This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google™ books

https://books.google.com
Library of

Princeton University.
1895 EDITION

THE CAR-BUILDER'S DICTIONARY

AN ILLUSTRATED VOCABULARY OF TERMS WHICH DESIGNATE AMERICAN RAILROAD CARS, THEIR PARTS, ATTACHMENTS, AND DETAILS OF CONSTRUCTION

FIVE THOUSAND SIX HUNDRED EIGHTY-THREE ILLUSTRATIONS

COMPILED FOR THE MASTER CAR-BUILDERS' ASSOCIATION

By Professor John C. Wait, M. C. E.

Assisted by

R. H. Soule, Superintendent of Motive Power, Norfolk & Western Railroad; A. E. Mitchell, Superintendent of Motive Power, New York, Lake Erie & Western Railroad; C. A. Smith, Master Car Builder, Union Tank Line.

The first edition was compiled by Matthias N. Forney, M. E. and issued in January, 1880

The second edition was compiled by A. M. Wellington, C. E. and issued in December, 1884

UNIVERSITY LIBRARY
PRINCETON N.J.

NEW YORK
THE RAILROAD GAZETTE, 32 PARK PLACE
1895
ACTION OF THE MASTER CAR-BUILDERS' ASSOCIATION.

At the Fifth Annual Convention, held in Richmond, Va., in 1872 it was
"Resolved, That a committee be appointed with power to publish an illustrated book, defining the proper terms or names of each and every part used in the construction of railway cars, and a description of the use of the same."

At the Fourteenth Annual Convention, held in Detroit in 1880,
"The committee to whom was assigned the duty of preparing a Dictionary of Terms used in the Construction of Cars submitted a copy of the book and reported that they had finished their work, and were discharged."

At a meeting of the Executive Committee held in Saratoga, June 17, 1892, Messrs. R. H. Soule, A. E. Mitchell, and C. A. Smith were requested to supervise the new edition (1895).
The need of a Car Builder's Dictionary has been established by the earlier editions and its uses recognized by railroad men, so that its purposes require no explanation in this edition.

Since the last revision, in 1884, the changes in car construction and equipment have been so general that few of the engravings of the old book represent the best practice of to-day. The illustrated part of the Dictionary has therefore been recast and, with the exception of a few pages, is entirely new.

As a rule, plans, elevations and sectional drawings are placed side by side, or directly above and below one another, as if in projection.

The numbers of illustrations in the three editions of the Car Builder's Dictionary issued in 1879, 1884 and 1895 are respectively 811, 3188, 5683. The general arrangement of engravings adopted in the last edition has been retained, the engravings being classified and arranged alphabetically under the following subjects: Cars, Car-bodies, Car-body details, Car-furnishings, Trucks, Truck-details, Master Car Builder's Standards and Recommended Practice, Hand-cars, Street-cars.

Considerable new matter has been introduced under the subject of details of separate parts of car-bodies with their forms and dimensions. This includes the details of parts of a box-car, a flat-car, a gondola-car, a four-wheel caboose-car, a baggage-car, and details of several freight and passenger car-trucks. Vestibules have come into use since the issue of the last edition and are therefore a new subject in the Car Builder's Dictionary. The leading types of vestibules in use are shown in general view and by detailed drawings.

In illustrating car-furnishings, a departure is made in the attempt to give to car builders a variety of designs in fittings and furnishings and to that end, several of each type have been given, the number including at least one each of a plain and a decorated style. Street-cars have received much more attention than in the last edition, but no more than the general application of electricity to suburban street-car lines and the threatening invasion of electric-motor power to some existing steam lines would seem to warrant. The standards and recommended practice of the Master Car Builders' Association have been shown in full and in a group by themselves to facilitate ready reference.

Working-cars have not been illustrated so fully as was desired, because few railroad companies build these cars at the present time, and manufacturers are not willing to give out detailed drawings of their machines and tools, representing, as they do, in many cases, the results of expensive tests and many years of experience, which explains the absence of detailed drawings of certain working-cars.

The number of illustrations of car-springs has been greatly diminished, the practice of carrying a large variety of springs in stock having been abandoned by the makers. Nowadays most springs are made to order according to specifications, and many of the numerous types existing in 1884 are quite unknown to-day.

The increase in the total number of engravings is due to several causes; somewhat to the increased number of subjects and in a measure to the greater number of types of cars shown, and more especially to the number of illustrations of each kind of car, showing the special features of the present practice of different car-builders. These cars differ in structural details and in the appliances with which they are equipped, as well as in their dimensions, capacities and weights. This was a secondary feature in the earlier editions and it has been greatly enlarged in the 1895 edition, it being the intention to afford numerous designs for comparison and study and from which to select.

The selection being made, the book becomes at once a book of reference between the car builder or purchasing agent and the supply man or manufacturer. Much correspondence and explanation may be avoided by making direct reference to the engravings by their numbers.

While primarily the book is a Dictionary and so called, the past has shown that it has been used and valued for the technical information it contains, quite as much as for the vocabulary of terms. Throughout it will be found that the drawings give the dimensions and structural details and that these drawings, with the details of separate parts given, are sufficient data to enable a car builder or designer to make working drawings of the cars shown. The illustrations comprise in most cases drawings of several types of each kind of car, thus giving to the designer numerous features of construction.

In illustrating car-furnishings, a departure is made in the attempt to give to car builders a variety of designs in fittings and furnishings and to that end, several of each type have been given, the number including at least one each of a plain and a decorated style. Street-cars have received much more attention than in the last edition, but no more than the general application of electricity to suburban street-car lines and the threatening invasion of electric-motor power to some existing steam lines would seem to warrant. The standards and recommended practice of the Master Car Builders' Association have been shown in full and in a group by themselves to facilitate ready reference.

Working-cars have not been illustrated so fully as was desired, because few railroad companies build these cars at the present time, and manufacturers are not willing to give out detailed drawings of their machines and tools, representing, as they do, in many cases, the results of expensive tests and many years of experience, which explains the absence of detailed drawings of certain working-cars.

The number of illustrations of car-springs has been greatly diminished, the practice of carrying a large variety of springs in stock having been abandoned by the makers. Nowadays most springs are made to order according to specifications, and many of the numerous types existing in 1884 are quite unknown to-day.

The increase in the total number of engravings is due to several causes; somewhat to the increased number of subjects and in a measure to the greater number of types of cars shown, and more especially to the number of illustrations of each kind of car, showing the special features of the present practice of different car-builders. These cars differ in structural details and in the appliances with which they are equipped, as well as in their dimensions, capacities and weights. This was a secondary feature in the earlier editions and it has been greatly enlarged in the 1895 edition, it being the intention to afford numerous designs for comparison and study and from which to select.

The selection being made, the book becomes at once a book of reference between the car builder or purchasing agent and the supply man or manufacturer. Much correspondence and explanation may be avoided by making direct reference to the engravings by their numbers.

While primarily the book is a Dictionary and so called, the past has shown that it has been used and valued for the technical information it contains, quite as much as for the vocabulary of terms. Throughout it will be found that the drawings give the dimensions and structural details and that these drawings, with the details of separate parts given, are sufficient data to enable a car builder or designer to make working drawings of the cars shown. The illustrations comprise in most cases drawings of several types of each kind of car, thus giving to the designer numerous features of construction.

In illustrating car-furnishings, a departure is made in the attempt to give to car builders a variety of designs in fittings and furnishings and to that end, several of each type have been given, the number including at least one each of a plain and a decorated style. Street-cars have received much more attention than in the last edition, but no more than the general application of electricity to suburban street-car lines and the threatening invasion of electric-motor power to some existing steam lines would seem to warrant. The standards and recommended practice of the Master Car Builders' Association have been shown in full and in a group by themselves to facilitate ready reference.

Working-cars have not been illustrated so fully as was desired, because few railroad companies build these cars at the present time, and manufacturers are not willing to give out detailed drawings of their machines and tools, representing, as they do, in many cases, the results of expensive tests and many years of experience, which explains the absence of detailed drawings of certain working-cars.

The number of illustrations of car-springs has been greatly diminished, the practice of carrying a large variety of springs in stock having been abandoned by the makers. Nowadays most springs are made to order according to specifications, and many of the numerous types existing in 1884 are quite unknown to-day.

The increase in the total number of engravings is due to several causes; somewhat to the increased number of subjects and in a measure to the greater number of types of cars shown, and more especially to the number of illustrations of each kind of car, showing the special features of the present practice of different car-builders. These cars differ in structural details and in the appliances with which they are equipped, as well as in their dimensions, capacities and weights. This was a secondary feature in the earlier editions and it has been greatly enlarged in the 1895 edition, it being the intention to afford numerous designs for comparison and study and from which to select.

The selection being made, the book becomes at once a book of reference between the car builder or purchasing agent and the supply man or manufacturer. Much correspondence and explanation may be avoided by making direct reference to the engravings by their numbers.

While primarily the book is a Dictionary and so called, the past has shown that it has been used and valued for the technical information it contains, quite as much as for the vocabulary of terms. Throughout it will be found that the drawings give the dimensions and structural details and that these drawings, with the details of separate parts given, are sufficient data to enable a car builder or designer to make working drawings of the cars shown. The illustrations comprise in most cases drawings of several types of each kind of car, thus giving to the designer numerous features of construction.

In illustrating car-furnishings, a departure is made in the attempt to give to car builders a variety of designs in fittings and furnishings and to that end, several of each type have been given, the number including at least one each of a plain and a decorated style. Street-cars have received much more attention than in the last edition, but no more than the general application of electricity to suburban street-car lines and the threatening invasion of electric-motor power to some existing steam lines would seem to warrant. The standards and recommended practice of the Master Car Builders' Association have been shown in full and in a group by themselves to facilitate ready reference.

Working-cars have not been illustrated so fully as was desired, because few railroad companies build these cars at the present time, and manufacturers are not willing to give out detailed drawings of their machines and tools, representing, as they do, in many cases, the results of expensive tests and many years of experience, which explains the absence of detailed drawings of certain working-cars.

The number of illustrations of car-springs has been greatly diminished, the practice of carrying a large variety of springs in stock having been abandoned by the makers. Nowadays most springs are made to order according to specifications, and many of the numerous types existing in 1884 are quite unknown to-day.

The increase in the total number of engravings is due to several causes; somewhat to the increased number of subjects and in a measure to the greater number of types of cars shown, and more especially to the number of illustrations of each kind of car, showing the special features of the present practice of different car-builders. These cars differ in structural details and in the appliances with which they are equipped, as well as in their dimensions, capacities and weights. This was a secondary feature in the earlier editions and it has been greatly enlarged in the 1895 edition, it being the intention to afford numerous designs for comparison and study and from which to select.

The selection being made, the book becomes at once a book of reference between the car builder or purchasing agent and the supply man or manufacturer. Much correspondence and explanation may be avoided by making direct reference to the engravings by their numbers.

While primarily the book is a Dictionary and so called, the past has shown that it has been used and valued for the technical information it contains, quite as much as for the vocabulary of terms. Throughout it will be found that the drawings give the dimensions and structural details and that these drawings, with the details of separate parts given, are sufficient data to enable a car builder or designer to make working drawings of the cars shown. The illustrations comprise in most cases drawings of several types of each kind of car, thus giving to the designer numerous features of construction.

In illustrating car-furnishings, a departure is made in the attempt to give to car builders a variety of designs in fittings and furnishings and to that end, several of each type have been given, the number including at least one each of a plain and a decorated style. Street-cars have received much more attention than in the last edition, but no more than the general application of electricity to suburban street-car lines and the threatening invasion of electric-motor power to some existing steam lines would seem to warrant. The standards and recommended practice of the Master Car Builders' Association have been shown in full and in a group by themselves to facilitate ready reference.

Working-cars have not been illustrated so fully as was desired, because few railroad companies build these cars at the present time, and manufacturers are not willing to give out detailed drawings of their machines and tools, representing, as they do, in many cases, the results of expensive tests and many years of experience, which explains the absence of detailed drawings of certain working-cars.

The number of illustrations of car-springs has been greatly diminished, the practice of carrying a large variety of springs in stock having been abandoned by the makers. Nowadays most springs are made to order according to specifications, and many of the numerous types existing in 1884 are quite unknown to-day.
however, be stated that the engravings of cars and trucks shown in this edition have been selected from several thousand blue-prints and photographs, collected for the purpose.

To bring the size of the book within reasonable bounds, matter that is merely historical has been omitted. Without a careful survey of the field one can hardly realize the changes which ten years have made in American rolling stock. The sizes, weights and capacity of new cars have been increased by nearly one-half, and corresponding changes have been necessary in almost every structural detail. The kinds of cars have been multiplied and the interchange of traffic greatly augmented. The illustrations, therefore, have been confined, so far as possible, to what are generally considered to be good practice. In making this statement it is only fair to English car-builders to state that the English carriage and goods-wagon shown were illustrated in the last edition, and that no such care has been taken to bring them down to date, as was taken with the American equipment. The same should be said of the vocabulary of terms applicable to the English cars. It is, however, confidently believed that the engravings and the text describing the English equipment fairly represent the present English practice.

The space devoted to definitions and descriptive matter has been increased by about one-fourth. Considerable space has been saved and the duplication of definitions avoided, by embodying several definitions in one, by describing the whole device or appliance and the parts comprising it, and by explaining the use of each part as well as the distinctions which exist between the parts under the name of the device as a whole. The several parts have not then been defined under the name of each separately, but the reader has been referred to the primary definition and to the illustrations.

Everything has been done to facilitate ready reference from the Dictionary to the engravings, and vice versa, "since it is obvious that no definition in words of a material object can be so effective and complete as a picture of that object." Drawings of almost every part and detail are given and definitions have been made brief, and, in some cases, omitted entirely where the name of a part in connection with the engraving is alone sufficient to describe the object or part. Alternative names have been given, and when new names have been used, the old one (if such has been in general use) has been retained. The new names adopted have been approved by the Committee appointed by the Master Car Builders' Association.

No doubt mistakes have been made which will come to light. Some minor ones have been discovered by the editor, but they are not sufficient in number or importance to require that certain pages be reprinted or that a table of errata be added. They are typographical errors and mistakes in numbering which are apparent at once to the reader, and which, it is believed, will not lead to error. The engravings having been made up and printed before the text was prepared, some of the mistakes made in the illustrated matter have been corrected in the definitions, to which the reader is referred. It is the earnest hope of the editor that no more serious mistakes have been made than have come to his attention.

Much credit is due to the editors of the earlier editions, for it was the great labor undertaken and unfailingly carried out by them that rendered the completeness and fullness of this revision possible. Few can appreciate the labor and application necessary to bring the Dictionary to its present state, imperfect as it may be; and the editor must confess that his appreciation for the "old book" and for the men who made it has grown with his work on this revision.

NEW YORK, March 1, 1896.

J. C. W.

DIRECTIONS

For Using the Car-builder's Dictionary.

To find the meaning of a given word or term, refer to it in the alphabetical list which constitutes the first half of the book, where a definition similar to those contained in ordinary dictionaries and a reference to some engraving illustrating the object—if it is capable of such illustration—will usually be found.

To find the name of a car or part of a car, examine the alphabetical list of the different classes of engravings in the index which immediately precedes them, until the class is found to which the object looked for belongs, bearing in mind the system of alphabetical classification for the engravings, which is as follows:

CABS, CAR-BODIES, CAR-BODY DETAILS, CAR FURNISHINGS,
TRUCKS AND TRUCK DETAILS, M. C. B. STANDARDS
AND RECOMMENDED PRACTICE, HAND-CARS, STREET-CARS.

By referring to the engravings included in that class a representation of the part or object sought will be found with either its name underneath or a reference number, by which number the name may be learned from the list of names of parts accompanying the illustration and usually to be found in the immediate vicinity.
### Classified Index to Advertisements

#### Air Brakes

#### Air Brake Hose
- Boston Belting Co., Boston, Mass.
- Chicago Hose Co., Chicago, Ill.
- Dayton Mfg. Co., Dayton, O.

#### Air Paint

#### Axles
- Bumble-Marter, Hales St. Pierre, Belgium
- Buda Foundry & Mfg. Co., Harvey, III.
- Cormack Foundry & Mfg. Co., Harvey, III.
- Gold Coiler Co., Chicago, Ill.
- Lenoir Fdy. Co., Lenoir City, Tenn.
- Ramapo Wheel & Fdy. Co., Ramapo, N. Y.
- Ramapo Iron Works, Hillburn, N. Y.
- St. Louis Car Wheel Co., St. Louis, Mo.

#### Baskets
- Adams & Westlake Co., Chicago, Ill.
- Dayton Mfg. Co., Dayton, O.

#### Bell Cords
- Samson Cordage Works, Boston, Mass.

#### Brake Beams
- Chicago Railway Equipment Co., Chicago, Ill.

#### Brake Shoes
- Lenoir Iron Works, Hillburn, N. Y.
- Ramapo Wheel & Fdy. Co., Ramapo, N. Y.

#### Brake Slack Adjusters
- Buda Foundry & Mfg. Co., Harvey, III.

#### Brasses and Bronze Castings
- Central Union Brass Co., St. Louis, Mo.
- Dayton Mfg. Co., Dayton, O.

#### Car Replacers
- Fairbanks, Morse & Co., Chicago, Ill.

#### Cars
- Buda Foundry & Mfg. Co., Dayton, O.
- Bumble-Marter, Hales St. Pierre, Belgium
- Buda Foundry & Mfg. Co., Harvey, III.
- Fairbanks, Morse & Co., Chicago, Ill.
- Flemington Brake Co., Trenton, N. J.
- Lima Locomotive & Machine Co., Lima, O.
- Loko-Moto, Minneapolis, Minn.
- Ramapo Iron Works, Hillburn, N. Y.

#### Crane Stvgs.
- Morgan Engineering Co., Alliance, O.

#### Crane-Fin Processes
- Richard Dudgeon, New York.

#### Door Checkers
- Norton Door Check & Spring Co., Boston, Mass.

#### Door Fasteners
- National Malleable Castings Co., Chicago, Ill.

#### Doors, Car
- Chicago Grain Door Co., Chicago, Ill.
- Dayton Mfg. Co., Dayton, O.

#### Drawbar Attachments
- Butler Drawbar Attachment Co., Cleveland.

#### Engine, Cortines

#### Fittings and Castings

#### Hanging Steams
- Morgan Engineering Co., Alliance, O.

#### Gates (for Cars)

#### Gates
- Fairbanks, Morse & Co., Chicago, Ill.

#### Houses
- Samson Cordage Works, Boston, Mass.

#### Hydraulie Machinists
- Richard Dudgeon, New York.

#### Insulating Paper

#### Insulations

#### Jacks
- Chapman Jack Co., Cleveland, O.

#### Journal Bearings

#### Lamps
- Adams & Westlake, Chicago, Ill.

#### Locomotives
- Loco动机ive & Machine Co., Lima, O.

#### Locomotive Boiler Tubes

#### Locomotive Iron
- Buckeye Malleable Iron & Coupler Co., Columbus, O.
- Dayton Malleable Iron Co., Dayton, O.

#### Locks
- Adams & Westlake, Chicago, Ill.
- Dayton Mfg. Co., Dayton, O.

#### Locking Devices
- Chicago Grain Door Co., Chicago, Ill.

#### Locomotive Flues
- Lima Locomotive & Machine Co., Lima, O.

#### Motor Trucks, Electric

#### Motor Trucks, Electric
- Peckham Motor Truck & Wheel Co., New York.

#### Packing
- Boston Belting Co., Boston, Mass.

#### Pipes, Iron and Steel

#### Pipe Fittings

#### Platforms and Shelves
- Lenoir Foundry Co., Harvey, III.

#### Platform Stvgs.
- Dayton Mfg. Co., Dayton, O.

#### Pumps
- Richard Dudgeon, New York.

#### Rail Senders
- Watson & Stillman, New York.

#### Railroad Castings

#### Railways Machines
- Morgan Engineering Co., Alliance, O.

#### Roofing
- Buda Foundry & Mfg. Co., Harvey, III.

#### Rollers
- C. B. Hills & Sons, Detroit, Mich.

#### Rubber


#### Standard Tools
- Standard Tool Co., Cleveland, O.


Rubber Goods, Mechanical:
Boston Belting Co., Boston, Mass.

Sash Cord:
Samson Cordage Works, Boston, Mass.

Screws:
Hartford Woven Wire Mattress Co., Hartford, Conn.
Searritt Co., St. Louis, Mo.

Side-Body Trusses:

Signal Cord:
Samson Cordage Works, Boston, Mass.

Springs:
Chicago Tire & Spring Co., Chicago, Ill.

Snow Flows:

Standpipes:
Fairbanks, Morse & Co., Chicago, Ill.

Steel Castings:
Chester Steel Castings Co., Chester, Pa.
Gould Counter Co., New York.
J. G. Johnson & Co., Spuyten Duyvil, N.Y.
Krupp (Thos. Proctor & Son, New York).
Lima Locomotive & Machine Co., Lima, O.
Pfaut & Leitchworth, Buffalo, N.Y.
Shipley, Harrison & Howard Iron Co., St. Louis, Mo.
Taylor Iron & Steel Co., High Bridge, N.J.

Step Feeders:
Dayton Mfg. Co., Dayton, O.

Supplies:
Adams & Westlake Co., Chicago, Ill.
Buda Foundry & Mfg. Co., Harvey, Ill.
Central Union Brass Co., St. Louis, Mo.
Dayton Mfg. Co., Dayton, O.

Supplies (Continued):
Fairbanks, Morse & Co., Chicago, Ill.
J. L. Howard & Co., Hartford, Conn.
Q. & C. Co., Chicago, Ill.

Switches:
Bawme, Marpent, Hains St. Pierre, Belgium.
Ramapo Iron Works, Hillburn, N.Y.

Switch Stands:
Buda Foundry & Mfg. Co., Harvey, Ill.
Ramapo Iron Works, Hillburn, N.Y.

Tires:
Chicago Tire & Spring Co., Chicago, Ill.
Krupp (Thos. Proctor & Son, New York).

Tools:
J. A. Fay & Eggs Co., Cincinnati, O.
Standard Tool Co., Cleveland, O.

Trimmings:
Adams & Westlake Co., Chicago, Ill.
Central Union Brass Co., St. Louis, Mo.

Trolley Cord:
Samson Cordage Works, Boston, Mass.

Truck Channels:

Trucks, Freight Cars:
Fox Solid Pressed Steel Co., Chicago, Ill.

Truss-Buckles:
Cleveland City Forge & Iron Co., Cleveland, O.

Varnishes:
Bunkers Paint & Varnish Co., Toledo, O.
Pratt & Lambert, New York.

Ventilators:
Q. & C. Co., Chicago, Ill.

Ventilules:
Gould Counter Co., New York.
I. G. Johnson & Co., Spuyten Duyvil, N.Y.

Water Closets:
Adams & Westlake Co., Chicago, Ill.
Dayton Mfg. Co., Dayton, O.
J. L. Howard & Co., Hartford, Conn.

Weather Strips:
D. W. Bailey Co., Chicago, Ill.

Wheel Grinding Machines:

Wheel Presses:
Watson & Stillman, New York.

Wheels:
J. H. Bass, Chicago, Ill.
Krupp (Thos. Proctor & Son, New York).
Lenoir Fry Co., Lenoir City, Tenn.
Lima Locomotive & Machine Co., Lima, O.
Pake Car Wheel Co., Cleveland, O.
Ramapo Wheel & Fdy. Co., Ramapo, N. Y.
St. Louis Car Wheel Co., St. Louis, Mo.
Taylor Iron & Steel Co., High Bridge, N.J.
Washington Car Wheel Co., Hartford, Conn.

Window Shades:
Adams & Westlake Co., Chicago, Ill.
E. T. Burrowes Co., Portland, Me.

Woodworking Machinery:
J. A. Fay & Eggs Co., Cincinnati, O.
A DICTIONARY OF TERMS
USED IN CAR-BUILDING.

"A" car-roof. A car-roof with straight car lines, meeting at a point like rafters in the center of the upper deck. (Rarely met in standard construction.)

Acme automatic-window-shade. Fig. 4500. A car shade with a shade-holding device, which consists of a hollow tube with a metallic guide at either end, through which two cords are passed, one end of each being fastened to the casing on either side of the shade near the top, the cords passing down the side to the bottom of the shade, thence through the tube and down the other side to the bottom, being fastened at the bottom of the window to the casing.

Acme-burner. Figs. 3265-5, etc. A burner constructed upon nearly the same principle as a locomotive headlight burner, figs. 3388-9, and which gives a powerful light.

Acme-lamp. A lamp fitted with an Acme burner.

Acme spring. A form of elliptic spring, the peculiarity of which consists in tapering a single leaf from the center toward the ends, without the use of a number of separate leaves. An improved type is constructed of plates with a beveled edge, arranged one above the other as usual, and held in position by a wrought-iron band.

Adjustable foot-rest. 1. Figs. 3924-5 and 3974-5. A sliding Adjustable bracket-lamps. Figs. 3300, 3304.

Adjustable foot-rest. 1. Figs. 3924-5 and 3974-5. A sliding foot-seat, supported by various mechanical devices—as by a ratchet-arc or on rabbit-pieces. 2. Figs. 3971-3. A foot-rest or rail under a seat which can be adjusted to suit the passenger using it. See Foot-rest.

Adjustable Lamp-canopy. 13, figs. 3992-3 and 3449.

Adjustable lever (Hartley chair). 15, figs. 3998-9. A lever by which the position of the adjustable foot-rests and back is regulated.

Adjustable Shade-holder. Fig. 6808. See also figs. 8435 and 8577.

Advertising rack rail. 180, figs. 6554-8. A rail to which the frames for advertising cards are screwed or otherwise fastened.

Air-brake. Any brake operated by air pressure, but usually restricted to systems of continuous brakes operated by compressed air, in distinction from vacuum brakes, which see, which are operated by creating a vacuum. The air is compressed by some form of pump on the locomotive; and is conveyed by pipes and flexible hose between the cars, to cylinders and pistons under each car, by which the pressure is transmitted to the brake levers, and thence to the brake-shoes. This system is what is now termed the Westinghouse Air-brake or Straight Air-brake. This brake is now obsolete, having been replaced by the Automatic Air-brake, which see, and also see Westinghouse Air-brake, Quick-action Automatic, Eames vacuum brake, Ganet Air-brake, New York Air-brake.

Air-brakes—general arrangement and details. Figs. 5438-4, etc. The general arrangement and details of brake gear for air-brake cars, as shown, are standard. The following standards have also been adopted in this connection: 1. Maximum train-pipe pressure, 70 pounds per square inch. 2. Maximum brake power in freight cars, 70 percent of the weight of car. 3. All levers 1 inch in thickness; all pins turned to 1-3/32 inches in diameter; all jaws or clevises made of 3/8-inch iron; all rods 1/4 inch diameter. 4. Angle of brakebeam lever, 40 degrees with vertical.


Air-brake hose. See Brake-hose.

Air-brake repair card. In 1894 a recommended practice was adopted to use an air-brake repair card, as shown, figs. 5577-8, to report to division terminals such defects as are found by trainmen which require brake to be cut out.

Air-chamber (of student lamp). H, fig. 3399.

Air-cylinderoil-cup (air-pump). 46, fig. 1689; 08, figs. 1691-2.

Air-cylinderoil-cup (air-pump). 46, fig. 1692; 1691-2.

Air-inlet. An opening for the admission of air to an air-compressor or a refrigerator car. The term includes both the air-strainer and air-pipes.

Air-inlet. An opening for the admission of air to an air-compressor or a refrigerator car. The term includes both the air-strainer and air-pipes.

Air-pipes. (air-brake). 8, fig. 1699. More properly supply-pipe or air-inlet. The train brake-pipe is sometimes called the air-pipe.

Air-pipes strainer. (air-brake). 5, fig. 1699; 0, fig. 1695-7. Also called inlet-strainer, which see. It is frequently a part of the brake-cup, which see. Figs. 1748 and 1750-3.

Air-piston. (air-brake). See 11, figs. 1699; 65, fig. 1691, and 31-33, fig. 1753. See Piston. The air-pistons and steam-pistons of engines and air-pumps are generally alike in style of construction.

Air-piston packing-rings. (air-pump). 16, fig. 1699. See Air-pistons.


Air-pump Cylinder (air-brake). See 4, figs. 1699; 5, 1699 and 1690-2 and 1752. A hollow cast-iron cylinder with a piston, which piston compresses the air required to operate the brakes. The piston in the air-cylinder is directly connected with and is worked by the piston in the steam-cylinder.

Air-pump Cylinder-head (air-brake). 6, figs. 1699; 04, 1691-2. The cover for the lower end of the air-cylinder of an air-pump for an air-brake. See Cylinder-head.

Air-pump Governor. See Governor.

Air-signal reducing valve. See Reducing valve.

Air-strainer 1. (air-pump). 105, figs. 1691-2; 10, figs. 1691-2; 10, figs. 1691-2.
Arch-bar. Figs. 4587-90, 14, figs. 4580-4805. A bent wrought-iron or steel bar which forms the top member of an iron truck side-frame. In the Diamond truck the next lower member is the inverted arch-bar, and the next lower (occasionally) is the ascending-rail. The tie-bar comes under all, and sometimes becomes an arch-bar. See also Center-bearing arch-bar and Center-bearing inverted arch-bar, for 6-wheel trucks.

Arch-rail (English). See End arch-rail.

Arch roof. Figs. 95-6. A roof, the surface of which is curved. Some boudoir and private cars are built with arched roofs; they are at the present time little used for passenger-cars. A Turtle-back roof.

Argand burner. Figs. 5871-2. See Lamp-burners and below.

Argand-lamp. A lamp invented by Argand, a native of Geneva, about the year 1784. The burner consists of two concentric cylindrical tubes in which is the annular wick. The tube inclosing the wick is closed at the bottom and communicates by a pipe with the oil reservoir. The interior tube being open, free access of air is allowed to the interior and exterior of the flame, insuring more perfect and equal combustion. In 1880 a French mechanic named Carrel patented an improvement by which the oil is pumped from the reservoir to the wick by the power derived from a spring or by the ascending column of air above the chimney. This is called the Mechanical Lamp, but is little used except in large lamp-houses.

Argand-lamp (Moebring). Patented May 18, 1875. This lamp has certain improvements in the way of convenience for filling and for the use of a long wick.

Arm. See Berth-arm. Seat-back-arm. Lamp-arm. Striker-arm. Argand-lamp (Moehring). Patented May 18, 1875. This lamp has certain improvements in the way of convenience for filling and for the use of a long wick.

Arm-cap. Figs. 4017-21. A metalplate, wooden-cap, or Arm-sling (English). 200, fig. 501. In a carriage, a Arm-rest bracket. See Arm-rest. A bracket supporting Arm-rest. A wooden or metal bar or ledge attached to the side of a car, and not, like an arm-cap, to the top of a seat end, for passengers to rest their arms on.

Arm-rest bracket. See Arm-rest. A bracket supporting the arm-rest.

Arm-sling (English). 200, fig. 501. In a carriage, a padded ornamental leather strap, looped and secured to the doorway pillar. Also called arm-holder or arm-strap.

Asbestos cock (Consolidated Car Heating). Fig. 3921. A cock packed with asbestos with a drip connection, which drains the opening when the cock is shut off. This virtually automatic device is to escape to the ground and occasion a freeze in the train-pipe in cold weather.

Asbestos felt. A preparation of asbestos in loose sheets similar to felt, for use as a non-conductor. It is largely used in refrigerator-cars. It is manufactured for that purpose in rolls about 42 in. wide, and weighs about 1 lb. per square yard. It must be handled with care to prevent tearing.

Ascending-rail (English). 175, figs. 501, 504. Nearest American equivalent, prob-iron or hand rail. The end ascending-rail is a long wrought-iron bar secured at the ends of a covered vehicle, serving as a hand-rail for ascending to the roof. The roof ascending-rail, or roof commodo handle, 176, is a similar hand-rail at the end of the roof of a covered vehicle.

Ascending-step (English). 174, figs. 501, 504. Nearest American equivalent, ladder-round. A roughed wrought-iron plate secured to the ends of a covered vehicle serving as a step to ascend to the roof. They are used in England on both passenger and freight cars. In America, only on freight electric motor cars.

Ash-pan (Baker heater). Fig. 3872. This is the lower portion of every stove, under the grate, into which the ashes fall. Under it is sometimes placed an ashbox, fig. 3873. The ash-pan is made up of a casting usually called the ash-pan base and closed by an ash-pan front carrying one, or more commonly two, ash-pan doors. An ash-pan ring serves as a hopper to guide the coal and ashes on to the grate. The doors are distinguished as right and left; as for a person standing facing the stove. The ash pit doors are sometimes called as in fig. 3885, in an ash pit frame instead of an ash-pan front. Below are references to a few of the many such parts.

Ash-pan (Baker heater). Fig. 3875. Ash-pan door (Baker heater). Figs. 3871, 3890, and 3906. Astral Argand-burner. Fig. 3872. See Argand-lamp.

Atmospheric brake. See below. Also Air brake. Vacuum brake.

Attachment of couplers to cars. Figs. 5504-5. See Drawbar attachments, etc.


Automatic air-brake. One which is automatically applied by breakage of a coupling, derailment, etc. The term is indefinite, but usually refers to the Westinghouse automatic air-brake, figs. 1899-1748, which see, which is the one in most general use in this country.

Automatic closet-ventilator. Figs. 3841-2. See Bell's exhaust hopper-ventilator.

Automatic freight-car coupler. Figs. 3072-3726. A coupler which will couple by impact without the necessity of a person going between the cars. The Master Car Builders' coupler is any coupler of the vertical-plane type which conforms to certain contour lines adopted by the M. C. B. Association. This coupler is shown in figs. 5503-5, the contour lines in figs. 5190-5001. Recommended practice in attaching couplers, 5506-11.

This form of automatic coupler was adopted as standard in 1887 (see report for that year, pages 190-5, 263 and 303). Further details were adopted in 1889 and 1892. An action of the Association in 1889 permits the use of a coupler 25 ins. long instead of 30 ins. as shown, for use only on cars already in service and requiring such length drawbar. The carrier iron as shown for this coupler adopted in 1889.

The standard contour line shown was announced by Executive Committee under instructions from the Association, April 4, 1888. The limit gauges for preserving standard contour line adopted in 1891.

These gauges, properly proven by master gauges, may be procured from Pratt & Whitney Company, of Hartford, Conn. A duplicate set of master gauges is held in the office of the Secretary for reference when desired.

Other types of couplers are shown as follows:


Except the Link and Pin, these are all of the so-called "vertical plane," type. The movements of their parts in...
Automatic lubricator. A device for feeding at regular intervals a certain quantity of oil or lubricant to a cylinder or some mechanism requiring lubrication.

Automatic ventilator. Figs. 4390-4329. A ventilator which is self-adjusting and takes exhaust air from a car if the train runs in either direction. A great variety of such devices exists, not all shown. See Ventilator. Bell's exhaust hopper-ventilator.

Automatic window-catch. A device to hold a window shut from being shoved up or down. See Sash-lock.

Auxiliary arch-bar. 16, fig. 4750. A wrought-iron bar sometimes used, which forms the lower member of diamond-track side-frame. In some cases such arch-bars are made continuous by transverse pieces which extend across from one frame to the other under the transoms. See Arch-bar.

Auxiliary buffer-spring. A spring placed back of a draw bar follower-plates. Iron plates which are made continuous by transverse pieces which extend across from one frame to the other under the transoms. See Buffer.

Auxiliary brake-equalizing-lever. 7, fig. 1540-2. (Six or both of them loose, so that they can turn independently of the axle. Experience, however, has discredited all these attempts and indicated that the gain is far less and the loss greater than had been supposed. The M. C. B. standard axle is shown in figs. 5419-21. The following are the names of the parts: 1, Center of axle; 2, Nick of axle; 3, Wheel-seat; 4, Dust-guard bearing; 5, Collar; 6, Journal. See Hammered car-axle.

Auxiliary draft-spring. A spring of low capacity and used in buffing, and only one in tension.

Auxiliary draft-spring. A spring of low capacity and limited motion placed back of the rear follower to compensate for absence of slack.

Auxiliary drawbar follower-plates. Iron plates which bear against the ends of an auxiliary buffer-spring. One plate of this kind bears against each end. The pressure on the drawbar is thus transmitted to the auxiliary spring.

Auxiliary draw-spring. (English). 52, fig. 501. An India-rubber spring on the drawbar which assists in taking the draft strain. Seldom used.

Auxiliary exposed oil reservoir. (Westinghouse automatic air-brake). Fig. 1888; 1, figs. 1825-4 and figs. 1784-8. A cylindrical reservoir made of boiler iron, attached to the under side of a car or tender by auxiliary-reservoir bands attached through auxiliary reservoir beams. In freight cars, auxiliary-reservoir beams are termed brake-cylinder blocks and end-blocks. The reservoir serves to hold a supply of compressed air to operate the brakes of each car, and is supplied from the main reservoir on the engine through the train-pipe. For freight service, the auxiliary reservoir, triple-valve and brake-cylinder are combined in one piece, figs. 1728-9 and 1, figs. 1685-8.

Auxiliary reservoir-bands. (air-brake). 17, figs. 1688-3. See above.

Auxiliary reservoir-beams. (air-brake). Short wooden timbers bolted to the under side of the sills. In freight cars called brake-cylinder blocks. See above, and shown in figs. 1893-8.

Auxiliary reservoir bleeding-cock. 18, figs. 1893-8.

Auxiliary reservoir-nipple. (Automatic air-brake). 21, figs. 1893-4. A short pipe by which the triple-valve is connected with the auxiliary reservoir.


Axle. 2, figs. 4580-4966; figs. 1974-5, etc. A shaft made of wrought iron or steel to which a pair of wheels is attached. They are distinguished according to use, as passenger-car, freight-car, hand-car, street-car axles, etc., and according to mode of manufacture as hammered, forged, machined axles, etc., which see. See also Car-axle. In nearly all cases the wheels are both rigidly fastened to the axle, but it has been attempted to make one, or both of them loose, so that they can turn independently of the axle. Experience, however, has discredited all these attempts and indicated that the gain is far less and the loss greater than had been supposed. The M. C. B. standard axle is shown in figs. 5419-21. The following are the names of the parts: 1, Center of axle; 2, Nick of axle; 3, Wheel-seat; 4, Dust-guard bearing; 5, Collar; 6, Journal. See Hammered car-axle.

Axle. (M. C. B. Standard). 1. With journals 2½ by 7 inches. Fig. 5419. This axle is the standard of the Association for cars of 40,000 pounds capacity. In 1873 a standard for car axle was recommended, the form and dimensions of which, excepting the diameter in the middle, were substantially the same as shown in this figure. In 1894 the diameter at the middle was increased from 2½ inches to 4½ inches, by letter ballot. 2. With journals 4½ by 8 inches. This axle was adopted as a standard of the Association for cars of 60,000 pounds capacity, by letter ballot, in 1899.

Axles. (M. C. B. Rules for interchange of traffic.) The defects in axles for which cars may be rejected are as follows:

<table>
<thead>
<tr>
<th>Axles bent or broken.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Journals out.</td>
</tr>
<tr>
<td>(2) Axles less than the following limits:</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>60,000</td>
</tr>
<tr>
<td>50,000</td>
</tr>
<tr>
<td>40,000</td>
</tr>
<tr>
<td>30,000</td>
</tr>
</tbody>
</table>


Axle-box cover. (English). 36, figs. 584-51 and 501. A hinged movable cover on the axle-box through which the lubricant is introduced. On English oil axle-boxes the cover is generally bolted to the box, with a strip of leather interposed to make an oil-tight joint. The oil is replenished monthly through a small orifice closed by a screw-plug, or spring-hinge.

Axle-box keep (English). 37, figs. 584-51 and 508. The lower part of an axle-box, which in an oil-box contains the lubricant, and in a grease-box simply protects the underside of the journal from dust.

Axle-collar. Figs. 5190-90 and 5149. A rim or enlargement on the end of a car-axle, which takes the end thrust of the journal-bearing. Sometimes called a button.

Axle-gages. Gages for fixing the lengths and diameters of an axle. Were at one time standards of M. C. B. Association.

Axle-guard. 1. (English.) 14, figs. 501-4. American equivalent, pedestal. The ordinary or W pattern consists of a wrought-iron plate attached to the sole-bar, which permits vertical motion of the axle-box, but restrains movement in any other direction. 2. Axle-guard has of late been applied to the axle safety-strap as at Figs. 5070-3. It has also been applied to the safety-beam.

Axle-guard crown. (English). 17, figs. 584-51. The main part of the axle-guard, which see.

Axle-guard crown wash. (English). 30, figs. 584-51. A piece of wrought-iron plate, used as a washer for three or more bolts, which secure the main part of the axle-guard to the sole-bar.

Axle-guard keep or horn-stay (English). 31, figs. 584-51 and 501-4. A piece of iron which secures the lower end of the jaws of the axle-guard together.

Axle-guard stay-rod, or axle-guard stretcher (English). 15, fig. 501. American equivalent, pedestal tie-bar. A longitudinal rod connecting the lower ends of the axle-guards, and keeping them at the right distance apart.

Axle-guard strap. See Axle safety-strap.

Axle-guard truss. Figs. 5127-9. 60, figs. 5965-6. A wrought iron forged bar connecting the iron transoms of a six-wheeled truck, and carrying the middle safety-beam. It was better called the middle safety-beam truss.
Axle-guard wing (English). 18, figs. 846–51. The inclined part of an axle-guard, strengthening it fore and aft.

Axle-guard wing-washer (English). 19, figs. 846–51. A piece of plate used as a washer for two or more bolts securing the wing of the axle-guard to the solebar. See Axle-guard wing.

Axle packing. A dust-guard, which see. The Journal-box of all types is equipped with packing of some kind, to prevent the entry of dust and dirt. The packing may be of any suitable material, such as felt, wool, or rubber. The packing is often referred to as axle-packing.

Axle safety-strap. 55, figs. 4942–4968. See above.

Axle safety-bearing thimbles. 58, figs. 4806–4886, figs. 4813 and 4842. A bar of iron like an inverted letter U, or a block of wood bolted to the safety-beam of a truck above the axle. The axle safety-strap, 55, goes below it, the two parts together forming a circle around the axle. The axle safety-bearing thimbles, 56, are used as distance-pieces to hold both in their proper position. The details of the form of all these parts have some little variation, as will be seen from the illustrations. figs. 4806–4866.

Axle safety-bearing thimbles. 56, figs. 4806–4866, figs. 4878–79. See above.

Back is commonly applied to any white alloy for bearings, as distinguished from the box-metal or brasses in which copper predominates. -Knight.

Babbit-metals. "An alloy, consisting of 9 parts of tin and 1 of copper, used for journal-boxes; so called from its inventor, Isaac Babbit, of Boston (patent, 1839). Some variations have been made, and among the published recipes are:

<table>
<thead>
<tr>
<th>Copper</th>
<th>Antimony</th>
<th>Tin</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

Another recipe substitutes zinc for antimony. The term is commonly applied to any white alloy for bearings, as distinguished from the box-metal or brasses in which copper predominates. -Knight.

Babbit-metal bearing. A style of bearing of which a great variety of forms exist, which in effect substitute babbit-metal in some of its many forms for brass as a bearing surface. Lead-lined bearings, which see, are different in that they merely use a thin sheet of lead over the brass, to correct slight irregularities and give an even bearing-surface. The bearing or brass should be bored out to remove scale.

Babcock fire-extinguisher. Fig. 3704. A device for causing the rapid generation of carbonic acid gas when desired, by breaking a bottle of acid in the interior by means of the bottle-breaking head (the handle projecting up in the center of the top of the apparatus). The solution within consists of about 24 lbs. of bicarbonate of soda in about 6 gallons of water.


Back (for a pipe-clip). Fig. 2865. A metal strap sometimes used to attach the clip to, instead of attaching the latter directly to the surface to which the clip is attached.

Back-arm. See Seat-arm.

Back-band (car seat). 18, figs. 3917–35. The molding or metallic band that protects the top, bottom, and side edges of a seat-back. A Seat-back molding. figs. 4023–8.

Back base-plate (Spear heater). Fig. 5058. See Base-plate. Back cylinder-head (Westinghouse and other brakes). 4, figs. 1728–7.

Back face-plate. 4, figs. 2419–48. See Gould-vestibule. Back face-plate (steel-tired wheels). The inner one of the two plates connecting the tire with the hub. See Front face-plate.

Back foot-rest (Hartley chair). 6, fig. 3998. See Foot-rest.

Back frame (car seat). 47, figs. 3917–35.

Back-gravity-bar. 28a; figs. 2431–6. See Gould-vestibule.

Back guard (car seat). 98, fig. 5556. A longitudinal strip of wood which extends along the back edge and is fastened to the window posts.

Back seat (English). 152, figs. 501–2. In a carriage, a small transverse wooden bar secured to the partition and supporting the seat-back.

Back seat (English). 197, figs. 501–4. American equivalent, seat-back. In a carriage, that part of the seat which fits the small of the passenger's back, and also supports the head and a fixed back, covered with broadcloth, and stuffed with curved horse-hair, and also made elastic by springs (which see).

Back seat (English). 202, fig. 501. Analogous to the American back-springs. One end of these springs butts against the partition, and the other against a sheet of stout canvas, the back squab resting against the latter.

Back-stop-timbers. 212, figs. 229–66 and 278–82 and figs. 628–9, 647–8. Short sub-sills bolted and keyed by packing blocks to the center-sills of car in line with the draft timbers, to assist the draft or center-sills, in transmitting the buffing shocks and strains. In the engraving it is called a buffing sub-sill.

Baggage-barrow. Figs. 5638–40. See Barrow-truck.

Baggage-car. Figs. 139–141, 167, 555–6, 571–598. A car for carrying the baggage of passengers. A combination baggage-car, figs. 137, 599–604, is one having compartments set off for express or mail, or both. A combination car or coach, figs. 325–8, 175, 184, 481–1, 447–3, and 486–73, is a passenger-car with a baggage compartment. A push baggage-car, which see, is a light lorry car for use at stations.

Baggage-truck. See Baggage-barrow, figs. 5638–9. Baggage wagon-truck, fig. 5640.

Baggage wagon-truck. Fig. 5640. A four-wheeled vehicle with a frame or rack for carrying baggage, used to move the latter by hand about railroad-stations. A two-wheeled vehicle is a baggage-barrow.

Bail. A curved handle of a more or less semicircular form for a pail, bucket, lantern, or other utensil. As applied to lanterns, figs. 3893–92; to swing-barrel truck, fig. 5636.

Bail (to Raoul journal-box). Figs. 5105–6. The latter is a yoke fastened to the sides of the journal-box, which passes over the lid and enables it to sustain the end-thrust of the axle.

Baker car-heater. Figs. 2865–2977. A stove invented and patented by Mr. Wm. C. Baker for warming cars. It was arranged so as to heat water in a coil of pipe in the inside of the stove, and cause it to circulate through series of pipes laid near the floor of the car. The original heater has undergone many changes, and only those forms are shown that are in current use. They are: The single-coil Fire-proof, figs. 2865–84; The Toco-coil Fire-proof, figs. 2865–900; The Perfected, figs. 2901–3918; and The Mighty Midget, figs. 2910–29; with the parts belonging to them.

Ball-bearing butt-hinges. figs. 2865–7. A butt-hinge, the washer of which is a ball bearing.

Ballast-plow. See Rodgers ballast car and plow.

A four-wheeled gondola car, fitted with falling doors at the sides and ends, and used for conveying ballast, rails, and ties.

**Band.** See Auxiliary Bearing-band, Centre-bearing inverted arch-bar. Cross-bar. Door-guard band. Good-guard band. Tank-band, etc.


**Bar-lift.** See Sash-lift.

**Barrel-door bolt.** Figs. 2535-8. A door-bolt made of a barrel.

**Barrel-car.** Fig. 15. A flatcar, raked so as to carry many empty barrels. They are made long, and the racks are very high in order to make up a carload weight.

**Barrel-doorknob.** Figs. 2335-8. A door-bolt made of a round metal bar and held on its slide in a round tube or a short lever or knob, and held in either position by a suit gagedordisengaged from its keeper, it can be turned by a suitable stop.

**Barrel-seal.** Figs. 4029-33. See Seal-lock.

**Barrow-truck.** Figs. 5638-9. This term has been used to designate two-wheeled vehicles used about railroads for moving freight and baggage by hand; but the more usual practice is to speak of baggage barrows and freight stanchions; used for the large sashes of sleeping and parlor cars.

**Barrett's double-acting lever-and-rack jack.** Figs. 3740-1. A jack for trackwork consisting of a rack with sharp teeth, into which paws engage as the lever is worked up and down. It is double-acting; that is, the load is lifted when the handle is lifted or thrust down.

**Bar sash-lift.** Figs. 4515-36. A sash-lift having a short horizontal metal bar attached to two flanged studs or stanchions; used for the large sashes of sleeping and drawing-room cars.

**Bar shackle (of a padlock).** Fig. 2763. A rectangular, instead of U-shaped, shackle.


**Base (Hartley chair).** 12, figs. 3996-8. See Pedestal.

**Barr vestibules.** Figs. 3419, 3425-30. There are two types of vestibules designed by Mr. J. N. Barr, which are called the Wing vestibule and the Toggle vestibule.

1. Barr wing vestibule, Figs. 3419, 3425-30, was patented in February, 1890, and is manufactured by the Drexel Railway Supply Company, of Chicago. It is made up of folding walls, and does not require a rubber or canvas diaphragm between the face-plate and the car frame. It consists of a face-plate, 1, two outer wings, 2, in the place of the flexible diaphragm of the Pullman vestibule. The outer wings, 2, are hinged to the face-plate, 1, and also to the inner wings, 3, which are in turn hinged to the end or corner post, 5. The system of folding partitions is shown in more detail in the plans figs. 2437-8. This device dispenses with rubber diaphragms, permits the use of a single door, 7, at the side, gives two windows with wire screens for ventilation in the inner wings, 3. The top of the face-plate is kept forced out to meet its companion by its own gravity, beam or angle plate, 13, which is to one side of the gravity line of the face-plate; the bottom is fastened to the platform buffer. The tilting of the face-plate forward and backward is provided for by slotting the holes through which it is bolted to the outer wing, 2. The hinged wings permit lateral and longitudinal motion, yet exclude the dust and smoke.

2. The Barr Toggle-vestibule, figs. 3429-30, was patented in June, 1890, by Mr. J. N. Barr. It consists of a face-plate, 1, a flexible diaphragm, 2, inclining the space between the face-plate and end post, 5. The distinct feature is the toggle joint and bar, 50, designed to keep the face-plate forced out, and in contact with the one opposite to it. It has a threshold plate and double side doors.

**Barr contracting chill.** Figs. 5864-7. A contracting chill invented by Mr. J. N. Barr, in which steam and cold water are alternately circulated in the chill for the purpose of keeping the frame of the chill of a uniform temperature so that the full effect of the elongation of the segmental block shall be obtained. See Chilled.

**Base (of ash-pit, Spear heater).** Fig. 5035.

**Base-board corner-molding.** 206, fig. 560.

**Base-plate.** (Spear heater.) See also Back base-plate. A metal ring or plate, which is closed by a basin-plug. The basin-plug is attached to a basin-chain, which is fastened to a stanchion called the basin-chain holder.

**Basin-chain.** Shown in fig. 8469. See Basin.

**Basin-chain holder.** Figs. 4475, 461-6, 539 and 573. A metal ring or plate, which forms a bearing for the post on the platform end-timber.

**Basin.** 2, fig. 8468, and 1, figs. 5353-7. A hollow vessel made of porcelain or metal, and in cars usually fixed in a suitable stand with pipes and other attachments for filling it with water and emptying it. Such basins are used as lavatories in sleeping and other passenger cars. They are emptied at the bottom through a pipe connected to the basin by a basin-coupling, or basin-branching, which is closed by a basin-plug. The basin-plug is attached to a basin-chain, which again is fastened to a stanchion called the basin-chain holder.

**Basin-plug.** Figs. 3470-1. See Basin.

**Basin-pump.** 4, 5, 8, 9, fig. 8469, and figs. 4851-2. A pump of peculiar construction for supplying the basin of sleeping and parlor cars from the tank carried under the slab. It is called single or double-acting, according as the upward stroke only, or both the upward and downward strokes, eject water. Double-acting are most used. For names of parts, which explain themselves, see illustrations.

**Basin-valve.** 5, figs. 8355-6.

**Basket-rack (English, parcel-net).** Figs. 3873-70; 145, figs. 4475. A basket-rack made of cast metal ends, rods, or a combination of rods and wire netting for holding parcels. They are attached to the sides of passenger-cars, above the heads of the passengers, so as to be out of the way. A basket-rack of extra length with exhaust ventilators at each end is shown at 5, fig. 4518. Continuous basket-racks extend the full length of the car and are increasing in favor. One is shown in A, fig. 541. Parlor cars usually have no basket-rack, but
sometimes package-racks are placed between the windows. Basket-racks are sometimes called bundle-racks.

**Basket-rack bracket.** Figs. 787-70. A light metal or wooden support for the end or center of a basket rack.

**Basket-rack netting.** Figs. 7356-5. Wire or silk netting with very large meshes, which forms the bottom or back of a basket-rack.

**Basket-rack rod.** Figs. 7356-64. A small round metal bar which forms the main portion of a basket-rack, and to which the netting, when used, is fastened.

**Basket-rack tip.** Figs. 7357 and 7355. An ornamental knob or acorn on the end of a basket-rack rod.

**Bastard Pratt framing.** Is a similar modification of the Pratt bridge-truss, which differs from the Howe in having vertical posts instead of rods, and inclined rods instead of braces. A combination truss embodying the essential features of both the Howe and Pratt trusses is quite common in new construction. Figs. 844, 894, 891, and 893.

**Batten.** "A piece of board or scantling of a few inches in breadth."—Webster.

**Batten wagon (English).** A four-wheeled flat car about 34 feet long, fitted to carry sawed timber about 38 feet long, termed fletine.

**Bayonet-catch.** A general term derived from the manner of fastening on a bayonet to a gun, applied to the mode used in many forms of hardware and mechanical construction for connecting separate parts so as to be firmly united and yet easily removable. Many lamps are held in place by a form of bayonet-catch.

**Bay-window parlor-car.** Figs. 115, 116, 128, 190, 198, and 547. A common style of parlor-car construction, designed to give more variety to the interior and improve the line of vision of the passenger.

**Beam.** "A small salient molding of semi-circular section. Also the strip on the sash-frame which forms a groove or opening. These beads are known as the inside bead, outside bead, and parting bead."—Knight.

In car construction the place of the inside bead is taken by the window casing, or inside window-stop; the place of the outside bead by the outside window-stop, and of the parting bead by the sash parting-strip, or stop bead. The term is also frequently applied to any form of small, light molding of simple outline. See Molding and Stop-bead.

**Bead molding (English).** See Bead and Planted molding.

**Beam.** "The term beam is generally applied to any piece of material of considerable scantling, whether subject to transverse strain or not; for example, 'collar-beam,' 'tie-beam,' 'trestle-beam,' 'brattice-beam,' the two former being subject to longitudinal strains of compression and tension respectively, and the latter to transverse strain."—Stoney.

1. "Any large piece of timber, large in proportion to its thickness and squared or hewed for use."—Webster.

2. A bar of metal of similar proportions is also called a beam.

3. "A bar supported at two points and loaded in a direction perpendicular or oblique to its length is called a beam."—Rankine.

By analogy the term has of late years come to be applied to similar pieces or bars of iron. Thus we have iron I-beams and deck-beams (which see), to take the place of wooden beams in buildings. The term is also used to designate such things as the beam of a balance or scales, a prow-beam, the walking-beam of a steam-engine, brake-beam, etc.


**Beamed brake-rigging.** Fig. 1901. A method of hanging the brake-shoes to a truck-frame and a system of levers and rods by which the brake-shoes are applied to the wheels without the use of brake-beams. One form, fig. 1901, shows the shoe attached to a lever whose fulcrum is the extension of the arch-bar and tie-bar of the truck-frame. It is not at present much in use, but is illustrated as a type of beamless brake.

**Bearing.** That which supports or rests on something, and is in contact with it. Thus a block or stone on which the end of a timber rests is called a bearing. The metal block or bushing in contact with a journal is called a bearing.

For M. C. B. standard journal-bearing see figs 889-4.418.

**Bearing-casting (Tip-cars).** 17, 18, figs. 386-4. A casting one of a pair attached to either the car body or to the truck which supports the car body and its loads. In tip-cars it is pivoted or hinged so as to permit the body to tip or rock laterally and to thus discharge its load.

**Bearing-spring.** An occasional but not the conventional term for the bolster-springs or main springs of the car.

**Bearing-spring (English).** 22, figs. 348-51 and 501-4. American equivalent, bolster-spring. The spring which carries the weight of the vehicle, and rests on the axle-box. In English practice almost invariably a half-elliptic spring.

**Bearing-spring buckle (English).** 23, figs. 484-51 and 501-4. An American equivalent, spring-band. A solid wrought-iron strap which confines the plates of the bearing-spring; and is generally provided with lugs on the lower side, so that it cannot be moved transversely or longitudinally on the axle-box. The plates are secured to the buckle by A-in. vertical rivet.

**Bearing-spring shoes (English).** 24, figs. 484-51. A cast-iron lipped rubbing piece, secured to the under side of the sole-bar on which the ends of the bearing-spring bear. Beasley's seal-lock. Figs. 9899-a. This is a seal-lock which registers the number of times the car is opened and closed.

See "Door-spring.** Fig. 2616. See Door-spring. Bell. See Recording-bell. Signal-bell. Smoke-bell, etc. Bell-base jacka. 3738. A jack the bottom of which is cast in the form of a bell. See Screw-jack.

**Bell-cord.** Fig. 2471 and in fig. 429. A rope one end of which is attached to a signal-bell on the engine, and which extends through or along the top of the cars the whole length of the train, and is used for signaling to the locomotive engineer. It is carried by various forms of bell-cord bushings, bell-cord hangers, and bell-cord guides (which see). On freight trains, when used at
Bell-cord bushing. Figs. 2454-58. See Bell-cord bushing.

Bell-cord coupling. Figs. 2459-64. The hook attached to the end of a bell-cord to enable it to be connected or disconnected at pleasure with another bell-cord; not to be confused with a bell-cord splice, figs. 2470, 2473-74, which is intended as a permanent connection.

Bell-cord coupling. Figs. 2464-69. The hook attached to the end of a bell-cord to enable it to be connected or disconnected at pleasure with another bell-cord; not to be confused with a bell-cord splice, figs. 2470, 2473-74, which is intended as a permanent connection.

Bell-cord guide. Figs. 2454-3292. A metal eye or ring attached to the roof or ceiling of a car, or to the end of a bell-cord hanger (which see), and by which a bell-cord is carried or conducted. According to their method of attachment to the car they are designated as bell-cord guides, with flange, or with screw, or with screw and flange, and they are often provided with one or more pulleys, and are sometimes swiveled, when the bell-cord is to be conducted in an oblique line. Figs. 2480 and 2500. The pulleys are ordinarily at the bottom, but sometimes at the side of the bell-cord guide, according to the direction of probable strain. Certain tube-like forms of bell-cord guides are occasionally miscalled bell-cord bushings, which see. Bell-cord-guide washer. An ornamental washer for making a finish for a bell-cord guide where it is attached to a car roof. Bell-cord hanger bracket, or screw-top. Figs. 2503-7 and 2519-30. See Bell-cord hanger.


Bell-cord sheave. A bell-cord pulley, which see. Bell-cord splice. Figs. 2470 and 2474. A metal coupling with right and left hand screws for permanently splicing the ends of a broken bell-cord. See Bell-cord coupling.

Bell-cord strap. Figs. 2527-84. See Bell-cord hanger.

Bell-cord strap hanger. Figs. 2527-84. See Bell-cord hanger.

Bell-cord strap hanger bracket. Figs. 2527-34. See Bell-cord hanger.

Bell-cord strap hanger screw-top. Figs. 2519-30. See Bell-cord hanger.

Bell-cord thimble. A bell-cord bushing, which see. Bell-crank. An L-shaped rectangular lever, often with two extremities connected so as to be of triangular form, for changing the direction of motion by 90 degrees, more or less. Bell-crank (hand-car). 28, figs. 5392-5600. A crank attached to the propelling lever shaft giving more favorable direction to the power applied to the levers.

Bell-crank (of sofa-pull). Fig. 4138. Bell-crank (Driver-brake). 13, fig. 1749. Bell-crank driving-wheel brake (American Brake Co.'s brake-gear). Fig. 1749. One of the styles of driving-wheel brake-gear manufactured by the company referred to, taking its name from the peculiar manner of applying the brake power, as shown in the illustration. Bell-crank pin (Driver-brake). Fig. 1749.

Bell-punch. An instrument for punching a hole on a recording slip of paper or tickets, so as to register the fares collected by a conductor. The instrument has a bell attached which is rung every time a fare is recorded by punching the paper or ticket. The bell is intended to indicate or announce to the passengers that the conductor has recorded the fares collected. These instruments are made in a variety of forms. The punching of the slip is now generally omitted, the device being then simply an alarm register, often made of large size and attached to the side of the car. See Fare register.

Bell-strap. A bell-cord, which see. Bell's exhaust hopper-ventilator. Figs. 3841-3. An attachment placed underneath the floor-pipe of a closed hopper, on the under side of a passenger-car to produce a downward draft through the hopper when the car is in motion. The attachment is of a concave conical form, which by the motion of the train in either direction causes the air to pass downward through the floor-pipe by creating a partial vacuum at the base. Bell-strap (street-car). 98, fig. 5534. A leather strap which extends along the under side of the rafters, from a signal bell on one end of the platform to one on the other end; used by the conductor to signal to the driver, and by the driver to signal to the conductor.

Bell-strap bracket. A bell-strap guide, which see. Bell-strap guide (street-car). A metal loop or bracket attached to the ceiling of a street car for carrying a signal-strap. They are frequently provided with rollers and have slip or rope tops or flanges.

Bell-lining. A molding placed entirely around the interior of the passenger-car directly above the windows, in the middle of the wide board called the inside lining. Bell-rail. 65, figs. 440, 458, 540, 550, 560. A part of the framing of a passenger or street car frame below the windows on the outside, extending the whole length of the car-body and attached to each post. It is usually framed into the posts and supports the window-sills. The term is often applied to the girth of a box-car. The
Berth-curtain hook. Figs. 4223-6. A metal hook attached to a berth-curtain, and by which the latter is hung on a rod above the berths; usually covered with leather to prevent rattling.

Berth-curtain pole. See Berth-curtain rod.

Berth-curtain rod. 16, figs. 4304-19 and fig. 4194. A rod usually made of metal tubing, fastened above a section of a sleeping-car and to which a berth-curtain is hung. They are now made in sections, supported by folding brackets, and swing into the upper berth out of sight, except when berths are made up. See Berth curtains-rod bracket.

Berth curtain-rod acorn. See Berth curtain-rod tip.

Berth curtain-rod bolt. In Figs. 4309-17. A small vertical bolt, usually tipped with an acorn, fastening the curtain-rod in the coupling on the bracket.

Berth curtains-rod bracket. 15, figs. 4309-13 and figs. 4309-17. A metal bracket attached to the deck side of a sleeping-car, which forms a support for a berth curtain-rod. Such brackets usually have a coat and hat hook attached to them. A hanger, fig. 4309, is sometimes used as a substitute for a bracket at certain points. The stationary bracket is being done away with, the berth-being supported by the curtain-rod bracket, which folds, with the rod attached, into the upper berth and out of sight when the curtains are not in use. See Curtain-rod folding-bracket.

Berth curtain-rod coupling. Figs. 4309-17. A fastening by which a berth curtain-rod of a sleeping-car is secured to a bracket. It usually consists of a bolt or screw.

Berth curtains-rod hanger. Fig. 4309. See Berth curtains-rod.

Berth curtain-rod socket. Figs. 3614 and 3621. A metal flanged ring which is fastened to some part of a sleeping-car to carry the berth-curtain-rod, also called berth curtain-rod bushing.

Berth curtain-rod tip, or acorn. See Acorn.

Berth extension-arms. Fig. 4182.

Berth fixtures, etc. Figs. 4145-4271.

Berth-front. B, fig. 514. The bottom of the upper berth when it is down. There are two parts: the upper part marked B, and the lower part, which is adjacent to the car-side. The berth-front panel is between these two berth fronts.

Berth-front borders and corners. Figs. 3608, 3609.

Berth-handle. A berth-latch handle, which see.


Berth head-rest pivot and plate. Figs. 4147-8, 4193-4, 4192-3, and 4253-4.

A hinge or joint by which the back edge of an upper berth of a sleeping-car is attached to the side of a car. They are distinguished as loose and fast. Fast hinge is shown in fig. 4199. The loose hinge fits in a plate or bushing. Shown with the hinges.

Berth-hinge bracket (emigrant sleeping-berths). Figs. 4353-4.

Berth-hinge bushing. A hollow metal socket in which the spindle of a loose berth-hinge works.

Berth-hinge plate. Figs. 4147, 4193. A plate which takes the place of a berth-hinge bushing.

Berth-lamps. Figs. 4328-44. Electric lamps for the berths of sleeping-cars. There are two:

1. The Pullman, which is detachable, being carried on a bracket, which may be inserted in a socket at the side of the car, and the current being taken from another socket by an insulated wire joining it with the lamp.

2. The Gibbs is fixed in the partition between two berths, and the one lamp may light two berths, there being a metallic cover or slide which shuts it off at any time from either side of the partition.

Berth-latch. 47 and 48, figs. 4309, 4195-7, 4300-5. A spring bolt for holding the upper berth of a sleeping-car up in its place when not in use. To obviate the danger of the berth shutting up in case of overturning of the car, the safety-berth rope and attachments, 26, figs. 4309-19, are used. Safety-berth latches have also been used to obviate the necessity of using a safety-rope. See Safety-berth latch.

Berth-latch bolt. 49, figs. 4309-12 and 6, figs. 4195-7.
The bar or pin of a berth-latch which engages in a corresponding strike-plate or keeper to hold the berth up.

**Berth-latch face-plate.** Figs. 4219-22.

**Berth-latch handle.** 47, figs. 4269-12 and 4269-13.

**Berth-latch keeper.** Z, figs. 4269-5. Also called strike-plate. See Berth-latch bolt.

**Berth-latch lever.** D, figs. 4290-5. The part by which the berth-latch handle operates the berth-latch bolt: also called a berth-latch rocker-plate.

**Berth-latch (or lock) plate and bolt.** Figs. 4723-3.

**Berth-latch rods.** Fig. 4191.

**Berth-latch.** See Berth-latch lever.

**Berth-latch shell.** A metal covering made in the form of a sea-shell for covering and protecting the handle of a berth-latch in a sleeping-car.

**Berth-lock.** A berth-latch, which see.

**Berth-mattress.** 18, fig. 2409. The mattresses which cover the seat-cushions of the lower berth and the springs of the upper berth. When the berths are made up for day travel the mattresses are stored in the upper berth, as shown in the figure.

**Berth-numbers.** Figs. 4228-32. Figures or numbers, usually made of metal or porcelain, for numbering the berths or sections of sleeping-cars. They are frequently sewed to plush panels and hung from the berth curtain-rod.

**Berth or bunk partition.** 8, figs. 4209-13. The partition between the upper berths of two adjacent sleeping-sections. It is of the same outline as the upper berth's cross-section.

**Berth pivot.** Fig. 4158.

**Berth-pivot socket.** Figs. 4149-50.

**Berth-rattlestop.** Figs. 4145-6.4206.

**Berth-rattlestop.** Figs. 4145-6.4206.

**Berth-safety-rope.** 26, figs. 4209-13. A wire rope fastened to the upper berth by a berth-safety-rope fastener and to the lower berth by inserting a knob into a berth safety-rope holder.

**Berth-safety-rope fastener.** See Berth safety-rope.

**Berth-safety-rope hook.** Fig. 4227.

**Berth-safety-rope holder.** See Berth safety-rope.

**Berth-safety-rope knob.** See Berth safety-rope holder.

**Berth-spring.** 23, figs. 4209-12, figs. 4190 and 4207-8. A spring usually made in a spiral form, like a watch spring, coiled within a device called the berth-spring fusee and attached to the upper berth of a sleeping-car by a berth-chain so as to counteract the weight of the latter and make it easy to raise and lower it.

**Berth-spring frame.** 23, figs. 4209-12 and figs. 4190, 4208; 1, figs. 1249-51. A metal support which holds a berth-spring and fusee.

**Berth-spring fusee.** See Fusee.

**Berth-spring lug, or clip.** M, fig. 4196. The means by which the end of a berth-chain is fastened to the upper berth, sometimes called a berth chain end-plate.

**Berth-spring rope.** Fig. 4307. A cord, usually made of wire, which is connected to an upper berth of a sleeping-car at one end, and to the berth-spring at the other, and by which the tension of the spring is transmitted to the berth, thus counteracting its weight. Instead of the rope a pitch-chain is now used.

**Berth-stop (emigrant sleeping-cars).** Fig. 4247-8. A bearing-plate carried on upper berth at M, figs. 4242-14, to afford a bearing on the berth-rest, M.

**Berth striker-plate.** A berth-latch keeper, which see.

**Bevered-bushing.** Figs. 4251-8. See Bell-bushing.

**Bevered-washer.** Figs. 5711-7. A washer used to give an even bearing for rods which stand at an acute angle to the surface carried by them. Some times two such washers which come near together are cast in one piece, and are then called double-beveled washers. See Triangular washer.

**Bessel.** "A term applied by watchmakers and jewelers to the groove and projecting flange or lip by which the crystal of a watch is retained in its setting. An ouch.


**Bibb.** A curved nozzle for conveying liquids and changing the direction of their flow, usually from a horizontal to a vertical current. Hence—

**Bibb-cock.** Figs. 4241-3. Literally, a cock with a curved nozzle of brass, but commonly restricted to a cock with a plain valve without springs, moved by the hand only.

**Bird (F.W.) car-roof.** Figs. 3282-3. See Car-roof, and Neponset roof.

**Bissell heater.** A hot-air heater, taking in cold air by a wind-sclop and distributing it by pipes along the floor.

**Bissell storm-socket journal bearing.** Figs. 4970-8 and 5125-7. One with a projecting shoulder on the journal-bearing key to take up the end-thrust, so as to dispense with a collar. See Journal bearing. Also called stop-wedge journal-bearing. See Journal-bearing key.

**Bit (of a key).** Figs. 2714-21 and 2767. The part of a key which enters the lock and acts upon the bolt and tumblers. The bit consists of the web and wards. The web is the portion left after the wards are cut out. The wards (of a key) consequently are those parts of the bit which are not there and fit over the wards of a lock, which see. Some bits have no wards.

**Bit (of a padlock).** Z, figs. 3771-2. The forward end of the sliding-bolt, which engages with the shackle in the act of locking.

**Bit or jaw-bit (passenger car trucks).** A short bar closing the mouth of the jaw of a pedestal after inserting the journal bearing. It is little used.

**Blackstone car-coupler.** A form of platform invented by Mr. T.B. Blackstone, President of the Chicago & Alton Railroad, and used only on that road. It has projecting bars, which engage with the opposite platform to prevent one car from rising above the other and thereby lessening the danger of telescoping.

**Blake butt.** An indefinite term, meaning in general a plain cast-iron butt-hinge, having a washer, but no screws or screw-pin.

**Blank hinge.** A hinge which permits the door to swing open in either direction. It is intended as a substitute for one of a pair of double-opening spring hinges, which see, as being lighter and cheaper.

**Bleeding-cock.** A small cock on the auxiliary reservoir, etc. Generally called a drain-cock.

**Bleeding-valve or Bleeding-cock.** 19, figs. 1280-8. Another term for release-valve or release-cock. The operation of releasing the brake when applied upon a car detached from the locomotive is sometimes called bleeding. The bleeding-valve is located in the auxiliary reservoir, and the brakes may be released by opening it.

**Bleed-valve (Frost light).** Figs. 3217-8 and 6, figs. 3212-3. A valve of the carburetor of the Frost system of gas lighting, which is attached to the filling-can and affords a vent which permits the gasoline to flow freely from the can. The operation is shown in fig. 3232.
**Board**. 140, fig. 433. A window-blind, which see. They are sometimes single, but usually double, and then distinguished as lower and upper. Flexible window-blinds are rarely met now, having been displaced by window-shades.

**Block and tackle.** A general term applied to a pair or band, consisting of a rope, encompassing the shell, and attached by an eye of rope or a hook to some object.—Ed. Ency.

The interior wheels are termed sheaves, which latter term is often used to designate the whole block or pulley, but incorrectly. A snatch-block is a block with only one sheave and with an opening at the side for the ready insertion and removal of the rope. Blocks without this opening, however, are sometimes loosely termed snatch-blocks.


**Body-bearing hinge-casting.** 17, figs. 336-42. See Bearing-casting.

**Body-bolster.** Figs. 1428-57; also 15, figs. 229-66 and 410-18; 10, figs. 433-78; Freight Car Bolsters, figs. 1428-50; Passenger, figs. 1451-7. Cross-beams attached near the ends of the under side of the car-body which is supported on two trucks. The body centre-plate and side-bearings, which rest on the truck, are fastened to these bolsters. Such beams are made of wood, or of iron, or steel trussed, or of wood and iron combined. A bolster is sometimes called body-transom, or simply transom, but the term body-transom is more properly applicable, if used at all, to the needle-beam passing from side to side of the car between the trucks; also known as cross-frame tim-timers, or cross-beavers. A part analogous to a body-bolster and frequently called the Body bolster is the bank of logging-cars, figs. 12, 533-4; but this rests above a reach connecting the trucks, corresponds more properly to the only car-body as it sustains the load. The body-bolsters of passengers-cars are sometimes very elaborate structures, as the double iron body-bolster, figs. 1455-7. Iron body-bolsters are in the form of a truss, the top member being known as the top plate or tension-bar, and the bottom as the bottom plate or compression-bar, the two being held apart by small castings called body-bolster timbales.

**Body-bolster compression-bar.** 2, figs. 1428-57, and 12b, figs. 229-66. See Body bolster. Bottom plate.

**Body-bolster end pocket-casting.** Figs. 933-5. A cast cap that fits over the end of a composite body bolster, through which the truss-rods pass, and on which the truss-rod nuts bear. It is a body-bolster truss-rod washer enlarged so as to cover the entire end of the bolster.

**Body-bolster flitch-plates.** 12a, figs. 287-9; figs. 1428-30. Plates of iron or steel sandwiched in between pieces of wood and bolted together to give it greater strength. Frequently called Bodybolster sandwich-plates.

**Body-bolster sandwich-plates.** See above.

**Body-bolster spacing-blocks.** 12, figs. 229-66. See Body bolster.

**Body-bolster tension-bar.** 1, figs. 1428-57, and 12a, figs. 229-66. See Body bolster. Top plate.

**Body-bolster thimbles.** 3, 4, 6, figs. 1428-57. See Body bolster.

**Body-bolster truss.** Figs. 1455-7. See Body bolster.

**Body-bolster truss-block.** 15, figs. 229-66, 355-72, and 12a, figs. 1428-70. A block of wood or distance-piece, on the top of a wooden bolster, between the center floor-timbers and underneath the bolster truss-rods.

**Body-bolster truss-rod.** 13, figs. 229-66, 355-72; and 11, figs. 435-73. A rod which lies parallel with and passes above the center of the bolster over the trust-rod bearing so as to form a truss; generally two are used for each bolster.

**Body-bolster truss-bearing.** Figs. 1428-90. See Body-bolster truss.

**Body-bolster truss-rod.** Saddle-straps. 18a, figs. 288-4, 288-815, etc. Straps that connect the truss-rod peasing...
diagonally through the two ends of the body bolster.
The strap is a flat bar of iron about 8 x 4 inch with a
rectangular bend at the ends into which the true-rod
hinges fit, as in figs. 1409-90. These straps bear upon
the center-sills.

Body-bolster true-rod washer. 14, figs. 229-66; 12, figs.
435-73, and 1428-57. An iron bearing-plate on the end of
a body-bolster; often made to take two or more rods.

Body-brace. 33, figs. 229-66; 51, figs. 435-73, and 857-44
55, figs. 570-83. An inclined beam or strip of timber in
the side or end frame of a car-body, which acts as a
brace. A substitute for body braces as well as for true-
rods is the Challenger truss, figs. 568-9, which see. A
compression-beam brace, 164B, fig. 536, answers to the
definition of a body-brace, but is a long brace, constituting
with the compression-beam, 164, a single true or arch from bolster to bolster. A body-brace is an oblique
brace in one of several panels included in this space.
See Brace. Body counter-brace. End body-brace, 35,
figs. 229-66, and Side body-brace.

Body brace-rod. 64, figs. 229-66; 59, figs. 435-73. An
inclined iron rod in the side or end of a car-body frame,
which acts as a brace. They are distinguished as End
and Side body brace-rod. A brace straining-rod is a short vertical rod in the side of a passenger-car under
the window, ; 53, figs. 435-73.
In figs. 435-73, the rod 197 and 920 has been improperly
called body brace-rod. The proper term to be ap-
splied to this rod is overhang brace-rod. See also Inverted
body true-rod, or Hog-chain rod.

Body center-plate. 11, figs. 1438-57 ; 17, figs. 229-66;
15, figs. 435-73. The upper of the two center-plates,
which see, through which the king-bolt or center-pin
passes.

Body check-chain eye. 19, fig. 447. An eye-bolt or cle-
vis for fastening a check-chain to the car-body. See also Truck check-chain eye.

Body check-chain hook. Fig. 1313. An iron hook on
the check-chain which enters into the check-chain eye.

Body counter-brace rod. 37, figs. 229-66 ; 56, figs. 435-73.
Usually an inclined iron rod in the side-frame of a
car-body, between the bolster and the end of the car.
These braces are inclined in a direction opposite to those
together with the bolster and centre of the car. Some-
times counterbraces are inserted in the central portion of
the car between the two bolsters. These are then termed
center counter-braces. See Center-brace and Framing.

Body center-bearing truss. Figs. 2038-9. See Center-
plate truss.

Body-cushion (English). 186, figs. 501-8. See India-
rubber body-cushion.

Body end-rail. See End-rail.

Body end-furring (street-car). 148A, figs. 5054-8. Fur-
ing in the end of a car.

Body end-plate. J, figs. 514-15. A plate across the end
of the car joining the side-plates together. They are
frequently made very wide and heavy, as in the figure.
See End-plate.

Body end rib (street-car). A rib in the end of a street-
car. See Body-rib.

Body hand-rail. 44, figs. 488, 444, 450, and 889. An iron
rod or bar attached to the end of passenger and street-cars
for persons to take hold of in getting on or off the cars;
not to be confused with Platform-rail, which see.

Body knee (English). 82, figs. 348-51. No American
equivalent. A heavy wrought-iron knee, securing the
sides of the body to the under-frame, and keeping them
at right angles to one another.

Body-post (freight-car bodies). 42, figs. 229-66, 553-73;
54, figs. 570-74. An upright timber which is framed
into the sill and plate of a freight-car. The body-posts
and counter-posts form the vertical members of the side-
frame of a car-body. In passenger-cars such posts are
called window-posts, which see. See Post.

Body-post pocket. 42, figs. 229-66, 355-72, etc. See Pocket.

Body queen-post. 29, figs. 435-73, and 570-88. An iron
rod, bar, or casting, on the under side of a car-body and
against which the body true-rod rests. It is often
stiffened laterally and longitudinally by a body queen-
post stay. See also Queen-post.

Body queen-post stay. 29a, figs. 450, 540-1. See Body
queen-post.

Body rib or side-stud (street-car). 33, figs. 5654-67.
A rib of car-body framing, which corresponds to the studs
of a steam-car car-body. They are curved to conform to
the shape of the street-car car-body.

Body roller-plate. 17, figs. 302-5. A bearing-plate for
the center truck of a 12-wheel car; corresponds to the center-plate and side bearings of the end truck. The
rollers move transversely to the car when the car passes
upon and over a curved track.

Body side-bearing. 10, figs. 229-66; 14, figs. 435-73;
9, figs. 1438-57. The upper one of the two side-bearings,
which see, attached to the body-bolsters.

Body side-bolstering truss. Figs. 9032-3. See Side-bearing
bridge.

Body spring. A bolster-spring, which see.

Body-transom. 29, figs. 229-66, 283-79; 28, 435-73;
29, 338-41, etc. A name sometimes given to the needle-
beams or cross-frame tie-timber, which see, bolted to the
underside of the sills.

Body true-rod. 19, figs. 229-66; 20, figs. 435-73,
and 530-41. A long rod under a car-body to truss it,
and prevent it from sagging in the center. This rod is
continuous from end-sill to end-sill, in well-designed modern
freight-cars, but sometimes it is attached to a true-rod
anchor-iron on or near to the body-bolster. In passen-
ger-cars the use of the true-rod anchor-iron, 24, figs.
435-73, is very common although some roads use a con-
tinuous rod, as in figs. 453-8. The true-rods are dis-
tinguished as center and side or outside body true-rod.
The center true-rods are universally continuous from
end-sill to end-sill. There are usually four true-rods to a
center, but sometimes only two in number. See also In-
verted body true-rod.

Body true-rod bearing. 21, figs. 229-66. A cast or
wrought iron plate or post on the under side of a true-
block or of a cross-frame tie-timber, serving the purpose
of a body queen-post, which see. 22, figs. 435-73.

Body true-rod hopper-strap. 19a, figs. 298-315. A tie-
strap passing under and supporting the hopper of a
gondola-car, the ends of which strap are fastened to the
round body true-rod which carry the stress to the
end-sills, as shown in fig. 309.

Body true-rod saddle. 20, figs. 229-66, etc.; 81, figs. 435-73,
etc.; figs. 580-2. A block of wood or casting which forms
a distance-piece on top of a bolster, and on which a con-
tinuous body true-rod bears. Properly speaking, a sad-
dle means a common bearing for a pair of rods with a
central support, but it is not restricted to such use.

Bogie (English). A swiveling car truck, which see. All
Americaneight-wheeled cars and coaches are what are
termed in England bogie carriages, or wagons.

Bogie carriage (English). A vehicle for passenger service
recently much used on the fastest trains. The body is
from 40 to 54 feet long, divided into compartments, with
side doors, and seating from 30 to 80 passengers. It is
carried on four or six wheel trucks. See also Coachage.

Bogus-plate (refrigerator-cars). A horizontal timber at-
tached to the posts on the inside of the car, a short dis-
tance below the plate. The bogus-plates support hori-

Pocket.
Bolt. A pin, rod, or bar of metal used to hold or fasten anything in its place; ordinarily a bolt has a head on one end and a screw and nut on the other, while a rod has a nut on both ends, as shown in figs. 3708-30, etc.

Various forms of bolts, which see for further definition, are as follows:

- Carriage-bolt.
- Eye-bolt.
- Joint-bolt.
- Key-bolt.
- Lug-bolt.
- Machine-bolt.
- Strap-bolt, or U-shaped bolt.

For bolts whose names are derived from the purpose for which they serve, see:

- Brake-bolt
- Brake safety-chain bolt.
- Catch-bolt.
- Charge-valve stop-bolt.
- Draft-bolt (Janney).
- Drop-bolt.
- Draw-bar-bolt.
- Hub-bolt.
- Journal-bolt.
- Key-bolt.
- Lock-bolt.
- Ship-bolt.
- Stop-bolt.
- Tree-bolt.

2. (Locks and latches.) A bar which enters the keeper or strike-plate and effects the lock. Figs. 2353 et seq.

See Berth-latch bolt.

See Cupboard-bolt.

Door-latch-bolt.

Door-lock bolt.

Door-sash bolt.

Sofa-bolt.

3. Figs. 2335, etc. A door-bolt, which see, moved in slides directly by the hand to fasten an opening. See also:

- Barred door-bolt.
- Headboard bolt.
- Flush bolt.
- Window-blind bolt.

Bolt-stop (Seat-lock). Figs. 4029-33. A small pin passing through the bolt to check excessive withdrawal.

Bonnet (passenger-cars). A platform-hood, which see.

Books, catalogues, pamphlets, etc. (M.C.B. Standard sizes). See M. C. B. reports.

Boom (of a derrick or crane). 1, figs. 391-4. Also called jib. The main inclined compression member carrying the hoisting gear and abutting at its foot against a boom-shoe or directly against the mast. Its upper end is supported by stay-rods or tension-rods which, in a crane, are of fixed length, and, in a derrick, of varying length, capable of adjustment. See Derrick.

Boom-cap clevis (of a derrick or crane). Figs. 391-6. A clevis, which see, sometimes attached to the upper end of the boom, to which the fixed end of the hoisting-ropes is attached. In other cases, the clevis for this purpose is carried on the hoisting-block.

Boom-sheave (of a derrick or crane). Figs. 391-6. A sheave carried at the upper extremity of the boom over which the hoisting-chains pass.

Boom-shoe (of a derrick or crane). Figs. 392-3. A casting carried at the foot of the mast and constructed so as to be able to revolve against the boom base. It is supported by boom shoe-rods.

Boom-shoe rollers (of a derrick or crane). Rods attached to the head-block or cap at the top of the mast and supporting the boom-shoe.

Boom-shoe rollers of (a derrick or crane). Rollers at the foot of the mast upon which the boom-shoe revolves.

Boat weather-strips. Figs. 3819-34, 4534-40. See Weather-strips.

Boss, or hub (of a steel-tired wheel). Figs. 5355-5381. The central portion through which the axle passes. Boss is the usual English term, but little used in the United States.

Boston-finish flush door-bolt. Fig. 2545.

Bottle-breaking head (Babcock fire extinguisher, which see). Fig. 3704. It breaks the acid-bottle by screw-pressure.

Bottom. "The lowest part of anything; as the bottom of a well, vat, or ship." — Webster.

See Above-bottom.

See Alone-bottom.

See Alone-bottom.
Bottom-arch bar. 15, figs. 4075-4805. An inverted archbar. The pedestal tie-bar is sometimes called bottom archbar. See Archbar.


Bottom-case (engineer's valve, etc.). 33, figs. 1710-15. Another term for a lower-case of a valve.

Bottom-chord (of trusses). See Lower-chord. Neither term is regularly English to designate any part of car-trusses, but the side-sills are bottom-chords in trussed sideframes.

Bottom cross-piece (English). 93, figs. 501-4. The transverse piece in the under-framing, which see, supporting the floor and partition. Also called bottom cross-bar.

Bottom cylinder-head (Westinghouse driving-wheel brake). 4, fig. 1747. A circular cast-iron cover for the lower end of the cylinder. The piston-rod works through it.

Bottom door-panel (English). 128, fig. 504. The lower panel on the outside of the door of a carriage.

Bottom door-rail. 6, figs. 1700-98. The lower transverse piece of a Door-frame, which see.

Bottom door-track. 66, figs. 239-66, 355-72 and figs. 1795 and 1838. A door-track below a sliding-door. Usually a metal bar. Sliding-doors are often provided with rollers or slides which rest on the track. Freight-car doors usually slide on a top door-rack, which see. See also Bottom-rail.


Bottom light-rail (English). 102, figs. 501-3. A part of the body framing of a carriage, forming the bottom of the window opening.

Bottom panel-batten (English). 105, fig. 501. American equivalent, furring. In a carriage, a part of the body framing used to stiffen the panel, which is pinned to it. See Bottom-side panel.

Bottom plate (iron body-bolster). 2, figs. 1458-57. See Body-bolster.

Bottom rail. 1. (Of a sash or door.) 147, figs. 444, 540; 8, figs. 1788-98. The lowermost horizontal bar or member of a frame. 2. (Of pipe-box.) 298, fig. 554.

Bottom plate (English). 91, figs. 501-4. The lower longitudinal framing of the body of a passenger vehicle.

Bottom side-and-end knee (English). 144, fig. 590. A wrought-iron knee joining together the side and end members of the bottom of the body framing of a carriage.

Bottom side-panel (English). 123, fig. 501. The lower panel on the outside of the body of a carriage.

Bottom stove-plate (Baker heater). Figs. 2918, etc. See Ash-pit bottom.

Bottom stove-plate (Spear heater). A circular casting which rests on the floor of a car.

Boudoir (boud'-warr, Fr.). A luxurious private parlor for a lady. Hence—

Boudoir sleeping-car. Figs. 205, 2418. See Mann boudoir sleeping-car.

Bow. See Platform-hood bow.

Bowl. 2, fig. 8486, etc. See Basin.

Bowl (Pinchbeck gas-lighting). 100, fig. 3300. A clear glass bowl used on all center and vestibule lamps.

Box. See Journal-box. 3, fig. 4580; and figs. 4738-60, 5183-75. Wheel-box (street-cars).

Box-bolt (diamond trucks). 108, figs. 4581, 4666, and 4740. The bolts holding the journal-box in place. More properly, journal-box bolts.

Box-car. Figs. 1-14, 55-41, 229-66; details, 617-915. The most common form of American freight-car, with roof and sides inclosed, to protect its contents. They are mounted upon two-four-wheel trucks, and rarely built with four wheels nowadays. The present tendency is to continually increase their length and capacity. They are usually lined for half their height with inside lacing, and provided with an interior grain-tight grain-door. See Car. Freight-car.

Box-cover. See Journal-box cover.

Box-cushion. Figs. 8996, 8025-38, 2858-67, etc. A cushion for passenger-car seats made on a wooden frame. In distinction from a squash-cushion, now little used, which is a loose pad on the seat. Box-cushions are sometimes stuffed with hair or other elastic material alone, but usually steel springs are used in addition.


Box-lid. 4, figs. 4578-4806; and figs. 5167-75. See Journal-box cover. Davis, Drexel, Fletcher, Hewett, Morris, and Schoen journal-box lid.

Box-pack. Journal-packing, which see.

Box-room (on axle). The dust-guard seat, which see.

Box-steps. 45, 46, 46, figs. 444-50; and figs. 2418-45. Passenger-car steps made with wooden stringers or sides. They are to be distinguished from the open steps shown in fig. 588. Ordinarily called the platform steps.

Box stool-car. An ordinary box-car with large grated openings for ventilation, but excluding rain. Little except used for horses. See Stock-car.

Box fruit-car. Figs. 5, 6, 7. See Ventilated box-car.

Box-hopper and hoper bottom. Figs. 305-9. A hopper of a gondola-car with inclined floors running longitudinally with the car, but with the sides of the hoper straight; and sometimes straight with the side-sills of the car. To distinguish it from the pyramidal-hopper bottom, whose floors are inclined both on the sides and ends as in figs. 310-15.

Brace. 33, figs. 292-66; 105, fig. 456. An inclined beam, rod, or bar of a frame, truss, girdier, etc., which unites two or more of the points where other members of the structure are connected together, and which prevents them from turning about their joints. A brace thus makes the structure incapable of altering its form from this cause, and it also distributes or transmits part of the strain at one or more of the joints toward the point or points of support, or resistance to that strain. A brace may be subjected to either a strain of compression or tension. In the former case, in car construction, it is called simply a brace; in the latter it is called a brace-rod.

They are called right or left-handed, according to the inclination of their top to a person standing facing the car.

See Berth-brace, Corner-post brace.

Body-brace. Door-brace.

Brake-lever bracket. End body-brace.

Brake-shaft brace. Floor-timber brace.

Brake-shaft step. SEAL-bracket brace.

Compression-beam brace.

Stop-brace.

Brace-block. E, fig. 5660.

Brace-pocket. 39 and 43, figs. 292-66, 355-72, and figs. 495-710. A casting which forms a socket for holding the ends of braces, especially of car-bodies. See Brace, also Double-brace pocket.

Brace-rood. 34, figs. 292-66, 355-72; 51A, fig. 574. An inclined iron rod which acts as a brace. A vertical rod acting in conjunction with a brace is called a sill-and-plated rod, or, in passenger-cars, for short rods below the window, brace straining-rod. See Body-brace rod. Counterbrace-rod. Propelling-lever brace-rod.

Bracerod. straining-rod. 83, figs. 435-73. It should read brace-straining-rod.

Brace-road washer. 88, figs. 292-66; 57, figs. 483-78. A beaded plate for the nut or head of a brace-rod, sometimes made a triangular or beveled shape, which see, and sometimes a flat bar of iron, bent to fit into a notch cut in the timber. ...
Brake-straining-rod (passenger-car framing). Figs. 58, figs. 468-62, etc. A vertical iron rod or the side or end frame of a car-body by which the upper end of a brake is connected or tied to the sill of the car. The brake-rods are members of the truss, of which the sill, braces, posts or plates, etc., form parts. Such rods often have hook-heads at the upper ends against which the brakes bear, and cuts at the lower ends by which they are screwed up, and are thus brought into a state of tension and the braces into compression. An equivalent in freight service is the sill-and-plate rod.

Bracket. 1. "An angular stay in the form of a knee to support shelves and the like."—Webster.


See Beamless brake.

2. (Iron framing for bridges or cars.) An L-shaped angle-plate riveted to each of two members which it is desired to connect at right-angles to each other as an end-sill bracket, or S knee-iron. Figs. 451, 517. A stronger form, little used in car construction, is called a triangular gusset-plate, which see.

Bracket (of cast-iron wheels). Figs. 3386-88. The stiffening ribs cast on the plate.

Brake-berth hinge (emigrant sleeping-berths). Figs. 3413-14. A berth hinge with a shoulder to directly support the inner edge of the berth without relying on the hinge-pin.

Brake-gas-burner. A gas-burner attached to the side of a car.

Brake lamp. Figs. 3389-304. A side-lamp, which see. See Pintch gas-lamp and Frost lamps.

Bracket-nut. A small spanner-nut, which see.

Brake, or brake-gear. Figs. 1458-63. The whole combination of parts by which the motion of a car is arrested, or brake-beams are now supplied with automatic air brakes, by which the wheels when the brakes are released are prevented from the ends of the brake-shoes from coming in contact with the wheel when the brakes are released. It is attached to the truck transoms or truck bolster in freight trucks, and to the truck-frame end-piece in passenger trucks by a projecting brake-beam adjusting-hanger carrier, and to the brake-beam by an eye or clip. Sometimes called a Parallel brake-hanger.

Brake-beam adjusting-hanger carrier. 121, figs. 4580-4966; 15, figs. 1538-9, etc. A link attached to a brake-beam so as to cause the latter and the brake head and shoe to maintain the same relative positions when the brakes are released, so as to prevent the ends of the brake-shoes from coming in contact with the wheel when the brakes are released. It is attached to the truck transoms or truck bolster in freight trucks, and to the truck-frame end-piece in passenger trucks by a projecting brake-beam adjusting-hanger carrier, and to the brake-beam by an eye or clip. Sometimes called a Parallel brake-hanger.

Brake-beam adjusting-hanger eye or clip. 123, figs. 4580-4966. See above.

Brake-beam adjusting-hanger carrier. See above.

Brake-beam chafing-plate. A plate attached to a brake-beam against which a brake-spring bears, designed to resist the wear due to the action of the spring.

Brake-beam data. (M.C.B.) Fig. 5432. Certain dimensions and capacities of brake-beam were adopted as standard of the Association, by letter ballot, in 1889, and these standards, as modified by subsequent action, are shown for iron brake-beams.

All beams must be capable of withstanding a load of 7,500 pounds at center without more than 1-16 inch deflection; where it is necessary to use a stronger beam, it must be capable of standing a load of 15,000 pounds at center without more than 1-16 inch deflection.

The angle of brake-beam lever is 40 degrees from vertical. Standard heights of brake-beams, when measured from the top of the rails to the center of the faces of new shoes, were adopted in 1894, as follows:

- For inside hung beams, 13 inches.
- For outside hung beams, 14 inches.

Brake-beam eye-bolt. Properly an eye-bolt for fastening a lower brake-rod to a brake-beam. They have threads cut nearly their entire length, and usually a nut is placed on each side of the brake-beam, which can be screwed up so as to take up the wear of the brake-shoes. The term has been misspelled to the brake-lever fulcrum in N. 4923, 4964, and 4970-3-1.

Brake-beam fulcrum. See Brake-lever fulcrum.

Brake-beam hanger (hand-car). 28, fig. 5595. A brake-hanger, which see.

Brake-beam king-post. A post or distance-piece, which forms a bearing for the truss-rods of a brake-beam. In metal brake-beams the brake-lever is attached to it and then becomes a brake-lever fulcrum and is numbered A 85 in figs. 4581-2, 4584-1.

Brake-beam release-spring. See Release-spring.

Brake-beam safety-chain. See Brake safety-chain.

Brake-beam safety-guard. See Brake safety-chain.

Brake-beam sleeve. Figs. 4928-3. A sleeve that fits the brake-beam in the middle and takes the swiveling brake-beam king-post of the Universal brake-beam.

Brake-beam strut. Figs. 1606-71. A brake-beam king-post.
Brake-beam truss-rod. Figs. 1546-1600. A rod used to truss or strengthen a brake-beam.

Brake-block. Figs. 1605-166; 83 and 88, figs. 4576-4966. A piece of wrought metal which carries a removable shoe which bears directly against the tread of the wheel when the brake is applied. The brake-blocks are attached to the ends of a brake-beam. A brake-head is supposed to be a combined brake-block and shoe, but brake-block and brake-head are often used as equivalent terms.

3. (American "driver-brake"). 17, fig. 1749.

3. (English). 63, figs. 348-9. See Wooden brake-block, wood being the material of which they are composed.

4. (Westinghouse driving-wheel brake). 17, fig. 1747.

Brake-block pin (Westinghouse driving-wheel brake). 26, fig. 1747. A pin by which the suspending links are attached to the brake-block.

Brake-block pin rod (Driving-wheel brake). 27, fig. 1747. A tie-rod connecting the brake-shoes on opposite sides of the locomotive, to resist the tendency of the coned wheels to the locomotive, to resist the tendency of the coned wheels to lift the frame of the car or locomotive, by which the brakes are operated. Upon passenger-cars and locomotives the brake-block is fitted with two heads, in which the brake-shoes are brought to a bearing.

2. 160, figs. 441-4; 17, fig. 2441. A cylindrical casting with a screw-shaped groove, intended only to make the chain wind evenly.

Brake-clevis. A brake-lever fulcrum, which see.


Brake cord-guide. A guide similar to a bell-cord guide for the air-brake, which passes through every car fitted with the Westinghouse automatic brake, and operates the conductor's valve, 23, figs. 1698-4.

Brake cut-out cock. 19, figs. 1693-8; fig. 1744.

Brake cylinder (Westinghouse automatic brake). 2, figs. 1698-8, and figs. 1726-81. A cast-iron cylinder attached to the frame of the car or locomotive, by which the brake-shoes are operated. Upon passenger-cars and locomotives the brake-cylinder is fitted with two heads, in which the brake-shoes are enclosed. In the freight brake the auxiliary reservoir and brake-cylinder are cast in one piece. The cylinder contains a piston which is forced outwardly by the compressed air to apply the brakes, and is returned to its normal position, when the compressed air escapes, by a release-spring which is fitted to the piston-rod inside the cylinder. The piston-rod of the passenger-car cylinder (fig. 1727) has a crosshead upon its extremity, which is attached to the cylinder lever. The piston-rod of freight car cylinder (figs. 1728-9) and tender-cylinder (fig. 1729) is hollow and loosely incloses a push-bar, which latter is attached to the cylinder lever. The piston of the driving-brake cylinder (figs. 1749) has a crosshead to which brake connections are attached. In the Eames vacuum-brake a diaphragm takes the place of the brake-cylinder.

5. (Westinghouse driving-wheel brake.) Fig. 1748. A cylinder attached to a locomotive in a vertical position between the driving-wheels. The force of the compressed air is transmitted to two levers, by a cam motion, which act against the brake-heads and thus apply the brakes. The main casting of the cylinder is called the cylinder-body.

Brake-cylinder block (Westinghouse freight-brake gear). Fig. 1697. A block for attaching the combined cylinder and auxiliary reservoir to the side of the sills. See Auxiliary-reservoir beam, a similar part for passenger-cars.

Brake-cylinder pipe (Westinghouse brake). 21, Figs. 1690-4. The pipe which connects the brake-cylinder with the triple-valve.

Brake-cylinder plate (Westinghouse freight-brake). The plate to which the brake-cylinder is bolted and by which it is attached to the sills.

Brake-dog. A brake-pawl, which see.

Brake-drum. A brake-shaft drum, which see.

Brake-equalizer block, or center brake-lever block (Eldr brake). A block directly under the center of the car to which the brake-equalizing lever or center brake-lever (fig. 1469) is attached.

Brake-equalizing lever (Elder brake). 10, fig. 1468. More properly, Center brake lever, which see.

Brake-equalizer strap. A strap directly under the center of the car serving as a fulcrum for the center brake-lever.

Brake-finger. A brake-pawl, which see.

Brake foot-board. A brake-step, which see.

Brake foot-board A brake-step, which see.

Brake-gear (Air) for Freight Cars (M. C. B. Standards). Figs. 5480-41. See Air-brakes—general arrangements and details.


Brake-gear. (Rules for Interchange of Traffic.) The defects of brake-gear and parts for which cars may be rejected are as follows:

1. Brakes in bad order.

2. Bottom of brake-shaft secured by a nut or key or some other suitable device to prevent shaft lifting out of position.

3. Brake chain secured to shaft with bolts, and bolt properly secured by nut or by rivet.

4. Upper brake-shaft bearing properly secured to the end and top of box and on passenger-cars by either two bolts or one bolt and one lag screw not less than one-half inch in diameter.

5. Brake ratchet wheel sound and well secured to shaft.

6. The brake-pawl, when attached to upper brake-shaft bearing, secured with bolt and nut. When applied to roof of car, secured with either bolt or lag screw. The pawl sound and point effective.

7. Brake steps secured by bolts in each of the two brackets. The brackets secured to car by either four bolts or four lag screws. The brake steps must be well countersunk and can be given with the brake steps sound at outer edges through both bolt holes.

8. Brake step secured to car by either two or four bolts or lag screws. When the drawbar carry iron forms the step, the two bolts passing through draft-timbers should be effective.

9. Brake hangers secured to car body or trucks with full complement of bolts and nuts the hanger is drilled to receive, and also secured to brake head and bearings in like manner. Brake-beams, levers, and attaching bolts not less than 5 inches from the top of the rail.

10. Brake heads in a condition to hold the shoes in place when applied.

11. Brake-shoes secured to brake head by either key bolt, bolt and nut, or key, as required by form of head.

12. Brake-shoes 5/8 inch thick or more at center.

13. Brake wheels must be free from any defect.

14. Brake-beams sound, and when bent to body provided with guide irons.

15. Brake beam fulcrums (cast-iron) sound, and secured to brake-beam by two bolts. Wrought-iron fulcrums firmly secured.

16. Brake connections properly secured to brake-beam and to brake-lever with key bolt and key.

17. If the car has air-brakes, the cylinder and triple valve must have been cleaned and oiled within twelve months, and the date of the last cleaning and oiling marked on the brake cylinder.

18. If the car has air-brakes, the brake-shoe slack must be so adjusted that under the full application of the brakes the piston travels not less than five inches nor more than nine inches.

19. If the car has air-brakes, the brakes must apply and release promptly with proper handling by the engineer's valve.
Brakehead. Figs. 1602-16f; 83, figs. 4586-4966. A piece passing through the brake-hanger. Fig. 4670. A pin passing through the brake-hanger. 6, fig. 233. A short traverse for the brake-hanger. 87, figs. 4580-4966. An eye or iron. Brake-hand. 86, figs. 4580-4966. A link or bar by which the brake-blocks are suspended from a truck-frame or car-body. It is attached to truck and car-body by a brake-hanger. Brake-hangers are distinguished as hooked, linked, and U-shaped.

Brake-hand or rail. 190, figs. 229-31, 258, 244-6, etc.; details, figs. 878-9. A hand-rail, on the roof of box and stock cars, usually made of gas-pipe, for the protection of brakemen when applying brakes. It is stiffened by a hand-rail brace. Master Car Builders' Recommended Practice with regard to the same is shown in figs. 3467-9.

Brake-hand wheel. 93, figs. 229-32. See Brake-wheel.

Brake-hanger. 66, figs. 4580-4966. A link or bar by which brake-beams and attachments are suspended from a truck-frame or car-body. It is attached to truck and car-body by a brake-hanger carrier. Brake-hangers are distinguished as hooked, linked, and U-shaped.

Brake-hanger bolt. A bolt which fastens the brake-hanger to the brake-hanger carrier.


Brake-hanger bearing. 87, figs. 4942-55, 4968-9. A casting which is held by a brake-hanger carrier, and which forms a bearing for a brake-hanger.

Brake-hanger carrier. 87, figs. 4580-4966. An eye or U-bolt, a casting or other fastening by which a brake-hanger is attached to the truck or body of a car. See also Parallel brake-hanger carrier and Brake-beam adjusting-hanger carrier.

Brake-hanger pin. Fig. 4670. A pin passing through the brake-hanger carrier and brake-hanger.

Brake-hanger timber. 6, fig. 283. A short traverse timber between the floor-timbers of a car-body, and which is framed into them, and to which the brake-hangers, which are hung from the body of a car, are attached.

Brake head. Figs. 1602-16f; 83, figs. 4586-4966. A piece of iron or wood attached to a brake-beam and which bears against the wheels, and combines both a brake-block and brake-shoe in one piece. The term is also commonly applied to brake-blocks which carry a detachable shoe. See Christie, Collins, etc.

Brake head and shoe. Figs. 5425-31. The brake head and shoe shown, known as the Christie brake head and shoe, were adopted as a standard of the Association, by letter ballot, in 1896 with the exception of some slight modification in details made since that date.

Brake-hose (air-brakes). 26, figs. 1685-5, and 1797-43. Flexible tubes made of India-rubber and canvas by which the cars are connected together and compressed air, which operates the brakes, conducted through the train. The hose is made with a coupling at each end of each car, and so that they can readily be connected or disconnected. See Armed brake hose, 1898 a b c. 3. (James vacuum brake.) Figs. 1577-9. A coiled wire is used inside to prevent collapsing.

Brake-hose armor. See Armed brake-hose.

Brake-hose coupling (air-brake). Figs. 1740-1. A contrivance for coupling or connecting the ends of a pair of brake-hose together, so that the air by which the brakes are operated can pass from one vehicle in a train to another. The couplings for train-signal apparatus are made with thicker lips than brake-hose couplings, though otherwise similar, to avoid danger of wrong connections.

Brake-hand lever-bracket (air-brake). Figs. 1740-1. A hollow casing which joins the main part of a coupling to which the hose is attached.

Brake-hose nip (air-brake). Fig. 1739. A tubular elbow connecting the coupling-hose and the brake-pipe.

Brake-lever. 93, figs. 4580-4966; 5, fig. 1535; details, 4588-4601, 5129-5, etc. A lever by which the power employed to apply the brakes is transmitted to the brake-beams. The brake-levers are connected to the brake-beams at or near the short ends of the former, and the brake-shaft connecting-rod, or some equivalent part, to the other end.

When only one brake-lever to a truck is used, the pressure of the two brake-beams is unequal. To obviate this two brake-levers are used, as shown in figs. 4580-4966, which are further distinguished as dead-lever and live-lever. The upper end of the dead-levers is then attached to a brake-lever stop or dead-lever guide. Dead-levers are also called fixed brake-levers. See Centre-brake-lever. Floating lever.

Brake lever bracket. A diagonal wrought-iron brace, to stiffen the brake-lever bracket.

Brake-lever clevia. A Brake-lever fullerum, which see.

Brake-lever coupling-bar (inner-hung brakes). 93, figs. 4575, 4590-3, and figs. 4583-4. A compression-bar connecting the two brake-levers (dead-lever and live-lever), to which it is fastened by the coupling-bar pin. When the brakes are outer-hung, this member becomes in tension instead of compression and is known as the lower brake-rod. It is called a Brake strut.

Brake-lever fullerum. 85, figs. 4580-4647, 4740-1; 93, figs. 4731, 4593-5, and figs. 4586-7. A forked iron attached to a brake-beam by means of which a brake-lever is connected to the beam. It is usually a Jane-bolt, figs. 4740-1. In some cases a casting is used, brake-lever jane. In the trussed iron brake-beam the king-post of the brake-beam becomes the brake-lever fullerum. In the list of names with figs. 4586-75, 85 should be called a brake-lever fullerum, which is designated in the figures. See Brake-beam king-post.

Brake-lever guard (English). 58, figs. 348-51. No American equivalent. A curved wrought-iron bar which confines the movement of the brake-lever within proper limits. See also Brake-lever ratchet.
Brake-lever sheave (Elder brake-gear). Figs. 963, 978, and 1462. A pulley attached to a brake-lever, over which a chain by which the brakes are applied runs.

Brake-lever stop. 95, figs. 4581, 4644, 4943-4, and figs. 4591, 4727, 4792. An iron bar or loop attached to a truck or car frame, and which holds the upper end of a fixed or dead brake-lever. It usually has holes in it in which a fulcrum pin is inserted. By moving the pin from one hole to another the lever is adjusted so as to take up the wear of the brake-shoes. Also called Dead-lever guide.

Brake-lever strut. A brake-lever coupling-bar.

Brake-main. A brake-shaft, which see. 94, figs. 229, etc.

Brake-pawl. 103, figs. 229, etc., and figs. 770, 940, and 1137. A small pivoted bar for engaging in the teeth of a brake ratchet-wheel, which see. It is placed in such a position as to be worked by the foot.

Brake-pawli Carrier. Fig. 900. See Brake-pawl and Brake ratchet-wheel.

Brake-pawl dog. A pivoted casting serving as a weight to throw up the brake-pawl so as to engage with the ratchet when the ratchet is on the under side of the brake ratchet-wheel. Also applied to an eccentric which holds a pawl against a ratchet-wheel.

Brake-pin. Fig. 4671. A pin used in the brake-lever coupling-bar and other connections.

Brake-pipe (Air-brake). 16, figs. 1693-8. An iron pipe extending from one end of the car to the other under the car-body, and connected to the pipes on the adjoining cars by flexible brake-hose, serving to convey the air from the air-pump on the engine to the auxiliary reservoirs attached to the cars. These pipes are filled with compressed air when the brakes are not on. When the latter are to be applied, the air is allowed to escape from the pipes, which causes the triple-valves to open communication between the auxiliary reservoirs and the brake cylinders, so that the compressed air stored up in the reservoirs acts on the pistons and brake-levers. The popular term for this pipe is a train-pipe, or more properly a train brake-pipe, to distinguish it from the train signal-pipe or steam-heating pipes.

Brake-ratchet gear. complete. Includes the ratchet-wheel, the pawl, the dog, the carrier.

Brake-ratchet-wheel. 103, figs. 229, etc. A wheel attached to a brake-shaft, having teeth shaped like saw-teeth, into which a pawl engages, thus preventing the wheel and shaft from turning backward. In some forms the ratchet wheel has the ratchet upon the under side, instead of on the edge; the brake-pawl being automatically pressed upward against the teeth by a counter-weight called a brake-pawl dog and without being adjusted by the foot of the brakeman. Such a ratchet-wheel is minutely shown, 103, figs. 344-6, and in figs. 714-17 and 769. The brake-pawl is pivoted in the brake-pawl carrier, fig. 900, which latter is bolted to the roof of the car.

Brake-shaft (M. C. B. position and dimensions). Figs. 1974-17, 1989-90, etc. The M. C. B. Convention recommended that the practice of placing the ratchet-gear on a small platform or brake-step be discontinued, and that they be fastened to a suitable casting on the roof. Their recommendation has not been universally adopted, though it is a very common practice.

The earliest English dictionaries of the English language, as well as in Knight's "American Mechanical Dictionary," the term ratchets is defined as a dog or pawl which enters into the ratchet-wheel, as well as the ratchet-wheel itself. The same dictionaries, however, also reserve the name for the part serving this purpose, and it is believed that this is an error. In definition, at least as regards American practice, which has been copied from one dictionary to another, and which does not correspond with the practice in mechanical work, in which the term "ratchet" is correctly used for the toothed part of a wheel or a shaft, into which the pawl engages, and does not designate the pawl itself.

Brake-rod. Any rod serving to connect brake-levers, but especially the longer brake-rod, 97, figs. 4578-4968, which see, and the secondary brake-rod, which see. The brake-rod connecting-rod is sometimes called the main brake-rod. The long brake-rod extends the entire length of the car in the Stevens brake-gear.

See Lower brake-rod. Secondary brake-rod. Main brake-rod.

1. (English.) 58, figs. 348-51. A bar of iron connecting the brake-shaft arms to the brake-blocks.

Brake-guide. Any form of special support for a brake-rod.

Brake-rubber. A brake-shoe, which see.

Brake-safety-chain, or link. 88, figs. 4590, 4966; fig. 4595; B, figs. 1558-9; and 13, figs. 1540-2. A chain attached by brake-safety-chain eye-bolts to a brake-beam and to the truck or body of the car. It is intended for the same purpose as a brake safety-strap, or a brake-beam safety hanger, which see, to hold the brake-beams in case a brake-hanger should break. Sometimes made of a single link or bar. A brake-beam safety-guard is not bolted or fastened to the brake-beam, but is usually a shaped forging, the stem being bolted to the truck frame, the cross-bar hanging under the brake-beam to prevent it falling upon the track if the hanger break. See 12, figs. 1540-2, and figs. 4590-2, 4943-4.

Brake-safety-chain eye-bolt. 89, figs. 4580-4966. An eye-bolt attached to a truck or car-body, and which holds a brake-safety-chain.

Brake-safety-strap. 90, figs. 4583, 4998-6, and figs. 4987, 5180. A strap of iron fastened to the end-piece or transom of a truck and bent into such a shape as to embrace the brake-beam. In case any of the hangers should give way, the safety-strap is intended to catch and hold the beam and prevent it from falling on the track. Sometimes it is made of steel, and used as a brake-spring for throwing off the brake. A brake safety-chain, which see, is another device for the same purpose.

Brake-shaft. 94, figs. 229, etc.; 153, figs. 485, etc. A vertical shaft on which a chain is wound and by which the power of a hand-brake is applied to the wheels. It is sometimes made horizontal and so called, as 95, figs. 283-4, etc. In box and stock cars it extends above the roof and is called a long brake-shaft.

Brake-shaft (M. C. B. position and dimensions). Figs. 5544-7.

In 1893 the following recommended practice was adopted to protect trainmen from accident, under the sub-heads as given. The brake-shaft to be placed on what is the left-hand corner of the car when a person is standing on the track facing the end of the car, as in figs. 49 and 299. See Horizontal brake-shaft. Long brake-shaft.

Brake-safety-chain eye-bolt. 89, figs. 4580-4966. An eye-bolt attached to a truck or car-body, and which holds a brake-safety-chain.

Brake-safety-strap. 90, figs. 4583, 4998-6, and figs. 4987, 5180. A strap of iron fastened to the end-piece or transom of a truck and bent into such a shape as to embrace the brake-beam. In case any of the hangers should give way, the safety-strap is intended to catch and hold the beam and prevent it from falling on the track. Sometimes it is made of steel, and used as a brake-spring for throwing off the brake. A brake safety-chain, which see, is another device for the same purpose.

Brake-shaft. 94, figs. 229, etc.; 153, figs. 485, etc. A vertical shaft on which a chain is wound and by which the power of a hand-brake is applied to the wheels. It is sometimes made horizontal and so called, as 95, figs. 283-4, etc. In box and stock cars it extends above the roof and is called a long brake-shaft.

The M. C. B. Association (1879) recommended "that all brake-shafts be placed on the left-hand corner of the car when a person is standing on the track facing the end of the car; the ratchet-wheel and brake-pawl to be fastened to a suitable casting attached to the roof; a railing or guard to be attached to the end and the roof of the car around the brake-shaft, the center of the brake-shaft to be 20 ins. from the middle of the car; the nuts on the ends of the brake-shafts to be secured by split spring cotters.

Brake-shaft arm (English). 95, figs. 458-500. See above.

Brake-shaft bearing. A metal eye by which a brake-shaft is held in its place, and in which it turns. See Brake-shaft step. Lower brake-shaft bearing. Upper brake-shaft bearing.

Brake-shaft brace (Miller coupler and platform). 1, fig. 2390. A brace which holds the bottom of the brake-shaft and forms a step for it.

Brake-shaft bracket. 99, figs. 333-4. A support for holding a horizontal brake-shaft in its place.

Brake-shaft bushing (Miller coupler and platform). Figs. 2390-3. A thimble on the brake-shaft.
Brake-shaft chain. 150, figs. 299, etc.; 3, figs. 1459-63. A chain connecting the brake-shaft with the brake-levers through the brake-shaft connecting-rods, to the end of which it is attached. The force exerted on the shaft is transmitted by this chain. See Horizontal brake-shaft chain.

Brake-shaft-chain sheave. 1. (Elder brake-gear.) Fig. 1468; 106, fig. 384. A roller over which a brake-shaft chain passes.

2. A sheave attached to the end sill for the chain of a horizontal brake-shaft to work in, 106, figs. 232-43.

Brake-shaft connecting-rod. 161, figs. 239, etc.; 4, figs. 1466-8. A rod which is attached at one end to a brake-chain, and at the other to a brake-lever, or to the center-lever of the Elder brake, or to the floating-lever of the Hodge brake.

Brake-shaft crank (street-cars). 216, fig. 5654. An elbow attached to the upper end of the brake-shaft, carrying a handle for turning the brake-shaft and operating the brake.

Brake-shaft crank-handle (street-cars). Called also a brake-shaft crank or a brake-handle. See above.

Brake-shaft cross-bearer (English). 7, figs. 348, 351. A piece of timber secured to the under-frame and carrying a wrought-iron bracket in which the brake-shaft works. Brake-shaft drum. The part of a brake-shaft on which the brake-chain is wound. See Brake-chain worm.

Brake-shaft gear-wheel. 16, figs. 2441-5. A bevel gear attached to the brake-shaft by which the power applied to the brake-hand-wheel is conveyed to a horizontal winding shaft or worm, 17, fig. 2441, called a Brake-chains guide-casting.

Brake-shaft hanger (English). 54, figs. 488-51. A bracket by which the brake-chain is carried and in which it is free to revolve.

Brake-shaft holder. A Brake-shaft bearing, which see.

Brake-shaft stand (Janny). A Brake-shaft step, which see.

Brake-shaft step. 100, figs. 229-66, etc.; figs. 483-78. A bearing which holds the lower end of a brake-shaft. It usually consists of a U-shaped bar of iron, the upper ends of which are fastened to the car-body, with a hole in the curved part of the bar which receives the end of the shaft. The brake-shaft step should not be confused with a brake-step, which latter is a shelf on which the brake-man may step when applying brakes.

Brake-shaft step brace. A wrought-iron brace to resist the pull of the brake-chain.

Brake-shaft thimble. An iron bushing attached to some part of the car which is attached to a brake-chain and by which the brake-chain is carried and in which it is free to revolve.

Brake-shaft thimble. An iron bushing attached to some part of the car which is attached to a brake-chain and by which the brake-chain is carried and in which it is free to revolve.

Brake-shaft key. Fig. 1637 and 5481. A key or wedge by which a brake-shaft is fastened to a brake-block.

Brake-spool. Also called Brake-spool step (logging-cars). A U-shaped strap in closing the brake-spool and equivalent to a brake-step, which see.

Brake-spool step (logging-cars). A U-shaped strap in closing the brake-spool and equivalent to a brake-step, which see.

Brake-staff. A brake-shaft, which see.

Brake-step. 100, figs. 229-66, etc. A small shelf or ledge on the end of a freight-car near the top, on which the brakeman stands when applying the brake from the top of a car. Also called a brake-footslide. A brake-step should not be confused with a brake-step, which see, which is a bearing for the lower end of a brake-shaft.

The use of brake-steps has been discouraged by the Master Car-Builders' Association, which recommended (Chicago, 1879) 'that the small platform (brake-step) placed at one end of freight cars, to fasten the brake-pawl, etc., be discontinued, the ratchet-wheel and pawl to be fastened to a suitable casting on the roof.'

Brake-step bracket. 101, figs. 229-66, etc. An iron bracket to support a brake-step.

Brake-strut. 93, figs. 4909-2, 4644-7, and figs. 4908-4, 4724-6. A compression-bar or strut between the live and dead levers of a truck with inside-hung brakes. Probably the term Brake-strut is more common than Brake-lever coupling-bar. Brake-strut should not be confused with Brake-beam strut. A Brake-beam coupling-bar.

In the list of names, page 288, 93 is named a brake-lever fulcrum, which is a misnomer, according to the terminology herebefore adopted, though technically it be a fulcrum.

Brake-treadle (hand-cars). Shown in figs. 5095-5060. A lever for applying brakes with the foot.

Brake-valve (of air or steam brakes). The valve operated by the engineman to apply brakes. See Engineer's brake-valve (Westinghouse), figs. 1710-19.

Brake van (English). American equivalent, caboose or baggage-car. A covered vehicle in which the conductor (guard) of a train travels, and which is fitted with a powerful screw hand-brake. On passenger trains it carries the passengers' baggage (luggage), express matter (parcels), and dogs, etc. On freight (goods) trains it is weighted with pig-iron, and is primarily used as a source of brake power. Also called guard's van.

Brake-windlass. A term sometimes used to designate the brake-shaft, which see, with all its attached parts.

Brake-wheel. 93, figs. 229-66; 107, figs. 435-73, etc. A hand-wheel attached to brake-shaft, and by which the latter is turned. Sometimes on coal-cars and elsewhere a mere bent rod is used. Fig. 354.

Brass. "An alloy of copper and zinc. The term is commonly applied to the yellow alloy of copper with about half its weight of zinc, in which case it is called by engineers yellow-brass; but copper alloyed with about one-ninth its weight of tin is the metal of brass ordnance or gun-metal. Similar alloys used for the 'brasses' or bearings of machinery are called hard brass, and when employed for statues and metals they are called bronze."—Toml. Cyc. Useful Arts.

According to present usage, alloys of copper and tin, or of copper, tin, and zinc, are termed bronzes, which...
see. Railroad journal-bearing, which see, are often termed brasses, but they have the composition of bronzes.

Bridge. In car construction the term bridge means a timber, bar, or beam which is supported at each end. See Bolster-bridge. Center-bearing bridge. Side-bearing bridge.

Brill's standard street-car truck. Fig. 6868.

Brill's Eureka maximum-traction pivotal-trucks (street cars). Bridging. (Passenger-car framing.) 2, figs. 435-7. Short bridge. In car construction the term bridging means a timber, bar, or beam which is supported at each end. See Bolster-bridge. Center-bearing bridge. Side-bearing bridge.

Brilling (Passenger-car framing,) 6, figs. 435-7. Short transverse distance blocks between the sills of an underframe to keep the sills from displacement or buckling. A sill tie-rod is usually employed to keep the sills drawn tightly against the bridging. It is toenailed and sometimes tenoned into the sills, with small tenons.

"Brilliant." Argand-burner. Fig. 3369. See Argand-burner.

Brill's Eureka maximum-traction pivotal-trucks (street cars). Figs. 1880-3. A wheel of which the tread is wider than usual, so as to be able to run on 4 ft. 9 in. gage. The principal broad gage was 5 ft.; other gages were 5 ft. 3 ins., 5 ft. 6 in., 6 ft. 00 in., etc. These gages have been abandoned and the 4 ft. 9 in. gage adopted throughout this country on all lines. The broad gages, if any, are confined to short branches of no importance. Tracks of 4 ft. 8½ in. and 4 ft. 9 in. gage allow cars which are gaged by the Interchange rules to pass over them. See Narrow-gage. Standard-gage.

Broadlace (English). 206, fig. 503. A woolen fabric made in bands about 4 ins. wide and used as an ornamental border to the upholstery of a carriage.

Broad-treadwheel. A wheel of which the tread, flange, and web of which are formed from other metals and chemical substances, as phosphor-bronze which see. Brasa is an alloy of copper and zinc. Most journal-bearing are bronzes. The variety of proportions of the various metals is very great.

Brown's emergency-link coupler. Figs. 2082-9. A type of steel-tired wheels made by Fage, Newell & Co., Boston, supposed to take its name from the Brunswick tire-fastening, which is a modified form of the Giron tire-fastening. Other wheels made by this company and fastened by Manell rings, Gibson, and bolted fastenings are also called Brunswick wheels by the manufacturers. See Car-window brush.

Brush-and-comb rack. Figs. 3511-14.

Buckeye (Little-giant) car-coupler. Figs. 2086-9.

Buckle (English). 23, figs. 348-51, 501-4. See Bearing-spring buckle.

Buda corrugated steel wheel (for hand-cars.) Figs. 5620-2. A wheel, the tread, flange, and web of which are formed from the side plate of steel by the "drawing" and "spinning" processes, which is calculated to prevent the shocks and strains to which the metal might be subjected under a drop hammer.

Buda hand-cars. Figs. 5591 and 5598-5600. Details are fully shown.

Buffer. An elastic apparatus or cushion attached to the end of a car to receive the concussions of other cars running against it. The term is generally applied to those attachments in which springs are used to give the apparatus elasticity. The term is often applied to a drawbar, which see. The buffering apparatus now largely in use on new equipment are: The Janney-Buhop, 2901-3900; The Gould (which embodies features of the Miller and Cowell platform and buffer), figs. 2900-3000; The Miller platform and buffering apparatus, figs. 2290-4. The Thurmond-McKee, figs. 2279-91. In addition the Leonard Hydrostatic Buffer deserves notice, though its application has been limited, figs. 2291-4. Others not illustrated but in use are the Janney, the Buhop-Miller, and Janney-Miller.

For the combination of buffering apparatus with Vestibule face-plate see figs. 2255-45.

Buffer-arms. A Drawbar timber, which see.

Buffer-band (street-cars). 87, figs. 5654-8. A band of iron or steel fastened to the buffer-beam to save it from wear and bruising.

Buffer-bar. A wrought-iron bar at the end of a car, carrying a buffer, which see. They are used with the Miller, Janney, Gould, Thurmond, McKee, and Leonard Hydrostatic buffering apparatus. See Buffer-stem.

Buffer-beam. 1. (Freight-cars.) 33a and 93, figs. 229-86, etc. A transverse timber bolted to the outside of an end-sill of a car to which the buffer-blocks are attached.

2. (Passenger-cars.) A term sometimes used to designate a platform bend-drawbar.

Buffer-blocks, dimensions and location (M. C. B. Recommended Practice). 1. Figs. 5440-2 and 5548-51. The M. C. B. standard dimensions of buffer-blocks and their location, recommended in 1873, are shown in figs. 5540-2 and 5548-51. Buffer-blocks are to be made 8 ins. square on the face and 8 ins. thick, and are to be placed 22 ins. apart from center to center, and to have 14 ins. space between them.

Single dead-blocks are to be not less than 30 ins. long, 7 ins. thick, and 8 ins. deep measured vertically. In 1880 a Recommended Practice as shown was adopted for buffer blocks, classed and double, and location for same suitable for the old link and pin couplers. The beam 28 by 8 by 4 inches shown with the location of double-buffer-blocks may be omitted if construction of car permits.

2. (English.) A piece of hard-wood packing, interposed between the buffer-rod guide and the head-stock. This term is also improperly used to describe the buffer-rod guide, which see.

Buffer-block face-plate. A metal plate bolted to the face of a wooden buffer-block to protect the wood from wear.

Buffer-block front-plates. Figs. 1271-2.


Buffer-cushion. A circular rubber pad, to prevent the platform or buffer-springs from being overloaded.

Buffer-guide. 22, figs. 2369-9, and 186, figs. 2391 and 2338. The malleable iron sleeve carrying the buffer-shank through the platform end-timer.

Buffer-head. 21, figs. 2296-9; 168, fig. 2391; 35, figs. 2293-2. A broad flat end of a buffer in draw-gear. In English cars they are about 12 ins. in diameter; in American cars the side and center buffer-stems are often connected by a buffer-plate varying from 6 by 36 ins. to 7 by 40 ins. when the vestibule is applied. See figs. 2295-2334. In the Hydrostatic buffer the plate extends the full width of the car. See Buffer.

2. (English.) 47, figs. 348-5, and 501-4. See above. Equivalent, side-buffer.

Buffer-plate. 22, figs. 2393-5; 21, figs. 2296-9. A plate (usually bolted to the end of the buffer-stems) which
beams and rails against the opposing plate of the next car of the train. The seatbowl face-plate is bolted or riveted to, and carried by, the buffer-plate. Figs. 2439-45.

Buffer-rod (English), 45, figs. 248-51 and 501-4. A rod which transmits buffetting strains from the buffer-head to the buffer-spring. See also Buffer-stem.


Buffer-side-stem thimbles (Gould platform). Figs. 2079-2243. A projecting horn cast on top of freight drawbars to bear against a buffer-block and relieve the draw-gear from excessive compressive strains. Is very common on freight-car couplers.

Buffer-alank. 36, figs. 2390-3. The square part between the buffer-rod and the buffer-plate.

Buffer-side-spring yoke (Gould platform). Figs. 1413-15.

Buffer-shank. 86, figs. 2290-2. The squarepartbetween buffersafety-lug. Figs. 2079-2243. A projecting horn which transmits buffing and draft strains. Draft-spring is the preferred term, although both are used.

Buffer-stemwasher (Millercoupler). A cast-iron bushing in which the buffer-springs bear and rubs against the opposing plate of the next car of the train. The seatbowl face-plate is bolted or riveted to, and carried by, the buffer-plate. Figs. 2439-45.

Buffer-rod (English), 45, figs. 248-51 and 501-4. A rod which transmits buffetting strains from the buffer-head to the buffer-spring. See also Buffer-stem.

Buffer-side-guide, or buffer-block (English). 45, figs. 248-51 and 501-4. A casting bolted to the outer side of the end-sill or head-stock.

Buffer-rods (English). 48, figs. 248-51 and 501-4. A rod which transmits buffetting strains from the buffer-head to the buffer-spring. See also Buffer-stem.

Buffer-stem (millercoupler). The round part which passes through the buffer-springs. The term is sometimes applied to the buffer-bar which includes the round stem and the square end.

Buffer-rod yoke (Gould-platform). Figs. 2079-2243. A projecting horn cast on top of freight drawbars to bear against a buffer-block and relieve the draw-gear from excessive compressive strains. Is very common on freight-car couplers.

Buffer-alank. 36, figs. 2390-3. The square part between the buffer-rod and the buffer-plate.

Buffer-side-spring yoke (Gould platform). Figs. 1413-15.

Buffer-shank. 86, figs. 2290-2. The squarepartbetween buffersafety-lug. Figs. 2079-2243. A projecting horn which transmits buffing and draft strains. Draft-spring is the preferred term, although both are used.

Buffer-stemwasher (Millercoupler). A cast-iron bushing in which the buffer-springs bear and rubs against the opposing plate of the next car of the train. The seatbowl face-plate is bolted or riveted to, and carried by, the buffer-plate. Figs. 2439-45.

Buffer-rod (English), 45, figs. 248-51 and 501-4. A rod which transmits buffetting strains from the buffer-head to the buffer-spring. See also Buffer-stem.

Buffer-side-spring yoke (Gould platform). Figs. 1413-15.

Buffer-shank. 86, figs. 2290-2. The squarepartbetween buffersafety-lug. Figs. 2079-2243. A projecting horn which transmits buffing and draft strains. Draft-spring is the preferred term, although both are used.

Buffer-stemwasher (Millercoupler). A cast-iron bushing in which the buffer-springs bear and rubs against the opposing plate of the next car of the train. The seatbowl face-plate is bolted or riveted to, and carried by, the buffer-plate. Figs. 2439-45.

Buffer-rod (English), 45, figs. 248-51 and 501-4. A rod which transmits buffetting strains from the buffer-head to the buffer-spring. See also Buffer-stem.

Buffer-side-spring yoke (Gould platform). Figs. 1413-15.

Buffer-shank. 86, figs. 2290-2. The squarepartbetween buffersafety-lug. Figs. 2079-2243. A projecting horn which transmits buffing and draft strains. Draft-spring is the preferred term, although both are used.

Buffer-stemwasher (Millercoupler). A cast-iron bushing in which the buffer-springs bear and rubs against the opposing plate of the next car of the train. The seatbowl face-plate is bolted or riveted to, and carried by, the buffer-plate. Figs. 2439-45.
Burner. Figs. 3998-97. "That part of a lighting apparatus at which combustion takes place."—Knight. See Lamp-burner. Special varieties, which see, are—

Argand-burner.
Bracket gas-burner.
Dual burner.
Gas-burner.
Hinge burner.

Burner cock (Pintech system gas-lighting). 31, fig. 3181. It is used in wall-lamp No. 205 (fig. 3247) only. This cock is handled with key 46 (fig. 3215).

Burnt stock car. (For horses.) Figs. 45-7. A car specially designed for the transportation of valuable horses and trotting stock.

2. (For cattle.) One of the older and best arranged cars for the proper transportation of cattle. Arrangements are made for feeding, watering, and protection of the stock.

Bushing. "A lining for a hole."—Knight. Usually a Burton stock car. A lining for a hole. Often contracted into bush.

Other objects, as a shaft, valve, etc., which is inserted in a metal cylindrical ring which forms a bearing for some joint. Butt-hinge bushing. Brake-shaft bushing. Brake-shaft bushing. Brake-shaft bushing. Brake-shaft bushing.

Other bushings are commonly termed simply bush. Bushing is often ornamented with an acorn; and those having a washer between the two knuckles, but no acorns, are known as Blake bushing, which see. The best butt-hinges have washers, which are generally plain, but figs. 2993-7 show a butt-hinge with ball-bearing washers. Butt-hinges are commonly termed simply butt.
Canda freight-car truck. Figs. 4792-4803. This is a modified type of the "Suspension-car truck" with the number of parts considerably diminished. The essential features of it are: 1, the lateral motion of each pair of wheels in the truck-frame, which is accomplished by hanging the truck-frame in stirrups, over the journal-boxes; 2, the carrying of the car-body and load on V-shaped body side-bearing, which bear upon swing-links supported in a body-bearing casting, which last is also the spring-cast. The truck has a center-pole, but it acts only as a guide and does not carry the car-body or load. The truck has transom, but no body-bolster or spring-plank.

Canda refrigerator-car. Figs. 12, 283-6. A refrigerator-car whose chief features are: (1) the insulation, (2) the economic method of effecting it, (3) the arrangement for icing, (4) the circulation of air within the car. The insulation (see also figs. 1900-2, 2050) consists of an exterior sheathing of boards which are fastened on inside and allow a circulation of free air beneath them. This is to put the car in the shade and to give a free circulation of air around about the inclosed and shaded car, thus preventing the sun generating to the insulated part of the car. Beneath this exterior sheathing of weather-boards is a sub-sheathing, several layers of tar paper, one of felt 1 in. thick, two 1-wood partitions and a lining 4 in. thick. The tar paper is tacked upon both sides of triangular frames, which frames wedge the felt in place, thus saving any nailing and fitting.

The construction of the ice-crates is shown in the engraving, the air circulating through the crate and through its slats in the top and out at bottom, beneath the slatted floor and up into the car.

Canda refrigerator car-door. Figs. 12, 1880-2. A door that is set in 1½ ins., so that the outside frame may be flush with the siding. The door is made tight by forcing it bodily into the door-casing against rubber packing, by toggle-joints actuated by a lever on an eccentric rod, as shown. The door is carried on a frame that slides on a track somewhat like an ordinary freight-car door.


Candelabrum. 10, figs. 2452-3a. A bracket or suspended chandelier carrying several candles, or gas-jets in imitation of candles.

Candle. A special kind of large diameter called car-candles are used for lighting passenger-cars and burned in candle-cast, figs. 3383. Since the introduction of high-proof mineral oils they are now rarely used. The best car-candles are made of paraffin and hydraulic pressed.

Candle-bottom. Figs. 3245, 3259, and 3885. See Candle-lamp.

Candle bracket-lamps (Pintsch system). Figs. 3244-5 and 3248-9. Are for use in emergency, as in case gas gives out. May be attached to wall or to any center-lamp at will.

Candle-holder. Fig. 3884. See Candle-lamp.

Candle-holder cap. 21, fig. 3884. See Candle-lamp.

Candle-holder cap. 29, fig. 3884. See Candle-lamp.

Candle-lamp. Figs. 3244-4, 3248-9, 3259, 3294-6. A lamp for burning candles, sometimes elaborated into a chandelier with two or three burners. Candles, however, are now but little used except in emergency bracket-lamps, to be used when the gas or electric lights fall. A peculiarity of this form is seen in figs. 3293 and 3294. The candle is placed within a candle-holder, fig. 3884, carried within a candle-bottom, fig. 3888. The candle-holder consists of a candle-holder cup and candle-holder cap connected by the candle-rods, fig. 3884, and having a light spiral candle-spring within. As the candle burns away it is pressed upward by the candle-spring against the cap so as to keep the flame always in one position.

Candle-rods. 23, fig. 3884. See Candle-lamp.

Candle-spring. 24, fig. 3884. See Candle-lamp.

Calamined iron. See Kalamined iron.

Callender lamp-burner. Fig. 3881. One of the no-chimney burners.

Cam (Yale lock). The revolving-dink, usually of a spiral eccentric or heart-shape, fixed on the outside of the shaft which carries the tumblers.

Cane-seat. Figs. 3943-6, 3990. A seat made of woven strips of cane or rattan. For additional strength it is now often canvas-lined, the cane seating then coming in rolls. The plane, or rattan, is woven close and cemented to the canvas. Fig. 3912.

Cannon-car. Fig. 4804. A car specially constructed for carrying heavy cannon. Also called gun-car.

Canopy. Figs. 3438-33. See Lamp-canopy. Also called a smokebell, which see. A platform-hood is sometimes called a canopy.

Canopy return-ribs. Figs. 123940. See Ventilators.

Cantlever-truss (overhang of underframe). Shown in fig. 512, and W, fig. 514. An inverted truss which bears upon the side-all directly over the body-bolster. The inner end is connected by a tie-road to the innerend of the truss at the other end of the car-body, while the outer end supports the overhang of the underframe by a vertical tie-road and by a diagonal brace-road similar to the overhang truss-road of the old Pullman framing. It is clearly shown in fig. 512.

Cant-rail (English). 98, figs. 5014. American equivalent, plate. A horizontal timber running along the top of the upright pieces in the sides of the body, and supporting the roof and roof-sticks. Its upper edge is cut to the bevel of the roof; hence its name.

Canvas. A coarse cloth, made of cotton, used for outside covering of street-car roofs and for upholstering seats. Roofing-canvas is used for covering street-cars.

Canvas-lined seating. Fig. 3912. See Cave-seat.

Cap. The top or covering of anything. See Arm-cap.


Cap. The term used in the United States to designate a vehicle or carriage for running on a railroad. As the term is usually employed, it denotes any vehicle used for transportation and not belonging to the motive power of a railroad.

The term Coach, which see, is synonymous with passenger car. In England passenger-cars, or coaches, are called carriages (first, second, and third class), and freight cars, wagons, or trucks, and vans, all of which see.

Cars are divided into two general classes—passenger-cars and freight-cars. The latter is also further subdivided into freight-cars proper and working or construction cars, the latter including a great variety of types, but a comparatively small number of each type. The prices allowed by the Master Car-Builder's Association for the various forms of freight-cars will be seen under Freight-car, which see. Street-cars, for city and suburban use, take their names from the motive power employed to move them, as Horse-cars, Electric-motor cars, Cable-cars, etc. They constitute a class by themselves, which see. Hand-cars, which see, are a light vehicle moved by...

Car-bender. See Candle. Car-coupler. An appliance for connecting or coupling cars together. All passenger-car couplers and the greater part of the freight-car couplers in use are automatic. By Act of Congress, Feb. 27, 1898, all engines, passenger and freight cars engaged in interstate commerce must be equipped with couplers, that couple automatically by impact and that may be uncoupled without going between the cars, on or before Jan. 1, 1898. A penalty of $100 is imposed for each violation of this act, unless the time shall have been extended for each road by the Interstate Commerce Commission after a hearing and for a good cause. This act and the anticipation of such legislation by the roads have been strong factors in the abandonment of the old link-and-pin drawbar, and the adoption of the vertical-plane automatic coupler. Of automatic couplers there are a great many; the freight-couplers all conform to the lines adopted by the M. C. B. Association and shown in fig. 5499; they differ chiefly in the lock and the device for uncoupling. The general dimensions of the coupler universally adopted for freight service are given under figs. 5499-5505 with the limit gages to which all M. C. B. couplers should conform. The same gages are applicable to passenger couplers. The method of attachment of coupler recommended by Car-blower. See Axle. Car-brake. Figs. 5419-30. M. C. B. Standard. Also, 2, figs. 4890-4960. A shaft made of wrought-iron or steel to which a pair of car-wheels is attached. In nearly all cases the wheels are both rigidly fastened to the axle, but sometimes one or both of them are made so that it can turn independently of the axle. The following are the names of the parts of an axle: Center of axle. Neck of axle. Wheel-seat. Dust-guard bearing, Collar, Journal. See Axle. Hammered car-axle. Car-bodies. Figs. 229-615. Car-body details. Figs. 817-948a. Car-box. A journal-box, which see. Car-box jack-screw. Figs. 3730-1, 3781, 3793. A low screw or hydraulic jack to fit under a journal-box so as to take the load off the journal-bearing and enable it to be removed. Carburetor (Frost system of car-lighting). Figs. 3113-5. The carburetor is a square box, hermetically sealed, which is provided with an internal spiral chamber, 15, figs. 3113-5, sixty feet long, filled with capillary material. It has also a carburetor flue, which provides for the passage of air from the inside of the car. As a means of furnishing heat to the carburetor, it is surrounded with an air space which communicates with the inside of the car, so that warm air from the car constantly passes around the outside of the carburetor and out through the ventilator. To protect the car from the extremes of heat and cold, it is surrounded by a double mullion lined with hair-felt.

The air is supplied to the carburetor by means of the roof-pipe, and is conducted through the tee, 9, and the air-pipe, 10, to the copper-coil, 11, where it is heated by the lamp. From the coil, the heated air passes to the air-inlet, 12, where the current is divided. The greater part of the air passes down through this casting into the interior of the carburetor and the remainder continues its course through the air tube to the by-pass nipple, 14, in which is located a diaphragm, with a hole of sufficient size to admit of the passage of a limited amount of uncarbureted air. The air which has entered the carburetor at the air-inlet, 12, moves slowly through the spiral-chamber, 19, filled with a materials, mainly furnished by the gas flowing through the troughs, 19, to the absorbent wicking. The carbureted air to replace the gasoline passes up through the bleed-well tube, 21, and nipple, 22, to the bleed-outlet, 6, and thence into the can. As soon as the can becomes saturated, the excess oil collects in the bleed-well and prevents the further flow of oil from the can.

Car-candle. See Candle. Car-coupler. An appliance for connecting or coupling cars together. All passenger-car couplers and the greater part of the freight-car couplers in use are automatic.
heating-systems. See also Stove. Cook-stove. Range.
Carline, or caraling. 81 and 82, figs. 229-66, etc.; 100, figs. 435-73, etc.; and 200, figs. 536-606. A transverse bar of wood or iron which extends across the top of a car or from one side to the other, and which supports the roof-boards. In passenger-cars carlines are divided into main carlines, figs. 1245-49, passing entirely across the car; short carlines or deck carlines, which are confined to the upper-deck, and rafters, 101, figs. 435-73, and fig. 1215, which are confined to the lower-deck. The carlines of freight-cars are also rarely called rafters. The main carlines are usually compound, i.e., built up of wood and iron. They sometimes pass directly from side to side of the car across and under the upper-deck, when they are termed continuous or straight carlines, but usually are best to the outline of the clear-story, when they are termed profile carlines. In freight-cars the main carline is one made stronger than the others for carrying the purline and self. Other carlines having special names, which see, are:
Carline knee-iron. b, fig. 515. An angle iron which connects the end frame to the plate.
Carlton & Stroudley fastening (steel-tired wheels). Fig. 515.
Carlton & Streoudleyfastening (steel-tired wheels). Fig. 515.
Card-replacer. A device for forgetting a derailed track back on to the track. It usually consists of two inclined planes by which the wheels are raised so that the flame of the outside wheel can ride upon and over the rail. They are placed at an acute angle with the track so as to guide the wheels and force them upon the track. See Wrecking-frog.
Carriage-bolt. Fig. 3710. A bolt made square under the head or through the car. It generally refers to any arrangement for warming cars, other than stove. See also Stove. Cook-stove. Range.
Carriage, or railway carriage (English). Figs. 501-4. An open four-wheeled vehicle, with low sides, adapted to run on passenger trains, and carry a road vehicle.
Carrier. See Brake-hanger carrier.
Carrier. See Brake-hanger carrier. Parallel brake-hanger carrier.
Car-door. See Black-hanger carrier. Parallel brake-hanger carrier.
Car-doorlock. 19, fig. 1788; figs. 2644, 2735. A lock for a car-door, usually meaning for a passenger-car door. See Freight-car lock. Padlock.
Car-doorhangers. Figs. 2825-45, 1800-52. A device for hanging a sliding door so that it may be movable. In common practice the simple hooks upon which most freight-car doors are hung are termed simply door-hangers, which see, while more elaborate forms with rollers have their names expanded into car-door hangers.
Car-door hangers with wheels or rollers to prevent friction are termed Door-sheaves, of which there are various types. The type in most common use for heavy doors is shown in figs. 2835, 2837, 2839, 2844-4, in which the door carries a slotted plate, which rests upon the pivot of a large wheel which rolls upon the track; another class, figs. 2831-4, are of the "grindstone-bearing" type, the journal of the bearing-wheel proper resting upon other wheels. Other types in use are shown in figs. 2830, 2832, 2833-43, which have the single wheel in a fixed bearing.
Car-door lock. 19, fig. 1788; figs. 2644, 2735. A lock for a car-door, usually meaning for a passenger-car door. See Freight-car lock. Padlock.
Car-door sheaves. See Door-sheaves and Car-door hangers.
Car-drain-cup (Automatic air-brake). Figs. 1746 and 1747, figs. 2830, 2831, 1244-41. An attachment to the brake-pipe of every car to collect the water of condensation, which is drawn off from time to time by a cock at the bottom, it is usually combined with an air-trainer and so-called.
Car-furnishings. Figs. 2454-4573. The hardware, upholsterers materials and other fittings, such as lamps, ventilators, water-coolers, etc., used in finishing a passenger-car. In general it includes those parts of a car that are applied after it has left the paint-shop.
Car-heater. Any apparatus for heating cars by convection; that is, by conveying hot water, steam, or warm air into, or through, the car. It generally refers to any arrangement for warming cars, other than stoves. See Baker, Spear, Consolidated, Gold and Safety
into the four following classes: 1st, what is known as a double-board roof, with or without felt or other material between boards. Fig. 3979 is a simple and very largely used form. To this class belong also the Hutchins, fig. 3986; Careyg, fig. 3988; and many other roofs in which the boards are tongued and grooved and have a sheet of painting between the roofing material, or other prepared materials between them. 2d, Single-board roofs, covered with tin or other sheet metal, figs. 3989, 3988-91, the Excelsior galvanized car-roof, 3d. Roofs made of metal sheets, fastened to purline and roof strips, and protected by a single layer of roughly matted tarpaper. To this class belong the Winlow, figs. 3933-67; the "Chicago" car-roof, figs. 3988-78, which is very similar to the Winlow, except that in the Winlow the sheets run clear across the roof of the car, whereas in the Chicago they are in sections, corrugated, and divided by the ridge-pole; and the Excelsior car-roof, in which the sheets are divided by the ridge-pole. 4th, a type of double-roof consisting of inside roof covered with felt, tar paper, or asphalted canvas, and an outside roof built over it to protect the roofing material from injury. This type is illustrated in the Drake & Weir's roof, fig. 3922, and the Neponset red-ripe roofing, figs. 3928-4. Passenger car roofs are commonly of tin, zinc, or galvanized iron or steel of about 25 W. G., painted. For street-cars, painted canvas is used. See also Board-roof, and the various kinds above specified. In respect to form, see Archel-roof, Deck-roof, A car-roof, and X car-roof.

Carry-iron. See Drawbar carry-iron. Inner drawbar carry-iron. McKeen carry-iron.

Car-seal. Figs. 3877-900. A device to secure freight-car doors against opening, by making it impossible without destroying the seal. The original form consisted of a lead disk with two holes to receive a piece of twisted wire, which is compressed by a die so as to leave a seat-mark which must be defaced or the wire cut before the door can be opened. To prevent stripping the seal from the wire and re-inserting it, a detective wire of irregular cross-section is used, figs. 3898-7 and 3900. Sheet-metal eyelet-shackles, in a variety of other forms, are now also used, with or without tin return tags, and also a simple lead rivet with a shackle. Tin shank-builders often have the name of the road printed on them. Of seals there are a great variety, some of the more common of which are shown. See also Seal-locks. Seal-press.

Car-seat. Figs. 3901-1115; 129, figs. 450, and 540-1. The complete set of fixtures on which passengers sit in a car. It ordinarily consists of a seat-frame, seat-cushions, seat-back, arm-rest, foot-rest, and their attachments. Ordinarily, the seats in American cars are placed crosswise of the car, and are made for two passengers. The backs of the seats are generally made reversible. In the Buntin seat end, which see, etc., the seat and back are in one piece and both reversible together. These seats, and, less properly, ordinary car seats, are sometimes called reversible seats. The seats of parlor cars are commonly called chairs (see Revolving chair, Hitchcock chair, Hartley chair, etc.). To replace chair-cars these chairs have been superseded by so-called twin-seats, which see. In private and parlor cars, sofas, placed longitudinally against the side of the car, are sometimes used. In order to give an inclination to the seats which makes the back so of these seats are generally made reversible. In the "Chicago" car-roof, figs. 3988-78, which is very similar to the Winlow, except that in the Winlow the seats run clear across the roof of the car, whereas in the Chicago they are in sections, corrugated, and divided by the ridge-pole; and the Excelsior car-roof, in which the seats are divided by the ridge-pole. 4th, a type of double-roof consisting of inside roof covered with felt, tar paper, or asphalted canvas, and an outside roof built over it to protect the roofing material from injury. This type is illustrated in the Drake & Weir's roof, fig. 3922, and the Neponset red-ripe roofing, figs. 3928-4. Passenger car roofs are commonly of tin, zinc, or galvanized iron or steel of about 25 W. G., painted. For street-cars, painted canvas is used. See also Board-roof, and the various kinds above specified. In respect to form, see Archel-roof, Deck-roof, A car-roof, and X car-roof.

Car-seal. Figs. 3877-900. A device to secure freight-car doors against opening, by making it impossible without destroying the seal. The original form consisted of a lead disk with two holes to receive a piece of twisted wire, which is compressed by a die so as to leave a seal-mark which must be defaced or the wire cut before the door can be opened. To prevent stripping the seal from the wire and re-inserting it, a detective wire of irregular cross-section is used, figs. 3898-7 and 3900. Sheet-metal eyelet-shackles, in a variety of other forms, are now also used, with or without tin return tags, and also a simple lead rivet with a shackle. Tin shank-builders often have the name of the road printed on them. Of seals there are a great variety, some of the more common of which are shown. See also Seal-locks. Seal-press.

Car-seat. Figs. 3901-1115; 129, figs. 450, and 540-1. The complete set of fixtures on which passengers sit in a car. It ordinarily consists of a seat-frame, seat-cushions, seat-back, arm-rest, foot-rest, and their attachments. Ordinarily, the seats in American cars are placed crosswise of the car, and are made for two passengers. The backs of the seats are generally made reversible. In the Buntin seat end, which see, etc., the seat and back are in one piece and both reversible together. These seats, and, less properly, ordinary car seats, are sometimes called reversible seats. The seats of parlor cars are commonly called chairs (see Revolving chair, Hitchcock chair, Hartley chair, etc.). To replace chair-cars these chairs have been superseded by so-called twin-seats, which see. In private and parlor cars, sofas, placed longitudinally against the side of the car, are sometimes used. In order to give an inclination to the seats which makes the back so of these seats are generally made reversible. In the "Chicago" car-roof, figs. 3988-78, which is very similar to the Winlow, except that in the Winlow the seats run clear across the roof of the car, whereas in the Chicago they are in sections, corrugated, and divided by the ridge-pole; and the Excelsior car-roof, in which the seats are divided by the ridge-pole. 4th, a type of double-roof consisting of inside roof covered with felt, tar paper, or asphalted canvas, and an outside roof built over it to protect the roofing material from injury. This type is illustrated in the Drake & Weir's roof, fig. 3922, and the Neponset red-ripe roofing, figs. 3928-4. Passenger car roofs are commonly of tin, zinc, or galvanized iron or steel of about 25 W. G., painted. For street-cars, painted canvas is used. See also Board-roof, and the various kinds above specified. In respect to form, see Archel-roof, Deck-roof, A car-roof, and X car-roof.

Carry-iron. See Drawbar carry-iron. Inner drawbar carry-iron. McKeen carry-iron.

Car-truck. Figs. 4580-4966. Mechanically, a small low wheel for a railroad car. Chilled-wheels are called single-plate wheels or double-plate wheels, according to the number of plates between the hub and rim. When one plate is used, it is sometimes made flat, with ribs called brackets on the back, and sometimes corrugated, without ribs. The disks of double-plate wheels also are generally corrugated. What is known as the Washburn wheel has two corrugated disks extending from the hub about half way to the tread, and a single plate, with curved brackets on the back, between the tread and the double plates. This wheel is generally known as a double-plate wheel. Cast-iron wheels are also made with spokes, either solid or hollow, principally for locomotive use. Those in use in this country are either cast-iron with a chilled tread and called chilled-wheels, or are steel tired with wrought or cast iron or combination center. For freight-cars the cast-wheel with a chilled tread is still largely in use. As to passenger-cars the M. C. B. Committee on Steel-Tired Wheels of 1894 reported that replies from car-builders representing 57 percent of the passenger car equipment in this country gave the number of wheels in use as 51,862. These members reported 145,820 wheels under passenger equipment, of which 86 percent, were steel-tired. Of the entire passenger equipment in the country, probably not more than 25 per cent. has steel-tired wheels. Of the 57 per cent. reported, of the Allen wheels.
there were 18,948, the Paige 8,184, the Krupp 6,021, the Snow 3,875, the Arbel-Cockrell 3,218, the Boies 2,580, the Washburn 1,681, the Brunswick 1,387; of the other types there were less than 1,000.

The standard diameter of freight-car wheels may be said to be 30 ins.: 30 and 31-in. wheels, and wheels as small as 28 ins., and even less, are used for locomotive trucks. The average weight for a 33-in. wheel is 575 lbs. For several years there was a tendency to use wheels of large diameter for passenger cars. Forty-two inch wheels became quite common, but there has been a reaction against 43-in. wheels in favor of 36-in. wheels, which are now practically standard for passenger equipment. In England passenger wheels vary from 42 to 48 ins. in diameter, and freight-car wheels are always 86 ins. Both always have steel tires. Prices of wheels and axles and cost of work on same has been fixed at various rates by the rules for interchange of cars of the M. C. B. Association. See Interchange of Traffic.

The parts of wheels are the flange, tread, rim, fire, retaining-rings, plate, ribs, spokes, center, hub and axle-seat.

The varieties of cast-iron wheels beside the single-plate, double-plate, and Washburn, above mentioned, are the combination plate-wheel, combination spoke-wheel, hollow-spoke wheel, open-face wheel, spoke-wheel. Cast-steel wheels have been made, but cannot be said to be in general use. See Steel-tired wheel and any of the above.

In 1893 the M. C. B. Association adopted specifications for cast-iron wheels and a form of guaranty by manufacturers as Recommended Practice. These had formerly been standards of the Association; figs. 426, 7-8, M. C. B. Report. See Wheels, specifications and guaranty.

See also the following wheels:

Allen, figs. 5255-73.
Arbel-Cockrell, figs. 5274-81.
Boies, figs. 5289-91.
Brunswick, figs. 5302-97.
Chilled cast, figs. 5303-8.
Hand car, figs. 5303-34.
Krupp, figs. 5309-505.

Car-window blind. See Window-blind.

Car-window brush. Fig. 3701.

Case. "A covering, box, or sheath; that which incloses or contains: as a case for knives; a case for books; a watch-case; a pillow-case."—Webster.


2. (Back-tumbler spring padlock.) B, fig. 2766.


2. (For Spear heater.) Figs. 3038-60. A cylindrical sheet-iron cover by which the fire-pot is inclosed so as to leave an air-space between the two.

3. (For windows.) The frame which surrounds a window. See Window-casing.

Caster. Fig. 4115. A small wheel on a swivel attached to furniture and on which it is rolled on the floor. By custom of the trade, furnishings which are in reality mere sockets or knobs, like figs. 4112-14, are termed casters, although they are, strictly speaking, not such, not having any rollers. They are distinguished as chair-casters, table-casters, sofa-casters, etc., according to size and probable use.


Casting. Any piece of metal which has been cast in a mold.


Cast-iron spoke-center wheel. Figs. 5373-75, 5372-3, 5313-15, etc.

Cast-iron top (Baker heater). Figs. 2901, 2912, 2921. A plate which forms the top of the fire-chamber. It has perforations around the outside and an opening in the center through which the stove is supplied with coal.


2. (Janney coupler.) 136, fig. 2901. A latch which engages with the point of Janney knuckle and secures it in position when uncoupled.

Catch-lever (Janney coupler). 136, fig. 2901. A crank-lever passing vertically through the catch, by means of which it is caused to release the knuckle for uncoupling.

Catch-spring (Janney coupler). 33, fig. 2901. A coiled spring on the catch-spring bolt operating the catch.

Catch-spring bolt (Janney coupler). 13, fig. 2901. The bbl: 0.1 on which the catch of Janney coupler slides.

Cattle-car. Figs. 38-41 and 355-73. More properly Stock-car, which see.

Cattle-wagon (English). American equivalent, four-wheeled stock-car. A four-wheeled vehicle suitable for freight service, and adapted to carry cattle, sheep, or pigs. The floor boards are laid 1 in. apart to facilitate drainage, and are covered with strips to prevent the cattle slipping.


Ceiling. The inside or under surface of the roof or covering of a room or car opposite the floor. This term is sometimes used to mean sheathing, which see. When the ceiling of a passenger-car is made of painted canvas, or other decorated lining it is termed head-lining; the term ceiling in modern usage being restricted to wood ceiling. The term panel-ceiling is also used as synonymous with wood ceiling, although cloth head-lining is also sometimes put on in panels. Deepening-ceiling, which see, is boarding under the sills of the car, making an air-space between the sills. See Lignomur, Veneering, Paneling.

Ceiling-veneers. Thin boards with which the ceilings of passenger-cars are covered. The term is also applied to the thin preparations of papier mâché, etc., in imitation of natural wood veneers.

Ceiling-furring. The term is used to designate the whole arrangement and the function which it performs, in distinction from side-bearing, which see.

Central filling-piece (steel-tired wheels). Figs. 5310-11, etc. The part surrounding the hub and connecting it with the tire. Also termed the wheel-center. A wheel-center is a hub and central filling-piece combined in one.

Center-bearing. The place in the center of a truck where the weight of a car-body rests. A body center-plate attached to the car-body here rests on a truck center-plate attached to the truck. The general term center-bearing is used to designate the whole arrangement and the functions which it performs, in distinction from side-bearing, which see.

Center-bearing arch-bar. 66, figs. 4905-66. See Center-bearing-bridge.

Center-bearing beam. 66, figs. 4677-86. See below.
Center-bearing bridge (six-wheel trucks). 66-7, figs. 4957-66. A longitudinal iron beam, formerly sometimes a wooden beam, the ends of which rest upon the spring-beams and by which the truck center-bearing-beam, 65, carrying the center-plates, is supported. It consists of the center-bearing arch-bar and inverted arch-bar, including between them the center-bearing beam. Truck side-bearings, 61, similar in form to an arch-bar, are also attached to the extremities of the spring-beams, connecting them together.

Center-bearing inverted arch-bar. 67, figs. 4957-66. See above.

Center-block. A center-bearing beam, which see.

Center-block-column. Figs. 4990-2. A column placed on top of the center-plate block and between it and the center-bearing arch-bar.

Center-block fitch-plate. Figs. 5056-7. See Centre-block and Flitch-plates.

Center-body truss-rods. Those nearest the center, when two or more body truss-rods are used under each side of a car-body.

Center-brake-lever (Elder brake). 9, fig. 1462. A horizontal lever placed underneath the bottom of a car-body, and attached by a fixed fulcrum in the center of the body and of the lever. It is connected to each of the brake-beams by secondary brake-rods attached near to the fulcrum, and to the brake-shaft on each platform by a brake-shaft connecting-rod.

Center-brake-lever chain (Elder brake). 10, fig. 1462. A chain which runs over the center-brake-lever sheaves, on the center brake-lever.

Center-brake-lever sheave (Elder brake). 11, fig. 1462. See above.

Center-brake-lever spider. A wrought-iron support, resembling the letter H, for the center brake-lever.

Center-buffer-follower-guide. See combination follower-guide.

Center-buffer-spring. Fig. 1401. See Buffer-spring.

Center-buffer-spring (Janney-Miller coupler). A spiral spring situated above the draft springs, intended for buffing purposes only.

Center buffer-stem. Figs. 1388-4. See buffer-stem.

Center-buffer-yoke (Janney-Miller coupler). The yoke connecting the central Miller buffer with the Janney equalizer.

Center-counterbrace. 165, fig. 456. A counterbrace in the body of the car between the trucks, to stiffen a compression-beam brace. See Counterbrace.

Center-cross-bar (English). See Brake-shaft cross-bearer.

Center-cross-beam. A, figs. 335-7. A cross-timber framed into the two intermediate sills of a coal or ore car, to which the center doors are hung.

Center-cross-beam-cap. B, figs. 337-7. A cap-piece to cover the center cross-beam.

Center-cross-tie-timber. Fig. 399. A cross-tie timber in the middle of a car, generally placed between the double drop doors of a gondola-car.

Center door-hinge and stop (English). 179, fig. 501. The center of three brass hinges securing the door to the body. The insertion of two rubber plugs into striking pieces or side wings on the hinge constitutes Cross's patent stop, which is used to prevent the door striking the outside of the body when thrown violently open. See also Seat-rail support.

Center door-rail. See Middle door-rail.

Center-draft-bar. 33, figs. 2583-86a. A draft-bar which is connected directly with the king-bolt of a truck. It is a style specially designed for use on the very sharp curves (of 90 and 100 ft. radius) of elevated railroads, and is confined to those lines. See Barnes and Manhattan draft-gear.

Center draft-tube (Argand lamp). A, figs. 3371-2. The hollow passage for air in the center of the burner.

Center floor-timbers. 4, figs. 239-66, etc. The center-sills, which see.

Center-girth. See Door-center girth.

Centering-gage. A gage to fix the middle point of an axle.

Center-lamp. 135, fig. 447; L, fig. 540-1, 3235-75. A lamp suspended from the center of the ceiling of a car. The term is used to distinguish center-lamps from side-lamps, the latter being attached to the sides of cars. Center-lamps having two or more burners are commonly called chandeliers.

Center-pieces (air-pump of Westinghouse brake). 4, fig. 1699. An iron casting which forms the lower head of a steam-cylinder, and the upper head of an air-cylinder.

Center-pin, or king-bolt. 18, figs. 239-66, etc.; 16, figs. 455-72, etc. A large bolt which passes through the center-plates on the body-bolster and truck-bolster. The truck turns about the bolt. It normally has no strain upon it and no key or nut at the lower end. It is therefore a mere pin and not a bolt in the usual sense, but in wrecking cars the center-pin is sometimes provided with keys to fasten the truck and car-body firmly together. The name king-bolt is derived from the name of the corresponding part for the front wheels of a wagon. Center-pin, however, is the more common term.

Center-plate. 15, figs. 435-7, 4363-8, 4719-23, 4979-81, and 5178-82. One of a pair of plates made of cast or malleable iron or pressed steel, which support a car-body on the center of a truck. There are two, the body-center-plate and the truck-center-plate, which are sometimes also called the male and female center-plates. The center-pin or king-bolt, which see, passes through them but carries none of the strain except in emergencies. See Swinging-platform center-plate.

Center-plate block. Fig. 4044. A piece of wood placed under a truck center-plate to raise it up to the proper height.

Center-plate bolster-truss (double iron bolster). Fig. 1391.

Center-post (side dump-car). 111, Fig. 332-5. A post standing on the center-sills and bolted to the transverse filling-pieces, and helping with other center-posts to carry longitudinal floor timber to which the planking of the inclined floor is spiked.

Center-shaft (hopper-bottom cars). 70, figs. 298-315. A winding-shaft, which see.

Center-sills. 4, figs. 229-66, 455-73, etc. The two main longitudinal timbers underneath the floor which are nearest the center of the car. In iron-frame cars they are usually T-beams, which see.

Center-spring washer (Janney coupler). The washer against which the Janney centre-buffer spring impinges.

Center-stay (of a chandelier). 30, figs. 3561, 3571-76. The central support around which the lamps are grouped. In some cases it is the only method of attaching the chandelier to the ceiling, and in others there are several inclined "roof-braces" or vertical lamp-arms in addition. In "hurricane" or "tornado" lamps, which see, the center-stay is usually a hollow tube for the passage of air.

Center-stem chafing-plates. Figs. 1389-70.

Center-stem pipe (of a chandelier). Figs. 1389-70.

Center-stop (tip-car). A bracket or block attached to a draw-timber to restrain the body from moving longitudinally.

Center suspension-lamp. Figs. 3235-8. See Pintsch lamps.

Center-truck. Figs. 3235-8. The middle one of three trucks of a car.

Center-truck roller. 126, figs. 333-5. A roller placed between two plates, one attached to the car-body and the
other to the center-truck, so that the truck can move laterally and permit the car to pass over curved track.

Center-truck roller-plate. (Metal.) 123, figs. 339-3. A pedestal with projecting horns which engage with the bosses on either side of the roller and prevent displacements.

Chafing-clip. (National hollow brake-beam.) Figs. 1857, 1629a-b.

Chafing-plate. A metal plate to resist wear, used on brake-beams, truck-transoms, swinging spring-beams, etc.

Chain. "A series of links or rings connected, or fitted into one another, usually made of some kind of metal."—Webster.

Chain-box (of a derrick). A box below the hoisting-gear for holding loose chain or rope.

Chain-coupling-link. Two or more coupling-links attached together like a chain. Used with a draw-hook, which see.

Chair. "A series of links or rings connected, or fitted into one another, usually made of some kind of metal."—Webster.

Chair-car. Fig. 98. Another name for parlor or dining-room cars, fitted with arm-chairs which are usually adjustable arm-chairs, like the Hartley or Hitchcock, where this distinctive name is used. The term chair-car generally is applied to a car equipped with reclining-chairs or twin car-seats, and which car is run on local night trains so that people may rest and take cat-naps.

Chair-caster. See Caster.

Chair-leg caster or socket. Figs. 4113-15. A hollow casting which fits on the end of a chair-leg. Such casters, when casters proper, are provided with wheels, but frequently in car construction they are without wheels, and are then by custom of the trade still called casters (fixed or rigid casters), although properly not such.


It consists of a thin plate of iron with an angle iron riveted to the bottom and sometimes one at the top and bottom. It is fastened to each post by large wood screws, and is bolted to the side-sills. It is sometimes made to serve as a substitute for truss-rods under the car, and to form a part of the inside finish under the window. Cars trussed in this way are said to be as light and cheap as those in which the ordinary form of construction is used, but the truss has not so far found sufficient favor to be adopted as standard, not even by a few roads.

Chamber. See Dust-guard chamber.

Chamber-cap (Westinghouse brake). See Right chamber-cap.

"Champion" lamp-burner. Fig. 3880. One of the no-chimney burners.

Chandelier. A center-lamp having two or more burners, but generally meaning only those of very elaborate form or having more than two burners, as the two and four light chandeliers, figs. 3361-76.

Channel bar. Figs. 4661-3. A general term applied by makers to iron rolled with the following section: [J. They are in use for truck-sides of iron-frame cars, for transoms and spring-planks of trucks. L-bars, which see, are used for inside sills of under-frames and for truck-bolsters, figs. 4664-6.

Chapell-car. Fig. 303. A car, a number of which have been built, in which church services are to be held. They have been used in the West and Northwest, where missionary work has been carried on quite actively in them. They are encouraged by the railroads, and the meetings are said to be largely attended by railroad employees.

Chaplet. A piece of iron used in a mold for casting, to hold a core in its place.


Chase refrigerator-car. Fig. 14. An ice and salt car. In each end of the car are placed cylinders, in the center of which is a pipe larger at the top than at the bottom. The cylinders are filled from the roof with broken ice. Drainage is had by a valve at the bottom of the cylinders operated by a rod running to the top.

Check-chain. 68, fig. 4945. A chain attached to a truck and the body of a car to prevent the former from swinging crosswise on the track in case of derailment. Such chains are usually attached either to two, or to each of the four corners of a truck and to the sill of the car. At 8th Annual Convention, Cincinnati, 1874, it was "Resolved, That truck and car-body check-chains are, when properly applied, a valuable acquisition on passenger equipment, and your committee recommend their general use." In 1893, the use of truck and car-body check-chains, properly applied, was adopted as a Recommended Practice.

A difficulty with check-chains has been that the eyes by which they are attached to the body and truck were not strong enough to resist the strain, and that the chains themselves have been too long to come to a bearing soon enough to have the trucks controllable.

Check-chain coupling-plate. A plate attached to a truck timber to resist the wear of a check-chain.

Check-chain eye. 70, figs. 4943 and 4989-9. See Body check-chain eye. Truck check-chain eye.


Check-gage for mounting wheels. Fig. 5496. The check-gage for mounting wheels was adopted as standard in 1894. The gage is shown as applied, in one position, to a pair of standard wheels mounted to standard distance, and it is important that such gage be universally used after September 1, 1894, in mounting wheels, in order to have them pass inspection at interchange points.

Check-valve (triple valve). 15, figs. 1706-7.

Check-valve case. 13, figs. 1706-7. See above.
Check-valve case-gasket. Figs. 1706-7. See above.
Check-valve spring. Figs. 1706-7. See above.
Chicago car-coupler. Figs. 2111a-d.
Chicago grain-door. Figs. 1870-5. One of several grain-doors, which slides up and down on a grain-door rod fastened to the door-post and is hung to the carriages when not in use. The top of the door is fastened to the rods by a ring and a door-arm, fig. 1872.

Chicago, Milwaukee & St. Paul" refrigerator-car.

Chicago sectional-corrugated car-roof. Figs. 2368-78.

Chicago, Milwaukee & St. Paul system of direct steam-heating. Figs. 3056-7.

Chicago sectional-corrugated car-roof. Figs. 2368-78. See car-roses.

Chill. A kind of crystallization produced when melted cast-iron is cooled suddenly. It is usually accomplished by bringing the molten iron in contact with a cold metal (usually iron) mold. The hardened part of a car-wheel is called the chill. The mold in which a chill is produced is called a chill-mold. The name chill-mold has been given to this. Chilling was invented in Philadelphia in 1847. The name of the inventor is not known. The process was never patented. All cast-iron railroad car-wheels are chilled wheels.

Many wheels are now chilled in what are termed contracting chills, Figs. 3964-78, which are made in such form that the heat from the molten metal automatically keeps the chilling surface (in contact with the wheel-tread) very nearly a uniform size and shape; even though the mold does expand as a whole. The chilling surface may even contract to less than its normal size. The result of this, it is claimed, is to give a deeper and more uniform chill and a more perfect wheel. This contraction is accomplished by cutting the chilling surface into radially divided segmental blocks which are connected to the mold by radial arms. These radial arms are several inches long and are of less cross-section than the segmental blocks. When molten metal is poured against the segmental chilling-blocks, the heat travels by conduction to the radial arms which expand in the direction of their radial lengths and thus crowd the segmental blocks in toward the center of the wheel, contracting its size; hence the name contracting chill.

There are two types of chill in general use. The Whitney, figs. 3574-8; the Barr, figs. 3846-7; and the Cania, figs. 5886-78. The Whitney contracting chill was first invented and patented in 1886 by John R. Whitney, of Philadelphia. The Barr chill is alternately heated and cooled by forcing currents of steam and cold water through the periphery of the chill to keep it normal so as to intensify the contraction. In the Cania chill the mold is made up of three rings with the alternate segmental chilling-block joined successively to the two upper rings and the two lower rings.

Different kinds of iron have the property of chilling in different degrees, and the different kinds are mixed frequently to secure the best results. There are numerous theories advanced to explain and describe the phenomena, for which see the scientific books on metallurgy.

Chill-crack. An irregular crack developed in casting upon the chilled surface of the tread of car-wheels. Chill-cracks not over 1 in. wide, and not extending to the flange, are not considered as injuring the wheel or as indicating weakness or inferior quality. Iron which makes the most durable car-wheels is most liable to chill-cracks. See Wheel specifications. Interchange of Traffic.

Chimney (for lamps). Figs. 3412-22. See Lamp-chimney for the standard dimensions.


Chimney-holder and reflector combined. Figs. 3848.

Chipping (of chilled car-wheels). A scaling off of small portions of the chilled metal, due to imperfect or irregular crystallization. Wheels chipped on the tread to a depth of more than 1 in. or leaving the tread less than 34 in., are rejected under rules for interchange of car. See Interchange of Traffic.

Chock or chock-piece (snowplow framing). Figs. 409-8. In shipbuilding a wedge or triangular-shaped block of timber is used to unite the head and heel of consecutive timbers: Century. Also intended as a filling-piece to give form or shape. Hence in a snow-plow a timber which joins successive timbers, and fills out to give shape, as shown.

Chord (of a truss). The long horizontal members at top and bottom of a truss. The side-ribs and plates of a car-body are top and bottom chords of the side trusses, but the terms are not used in car-building. In England the chords are termed booms.

Christie brake-shoe and head. Figs. 1638-7. One of many forms of this detail in which combined strength and convenience of removal have been sought. See Brake-block.

Church-car. See Chapel-car.

Chute (Baker heater). Fig. 3870. The interior frame of the feed-door forming a passage for the fuel.

Cigar-holders. Figs. 4277, 4282.

Circulating-drums (Baker heater). Figs. 3968, 3969-8. A cast-iron vessel with hemispherical ends, on top or inside of the car, filled with water, and connected by two pipes with the coil in the stove and with the pipes which extend through the car. As the water in the coil becomes heated it ascends to the drum, and from there it descends through the other pipe to the radiating pipes in the car. After passing through them it is brought back by return pipes to the coil, when it is again heated. Thus a continuous circulation is kept up. It is also called the expansion-drum. There are several styles, among them the upright, fig. 2903; the horizontal, figs. 4349-50; and the cold metal, figs. 3504-5.

Circulating pipes (Baker and other heaters). Figs. 2957 and 2959. A general name for the pipes which carry the steam or other heated fluid through the car and return it again to the heater. The term radiating pipes is also used.

Circular tail-light. Fig. 3392. See Signal-tight.

Circumference measure (M. C. B. Standard). Figs. 5422-3. A steel tape-measure specially designed to measure the circumference of car-wheels.

Clamp. 1. In general, something that fastens or binds.
a piece of timber or of iron used to fasten work together.—Webster.

2. A frame with two tightening screws, by which two portions of an article are tightly compressed together, either while being formed or while their glue joint is drying.—Knight. See Deck-sash quadrant clamp. Deck-sash pivot clamp. Platform-timber clamp. Ridge-clamp. Closed-door clamp.

Clay car-seal. Fig. 3893. A seal made of a wire hooked at the ends into a piece of burnt clay in such a manner that it can be unfastened without breaking the clay-seal.

Clear-story. 110-11, figs. 435-73. An upper story or row of windows in a church, tower, or other erection, built within the limits determined by the car.

Clasp. Fig. 3827. See Door-bolt clasp.

Clevis-hook (of "American" tender-brake). The connection of the brake-chain to the brake-lever. Glitch nail. A wrought-iron forged nail, so named because it can be bent or clinched without breaking. Cut nails, the common and cheapest kind, although of wrought-iron, will not clinch.

Clip. A U-shaped strip for attaching any body, more particularly a pipe, to the side of a partition. See Berthspring clip. Deck-sash quadrant clip. Pipe-clip.

Closed car. Figs. 5443-4. Generally a car with end doors, and the sides closed by the car panels or sheathing, and windows, so that the passengers are protected from the wind and weather.

The term is used for a winter car to distinguish it from an open or summer-car, in which the seats are usually transverse to the car, the sides open, except for curtains as shown in fig. 5649.

Closed-door stop (freight-car doors). 73, figs. 259-66, 853-73. A block of wood or iron to prevent outside slidding-doors from moving too far when they are closed. See also Open-door stop.

Close return-bend. Fig. 2945. A short cast-iron tube made of a U-shape, for uniting the ends of two wrought-iron pipes. It differs from an open-return bend in having the two branches in contact with each other.

Closed. 1. A small room, usually for storage. See Linen-closet, Wine-closet, etc., figs. 482-4. A closet is a locker of less than the full height of car, but this distinction is not always observed.

2. A retiring-room for sanitary purposes, more commonly called a saloon, which see.

Closed-hopper. Figs. 2844-42; 131, figs. 489, 448. Also called soil-hopper. A metal or porcelain hopper used in saloons.

Closed-hopper ventilator. Figs. 3841-4. See Bell's exhaust hopper-ventilator.

Club-car. Figs. 161-2. A buffet-parlor car built and owned by railroad companies but kept expressly as a private car for members of a club, which members live in the suburbs of a large city. The car makes such trips each day as suit the convenience of the club members, and none others ride in the car.

Clutch-coupling. See Brake-hose coupling.

Clusters (Pintech lamps). The four-flame cluster, No. 327 (fig. 2809) is the one ordinarily used in center-lamps. Where a large amount of light is required, as in compartments having but one lamp, five or six flame clusters (Nos. 228, 229) may be used. Where a small amount is needed, as in central corridors at ends of cars, two-flame clusters, No. 228, may be used.

For vestibule lamps, No. 194 (fig. 3239), the two-flame cluster, No. 238A. (fig. 3210), is required. Four-flame vestibule lamps, No. 195 (fig. 3241), use the ordinary four-flame cluster, No. 227.

All clusters are provided with check screws, placed at the base of the burner arm, by means of which the flow of gas to each burner can be regulated. These check screws are locked in place by small nuts.


Coach. Figs. 89-96, 135-9, 419-460. A term used to designate cars for the conveyance of passengers, in distinction from freight, baggage, and express cars. The term was originally proposed by John B. Jarvis. See "Railway Property," page 178. By increasing usage the term is used as an equivalent for day-car in distinction from sleeping-cars as well as freight and baggage cars, but "sleeping coach" is a common expression.

Coach-bolt (English). American equivalent, carriage-bolt, which see.

Coach-screw (English). American equivalent, lag-screw, but coach-screw is also used. A square-headed screw with a pointed end used to screw into wood.

Coal-box. A box for carrying coal. It is usually a long narrow deep box, placed between the heater and the end of the coach.

Coal-car. Figs. 39-98, 65-72, and 299-334. A car especially designed for carrying coal. The standard cars built for...
coal service to-day are largely what are termed gondolas. They are from 27 to 88 feet long and carry 50,000 lbs. They are usually designated by the character of the dumping devices applied; as, Drop-bottom, Hopper-bottom, Box hopper-bottom, Pyramidal hopper-bottom, Twin hopper-bottom, etc. Four-wheeled coal-cars are discarded as rapidly as they are worn out, and being replaced by 60,000 lb.-gondolas with hopper-and-drop bottoms.

Where railroads have a large lumber business, the drop-bottom cars like figs. 294-5 are in favor in preference to figs. 305-320.

See Eight-wheeled car. Hopper-bottom car.
Four-wheeled car. Twin hopper-car.

Coal-hopper. See above and Hopper.

Coal-oil burner. See Mineral-oil burner. Figs. 3836-97.


Cobb's Elliptic seat-springs. 1. H. B. Cobb's broad band elliptic seat-springs, fig. 4003. The difference is shown in the illustrations.
2. Z. Cobb's narrow-band elliptic seat-springs, fig. 4004. Also called Cobb's striker-arm, which see.

Cobb's pivoted seat-arm. Fig. 4083. A device by which the seat-arm is hinged at the seat-back by swing-joint so that in reversing the back is raised up, making a cushion.

Cock. 4 and 6, figs. 3525-7, and 3489-94. "A spout; an instrument to draw out or discharge liquor from a cask, vat, or pipe."—Webster. See Faucet for the various forms; also Bibb-cock.

Combination. An adjective often prefixed to the parts of the Janney-Miller combination coupler. The parts in the following list are designated sometimes with and some times without the prefix "combination." See Janney-Miller coupler and the names of the several parts, omitting the word "combination."

Combination ball-joint washer.
Combination bail-joint. The barrel or shank to which the Janney head or Miller hook is secured.
Combination chafing-pan.
Combination fast-plate.
Combination follower.
Combination follower-guides.

Combination head (Janney-Miller coupler). A head for the Janney coupler subordinately similar to the ordinary form, but adapted for use in the Janney-Miller combination coupler.

Combination hood.
Combination Janney head. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.
Combination Janney head-lever. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.
Combination Janney head-stopper. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.
Combination Janney head-stop. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.

Combination Janney head-taller. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.
Combination Janney head-stop. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.

Combination Janney head-stop. Combination large equalizing-gauge (right and left). Combination Miller equalizing-gauge.

Cold-shot. Small globules of iron resembling ordinary gun-shot, which are found in the chillied portion of cast-iron vessels.

Collar. 1. "A ring or round flange upon or against an object."—Knight. Ordinarily an axle-collar, below, is meant.

See Deck-collar. Lamp-collar.

Dust-collar. Reducing-collar.

Empty-end collar.

3. (Of journal.) Fig. 5420. A rim or enlargement on the end of the car-axle which takes the end-thrust of the journal-bearing. A muley axle has no collar.

Collins brake-head. Fig. 1616. The shoe is fastened by a dove-tail, which is wedge-shaped.

Color-coat (painting). The coats which follow the rough stuff or scraping filling-coat in painting passenger car bodies. It is applied before the lettering and striping. The colors are mixed with turpentine and dryers, as little oil as possible being used, only sufficient to prevent the color from rubbing off. Twenty-four hours are allowed to each coat to dry, and the processes of lettering, striping, and varnishing then follow, which vary greatly in the time and care given to them, but which are always very carefully done. See Finishing varnish and Painting.

Columbian deck-ceiling. Figs. 107, 109, 116-7, 123, 129, 130, 133. A style of interior finish and decoration introduced first by the Pullman Palace Car Company, and exhibited at the World's Columbian Exposition in 1893. It consists of an arched-deck ceiling divided up by prominent ribs, elliptical arched-deck windows, whose arches go in with the deck ceiling as in figs. 129, 136, and produce a very pleasing effect.

Column. 1. (Diamond and other trucks.) 37, figs. 4580-4585. A rather and perhaps more common name for a Bolster-gardeur, which see.
2. (Of crane.) Another name for the mast, especially when entirely supported from below.
3. (Hartley chair.) 12, figs. 8986-9. See Pedestal.

Column-bolt. 109, figs. 4580-4585. A bolt passing through the arched-deck and holding the column in place and the truck-frame together.

Comb-and-brush rack or case. Figs. 3810-34.

Combination. An adjective often prefixed to the parts of the Janney-Miller combination coupler. The parts in the following list are designated sometimes with and sometimes without the prefix "combination." See Janney-Miller coupler and the names of the several parts, omitting the word "combination."
and the other to the conveyance of mail, baggage, or express. A combination baggage-car, which see, is also a combination car.

Combination cock. Figs. 2914, 2953. (For Baker heater.) A cock with funnel attached, used at the top of a tank for filling. When opened with the key it allows the inward passage of the water, and at the same time the outward passage of air through a separate channel. Hence the name.

Combination follower-guides (Jenney-Miller Coupler). Two guides (R. & L.) bolted to the principal platform timbers and which guide the centre buffer-spring follower.

Combination hand-cars. Figs. 5583-4, 5589-90. A car so constructed that the propelling levers or walking-beam can be removed and the car used as a larry or push-car.

Combination hot-and-cold-water-faucets. 6, figs. 3325-7, and figs. 3492, 3528.

Combined label-holder and drawer-pull. Fig. 3929-30.

Combination hot-water-heater. Fig. 3029-30.

Combined label-holder and drawer-pull. Fig. 3929-30.

Combined triple-valve, reservoir, and brake-cylinder (Janney-Miller Coupler). Combination hand-cars. Figs. 5583-4, 5589-90. A car so constructed that the propelling levers or walking-beam can be removed and the car used as a larry or push-car.

Combination hot-and-cold-water-faucets. 6, figs. 3325-7, and figs. 3494, 3528.

Combined label-holder and drawer-pull. Fig. 3929-30.

Compound-bolster. Fig. 1428-30. A bolster composed of one or more sticks of timber stiffened with vertical plates of iron.

Compound-carriage. 100, figs. 455-73. A carline of which the main or central portion is made of wrought-iron, with a piece of wood on each side. They are commonly used for cars with clear-stories, and either extend directly from one plate to the other, or are bent to conform to the shape of the clear-story. In the latter case they are called profile-carlines. See Carline.

Compression-bar. See Body-bolster compression-bar.

Compression-beam. 163, fig. 456. A horizontal timber in the center of the side of a car-body, which acts as the compression-member of a truss for strengthening the body. The compression-beam-brace abuts against it. An end compression-beam is sometimes used. The compression-beam is sometimes made double, one above the other, with separate braces (main compression-brace and center compression-brace) acting upon each.

Compression-beam brace. 164, fig. 456. A brace used in connection with a compression-beam to form a truss in the side of a passenger-car. It is sometimes stiffened by a center-counterbrace, 165; and sometimes two or more braces are used, as in fig. 456. It is then termed main compression-brace.

Compression-faucet. Fig. 3485 and 4, figs. 3525-7. A spring faucet with a flat disk on top, letting on the water by direct vertical compression. Telegraph-cocks, which see, are in a sense compression-faucets, but are not so called.

Compression-member. Any bar, beam, brace, etc., which is subjected to strains of compression, and forms part of a frame truss, beam, girder, etc. Struts, body-frames, etc., are compression-members. Similarly a tension-member is used for tensile strains.

Compression-rod brake. Fig. 1458. An inner-hung brake with a single lever, which is connected with a brake-rod farthest from it by a rod or bar which is subjected to a strain of compression when the brakes are again brought into service. The pressure on the brake-blocks is not equal.

Compromise-wheel. A broad-tread wheel, which see, for running over slightly different gauges is used.

Concave elliptic spring. Fig. 3533. A spring of steel in which the plates are dished or concave, with the object of stiffening the plates, holding them more firmly in their relative positions, and throwing the edges of the plates wholly into compression so as to diminish the danger of fracture by the gradual development of cracks.

Concealed urinal. One designed to be opened for use by a handle at the top, and then closed up flush with the wood-work so to be invisible. They are in limited use, but not generally approved.

Concealed water-closet. A form of closet covered with a seat to resemble an ordinary chair or sofa.

Condensing diaphragm (refrigerator-car). Sheets of Composite carriage, or composite (English). A coach in which compartments for more than one class of passengers are provided. A compartment for baggage is generally included.

Composite end-framing. Figs. 552-38. A type of framing adopted by the Wagner Palace Car Company and by the Vanderbilt system of railroads, which combines iron and wood, in the sills, posts, plates, etc. The sills and plates of the body and deck consist of two pieces of wood with an inner or steel flitch-plate between, the three pieces being bolted together as one. To these iron flitch-plates and mortised into the wood flitch-planks of the sills and plates are bolted or riveted upright iron posts. These iron posts are also sandwiched between wood studs making a composite post of great stiffness and strength. The end plate is also strengthened in the same manner, as are all the important members of the car-body frame.

Composite end-post. Q, figs. 559-30. See Composite end-framing.

Compound-star. See Body-bolster compression-bar.
metal placed in the cold-air flue on which moisture may be precipitated.

**Conductor** (refrigerator-car.) The drip-pipe from the ice-pan. See also Float-conductor.

**Conductor's car**. Figs. 50-4. A caboos-car, which see. **Conductor's lantern.** Figs. 5332-60. One with an extra sized bulb attached to it by which it can be held on the arm, leaving the hands free. It is sometimes provided with a reflector. They are often elaborately finished and sometimes bear the name of the conductor cut on the globe.

**Concave-panel corner-iron** (street-car). 53, figs. 5656, etc.

**Conductor's valve.** (Westinghouse brake). 28, figs. 1688-8. A valve for applying the train brakes placed at some convenient point in a car, usually in the saloon, and operated by a cord extending through the train within reach of the conductor.

**Conductor's valve discharge-pipe** (Westinghouse brake). A pipe leading from the conductor's valve down through the floor of the car.

**Conductor's valve pipe** (Westinghouse brake). 28, figs. 1688-8. Connects the brake-pipe with the conductor's valve.

**Cone.** 1. (For berth-spring.) A berth-spring fusee, which see.

2. (Graduated bolster-spring.) Fig. 5218. A projecting sleeve on the spring-plates to serve as guides or distance for the springs. They are distinguished as lower and upper.

**Cone-and-apron ventilator.** Fig. A302. See Ventilators.

**Cone-cap ventilator.** Fig. 4309. See Ventilators.

**Cone lamp-shades.** Figs. 4383-3. See Lamp-shade.

**Cone splash-guard.** Figs. 4386-7. See Splash-guard.

**Cone brake-shoe.** Figs. 1656-7. A brake-shoe in a coned closet-hopper. Figs. 3866-7. See Closet-hopper.

**Cone and apron ventilator.** Figs. A303. See Ventilators.

**Cone lamp-shade.** Figs. 4383-3. See Lamp-shade.

**Cone and apron ventilator.** Fig. A303. See Ventilators.

**Contracting-chill.** See Chill.

**Cook-stand.** See Ranges. Caboose stoves.

**Cork wall** (refrigerator-cars). Fig. 279. One of the walls of the car-body.

**Corner angle-post.** 1.43, figs. 229-66; 61, figs. 435-73. The corner-post. 102, figs. 229-66. A wooden-post.

**Corner-brace** (street-car). D, fig. 5660. A diagonal floor timber between the end-sill and Transverse floor timber.

**Corner-casting.** A knee-iron, or a corner-plate, which see. Also, overhang truss-rod, inverted truss-rod, or hog-chain rod.

**Corner drawbar.** A draft-gear, having a continuous rod or rods extending throughout the length of the car from the drawbar at one end to the drawbar at the other end, whose office is to transmit the tractive strains and relieve the draft-timbers. The American, figs. 1940-58, and Wadley, figs. 1960-9, are types most frequently met.

**Continuous frame truck.** A car-truck with an iron frame, the sides and ends of which are all made in one piece. It is a type of truck largely in use on the Boston & Albany road, but which is no longer standard on any road. It was a truck equipped with pedestals.

**Continuous top-side** (English). 69, fig. 130-1. Nearest American equivalent, top-side rail. A side-board run continuously from end to end of a wagon in order to stiffen it vertically and assist in tying the ends together.

**Continuous truck-frame.** An iron bar which is welded together in a rectangular shape so as to form the sides and ends of a truck-frame.

**Coping** (English). 74, figs. 348-81. A bar of iron secured to the top of the sides and ends of a gondola-car (open wagon), and protecting them from local distortion and the friction of a chain or any heavy body.

**Corbelseat**. 2. figs. 2452-3a. Also in figs. 107 and 109.

**Corbels.** The upper portion of a mold or flange used in making metal castings.

**Coping** (English). 74, figs. 348-81. A bar of iron secured to the top of the sides and ends of a gondola-car (open wagon), and protecting them from local distortion and the friction of a chain or any heavy body.

**Corbelseat**. 2. figs. 2452-3a. Also in figs. 107 and 109.

**Cord**. "A string or small rope composed of several strands twisted together."—Webster. See Hat-cord, Window-curtain cord, neither of which is used, however, to any appreciable extent.

**Cord-binding**. See Ranges. Caboose stoves.

**Cork wall** (refrigerator-cars). Fig. 279. One of the walls of the car-body.

**Corner angle-post.** Figs. 514-15. A corner-post which consists of an angle-bar, usually in combination with a wooden-post.

**Corner-brace** (street-car). D, fig. 5660. A diagonal floor timber between the end-sill and Transverse floor timber.

**Corner-casting.** A knee-iron, or a corner-plate, which see. Also, overhang truss-rod, inverted truss-rod, or hog-chain rod.

**Corner drawbar.** A draft-gear, having a continuous rod or rods extending throughout the length of the car from the drawbar at one end to the drawbar at the other end, whose office is to transmit the tractive strains and relieve the draft-timbers. The American, figs. 1940-58, and Wadley, figs. 1960-9, are types most frequently met.

**Continuous frame truck.** A car-truck with an iron frame, the sides and ends of which are all made in one piece. It is a type of truck largely in use on the Boston & Albany road, but which is no longer standard on any road. It was a truck equipped with pedestals.

**Continuous top-side** (English). 69, fig. 130-1. Nearest American equivalent, top-side rail. A side-board run continuously from end to end of a wagon in order to stiffen it vertically and assist in tying the ends together.

**Continuous truck-frame.** An iron bar which is welded together in a rectangular shape so as to form the sides and ends of a truck-frame.

**Contracting-chill.** See Chill.

**Cook-stand.** See Ranges. Caboose stoves.

**Cork wall** (refrigerator-cars). Fig. 279. One of the walls of the car-body.

**Corner angle-post.** Figs. 514-15. A corner-post which consists of an angle-bar, usually in combination with a wooden-post.

**Corner-brace** (street-car). D, fig. 5660. A diagonal floor timber between the end-sill and Transverse floor timber.

**Corner-casting.** A knee-iron, or a corner-plate, which see. Also, overhang truss-rod, inverted truss-rod, or hog-chain rod.

**Corner drawbar.** A draft-gear, having a continuous rod or rods extending throughout the length of the car from the drawbar at one end to the drawbar at the other end, whose office is to transmit the tractive strains and relieve the draft-timbers. The American, figs. 1940-58, and Wadley, figs. 1960-9, are types most frequently met.

**Continuous frame truck.** A car-truck with an iron frame, the sides and ends of which are all made in one piece. It is a type of truck largely in use on the Boston & Albany road, but which is no longer standard on any road. It was a truck equipped with pedestals.

**Continuous top-side** (English). 69, fig. 130-1. Nearest American equivalent, top-side rail. A side-board run continuously from end to end of a wagon in order to stiffen it vertically and assist in tying the ends together.

**Continuous truck-frame.** An iron bar which is welded together in a rectangular shape so as to form the sides and ends of a truck-frame.

**Contracting-chill.** See Chill.

**Cook-stand.** See Ranges. Caboose stoves.

**Cork wall** (refrigerator-cars). Fig. 279. One of the walls of the car-body.
Corner-post knee-iron. 1. E, figs. 514-15. (Pullman end-framing.) An angle-brace used to connect the foot of the corner-post to the side sill.

2. (Barr wing-vestibule and Pullman extended-vestibule.) An angle-brace for the outside corner-post of a vestibule resting upon the platform end-sill.

Corner-post grab-handle (street-car). 30, figs. 5654-67; fig. 3881.

Corner-post pocket. 45, figs. 239-66. See Pocket.


Corner-post pocket. 45, figs. 239-66. See Pocket.

Corner-seat. A seat for the corner of a car, the back of which is not reversible. They are called left-hand or right-hand, as for a person sitting in them.

Corner-seat-end. A seat-end bracket secured to the wall of a passenger-car for supporting the outer end of a corner-seat, which see.

Corner transom-muntin or Mullion (street-cars). 176, fig. 5662. A side mullion in the transom-frame of an open car, to distinguish it from the center transom-muntin, 177.

Corner-urinal-handle. Fig. 3847. See above and Urinal.

Corner-urinal. Figs. 3874-6. So called in distinction from a side-urinal.

Corner-urinal-handle. Fig. 3847. See above and Urinal-handle.

Corner urinal. Figs. 3874-6. So called in distinction from a side-urinal.

Corticine. A form of floor covering much like linoleum, which see, composed of linseed oil, prepared by a special process, mixed with ground cork and placed upon a strong backing of water-proof canvas.

Counter-boring. An enlargement or other alteration of form, for a certain portion of its length, of a hole bored in any substance.

Counterbrace. 55, figs. 483-78, and 165, fig. 456. In bridge-building, a brace which carries a load in the opposite direction to a main brace, or resists the tendency to buckling of a panel, when the shear due to dead load exceeds that of the live load. In car-building, a counterbalance usually means a brace in the side of the body between its ends and the body bolster. Sometimes there are two styles of counterbraces: one, near the middle of the car, is alone a counterbrace proper, in the technical sense, and called centre counterbrace; while the other is designated as the counterbrace or overhang brace, and generally the only counterbrace recognized in car-building. See Body counterbrace.

Counterbrace rod. An inclined rod which acts as a counterbrace. See above and also Body counterbrace-rod.

Counterbrace-rod plate-washer. 94b, 94c, figs. 250-66, etc. Washers that rest upon the plate and receive the end of the counterbrace-rod.

Coupler. That which couples. In relation to cars the term usually designates the appliances for coupling or connecting cars together. The word is more appropriately applied to the automatic car-coupler, which performs the act of coupling itself. The term is sometimes used to designate the coupling of steam pipes between cars, but this is unfortunate, as it seems desirable to maintain the distinction already established. To apply the term coupling to an M. C. B. automatic coupler would be an innovation, and it would seem equally so to call a steam-hose coupling a coupler. See Automatic freight-car couplers.

Coupler-gages. Gages adopted by the M. C. B. Association in 1891 to preserve the contour line for couplers. These gages may be obtained from Pratt & Whitney Company, Hartford, Conn.

Couplers, automatic. For M. C. B. Rules for Interchange of traffic with regard to couplers, see Drawbar and Attachments and Interchange of traffic.

Couplet (of springs). 80, figs. 474-84. Two elliptic springs, which see, placed side by side, to act as one spring. Three springs united in this way form a triplet, four a quadruplet, five a quintuplet, six a sextuplet.

Coupling. "That which couples or connects, as a hook, chain, or bar."—Webster. A coupling-link was called simply a coupling. See Coupler.

Coupling-bar. See Brake-lever coupling-bar.

Coupling-bar pin (brake gear). A pin for the brake-lever coupling-bar, which see.

Coupling-case. See Brake-hose coupling-case.

Coupling-chain, or chain coupling-link. A three-link chain used in coupling to draw-hooks, which see. See also Safety-coupling-chain. Figs. 5339-4, 5553-5; 55, figs. 2441-5.

Coupling-hook. Fig. 1746a. A bracket with a hook projecting on which the hose coupling is hung when uncoupled.

Coupling-hook. Figs. 5553-4, 5553-5. A hook for coupling cars together. See Drawbar coupling-hook (of Miller coupler).


2. (Westinghouse brake.) Figs. 398, etc. More commonly brake-hose.

Coupling-link. 2, figs. 2073-4. A wrought-iron link or
crank (which see) of a hand-car; 23, is at the upper end of the connecting-rod, the crank at the lower end.

Crank-hand-car. Figs. 5616. A hand-car which is worked by one or two cranks connected by gearing with the axles of the car. Originally in very general use, it is now nearly obsolete in favor of lever hand-cars, which see.

Crank-shaft (lever hand-car). 6, figs. 5592-5600. A short wrought-iron shaft to which a crank of a hand-car is attached, which is turned by suitable levers and is connected by gear-wheels with one of the axles of the car.

Crank-shaft bearings (hand-car). 5, figs. 5592-5600.

Creamer automatic ventilator. Figs. 4814, 4818. See Ventilator.

Crib-rail (English). 64, figs. 548-51. A longitudinal piece of timber secured to the upper part of the outer side of the sole-bar and supporting the body of the vehicle.

Cricket-iron. A Scot-stand, which see.

Cripple-post. 195, fig. 566. (Street-cars.) A post of an end window, where the window is not of the full width, between the door-post and corner-post.

Crooked end-piece (wooden truck-frames). 17, fig. 4944, and 5109-10, 4838. An outside end-piece hollowed out on top by cutting away the wood so as to clear the draw-timbers and drawbar fixtures.

Cross-bar (swing link-hanger). Fig. 4914. The bar supporting the cross-bar casting which carries the spring-plank. Also called mandrel-pin and lower swing-hanger pivot.

Cross-bar casting, or spring-plank carrier (swing link-hanger). See Cross-bar.

Cross-beam (on sills). D, figs. 353-57. A transverse floor-timber placed upon the sills to support the inclined floor of a coal or ore car.

Cross-beater (English). A forked casting attached to the lower end of the connecting-rod, the crank at the lower end.

Cross-caster (steel-iron). A Seat-stand, which see.


Cross-frame king-post, or truss-block. See Cross-frame truss.

Cross-frame tie-bolt. A sill tie-rod, which see. 10, figs. 229-66.

Cross-frame tie-timber. 22, figs. 220-66, 125-8; 26, figs. 485-73. A transverse timber bolted to the under-side of the longitudinal sills and floor timbers of a car-body between the bolster, and to which the body king or queen posts, or truss-blocks, are attached when truss-rods are used under a car-body.

Cross-frame truss. 26, fig. 568. A truss for a needle-beam or cross-frame tie-timber. The various parts, king-post, truss-rod, truss-rod washer, etc., are shown.

Cross-frame truss rod. See above.

Cross-head. 1. (Westinghouse driving-wheel brake.) 6, fig. 1747. A wrought-iron T-shaped head attached to the lower end of the piston-rod, and to which two eccentric-lever links are attached, to connect the piston-rod with the eccentric-levers which work the brake-blocks.

2. (Westinghouse brake.) A forked casting attached to the outside end of a piston-rod, to which the brake-levers are connected.

Cross-sill castings. Figs. 1092-90.

Cross-tie (street-car). 22, figs. 225-66, etc. A cross-frame tie-timber or needle-beam, which see.

Cross-tie (street-car). Figs. 5635, etc. A sill tie-rod.


Cross-tie-rod (street-car). Figs. 566, etc. A sill tie-rod.

Cross-tie-rod (street-car) truss-rod. See Cross-frame truss.


Covered wagon (English). A roofed vehicle used for conveying freight liable to be stolen or to be damaged by damp. It has side doors which can be locked, and occasionally doors in the roof so that the contents can be readily hoisted. As a rule, tarpaulins, which see, and open cars are used in English.

Cover-plate. A face-plate of a steel-tired wheel is a disk connecting the tire and hub. A ring covering the packing inside the tire of an Atwood hemp-packed wheel.

Cover-strip. 1. (Refrigerator car.) Metal plates covering a gutter in the floor.

3. A strip of metal, or sometimes wood, to cover a joint in the roof-sheets.

Crab (pallet-driver car). 29, figs. 401-4. (Wrecking car.) See Tongs, also called rail-clips or rail-clamps.

Crane (pallet-driver car). 34, figs. 401-4. See Pile-driver car and Derrick.

Crane-post. 4, figs. 559-566. The post of a crane, and corresponds to the mast of a derrick.

Crank. 1. "Literally a bent or turn; hence an iron axis with a part bent like an elbow, for producing a horizontal or perpendicular motion by means of a rotary motion or the contrary."—Webster. See Bell-crank. See also Brake-shaft crank. Door-shaft crank (street-cars).

2. (Of a derrick or crane.) 22, figs. 392-3. The L-shaped handle by which the driving-gear is actuated.

3. (Of a lever hand-car.) 6, figs. 5592-5600. The bell-crank (which see) of a hand-car; 23, is at the upper end of the connecting-rod, the crank at the lower end.

Crank-hand-car. Figs. 5616. A hand-car which is worked by one or two cranks connected by gearing with the axles of the car. Originally in very general use, it is now nearly obsolete in favor of lever hand-cars, which see.

Crank-shaft (lever hand-car). 6, figs. 5592-5600. A short wrought-iron shaft to which a crank of a hand-car is attached, which is turned by suitable levers and is connected by gear-wheels with one of the axles of the car.
Cup-leather (for piston-rod of Westinghouse driving-cupboard-latch. Fig. 2548. See above.

Cup-board-bolt. Figs. 2550-3. See Door-bolts.

Cup-washer. A socket-icasher, which see.

Cup side-bearing. A side-bearing for trucks, with a re

Cup-holder, or tumbler-holder. Figs. 3495-3501. A stand fora drinking-cup. See Alcovecup

Cup. 1. "A small vessel used commonly to drink out of, exceptaclefor holding oil and waste. Little used.

Cup-washer. A socket-washer, which see.

Curtain-rod-bracket (sleeping-car). Figs. 4194, etc.; 16, figs. 2462-12. A bracket for a curtain-rod in a sleeping-car, which may be folded into the upper berth, in such a manner that it is out of sight when the upper berth is shut up. See Folding-curtain rod-bracket.

Curtis Electric Company's street-car motor. Fig. 5078.

Curved seat-reatl. Figs. 4006-7.

Curved seat-stop. Figs. 4033-7. See Seat-stop.

Cushion. 1. Figs. 2897-51, 2807-57. Cushions used in passenger-car upholstery are of the box type, being built upon and connected with a wooden framework (cushion-frame). See Seat-cushion.

Cushion back-rail (English). 151, figs. 501-2. In a carriage a small transverse bar which confines the hind end of the seat-cushion.

Cushion-frame. Figs. 3017, 2892-58, 2860-7. A wooden frame to which the seat-springs and upholstery of a car-seat are attached.

Cushion weather-strap. Figs. 4538-41. See Weather-strap.

Ouspidor. Fig. 2899. A vessel to receive discharges of spittle, and having a wide rim so that if it is upset its contents will not be spilled. It is the modern substitute for a spittoon, fig. 2898, from which it differs only in form.

Cut-out-cock. Fig. 1744. See Brake cut-out-cock.

Cylinder. 1. A chamber or vessel whose ends are circular, and with straight parallel sides, as the cylinder of a steam-engine. The cylinders used in connection with cars and locomotives are made of cast iron, and have pistons fitted so as to work air-tight in them. Cylinders used in brake apparatus are shown in figs. 1736-31, 1748. Also see Air-cylinder. Brake-cylinder.

Cylinder-body (Westinghouse brake). The main central portion closed by the cylinder-heads.

Cylinder-head. A metal cover for the end of a cylinder, held on by cylinder-bolts or cylinder-studs. The cylinder-head through which the piston passes is commonly termed the back-cylinder-head, and the other the front cylinder-head, corresponding to locomotive practice. In the Westinghouse air-pump and engine they are designated as top and bottom cylinder-heads. See Cylinder.

Cylinder-levers (Westinghouse brake). 7, figs. 1693-4. Two levers which are connected together by a tie-rod attached near their centers. One end of one lever is attached to the cross-head of the brake-cylinder, and the corresponding end of the other is attached to a bracket on the brake-cylinder head, at the opposite end of the cylinder. The other ends of the levers are connected with the floating levers by rods.

Cylinder-lever and Hodge-lever connecting rod. 8, figs. 1693-8.

Cylinder-lever bracket (Westinghouse brake). Fig. 1698. A T-shaped piece of iron bolted to the front cylinder-head, to which one of the brake-levers is attached.

Cylinder-lever-guide. 15w, figs. 1690-8.

Cylinder-lever support (Westinghouse brake). Figs. 1688-8. A wrought-iron bar bolted to one of the center sills, on which the ends of the cylinder-levers rest.

Cylinder-lever tie-rod (Westinghouse brake). 14, fig. 1694. See Cylinder-lever.

Cylindrical gages. Gages made for measuring the size of cylinders and cylindrical holes, often called Whitworth gages. They consist of steel cylinders and rings hardened and ground very accurately to standard sizes. These fit into each other. The first is used for measuring the size of holes and the last for measuring the outside of cylindrical objects, and they are called internal and external cylindrical-gages. They are generally used as standards alone, from which other tools and gages are made of the proper size.

Cylindrical stove. See Stove.
"Cyrus Roberts" truss-frame combination hand-cars. Figs. 5554-4. A hand-car having several new features. viz: 1. True-rod secured to the four corners of the car-frame, forming two diagonal trusses, each provided with "turnbuckle" adjustment, to keep axles in line, impart rigidity to the frame, and to overcome the tendency to "twist" or "wring."

2. A dash-guard strap is applied simultaneously to both wheels, with the foot lever hung back of center of car. 3. Steel pedestals supporting the frame of car, providing a secure and firm seat for the boxes. 4. Propelling levers that may be detached at a moment's notice and the car converted into a push-car.

Damper. See Store-pipe damper. A valve for regulating the draft.

Damper-handle. See Store-pipe damper-handle.

Danger-signal. Usually a signal made by a person with a flag or lantern to warn a train that there is danger ahead. For such warning, flags, lights, and torpedoes and fuses are used, red flags and lanterns being usually a signal of danger. On a train a danger-signal is a red light or flag attached to the rear of the train; green is used to signify caution; white for safety.

Dasher or dashboard. See below.

Dasher-guard (street-cars). 79, figs. 5664-67. A plate attached to the platform-railing to prevent mud or snow from being blown through the platform. Called a dashboard and a dasher.

Dasher-guard straps. 81, figs. 5554-67. Small clips by which a dash-guard is fastened to the platform posts. Also called dasher-post clip.

Dasher-post (street-cars). 80, figs. 5554-67. A post supported by the crowned piece which carries the dasher and the platform rail. Called on steam-cars a platform railing-post.

Dasher-post washer (street-cars). 82, figs. 5554-67.


Dasher-rail caps (street-cars). 85, figs. 5554-67. A wood or metal cap bolted to the dasher-rail for decoration and to prevent injuries.

Davis automatic car-shades. Figs. 4544-7. A car-shade, the automatic feature of which is the holding-device inserted in the bottom of the shade by which the shade may be left at any height desired. It consists of two rods in a metallic case connected in the middle with an eccentric, turned by a thumb-latch. At the outer ends of the case rubber wheels are placed which bear against the window casing, and these rods carry a braking device which restrains these rubber wheels from turning, thus holding the shade.

Davis journal-box lid. A pressed steel journal-box lid of the Fletcher type, but with the spring on the inside.

Davis shade-holding device. See Davis automatic car-shades.

Day coach. Figs. 89-95. A common term for an ordinary passenger-car in distinction from sleeping-cars. It ought in strictness to include parlor-cars, but in general does not. It is often termed a coach simply, which see.

Dayton freight-car door-lock. Figs. 2785-7. See Door-hasp.

Dead air-space (insulation of refrigerator-car). Airspaces which have no communication with the atmosphere or its attachments should give way. They are called dead-blocks from the fact that they are blocks which subserve no function in the construction of the car proper. See Buffer-block.

The M. C. B. standard dimensions recommended in 1882 were amended in Saratoga, 1884, as follows:

Buffer-blocks are to be made 8 in. square on the face and 6 in. thick, and are to be placed 22 in. apart from centre to centre, and to have 14 in. space between them.

Single dead-blocks are to be not less than 30 in. long, 7 in. thick, and 8 in. deep measured vertically.

2. (English.) A piece of hard-wood packing, interspersed between the buffer-rod guide and the head-stock. This term is also improperly used to describe the Buffer-rod guide, which see.

Dead-center. "One of the two points in the orbit of a crank in which it is in line with the connecting-rod."—Knight. To avoid the annoyance of a dead-center two cranks are frequently applied to a shaft at 90 degrees with one another.

Deadening, or Deafening. The filling placed between the floor and the deafening-ceiling to serve as a non-conductor to heat and noise. Mineral wool, which see, is sometimes used for deadening, but commonly shavings, when anything at all is used. An intermediate floor (between a dead-lever guide, or brake-lever stop, which latter is provided with pins to adjust the end of the brake-lever as the brake-shoes wear. The lever to which the power is first applied is termed the line lever.

Dead-lever guide, or brake-lever stop (brake-gear). 95, figs. 435-73. See above.

Dead-lock. Figs. 2784-5. A lock in which the bolt is thrown each way by the key, and not in one direction by a spring, as with a spring-lock or night-latch.

Dead-paddock. A padlock in which neither the lock, bolt, nor hasp has a spring, but the former is thrown each way by the key, and the hasp must be opened by the hand.

Dead-wood. A dead-block, which see.

Deafening-ceiling. 28, figs. 435-73. Boarding on the under side of the floor-timbers of a passenger-car to exclude or deaden the noise of the car. When cut and inserted between the sills it is called a deadening-floor, but quite as often, though improperly, a deafening-ceiling. See Deadening.

Decatur grain-door. Figs. 1896-1926. A door suspended from the carlines overhead when not in use. The doorgrips are greased, cut and fitted with angle-irons, behind or between which the door flits. A lever is provided by which the door may be started from the bottom and the grain allowed to discharge itself automatically.

Deck. 102, figs. 435-73, 539-41. A term applied to the roof of a passenger-car by analogy from the deck of a ship. The term is not applied in general use, however, to freight-cars. The deck of passenger-cars is subdivided into the upper-deck (also called clear-story, which see) and lower-deck, the roof at the side of the clear-story; but in designating parts which belong to the clear-story alone and which are not repeated in the lower deck the term deck alone is used.

Since the issuing of the first edition of this work the use of the term deck instead of clear-story in compound words seems to have become practically universal among manufacturers of furnishings and in far more general use than any other among car builders. The manufacturers of passenger-cars are generally and almost unanimously replied that they used no other term than deck.

Deck-beam. 1. A beam in the form of an inverted T with a round knob on the upper end, used in some forms of iron car construction. The Marden steel brake-beam, fig. 1609, is a deck-beam.

2. Y, figs. 325-7. Transverse beams extend across a car from side-rail to side-rail to which the deck-planks are spiked.
Deck-bottom-rail. 118, figs. 589-67. A horizontal timber running lengthwise of a car, fastened to the rafter and carlines of the main roof, or to the deck-sill, which forms the base for the deck-posts. The term is sometimes applied to the deck-sill.

Deck-collars. See Bridging.

Deck-carlina, or upper-deck carlina. 119, figs. 485-73, and 538-67. A timber which extends from side to side of the upper deck, and supports the roof-boards. Corresponding parts in the lower deck are generally called rafters.

Deck-colar (Spear and other heaters). A sheet-metal ring to line the open opening through the roof, having a double sheet-metal tube to leave an air-space as a heat-guard, and a flange on the outside to exclude rain.

Deck-cornice filling-block. 120, figs. 589-67. A molding which fills the interior angle where the upper deck joins the deck-side.

Deck-planking. V, figs. 832-7. Planking nailed to the side and end rails of a coal or ore car to form a deck.

Deck-plate. 117, figs. 588-67. A horizontal timber on top of the deck-posts or mullions to which the deck carlines are attached. Also called a deck-top-rail.

Deck-post. 115, figs. 538-67. An upright piece of wood which connects the deck-plate with the bottom rail.

Deck-sash. 144, figs. 588-67. A glazed sash in the sides of the upper deck.

Deck-sash latch. Figs. 4870-74. A hook giving a simpler equivalent for a deck-sash latch.

Deck-sash double-ratchet. Fig. 4800. A special form of deck-sash pivot-plate, used with spring ratchets.

Deck-sash flush-catch. A Deck-sash latch mortised into the sash rail flush with the sash.

Deck-sash latch. Figs. 4860-74. A spring-bolt attached to a deck-sash, which engages with a deck-sash latch keeper or strike-plate. See Keeper.

Deck-sash latch-keeper. Figs. 4881-4. See above.

Deck-sash lintel. See Lintel.

Deck-sash opener. Figs. 4830-41. A lever attached to a revolving rod by which a deck-sash is held in any desired position. A great variety of forms exists, including many patented devices. See engravings. A pull-hook, figs. 4876-80, is sometimes called a deck-sash opener, but a more elaborate contrivance is generally meant.

Deck-sash outer. 144A, figs. 589-67. A deck-sash which carries the screen, and prevents the admission of dust and cinders.

Deck-sash pivot. Figs. 4851-64. A metal stud or spindle attached to a suitable flange by which it is fastened to a deck-sash, and on which the latter turns. A variety of forms exists, including several patented devices, as Moniter, fig. 4907-8; Morgan, figs. 4888-8, etc., to render the sash readily removable and adjustable.

Deck-sash pivot-bushing. Same as figs. 4407-8. See Bushing.

Deck-sash pivot-plate. Figs. 4835-6. A plate attached to the window-casing, with a hole or eye in which a deck-sash pivot works. Sometimes they are provided with springs to prevent the sash from rattling.

Deck-sash pull. Figs. 4940-50. A screw-ring attached to a deck-sash to open and close it. Made either with screw or with flange.

Deck-sash quadrant. Figs. 4900, 4902. A curved bar or plate of metal used as a guide or stop to control the movement of a deck-sash. Little used.

Deck-sash quadrant clip. Fig. 4980. A guide-strap embracing a deck-sash quadrant.

Deck-sash ratchet-plate. Figs. 4897, 4899, and see 4891-8. A part usually attached to the side of the car, but sometimes to the sash, carrying a ratchet in which the ratchet-catch engages.

Deck-sash socket. Fig. 4894. A hook attached to a peculiar form of deck-sash pivot. See engravings.

Deck-sash spring pivot. Figs. 4834-3, 4883. A deck-sash pivot, which see, provided with a spring to make the sash removable.

Deck-screen. 144B, figs. 542-67.

Deck-screen bottom-molding. 112A, figs. 470. A rail running the entire length of the clear-story, and closing the space between the bottom of the screen and the roof.

Deck-screen sash-sill. 150, fig. 542.

Deck-side. The entire part, consisting of a plate, rail, posts, and panels, or sashes, which forms the side which occupies the vertical space between the lower and upper deck.

Deck-side ventilator. Figs. 4819-22. This term is also used to designate the sash or valves and their attachments for opening and closing the aperture.

Deck-sill. 111, figs. 581-67. A horizontal timber attached to the inner ends of the rafters, or short carlines, on which the deck-side rests.

Deck-sill bottom-molding. 114A, figs. 542, 560.

Deck-sill facing. 114, figs. 581-67. Thin boards or moldings attached to the inside of a deck-sill, for ornament.

Deck-sill side-molding. 111A, figs. 554, 560.

Deck-sill top-molding. 111B, figs. 554, 560.

Deck soft-board. 121A, figs. 539-67. A board on the under side of the overhanging cornice of an upper deck.

Deck top-rail. 117, figs. 539-67. A deck-plate, which see.

Deck-ventilator. See Deck end-ventilator. Deck-side ventilator. The deck-sashes are frequently hung and operated as deck-side-ventilators as by the continuous deck-sash opener. Fig. 4849.

Deck window-screen. 8, figs. 539-41. An outside sash with a screen over it to exclude dust and cinders.


Decorated-ceilings. 9, figs. 2432-6, and in general interior views, figs. 90-188.

Defiance improved asphalt car-roofing. A composition car-roofing material made by saturating and coating a heavy web of burlap with refined Trinidad asphalt tempered with a mixture said to contain no coal-tar or petroleum residuum. On the face of the saturated and coated web is run another web of heavy burlap, and on the back is run a tough sheet of rope fiber paper. While the material is still fresh it is run through pressure rolls which imbed and set the surface web of burlap into the asphalt, forming a complete sheet of heavy roofing material which is strong, flexible, elastic, and water-proof.

The material is used between boards, of double roofs, similar to the Carey and Hutchins roofs. It is made by the A. E. Filley Mfg. Co.

Deflector. 1. (For windows.) Figs. 4827-30. A piece of thin board fastened to the back of the window and left projecting two or three inches beyond and at right angles to the car. When the car is in motion it deflects the cinders and dust from the window, and also produces an exhaust draft. Also called a window dust-guard.
Deflector-springs. (of ventilators.) Springs controlling the movement of the deflectors.

Deflector ventilator. A name given to the Pancoast ventilators, fig. 4317.

Derrick. Figs. 77-80, 206, 392-3. "A form of hoisting machine. The peculiar feature of a derrick, which distinguishes it from other forms of hoisting machines, is that it has a boom stayed with a central post" (termed the mast), "which may be anchored, but is usually stayed by guys.

A derrick has one leg, a shears two, and a gin three. A crane has a post and a job," and is a rigid machine, not having a movable boom. "A movable whom has a vertical axis on which a rope winds. The capstan has a vertical drum for a rope, and is rotated by bars. The windlass has a horizontal barrel, and is rotated by hand-spikes. The winch has a horizontal barrel, and is frequently the means of winding up the tackle-rope of a derrick; it is rotated by cranks. The crane is a portable winch and has cranks.

"The derrick is more commonly used in the United States than in Europe, and has attained what appears to be maximum effectiveness with a given weight. Two spars, three guys, and two sets of tackle—one for the job and one for the load—complete the apparatus, except the winch, crane, or capstan, for hoisting.

"The invention is nautical, the original being the sailor's contrivance, made of a spare topmast or a boom, and the appropriate tackle. Such are used in masting, putting in boilers and engines, and hoisting heavy merchandise on board or ashore.

"The derrick-crane is a combination of the two devices, as its name imports, having facility for hoisting and also for swinging the load horizontally."—Knight.

Derrick-car. Figs. 77-80, 206-7, 392-3. A strong platform car which carries a derrick-crane which is used for removing wrecked cars and engines, erecting bridges, or handling any heavy objects. Also called wrecking-car. They are distinguished as hand or steam derrick-cars, according to the power used.

Derrick truss-rod. Figs. 392-3. A rod attached to the side-sills of a derrick-car at each end and passing under the mast-pocket or other equivalent compression-block, or crotched or trussed to resist the pressure of the derrick.

Destination-board bracket (English). 183, fig. 501. A small shelf of cast or wrought-iron secured to the upper part of the outside of the body, in order to carry a small shelf of cast or wrought-iron, securing it to the body of the outside of the body, in order to carry a small shelf of cast or wrought-iron, securing it to the body of the body. They are called drawing-cars.

They are distinguished as hand or steam derrick-cars, according to the power used.

Diameter testing-gage (for car-wheels). A gage for testing wheels and axles. Some time, an M. C. B. standard.

Diamond-truck. Figs. 4580-4748. A car-truck with iron side-frames consisting of two or more arch-bars, which see, and a pedestal tie-bar. The spaces between the arch-bars are diamond-shaped, whence the name. The journal-boxes are rigidly bolted to the sides. The cross-members of the truck, bolster, spring-plank, etc., are either of wood or iron, or of both wood and iron combined. Iron transoms, bolsters and spring planks may be said to be in general use and increasing in favor. See figs. 4076-4095.

At the Master Car Builders' Convention (1884) it was voted that this form should be the type used in preparing designs for a standard freight-car truck, to have a 5 ft. wheel-base, channel-bar transoms, and either swing or rigid bolster, which see. It is the type in almost universal use for freight-cars, and the rigid-bolster is applied to nearly all new construction. The swing-bolster truck remains in standard on a few important roads that have a large traffic of live-stock.

Diaphragm. 1. (Eames vacuum brake.) 1, figs. 1699-72. An equivalent for the Westinghouse brake-cylinder, serving to operate the brakes. It consists of a cast-iron bowl-shaped shell, to which the diaphragm-plate is attached by diaphragm-rings. A rubber diaphragm-hose connects it to the brake-pipes. Three sizes of diaphragms are manufactured: No. 4, for narrow-gage cars, No. 7 for standard-gage cars, and No. 24 for heavy driver-brakes.

2. (Pintech gas pressure-regulator.) Fig. 8168.

3. (Refrigerator-car.) See Condensing diaphragm.

4. (Westinghouse brake and train-signal apparatus.) Some valves are regulated by diaphragms or diaphragm-plates, to which are attached springs, nuts, stems, etc., etc., whose names explain themselves. See figs. 3408-4. These diaphragms all operate on the same principle. They are spring-plates which guide the rod and, assisted by spiral springs, cause the attached valves to seat or unseat at a fixed pressure.

5. (Of a vestibule.) 9. figs. 3419-48; fig. 3420a. A piece of rubber, damper, or canva in folds attached to the diaphragm face-plate and platform-incluse to exclude the dust and cinders, and at the same time to allow the face-plate free movement, laterally and longitudinally, in the Barr and Gould vestibules, and longitudinally only in the Pullman vestibules. The Barr wing-vestibule has no diaphragm.

Dictionary of Terms (Master Car Builders). At the fifth Annual Convention, held in Richmond, Va., in 1872 (see page 18 of the report of that meeting), it was

"Resolved, That a committee with power to publish an illustrated book, defining the proper terms or names of each and every part used in the construction of railroads, and a description of the uses of the same."

At the Fourteenth Annual Convention, held in Detroit, in 1889, "The committee to which was assigned the duty of preparing a dictionary of terms used in the construction of cars submitted a copy of the book and reported that it had finished its work, and it was discharged."

See Index of parts of book.


Dining-car. Figs. 101-10, 179, 191, 474-86. A car provided with a kitchen and cooking appliances and arrangements for serving meals as in a hotel. Hotel-cars which are now quite out of use, had similar arrangements on a smaller scale, but they were mainly given up to sleeping-berths. The term diner is in bad taste, since the cars has not the capacity to dine.

The first dining-cars were probably those run on the Philadelphia, Wilmington & Baltimore road in 1839-5, but these cars had no arrangements for cooking, but received cooked provisions at the end of each run. On the more modern cars nearly all their cooking is done on the car itself. Dining-cars are usually luxurious in their appointments and are run by the companies themselves and at a slight pecuniary loss, with the object of attracting travel. They are in general use. Dining-cars are to be distinguished from lunch-cars. A dining car is a place where a full-course dinner may be cooked and served with the service usually furnished in hotels, and the whole car is given to that end. They are frequently attached to a train for a few hours only at about mealtime. A lunch-car partakes more of the character of a car. It is a revival of the earliest dining-cars above mentioned.

Dining-car range. Figs. 474 and 8106-8. See Range.

Direct steam-heating system. Figs. 1009-91, 1895, 2082, 3889. A system of car heating in which the steam from the locomotive or heat-tender is carried directly to the radiators or heating-pipes. The term is used to distinguish the system from those in which the steam is employed to heat the water which circulates in the radiators or heating-pipes, usually in connection with the Baker-heater. See Consolidated, Gold's and Safety's systems of car-heating.

Direct steam-storage system. Figs. 1901, 1905-10. A direct system of car heating in which the radiating pipes are enlarged and inclose a smaller pipe or tube which is filled with salt water or other heat-retaining substance, and which when heated continues to radiate heat after the steam is shut off. In the Gold terra-cotta storage-heater the radiating pipe contains a fluted cylinder of terra-cotta of the same extreme diameter as the inside diameter of the radiating pipe. These storage-heaters are described in detail in figs. 1907, 1909-10. See Consolidated and Gold's car-heating systems.

Direct steam-storage system (Consolidated car-heating). Fig. 2959. A system of heating in which a 2-inch pipe is divided into chambers and each chamber being half full of water, steam occupying the space above this water. As the pipe is but partly filled with water it is not necessary to insulate the heating-pipes. It heats quickly and makes a cheap and effective storage system.

Discharge-pipe (air-pump for Westinghouse brake, also called reservoir-pipe). Fig. 1689. A pipe by which the compressed air is conveyed from the air-pump to the main air-reservoir.

Discharge-valve. 1. (Of car-signal valve, Westinghouse train-signal apparatus.) 3400; 93, fig. 2888. The valve in the description called the signal-valve. The whole device is also sometimes so called.

2. (Of air-pump for Westinghouse brake.) 30-88, fig. 1689. The valve through which the air as compressed passes to the main reservoir. There are two—upper and lower. See also Auxiliary discharge-valve.

Discharge-valve-seat wrench (Westinghouse brake). See Wrench.

Discharge-valve stop (air-pump). 44, fig. 1689.

Disengaging-bolt (Howard's parlor-car water-closet). Figs. 3888-9. An attachment by which the water-supply valve and the pan are disconnected from the bowl proper, so that the closet can be used as a plain hoper in case the water supply gives out.

Disengaging-bolt (Westinghouse brake). See Ventilators.

Distance-block. A short, thick piece of wood placed between two or more objects to keep them apart, or to preserve an interval of space between them, as floor-timber distance-block, truck-bolster distance-block, etc.

Distance-gage (between backs of wheel-flanges). Fig. 5431. One of the M. C. B. standard wheel and axle gages.


Distributing-table (postal-car.) 4, figs. 599-604. A table upon which the mailbags are emptied of their contents, and from which they are distributed to the various boxes or pouches.

Distributing-table hinge. Fig. 3610.

Ditching-car. Fig. 217. A car provided with derricks and scoops for excavating the ditches of cuts by the power of a locomotive. The contrivance has been patented by the American Ditching Co., of La Crosse, Wis.

Dividing attachment (Eames, for engines fitted with drum-brakes). Figs. 1893-8. A device to regulate the application of the brakes to either the locomotive or train, or both.

Division-arm (twin-seats). Figs. 2934, 2935, 2974-6, 3881, etc. The middle seat-arm between the two seats.

Dog. 1. A general term in mechanics for all devices which bite or take hold of or give motion to other parts. See Ratchet-dog.

2. (For pawl of winding-shaft.) 69, figs. 805-15. A disk or button eccentrically pivoted in such a way as to hold the ratchet-wheel pawl of a winding-shaft in its place. The pawl itself of a ratchet-gear is also sometimes termed the dog in other forms of ratchet-gear where no dog to hold the pawl is necessary. It is termed in this way.

3. A brake-pawl dog, which see. A very similar part of that defined above.

Dome. A clear-story or upper deck is sometimes erroneously called a dome. See also Tub-dome.

Dome-head (tank-car). 190, fig. 875. The top of the dome.

"Dome" lamp-shade. Fig. 8436. A lamp-shade, which see, of curved or ogee outline.

Door. Figs. 1788-1895. A frame of boards for closing a doorway. See Door-frame for names of parts. See also

Ask pit door. Lamping door.

Double-door. Overhung door.

Double fire-door. Platform trap-door.

Dust-door. Shaker-door.

Dust-hand-hole door. Slide-door.

Pure window-door. Smoke-box door.

Poe-door. Sub-door.

Poe-hand-hole door. Tip-door.

Fire-door. Under-hung door.

Grain-door. Ventilator-door.

Door-sprout (street-car). A sheet-iron cover attached to a swinging door to inclose the step.
Door-bolt. Figs. 2533-35. A metal bar attached to a slide and fastened to a door so as to hold it shut from the inside. They are either round, or barrel, or square. A square-neck door-bolt is one with an angle or shoulder in it. Flush door-bolts are gained in so as to be flush with the surface, there are numerous styles shown in figs. 2534-35. A cupboard-catch is a form of door-bolt, having a beveled latch and actuated by a spring, but bolts so formed are commonly termed latches, which see.

Door-bolt keeper. Figs. 2341-2. A catch attached to a door-frame, in which the bolt engages.

Door bottom-rail. 147, figs. 539-41; 5, fig. 1788. See Door-frame.


Door-brace (freight-car doors). A diagonal piece of timber framed to stiffen the door.

Door butt. A butt-hinge, which see.

Door button. "A small piece of wood or metal swiveled by a screw through the middle, and used as a fastening for a door or gate."—Knight. They are often attached by a rivet or pin to a metal door button-plate, which is fastened on with screws. Sometimes the button is an eccentric disk.

Door-caps (freight-car doors). 177, figs. 229-66. A horizontal board across the top of the door.

Door-cases. 170, fig. 557.

Door-case. Fig. 1788. 1. The frame which incloses or surrounds the sides and top of a door. The separate parts are the door-jamb, or door-posts, door-sill, and door-lintel, which see. 2. A partition at the end of a street-car which incloses a sliding door when open. See True-wicket door-case.

Door-case intermediate-rail (street-cars). A rail of a door-case above the window.

Door-case panel (street-cars). A panel in a partition which incloses the sliding door. There are two, the top-panel and seat-panel.

Door-case sash (street-cars). A window-sash in the partition which incloses a sliding-door. It opens on hinges and is placed opposite to another in the end of the car inside of the door.

Door-case sash-butt. See Door-button.

Door-case top-panel. See Door-case panel.

Door case seat-panel. 194, fig. 5656. See Door-case panel. In some cases a mirror is used in place of a panel.

Door case top-rail. A stick parallel with the Door-lintel, which see.

Door center-girt (freight-car doors). A horizontal board across the middle of the door. A middle door-rail, except that it is not framed into the door but simply nailed on.

Door chain-bolt. Fig. 2376. A device which permits a door to be opened a short distance, yet not far enough to gain admission.

Door-check (Norton's). Fig. 2818. An automatic device consisting of a piston in a cylinder, which forms a pneumatic cushion and prevents the door from slamming.

Door fence-rail (English). 118, figs. 501-4. A horizontal piece of wood forming, on the outside of the door, the bottom of the window aperture. It is reinforced with a band of brass or iron against which the window-sash bears when it is closed.

English carriage windows drop down to open, like an omnibus or street-car window.

Door frame. Fig. 1783-88. The structure in which the panels of a door are fitted. It is composed, as is also a window-sash of the stiles, or upright pieces at the sides; the mullions, or central upright pieces; the bottom-rail; the lock, or central rail, and the top-rail. The Door-case, which see, surrounds it. See Fire-door frame.


Door glass-frame stop-rail (English). 115, figs. 501-4. In a carriage, a small horizontal piece of wood in the lower part of the door against which the window drops when opened. See Door-fence rail.

Door guards (freight-car sliding doors). 175, fig. 573. Strips of wood which inclose the space occupied by the door when open to keep the freight from interfering with its movement.

Door guard-band (street-cars). 140, figs. 5656. A metal band fastened crosswise on the middle door-rail to protect the door from being chafed. Also called a sliding-door strip.

Door guard-rod. 12, figs. 2482-3. See File-door sill-door-rod.

Door guide. Fig. 2388.

Door handle (freight-cars). 178, figs. 229-66. A U-shaped wrought-iron bolt attached to the door, sometimes horizontally and sometimes vertically. A Sliding-door handle, which see, is for passenger cars.

Door hand-rail (street-cars). A rail attached to the inside of a door, that swings out, for passengers to take hold of in getting on and off the car.

Door hanger. 21, fig. 1792, and figs. 2382-42. A hook-shaped piece of metal by which a sliding-door is suspended at its top, and which slides on an iron track at the top of the door. For freight-cars they are usually made of wrought-iron, but sometimes of cast-iron, with friction rollers, or sheaves, on which the door rolls. They are also used in sleeping and dressing-room cars, and are then generally made of brass and plated. The name of these more elaborate forms is commonly extended into car-door hanger, which see. See also Anti-friction car-door hanger.

Door hauep. 78, figs. 229-66. A metal clasp attached to car-doors, by which they are fastened to a staple on the body of the car. Used chiefly on freight-cars doors secured with a pin or bolt. They are now made of malleable iron and the pin fixed so it cannot be lost, as in figs. 5736-41. Padlocks are rarely used on freight-cars.

Door haup (deai-lock). A projecting lug on which a carefully shaped door-hasp enters, and is secured in place by the clasp.

Door hinges. 1. See Hinge.

Door hinges. (English.) 178, fig. 501. Three brass hinges, upper, middle and lower, securing the door to the body. These hinges generally differ slightly to allow for the curvature or fall-under of the door.

Door holder. Figs. 2808-14. A device for holding a door open or shut. They are also called door-stops, as they are also intended to check momentum of the door when swing open violently. Lamp-case door-holder. Sliding-door holder.

Door holder catch, or door-holder stop. Figs. 2808-14. A metal bracket attached to the floor (floor-stop) or side (partition-stop) of a car, with which a door-holder engages, to hold a door open.

Door hook. Figs. 2356-7. A sliding-door holder, which see.

Door jam. 1, fig. 1788. The side piece or post of a door-case. Also called door-post. Not to be confused with the stiles of the door itself.

Door knob. Figs. 2821-23. A ball attached to the end of the spindle of a door-latch to take hold of in moving the latch or opening the door. The knob is often made in various peculiar forms, as T door-knob, fig. 2364.

Door latch. Fig. 2844-45. An attachment to a door to hold it shut. See Latch. A door latch is often made in combination with a lock, having a separate bolt and key to secure or fasten the door from the outside, as in figs. 2637, 2653, etc.
Door-latch arbor. A Door-latch spindle, which see.
Door-latch bolt. See Latch.
Door-latch hook. Figs. 2388-89. The part of a sliding-door latch which engages with the keeper and holds the door shut.
Door-latch keeper. Figs. 3554-78. Also called Strike-plate, which see.
Door-latch rose, or escutcheon. Figs. 3644-81. A plate fastened to a door as a guard or bearing for the spindle. A rose is frequently called a rosette. See Escutcheon.
Door-latch spindle. 10, figs. 2681, 2689-91. A small metal rod or screw which the door-pin or knob is attached, and by which the latch is turned.
Door-latch spring. A spring which acts on the latch-hook or bolt and causes it to engage with its keeper; usually made of a flat piece of cast-steel.
Door-light bottom sash-rail, or glass-frame bottom sash-rail (English). 140, figs. 501-3. The bottom part of the door window framing.
Door-lintel top-rail. 99b, figs. 555.
Door-lintel backing. 172, fig. 557.
Door-lintel (English). 100, figs. 533-41. The horizontal part of the door-casing above the door. It is usually of wood, but in passenger-cars it is sometimes made of a thin shell of cast-iron. See Door-frame.
Door-lintel backing. 172, fig. 557.
Door-lock. Figs. 2681-2746. See Lock. A latch, which see, is usually combined with a passenger-car door-lock.
Door-lock bolt. See Lock.
Door-lock keeper, or nosing. See Keeper.
Door-mullion. 146, figs. 495-73; 9, figs. 1788-98. A vertical bar of wood between the panels of a door. See Door-frame.
Door-plate. 3, fig. 1788; figs. 2773-82. A notice-plate.
Door-plate. 3, fig. 1788.
Door-pin. A Door-pin (freight-car doors). 74, figs. 268-86, 355-72. A pin used to fasten a hinge to a staple. Leaden seals are sometimes attached thereto.
Door-pin chain. 75, figs. 244, etc. A chain by which a door-pin is attached to a car.
Door-plate. 3, fig. 1788; figs. 2773-82. A notice-plate. See Door-name-plate.
Door-post, or door-stile (English). 139, figs. 502-3. The outer sides of the stiles are beveled in a peculiar manner, so as to shut tight, and the inner sides are grooved to allow the movement of the window.
Door-pin (freight-car doors). 74, figs. 229-86, 355-72. A pin used to fasten a hinge to a staple. Leaden seals are sometimes attached thereto.
Door-post pocket. 44, figs. 229-86. See Pocket.
Door-pull. Figs. 2690-81. A D-shaped handle attached to a door to take hold of in opening or closing it.
Door-rail. Figs. 2846-51. A small metal rod or screw which the door-pin or knob is attached, and by which the latch is turned; the lower one, 5, the bottom-rail; 6, the middle or lock-rail; 7, the parting-rail. Minor variations often occur, as in figs. 1784-6 and 1790-1.
Door-rail bracket (car-doors). Figs. 1817-90. A bracket to carry top door-rail, serving as a guide for the door. See Door-track bracket.
Door-roller. Figs. 3846-51. Also called a door-sheave. The term Door-roller is applied to a flat round wheel pivoted in a bracket and attached to the bottom of a door to roll upon a flat surface rather than a narrow track.
Door-sash. 12 and 13, fig. 1788. A wooden frame, containing one or more panes of glass, placed in a door. In some cases one of these sashes is made to slide, so that it can be opened for ventilation. They are distinguished as lower and upper door-sash. The lower sash is commonly movable for ventilation and held open by a door-sash lift or bolt entering into a door-sash plate.
Door-sash bolt. 14, fig. 1788, fig. 4405-9. A metal pin attached to a sliding-door sash to hold it in any desired position.
Door-sash lift. Fig. 4470. See also above.
Door-sash plate. Figs. 4450-1 and 16, fig. 1788. See above.
Door-sash (single-platform street-cars). An iron shaft extending through the car for the purpose of enabling the driver to open the rear door. A door-sash lever is attached at the front end, and a door-sash crank at the back end, which is fastened to a slotted door-sash crank rail on the door-sash plate.
Door-sheave, or sliding-door sheave. 21, figs. 1798, 2824-48. A small wheel on which a sliding door rolls. It is usually placed at the top of the door, and sometimes at the bottom also. It is carried in a door-sheave holder. A grooved casting called a door-shoe or door-slide is sometimes used as a substitute for freight-car doors, especially when the load does not rest upon the lower door-track. See also Door-roller.
Door-sheave transom (street-cars). 191, fig. 5556. A long narrow panel which is hinged and with catch so that access may be had to the car-doors sheaves and track.
Door-shoe. 70, figs. 228-66. See Door-sheave.
Door-sill. 64, figs. 229-66. A cross-piece attached to the floor on the under side of a door-opening. In car construction the term is usually applied to an iron plate used under passenger-car and occasionally freight-car doors.
Door-sill. See Door-sheave.
Door-spindle. Figs. 3689-41. The bar passing through the door which carries the door-knobs.
Door-spring. Figs. 2815-18. An attachment to make doors self-closing. Three of the great numbers of devices in use are shown. Double-action spring hinges, fig. 2917-30, are in general used instead for the few doors requiring them.
Door-stile. 150, figs. 483-78; 8, fig. 1788. One of the two upright pieces on the outer edges of a door-frame, which see.
Door-stop. 1. A peg or block against which a passenger-car door strikes when opened, often provided with a rubber cushion, especially for swinging-doors. Door-holders, which both stop the door and retain it, are often called door-stop, as figs. 2803-14.
Door-stripe (freight-car sliding doors). 71, 72, figs. 228-66. Blocks or strips of wood or iron to restrain excessive motion. They are distinguished as closed door-stop and open door-stop.
Door-strap (street-cars). A leather strap or cord by which the back-door is opened and shut from the front platform. See Door-shift.
Door-top rail. 113, figs. 501-3. See Door-rail.
Door-track. 65, 66, figs. 244-66, etc. A metal bar or guide which supports a sliding-door, and upon which it moves, or by which it is held in its place. They are either top door-tracks or bottom door-tracks. The former usually carry the weight of freight-car doors, being hung
Dope. A mixture of waste, oil, and grease, for journal bearing packing, which is not fluid.

Double-acting spring hinge. Figs. 3617-30. A device to permit a door to open in either way and also to make itself closing. They are from 24 to 7 ins. in length of flange, 4 ins. being the most usual. They consist in their original form of a hinge on a hinge, the two opening in opposite directions. The "Utility" double-acting hinge is much like an ordinary butt-hinge, the tendency to restore the door to its normal position when opened in either direction being caused by a spring.

Double-board roof. Fig. 3379. See Car-roof.

Double-door. 1. A door made in two parts. These are made from 3$ to 7 ins. in length of the tenon in the direction to which it will be exposed to strain."—Knight. There are many forms of dovetail-joins.

Draft-bar slide. Draw-bar slide. (Street-cars.) 89, figs. 5954-5. A draw-bar sector which supports the follower-plate-block, bolted to and under the center-sills and connected thereto by packing-blocks.

Draft-bolt (Janney coupler, which see). 157, fig. 3301. A double-washer. A washer that answers for two bolts. See Tio in-washer.

Draft-gear. Figs. 1936-72 and 2275-3354. A term used to designate the drawbars, draft-timbers, buffing apparatus, and all their attachments—in short, the whole of the arrangements by which a car is drawn and which resist concussions. See the various heads above. Also Drawbar, Draw-head, Draft-timbers, etc.

Double elliptic spring. See Elliptic spring.

Double-guard (lanterns). See Guard.

Double-iron body-bolster. Figs. 1455-57. A common form for passenger-cars with six-wheel trucks, composed of two parallel iron trusses connected by iron plates or barret. It is sometimes applied to freight-cars, fig. 1448.

Double-lever brake. Fig. 1460. A brake which has two levers to a truck. The object of using two levers is to equalize the pressure on the two brake-beams. See Brake-gear.

Double-pipe-clip. Fig. 3935. An iron band made with two bends for holding two pipes (as heater pipes) in their place. See Clip.

Double plate-wheel. Figs. 5329-30. A cast-iron car-wheel, the rim and hub of which are united by two cast-iron plates or disks. Wheels in which the double plates extend only part way between the hub and rim, the connection being made by a single plate, are often called double-plate wheels. Figs. 5316, 5849. See Car-wheel. Wheel. Washburn Wheel.

Double ratchet (Morgan's deck-sash pivot). Figs. 4898-8. A pair of stationary ribbed disks which engage with each other in any position, there being no separate dog or ratchet-bolt. Another style of double ratchet, so called from its working when the sash is moved either way, is shown in fig. 4400.

Double sash-spring. See Sash-spring.

Double sliding-door fixtures. Figs. 5843-5, 5685.

Double-spoke car-wheel. Figs. 3944-5. See Car-wheel.

Double strap-hanger (for bell-cord). See Bell-cord hanger.

Double spring drawbar. Figs. 2388-89. A form of draw-bar in which two springs are used, either side by side or one in front of the other. In the latter case only one of the springs acts at once, one under tension and the other under compression. Drawbars with auxiliary draw-springs, are still another class, which are double springs de facto, but not so called.

Double-spring drawbar-timber. Figs. 3889-72. Two timbers extending longitudinally from the needle-beams to the follower-plate-block, bolted to and under the center-sills and connected thereto by packing-blocks.

Double-track snow-plow. Figs. 224, 408-9. A push-plow which plows the snow to one side of a track only, as to not crowd it upon the other parallel track.

Double-washer. A washer that answers for two bolts. See Tio in-washer.

Double window-blind. The usual form of window-blind. They are made in two parts, so as to require less height when raised. See Window-blind.

Double window-blind lift. Figs. 4445-7, 4445-7. See Window-blind lift.

Double-strap hanger. A flaring tenon adapted to fit into a mortice having receding sides so as to prevent the withdrawal of the tenon in the directions to which it will be exposed to strain."—Knight. There are many forms of dove-tail-joins.

Draft-bar slide. Draw-bar slide. (Street-cars.) 89, figs. 5954-5. A draw-bar sector which supports the coupler end of the drawbar and over which it swings. Draft-bolt (Janney coupler, which see). 157, fig. 3301. A draft spring-bolt.

Draft-door (Baker heater). Figs. 3868, etc. A door in the smoke-flue base, automatically opened and closed by the fire-regulator, and by which the fire is regulated.

Draft-gear. Figs. 1936-72 and 2275-3354. A term used to designate the drawbars, draft-timbers, buffing apparatus, and all their attachments—in short, the whole of the arrangements by which a car is drawn and which resist concussions. See the various heads above. Also Drawbar, Draw-head, Draft-timbers, etc.
Draft-gear check-casting. Figs. 2000-2. (Graham and Mitchell-Graham draft-rigging, which see.) A casting which inclose the thimbles or followers, and carries the thrust to the draft-sills and draft-timbers, with which they engage.

Draft-spring. Figs. 1936-2348.

(M. C. B.) Figs. 5499-5537.

(automatic couplers). Figs. 2073-2424.

(continuous). Figs. 1938-59.

(link-and-pin drawbars). Figs. 2073-4.

(English). Figs. 545-51.

(Graham). Figs. 1959-75.


(Butler). Figs. 2007-17.


(sundry railroads). Figs. 2027-72.

passenger (English). Figs. 2296-00.

(Janney-Buhoup). Figs. 2301-50.

(Miller). Figs. 2300-5.

(center-draft). Figs. 2283-90a.

(English). Figs. 501-4.

(Thurmond-McKeen). Figs. 2275-8.

(Thurmond-McKeen). Figs. 2377-81.


Draft-spring tie-rod. 162, fig. 483: 51, fig. 2291. A rod which connects an end-sill or platform end-timber with a body-bolster or drawbar cross-timber to tie them together. The term is sometimes applied to the continuous draft-rods that run from one drawbar to the one at the other end of the car.

Draft-iron (Janney coupler, which see). Fig. 2801. The equivalent of a drawbar-jaue, which see.

Draft regulator. See Fire regulator.

Draft-rod (continuous draw-gear). Figs. 1996-58. A rod which unites two drawbars at opposite ends of a car, and relieves the draw-timber attachments from strain.

Draft-sills. The center-sills.

Draft-springing (street-car). 93, figs. 5654-67. A spring attached to a coupler or drawbar (which see) to give elasticity. They are usually so arranged by means of follower-plates at each end as to resist either tension or compression. The usual size for draft-springs is 5 inches in diameter and from 6 to 8 inches in length, double-coil spiral springs. See Auxiliary buffer-spring.

In 1893 a Recommended Practice was adopted by the M. C. B. Association for attaching M. C. B. Automatic couplers to cars as shown in figs. 5507-37, and by a separate vote the use of a draft-spring 6 inches diameter by 9 inches long with 1½ inches motion and 22,000 lbs. capacity was recommended.

An occasional substitute for draft-springs in narrow-gage and other cheap cars is the spring-end-jaue, which see.

2. (English.) Figs. 240, 502. A long, half-elliptic spring reaching entirely across the car. Rubber draft-springs are more generally used, especially with continuous drawbars. Sometimes called a draze-spring.


Draft-spring cradle-plate (English). 146, figs. 348-51. A longitudinal plate in the under-frame, which supports the draw-spring.

Draft-spring pocket. A drawbar spring-pocket, which see.

Draft-spring stop. A metal sleeve or thimble in the center of a spiral or volute draw-spring to resist excessive compression. Not to be confused with a draw-bar stop, which see.

Draft-timbers. 10, figs. 1988-3038. A pair of timbers, carrying the drawbar attachments, placed below the center-sills, and usually extending from the platform end-timber of passenger-cars, or the end-sill of freight-cars, to the body-bolster. In passenger-cars these timbers are usually the principal supports or the platform.

See Platform-sills and Platform short-sills. The draw-timber in a tip-car is also termed a car-perch.


Draft-timber pocket. A casting attached to the body-bolster or center-sills of a car to receive the end of a draft timber.

Draft-timber tie-bar. Figs. 1970-1. A transverse iron bar attached to the under sides of a pair of draft-timbers to tie them together.


Draft-washer (Janney coupler). The washer for the rear end of the auxiliary draft-spring.

Drain-cock. (Of Westinghouse air-pump.) 41, fig. 1889, and 106, figs. 1691-2. A faucet attached to the lower end of the steam-cylinder to draw off water of condensation. See also Reservoir drain-cock and Tender drain-cup cock.

Drain-cup, or drip-cup (Westinghouse brake). 19, figs. 1706-7. A globular receptacle under a triple valve to collect water of condensation.

Drain-pipe union (Westinghouse air-pump, etc.). 41, fig. 1889.

Drake & Weir car-roof. Fig. 2302. See Car-roofs.

Draperies (curtains). D, figs. 2452-3a.

Drawbar. 1. (Link and pin.) An open-mouthed bar at the end of a car in which the coupling-links enter and are secured by a coupling-pin. They are provided with a draft-spring, which see, to give elasticity to the connection between the cars. Drawbars are made either of cast, malleable, wrought iron, or cast-steel, and in respect to their form are either (1) bolt or spindle drawbars, in which the draw-spring is attached by a bolt passing through its center; or (2) spring-pocket or strap drawbars, in which the draw-spring is inclosed within a yoke surrounding it. The elevated railroads use the center-draft drawbar, which see, figs. 2293-986, attached directly to the center-pin of the car. The solid-head is a wrought-iron drawbar forged in one piece instead of having a drawbar face-plate riveted on. The drawbar is frequently called draw-head, especially cast-iron drawbars. With certain coal cars a cheap form of drawbar, called a draw-hook, is used. In England this style is almost universal in combination with plain links in freight-car service, and with a screw-coupling, which see, for passenger-cars. The drawbar of the Miller couplers is also very frequently called a coupling-hook. See below. See figs. 2007-2026.

2. The word drawbar is used indiscriminately to designate both the old link-and-pin drawbar and the modern automatic car-coupler. There has been an effort to confine the name drawbar to the old link-and-pin type, but in the Proceedings of the M. C. B. Association, in speaking of the height of drawbars, the term is manifestly applied to the M. C. B. standard automatic coupler. The general adoption of the word to mean the old link-and-pin drawbar is hardly desirable if it were possible; for the link-and-pin drawbar will in a few years, without doubt, be a thing of the past, which will end all confusion of terms. The standard height of passenger-car drawbars adopted in 1890 by the M. C. B. Association is 35 inches from the top of the rail to center of drawbar, where the car is light. The standard height of drawbar for freight-cars from level of top of rails to center of drawbar is 34½ inches, adopted in 1898, with no greater variation than 8 inches, minimum height 31½ inches. See Automatic Car-coupler, Coupler, and Car-coupler.

3. (Miller coupler.) The drawbar coupling-hook, 11, figs. 2300-2.

Drawbars and attachments (Rules for interchange of traffic). Figs. a-k in the text.

Drawbars and attachments shall be considered in bad order unless the following ten conditions are complied with:

1. M. C. B. couplers with such minor defects only as
do not impair their efficiency and safety. The following defects will not be considered as impairing the efficiency or safety of M. C. B. couplers:

A. Chipped to 1/4 in. vertically and 2/4 in. horizontally from outer edge of guard-arm, provided not less than 5 in. of metal is left intact on outer edge of guard-arm at A. (See fig. a.)

B. Chipped to 3/4 in. vertically and 1 in. horizontally in center of guard-arm, provided both top and bottom corners are perfect. (See fig. b.)

C. Chipped on side wall to 8 in. vertically and 1 1/4 in. horizontally, as shown in fig. c.

D. Chipped on front wall or center front face to 3 in. horizontally and 3/4 in. vertically in top, bottom, and throat, as shown in fig. d.

E. Chipped on lugs in which knuckle swings, to 1/4 in. vertically, 1/4 in. back, and 3 in. transversely, as shown in fig. e.

F. Having combination of chipped places within limits given above, as shown in figs. f and g, provided that defects shown in figs. a and b, do not together exist in the same coupler.

G. Having rib in front of locking-dog bent inward, provided rib is chipped off so as to allow dog to drop into position.

H. Having cracks at one or both top corners just behind the horn if such cracks do not exceed 1/4 in. horizontally, or vertically, or both. (See figs. h and i.)

I. Having cracks in front walls or face of coupler, either at top or bottom, as shown in fig. j, provided these cracks do not extend back into the main body or horizontal walls of the coupler.

J. 1. Knuckles with lugs chipped to 3/4 in. vertically and 3/4 in. horizontally at A, B, C, and D. (See fig. k.)

2. M. C. B. couplers must be equipped with a steel or a wrought-iron knuckle.

3. Where wrought-iron drawbars are used they must not be broken off outside of tenons, nor broken nor cracked in the opening of face-plate, nor in the angles of the pocket, nor through rivet holes, nor must the filling be lost. Where cast-iron drawbars are used
they must not be broken nor cracked through pin-hole
nor back of head, nor must bolts or rivets be missing
where wrought pocket is used.
4. Drawbar stem, rod, and bolt must be sound and
secured back of drawbar follower-plate by a nut or flat
key. This to be secured by either a ring or spring cotter.
5. Drawbar stop must be sound, with all bolts and
nuts in proper place.
6. Drawbar keys and followers must be sound, keys
secured by cotter or ring, and followers held in proper
place by drawbar-guards.
7. Draft-springs composed of two or more coils must
not have more broken parts than one inside coil.
8. Drawbar carrier-irons should have two effective
bolts on each side.
9. Draw-timbers must not be more than \( \frac{1}{2} \) in. down,
and this only where bolts are effective.
10. Dead-blocks, wood sound, castings free from cracks
through bolt-holes and properly secured in place with
bolts or rods.

**Drawbar attachments and dimensions.** Figs. 5006-57.
In 1893 a Recommended Practice was adopted for at-
taching M. C. B. automatic couplers to cars, as shown,
and by a separate vote the use of a draft-spring 6 inches
diameter, 8 inches long, with 24 inches motion and
23,000 pounds capacity was recommended.

**Drawbar bolt.** 14, figs. 1936-3033; 5, fig. 2081. A bolt
or spindle which connects a drawbar to a draw-spring
and follower-plates, passing through the center of the
latter. A tail-bolt. See Drawbar.

**Drawbar carry-iron.** Figs. 2218, 2281, 5007. A transverse
iron bar bolted to the under side of the draft-timbers,
and on which the drawbar rests. It is usually U-shaped,
and the ends are bolted to the end-sills, but sometimes
flat, with draft-timber guards at the side, figs. 1985-8. A
drawbar carry-iron is sometimes called a stirrup.

**Drawbar chaining-plate.** (Miller coupler). An iron plate
framed into the platform true-locam, 29, figs. 2290-2,
above the drawbar coupling-hook, to protect it from
abrasion.

**Drawbar coupling-hook.** (Miller coupler). 11, figs. 2290-9.
The Miller drawbar, which see.

**Drawbar distance-plates (wrought-iron drawbars).** A block of iron between the upper and lower plates.
In many cases it serves as a thimble for the rivets.

**Drawbar follower-plates.** 7 and 8, figs. 1969-904, 207-9.
The term is misused as applied to 8A. The piece marked
8A should be called a check-casting. Two iron plates
which bear against each end of a draw-spring, and trans-
im the tension and compression on the drawbar to the
draft-springs and to the draft-timbers. See Auxiliary
drawbar follower-plate.

**Drawbar friction-plate (street-cars).** A cast-iron plate
through which the drawbar passes, attached to the plat-
form end-timber, to protect it from abrasion.

**Drawbar guides.** 13, figs. 2293-5, also shown in fig. 2299.
Wrought-iron bars which are fastened in pairs to the top
and bottom of the lugs or stops bolted to the draft-
timbers on each side, forming guides in which the draw-
bar follower-plates move. A drawbar jax, which see, is
sometimes used as a substitute for both the guides and
stops.

**Drawbar guide.** Cast-iron lugs, or wrought plates, bear-
ing against the sides of draft-timbers over the drawbar
carry-iron, to resist lateral strains and protect the draft-
timbers from wear.

**Drawbar head (wrought-iron drawbar).** 3, fig. 2074.
The outer end of a drawbar, which bears against a sim-
ilar head on the adjoining car.

**Drawbars, Height of.** (M. C. B. Standard). The stand-
ard height of drawbars for passenger equipment cars
is 35 inches from top of rail when car is light. Adopted in
1890.

The standard height of drawbars for freight-cars,
measured perpendicular from the level of the tops of
rails to center of drawbars, adopted in 1898, is 84 inches,
with no greater variation allowable than 3 inches, mini-
imum height 31 inches.

**Drawbar horns** (Jennys-Buhoup platform). 49, figs.
2440-5.

**Drawbar packing-blocks.** 180, figs. 2289-66; 11, figs.
1989-3009. A rectangular piece gained into the draw-
timbers and center-sills and serving to prevent longi-
tudinal movement. See Packing-block.

**Drawbar pin (street-cars).** A coupling-pin.

**Drawbar pocket (strap or spring-pocket drawbars).** Figs.
3001-4. A drawbar spring-pocket, which see.

**Drawbar safety-lug.** Figs. 2075-2248. A horn on the
upper side of a drawbar to bear against the end-sill on a
single dead-block on the end-sill, to relieve the draft-
spring, etc., from excessive buffing strains.

**Drawbar sector (center-draft draw-gear).** 20, figs.
2299-9a. A guide for the drawbar, shaped like an arc
of a circle, fastened underneath the platform.

**Drawbar side-casting.** Figs. 3015-17, 3025, and in fig.
3031. An iron casting, of which a pair serve as com-
bined drawbar guide and stop, which see, for the fol-
lowers to hold them in their places. A drawbar-jax is
a wrought-iron substitute and equivalent.

**Drawbar spring-pocket.** Fig. 2218. A spring attached to
the stirrup, or drawbar carry-iron, to give the drawbar
the necessary lateral motion in coupling. It takes the
place of the Miller leaf-spring or coupling-spring.

**Drawbar spindle, or stem.** 14, figs. 1969-3033. The
drawbar bolt which passes through the center of the
draw-spring and follower-plates in a bolt or spindle
drawbar.

**Drawbar spring-pocket.** 6, figs. 1986-3033. The space at
the back end of a spring-pocket or strap drawbar which
receives the draft-spring and follower-plates.

**Drawbar stem.** A drawbar bolt, or tail-bolt, which see.

**Drawbar stirrup.** A drawbar carry-iron, which see.

**Drawbar stop.** A casting which limits the movement
of the drawbar-followers, bolted to the draft-bar timbers
and forming distance-pieces to which the drawbar-guides
are bolted. The castings for the drawbar-stop are some-
times made long enough to bear against the body-bolster,
or a filling-block interposed between it and the draw-
bar, thus relieving lugs and bolts of strain.

**Drawbar stop-block.** Figs. 661-3.

**Drawbar washer (logging-cars).** A follower-plate on a
small scale.

**Drawbar yoke.** 1. A drawbar carrying-iron, which see.
2. The yoke or strap-pocket that incloses the draft-
spring and is bolted to the end of the drawbar is also
called a yoke.

**Drawbar yoke filler.** See Drawbar-yoke guide.

**Drawbar yoke-guide.** Figs. 1989-3. A casting that fits
into the rear-thimble and transmits the draft from
the yoke to the thimble and thence to the spring. A draw-
bar yoke-filler.

**Draw-chain (English).** See Wagon coupling.

**Draw-clevis (street-cars).** A wrought-iron bar with forked
end attached to the platform, to which the horses are
attached. Two kinds of these are used, one fastened to
the platform so as to be immovable; the other a spring
draw-clevis, can slide lengthwise, and its motion is re-
sisted by a spring.

**Drawer-pull.** A wooden or metal attachment to a drawer
to take hold of and pull out. In postal-cars they are
combined with label-holders, figs. 3859-90.

**Draw-head.** The head of an M. C. B. coupler exclusive
of the knuckle, knuckle-pin and lock. See also Draw-
head.

**Draw-hook.** 1. (Coal-cars and street-cars.) Figs. 843-4a.
An iron hook attached to the end of a car, by which it
is drawn and by which it is coupled to other cars.
Driving-wheel brake, or driver-brake (air-brake). Figs. 145, 348-51. American equivalent, draw-back or draw-bar plate. A wrought or cast iron plate secured to the head-stock, guiding the drawbar and receiving its rebound.

Driving-room car. Figs. 111-171, 172, 178, 190. A luxurious passenger-car for day travel, furnished with armchairs, sofas, carpets, etc. An extra charge is usually made to passengers who travel in them, and they are run by separate companies, like sleeping-cars, under contract with the railroads. Also, and perhaps more commonly, termed parlor-car or chair-car, which see; sometimes extravagantly palace-car. See Bay-window parlor-car.

Drop-off cock (Baker heater). Fig. 2957. A cock attached to the pipe, E, for emptying the pipes. It is a combination cock, which see.

Drop-spring. See Draft-spring.

Drop-timbers. See Draft-timbers.

Dressing-room. Figs. 3468 and 3545-7. Another name for a saloon, especially one provided with wash-bowl and toilet facilities. The ladies' saloon of sleeping and parlor cars is commonly so fitted.


Drexel journal-box lid. Figs. 5172-5.


Drexel vestibules. See the Barr vestibules.

Drilling. A term used in New Jersey for switching, which see, or making up trains. Regulating is another term sometimes used. The English term for this is marshaling or shunting.

Drip. 1. A receptacle to collect waste or superfluous liquid, as the water-drop of a water-cooler. See Urinal drip-pans, fig. 3078.

2. (Dining-car kitchens.) A lower sink receiving the drainage therefrom.

Drip-cock (Westinghouse brake). Fig. 1718. The cock at the bottom of the drip-cup.

Drip-coupling, or basin-coupling (wash-basin). Fig. 3474. The connection of the waste-pipe or drip-pipe with the basin.

Drip-cup. 1. (Westinghouse brake.) Figs. 1719, 1738-60. A receptacle inserted in the brake-pipe of each car to receive water condensing therein. A drain-cup.

2. (Student-lamp.) D (or E), figs. 3204.

Drip-cup screw (Student-lamp). E, fig. 3299.

Drip-dish (refrigerator-car). A dish or pan at one corner or end of the car for receiving the water from the melting ice, usually permitting it to escape by a trap, which see.

Drip-tray. Figs. 3890-1. An enamelled piece of sheet-iron placed directly under the seat of a closet, and over the bowl.

Driver-brake tie-rod. 31, figs. 1699, 1707. See Brake-block pin-rod.

Driving-chain (pile-driver car). 48, figs. 401-4. A pitch-chain (see also) used to drive the pile-driver car self-propelling, by engaging with the pitch-geared attached to one of the axles. Such cars are not usually made self-propelling.

Driving-gear (lever hand-car). 4, 5, figs. 5092-5060. It consists of the spur-wheel, or gear-wheel, and pinion.

Driving-wheel brake, or driver-brakes (air-brake). Figs. 1747-9. A brake applied to the driving-wheels of a locomotive. They are in very general use on locomotives in all kinds of service. All of the air-brakes are or may be so applied. A brake, manufactured by the American Brake Co., has also been quite largely introduced, but this brake apparatus now employs air instead of steam.

The two forms of brakes illustrated are the ones in most general use and in highest favor.

Driving-wheel brake-cylinders (Westinghouse). Fig. 1748. (American Brake Co.) Fig. 1749.

Drop (of lamp). "The drop of a center-lamp is its extreme length," measured from the ceiling to the lowest part of the lamp.

Drop-bottom. See Drop-door.

Drop-bottom car. Figs. 30-38, 31, 208-206. A car so constructed that its contents can be readily unloaded from the bottom by means of drop-doors.

A distinction is sometimes made between hopper-bottom cars, fig. 34-35, 351-357, which will discharge nearly all their contents without assistance, on opening the drop-doors: and a drop-bottom car, as figs. 51-53, 52-54, will not do this.

Drop-bottom cars are usually gondola-cars.

Drop-bottom car, brake for. Figs. 35, 810-19, 1459, 1781, etc. A brake specially arranged to have no parts under the center of the car to interfere with the drop-doors.

See Brake and Brake-gear.

Drop-door. 61, figs. 298-315. A door at the bottom of a drop-bottom or hopper-bottom car for unloading it quickly by allowing the load to fall through. Drop-doors are usually, if not invariably, in pairs, and are supported by a drop-door chain wound upon a winding-shaft, which see. A drop-door beam extends across the car above the winding shaft to assist in supporting it and to stiffen the car.

The subject of drop-doors has received a great deal of attention of inventors, and numerous designs and devices have been patented, yet the original drop-door with winding-shaft and chain is in very general use. Two other designs are illustrated—King's door, and the Canda slide-door—both of which possess novelty, and are in service on a considerable number of cars, especially the former.

Drop-door beam. See above.

Drop-door chain. 64, figs. 398-315. A chain attached to the winding-shaft and the drop-doors, which see. Also termed hopper-chain.

Drop-door hinges. 63, figs. 298-315. See above.

Drop-down frame (seat-cushions). Fig. 2906. One made so as to drop the slats supporting the seat-springs below the level of the seat rails so as to enable higher and easier springings to be used. The same thing is also effected by using curved seat-slats, as in figs. 4090-7.

Drop-forging. One made under the drop-hammer by the use of a die.

Drop-table (dining-car kitchens). A table hinged to the wall so as to drop against it out of the way when desired.

Drop-letter-box plate. Fig. 3928-9. A letter-drop, which see.

Drop-rack (Hartley chair). 4, figs. 4898-9. A rack by which the position of the back of the chair is regulated.

Drum. 1. "A cylinder over which a belt or band passes.

2. "A chamber of a cylindrical form used in heaters, stoves, and furnaces. It is hollow and thin, and generally forms a mere casing, but in some cases, as steam-drums, is adapted to stand considerable pressure."—Knight. See Brake-shaft-drum, Circulating-drum, or Expansion-drum (Baker-heater).

3. (Hoisting-gear.) 7, figs. 389-96; 41, figs. 401-4. The main cylinder upon which the hoisting-ropes are rolled up.

Drums for direct storage (Consolidated car-heating). Figs. 2961-7. A pipe containing salt-water, or a solution of acetate of soda, placed within a larger pipe,
the steam being admitted to the space between the two pipes. The outside pipe is therefore heated with steam. When steam is shut off, the heat from the inner tube containing salt-water, or solution of acetate of soda, maintains the temperature in the outer pipe. The two pipes at one end connect into the same fitting through which access is had to the space within the inner tube as well as the space between the tubes, so that the inner tube may be charged with salt-water, or with solution of acetate of soda, after the drum is made up and placed in position in the car.

Drum systems of car-heating. This method of heating employs a hot-water circulation within the car, to which a "Baker" or other similar heater is attached. To provide a means for maintaining heat in the car when steam from the locomotive is used, a drum is employed to transfer the heat of the steam to the water of circulation. Simple forms of drums are shown in figs. 2991-7, 3038-43, 3051-5, which consist simply of a cylinder or pipe within another pipe of larger cross-section, provision being made for the unequal expansion of the pipes; and outlet and inlet orifices being provided for the circulation of the steam and water.

Another type is the coil-drum or coil-jacket, figs. 3043-5, which see, which generally consists of a large sized pipe or casting capped at both ends. In this drum is placed a coil of copper pipe, which coil is made a part of the hot-water circuit of the car. Steam from the locomotive is admitted to this drum around the copper coil, through which heat is imparted to the water of circulation. That part of the circuit above this drum becoming relatively lighter than the water of the circuit, a movement of the part of the circuit above this drum becoming relatively lighter than the water of the circuit, a movement of the surface of the coil and upon its conductive power to heat. A pressure of from 10 to 20 lbs. of steam is carried in the drum. See also Double-coil systems. Gold's systems car-heating.

Safety car-heating. Drummond fastening (English). Fig. 5818. As applied to railroad wheels, a mode of securing the tire to the wheel, which prevents their coming asunder should the tire break or become loose. The tire is turned to the dotted line on the left hand of the figure, and when hot is hammered into shape shown in full lines in section, securing the retaining-ring in position. See also Tire-fastening.

Drum-shaft (of a derrick or crane). Figs. 888-90. The shaft on which the winding-drum is carried.

Drum-support (Baker-heater). A bracket on the roof to hold the circulating-drum.

Dual-burner. Figs. 5887-8. A coal-oil lamp-burner with two wicks, each in a separate-tube, by which a double flame is obtained. The Tuber burner has two wicks in a single tube.

Duck. A flaxfabric, lighter and finer than canvas, for upholstery. It is usually manufactured in rolls 15, 24, and 40 inches wide and about 40 yards long. Foofing-duck (used for street-car roofs) is manufactured of many different widths up to 12 feet, so as to entirely cover the roof when desired.

Dudgeon's hydraulic jack. Figs. 7745-6. A jack with a base and head, and two cylinders, one cylinder sliding within another. To the inner one (which is termed the ram) is attached the head having a socket to receive the lever, which operates the force pump in the lower end of ram; the remaining space is the reservoir containing the liquid which when forced into the lower chamber causes the ram to rise, and to lower, when allowed to return through the lower valve and back passages which are operated by the same lever. These jacks are light, portable, and may be worked by one man; who can lift 30 tons 1 foot in 8 minutes.

Dummy coupling-hook. A term used to designate both drop-bottoms, side-dump, and tip-cars, which see.


Duplex double-coil jet-system (Gold's car-heating systems). Figs. 3053, 3055. A system using two double-coils (which see) in a Baker-heater and also employing a jet in the circulating-pipes to promote the circulation. The duplex-double coils are plainly shown in fig. 3006, and the jet, fig. 3008, and in fig. 8006. In consequence of the jet an overflow pipe, Z, is necessary to carry off the increase of water from the condensation of the steam blown into the circulating-pipes. The arrows and letters plainly show the circulation of the steam and hot water.

Duplex double-coil overflow system (Gold's car-heating systems). Figs. 3002, 3004-5. A system of heating which employs two double-coil steam jackets in a Baker-heater, to the inner coils of which steam is admitted. Each of the coils is connected independently with the return pipes from one side of the car, making two complete circulations. It may be understood from the figure, the arrows and the lettered parts showing the circulation and names of parts.

Dust-guard chamber (of a journal-box). 15, fig. 5138. A kind of shim.
Eames vacuum brake. Figs. 1661-87. A system of continuous brakes, invented by Fred. W. Eames, operated by exhausting the air by an ejector, which see, from behind flexible india-rubber diaphragms attached to each truck. These diaphragms are directly connected to the brake-levers, and the pressure of the air on the outside of the diaphragms is thus communicated to the brake-shoes. The rubber diaphragms cover the mouth of a large cast-iron diaphragm-shell or bowl.

This brake is in use on the New York Elevated railroads, on which the number of stops is very great, and on several other lines. The advantage of the plan is its simplicity. The disadvantage, especially for high-speed trains, is that it does not act so quickly as the Westinghouse automatic.

Ear. A general name for projections to which handles or other exterior parts are attached, but more especially applicable to projections intended for movable attachments. See Ear to padlock; and Ear-bail, below.

Ear-ball (lanterns). Figs. 3855-62. An attachment formed of wire connected with the wire-guard, to which the bail is attached instead of to the body of the lantern.

Earthen-hoppers. Figs. 3865. A projecting board on the outside of the lower deck, intended for movable attachment. See above.

Eaves fascia-board. 1. (Freight-cars.) 91, figs. 239-66, etc. A plain board connecting the sheathing with the roof. See also Eastlake style.

2. (Passenger-cars.) 93, figs. 539-41; 98, figs. 543-69. A projecting board on the outside of the lower deck, immediately under the eaves, which comes below and under the eaves-molding.

Eaves-molding. 1. (Freight-cars.) 90, figs. 229-66, etc. A plain strip sometimes used outside an eaves fascia-board, which see.

2. (Passenger-cars.) 93, figs. 539-41, etc. An ornamental finish to the exterior angle of the lower deck, outside of and above the eaves fascia-board. A similar type is used for the upper deck.

Eccentric-lever (Westinghouse driving wheel brake), 18, fig. 1747. An arm consisting of an eccentric-lever casting and screw, or eccentric-lever stud, one end of which is attached to a brake-head and the other connected with the piston-rod by the eccentric-lever links. The end or head of the casting is made of a cam-shaped or eccentric form, and bears against another lever of the same kind, so that, when the two are forced downward, the brake-shoes are forced against the driving-wheels. The stud or screw is intended to either lengthen or shorten the lever so as to adjust the pressure of the brake-shoes against the wheels when the shoes become worn. Also called a cam.

Eccentric-lever casting. 15, fig. 1747. See above.

Eccentric-lever links. 28, fig. 1747. See above.

Eccentric-lever nut. 18, fig. 1747. A lock-nut which screws on an eccentric-lever stud. See above. Also called a cam-nut.

Eccentric-lever stud. 19, fig. 1747. See above.

Eccentric pivot-plate (for seat-arms). A seat-arm pivot-plate, made eccentric only to get room for screw-holes. The eccentricity has no functional purpose.

Edge-rolled spiral-spring. Fig. 5322. A spring formed by rolling a flat bar edgewise. See Spiral-spring.

Egg-shaped lamp-globe. Fig. 4938. See Lamp-globe.

Egg-shaped stove. A stove resembling an egg in form. It is commonly known simply as a cast-iron stove, and is very largely used for caboosees, etc., where appearance is not important.

Ejector. Figs. 1655-85. An appliance for operating a vacuum-brake by exhausting or "ejecting" air. It consists essentially of a pipe, 1, fig. 1664, placed in the center of a surrounding shell or casing, 2, with an annular opening, 3, between the pipe and the casing. When a current of steam is admitted at the lower end of 1, and escapes at the upper end, the air in the casing at 4 is drawn out through the annular opening by the current of the escaping steam. The space 4 is connected by a pipe 5 with the appliances on the cars for operating the brakes. Suitable valves are also used in connection with the ejector to shut off and admit steam and air. Ejectors are very noisy. In the ejector for Eames vacuum brake, a muffler is used to render noiseless the escaping steam. It consists simply of a box of small round balls, like shot, through which the steam must pass to escape.

Elastic fiber journal-packing. A compound, principally of cocoanut fiber mixed with jute, to serve as a substitute for waste. It is lighter, cheaper, and claimed to be more effective.

Elastic wheel. Any car-wheel in which some elastic material is interposed between the tire and the wheel-center or hub to resist the concussions. Different substances are used, such as paper, wood, india-rubber, oakum, etc. English passenger-wheels are made of teakwood (fig. 5380) to effect this purpose.

Elbow. Fig. 2947, etc. A short L-shaped cast-iron tube for uniting the ends of two pipes, generally at right angles to each other.

Elbow-rail (English). 106, fig. 501. In a carriage, a part of the body framing running horizontally along the sides at about the height of the elbow of a passenger in a sitting position.


Elder brake. Fig. 1462. A brake for eight-wheeled cars, with a horizontal center brake-lever in the middle of the car connected to the brake-shaft, having a fixed fulcrum under the car-body and pulleys at each end, over which a chain passes. The live lever (which see) of each truck also has a pulley or brake-lever shemve at its end, over which the same chain runs to apply the brakes. In very limited use.

Electric car. An electric motor-car.

Electric lighting. Various plans for the lighting of cars by electricity have been tested with promising success, but none of them as yet has obtained general introduction. The system that has been longest in use and most satisfactory on the whole is that shown in fig. 149, where the plant, consisting of an engine and dynamo, installed in one end of the baggage-car, the steam being taken from the engine. This system has been in use for several years with the Pullman Palace Car Company, and on the Chicago, Milwaukee & St. Paul Ry. Numerous attempts have been made to connect the dynamo with the axle of cars, one of the latest being a method of attaching the dynamo directly to the axle. These systems are yet in the experimental stage and no illustrations of them are given, as it is impossible to say what prominence they may gain.
End belt-rail tie-rod. 51, figs. 229-66. A tie-rod parallel to and alongside of the end belt-rail to keep the posts drawn tight and close against the end belt-rail.

End berth-rest, or single berth-rest (emigrant sleeping-benches). N, figs. 2414. So called in distinction from the regular (double) berth-rest used on the berth-posts in the body of the car.

End-board (English). 68, figs. 348-51. American equivalent, end-plank. A plank in the end of a "goods wagon" or gondola-car.

End-brace. 35, figs. 229-66, etc. See Body-brace.

End brace-pocket. 35, figs. 229-66, etc. See Pocket.

End brace-rod. 34, figs. 229-66, etc. See Brace-rod.

End-carriage. A carriage (which see) at the end of a car-body. See also End-plate. Platform-roof end-carriage.

End chute-plank. B, figs. 335-7. The planking of an inclined floor of a car which discharges its load longitudinally from the end toward the middle of a car, or vice-versa.

End compression-beam (passenger-car framing). Shown in fig. 429. A timber directly above the sills on the body bolster against which the compression-beam brace and the end-counterbrace abut. The compression-beam proper is situated at the middle of the car directly under the window-sills. The end compression-beam is sometimes omitted.


End-door (box-cars). Fig. 4. A door frequently applied to afford means for the insertion of long pieces of freight or lumber that cannot be entered by the main side-doors.


End door-locks. Fig. 2644, etc. See Locks.

End-door sash-bolt. Figs. 4465-9, etc. See Sash-bolt.

End-door sash-lift. Fig. 4470. See Sash-lift.

End dump-car. Figs. 29, 32-3, 343-4a. A car with an end-door through which the contents of the car may be discharged by tipping the car or by having the floor inclined.

End face-plate. (Janney coupler). 147, fig. 3801. The wrought-iron plate on the nosing of the Janney platform.

End-frame (of a car-body). The frame which forms the end of a car-body. It includes the posts, braces, end-rail, end-girth, etc.

End-girth. 50, figs. 229-66, etc. A girth in the end of a box-car. An end belt-rail.

End-girth tie-rod. 51, figs. 229-66. A rod extending across the end of a freight-car body along the end-girth, from one corner-post to the other. An end-belt-rail tie-rod.

End grab-iron. See Grab-iron.

End half-longitudinal (English). 6, figs. 348-51, 501-4. American equivalent, intermediate-sill. A part of the underframing extending from the cross-bearer to the headstock.

End hook (bell-cord). Figs. 3460-7. A hook sometimes used on the ends of passenger-cars, high up under the platform roof, for fastening the end of the bell-cord to.

End lamp-iron (English). 183, figs. 501-8. American equivalent, tail-lift holder. A wrought-iron holder secured to the side of the end of a box in order to carry one of the colored signal or "tail" lamps, denoting the last vehicle of the train. See also Side lamp-iron.


End-lining panel. 196, figs. 5854-67.

End-muntin (English). See End-stanchion.

End-panel. 1. Figs. 441, 445, and 44, fig. 5656. A panel at the end and on the outside of a passenger or street car below the window. In street-cars distinguished as lower and upper, both under the window. In passenger-cars
distinguished as end window-panel, alongside of the window, and end-panel, below it.

2. (English). 127, fig. 504. A panel in the outside end of the body of a carriage, extending from the archrail to the bottom end-piece.

End-piece (wooden truck-frame). 17, figs. 4806-4966. A transverse timber or bar of iron by which the ends of the two wheel-pieces of a truck-frame are connected together. A crooked end-piece is one cut away on top to clear the draw-gear. The inside end-piece is the one nearest the center of the car, in distinction from the outside end-piece. They are frequently designated as the front and back end-piece, as in figs. 4858-49.

End-piece corner-plate (passenger-trucks). 190, figs. 4840-4966. See Truck-frame corner-plate.

End-piece plate. Figs. 5023-3. A top-plate for the end-piece of a passenger-truck.


End-plank (of a gondola-car). They are often hinged to the end-frame to drop down upon it as in figs. 502-4, when they are called drop-ends.

End-plate. 48, figs. 229-66, etc. A timber across the end and top of car-body and which is fastened to the two side-plates. It is usually made of the proper form to serve as an end-carline.

End-plate channel-bar. H, figs. 514-18. An angle iron bolted or lag-screwed to the top of the end-plate between the side-plates to strengthen the end-plate and the connection between the sides.

End-play. 1. (Of an axle.) The movement, or space left for movement, endwise.

2. (Of a truck-bolster.) Usually called lateral-motion, or from side to side.

End-post. See Vestible end-post.

End-post knee-iron (street-cars). 38a, figs. 5564-67. See Knee-iron.

End-rafter. A term erroneously applied to the end-carlines, which see.

End-rail. 1. See Wainscot end-rail (lower and upper).


End roof-panel. The panel above the door and below the clear-story.

End scroll-iron (English). 89, figs. 501-4. A wrought-iron support for the spring-link adjusting-screw. The upper face is attached to the under side of the solebar, and the lower part is bored horizontally for the adjusting-screw. It is placed near the end of the vehicle, and hence differs somewhat in pattern from the ordinary scroll-iron.

End-seat panel (street-car). An inside panel at the end of a longitudinal or side seat.

End sill. 3, figs. 298-96, etc., 495-78, etc. The main outside transverse timber of a car-body into which all the floor-frames are fastened. In passenger-cars it comes directly under the door, the platform (which see) with its various parts, being a separate construction. A spring end-sill, which see, is sometimes added outside of the end-sill proper as a substitute for a draft-spring. In England the end-sill is termed the head-stock. In iron frame cars a wooden end-sill is commonly used, and bolted to an end-sill channel-bar with which the iron sills are connected, and which is the true end-sill.

End-sill brackets (of iron-frame cars). L-shaped angle-plates used to connect the iron sills and the end-sill channel-bar. In bridge-building such plates are termed brackets. When of triangular section they are termed gussets.

End-sill channel-bar. See above.

End sill and plate tie-rod. S, figs. 514-18. A tie-rod joining the end-sill, S, with the end-plate, J, fig. 514.

End-sill corner-plate. Should read End-piece corner-plate.

End-sill flitch-planks. D, figs. 509-90. The planks or sticks of timber which are placed on the sides or between the flitch-plates, and are part of a composite end-sill.

End-sill flitch-plates. A, figs. 509-90. The iron or steel plates sandwiched between the wood members of a composite end-sill.

End-sill protection-plates. Figs. 1265-6.

End-sill stiffening-angle. B, figs. 514-18. Pullman anti-telescoping device. A | x 3 x 4 angle iron riveted or bolted to the end-sill stiffening-plate and to the end-sill on the inside. The inner body-truss rods pass through it, the end-sill and the truss-rod weather-plate.

End-sill stiffening-plate. A, figs. 514-18. Pullman anti-telescoping device. A ⅝-inch plate, 30 inches wide in the middle by 13 inches at the ends, bolted on the under side of the end-sill and to the under side of the center, intermediate, and side sills.

End-stanchion, or end-muntin (English). 65, figs. 548-51. An upright bar at the end of a wagon, stiffening the end against shocks in switching.

End-step (street-car). 73-6, figs. 5654-5.

End-stop (journal-box). Figs. 5133-48 and 5165-6. A brass block inserted upon the inside of the lid to take up the end-thrust of the axle. In the Raoul journal-box the end-stop is a part of the plate attached to the box-lid. In the Adams, Bissel, and C., B. & Q. boxes the end-thrust is taken up by a stop-sedge which is held in place by lugs. End-stops were at one time in considerable favor and in quite general use; subsequently their use became very limited, but to-day they are in increasing favor. They have been in constant use on the six-wheel trucks of parlor and sleeping cars for many years. See Stop-journal bearing and Stop-key journal bearing.

End-timber. See Platform end-timber or buffer-beam, also End-sill.

End truss-plank. See Truss-plank.

End ventilator. An aperture for the admission or escape of air at the end of a car, usually placed over the windows. See also Deck end-ventilator and the end-ventilator for fruit-car.

End-ventilator-opener. See Deck sash-opener.

End ventilator-top rail. 173, fig. 557.

End wainscot-panel. See Wainscot-panel.

End window-panel. A panel at the end and on the outside of a passenger-car alongside of the window, in distinction from the end-panel proper, which is below the window.

Engine and air-pump complete (Westinghouse brake). Figs. 1689, 1091-3. A machine attached to a locomotive for compressing air. It consists of a steam and an air-cylinder, the pistons in which are connected to the same piston-rod, so that the air-piston is worked directly by the steam-piston. Suitable valves are provided for admitting and exhausting the steam and air to and from the cylinders. See Reversing-valve, etc.

Engineer's brake and equalizing discharge-valve (Westinghouse brake). Figs. 1719-13. The valve now used instead of the old three-way cock, figs. 1708-9, for applying and releasing the brakes. A valve device located in the cab of the locomotive for applying and releasing the air-brakes. It is operated by the engineer through the medium of a projecting handle or lever. In the release position of the handle, the air from the main reservoir has access to the train-pipe only through the feed-valve attachment which operates to limit the air pressure in the train-pipe to 70 lbs., when it is 90 lbs. in the storage reservoir. In the position for service application of the brakes the air main pressure is partially released from the chamber above a piston which is then forced upward by the train-pipe pressure below it and opens a
valve to the atmosphere through which the train-pipe air is discharged at such a rate that the emergency action of the cars cannot take place. Any degree of reduction of train-pipe pressure may be effected in this way for graduated applications of the brakes. In the position for the emergency application of the brakes, a large direct port from the train-pipe to the atmosphere is opened, which causes the instantaneous application of the brakes throughout the train.

Engine-lamp. Fig. 3318.

Equalizer-guides (Janney-Miller coupler). Cast-iron chafing-plates bolted to the main knees of the Janney platform, above and below the equalizer.

Equalizer-spring. 79, figs. 4942-66, and figs. 5223-8. A casting which bears against the under side of the journal-box and holds the spring in place.

Equalizing-bar. A short term for an equalizing bar, which see.

Equalizing-valve (Westinghouse brake). A valve for use on long trains to equalize the pressure in the brake-pipe and prevent the inequality of pressure in the front portion of the pipe during the brief period in which the brakes are being applied by release of air from the brake-pipes, from tending to first apply and then immediately release the brakes on the forward cars, owing to the rush of air from the rear portion of the train.


Escutcheon. 1. Figs. 2831-7, etc. A plate or guard for a key-hole of a lock. Similar plates for the holes through which door-knob spindle passes are also called escutcheons, but more commonly rose or rosette. See Seat-lock escutcheon. An escutcheon-plate is often attached to an escutcheon to cover the key-hole.

2. (Yale lock.) A revolving post provided with holes to carry the pins which act as tumblers. When the key with corrugated edge is inserted, each of these tumblers is raised so that the joint comes exactly at the edge of the escutcheon, thus permitting revolution.

3. (Padlock.) Fig. 2765. More properly an escutcheon-plate. See above.

Excavator. A patent door said to be spark and storm proof. The door slides upon an overhead track, and is divided horizontally so that it may be pushed past the cleats between which it closes. To bend the door at the hinged division, an eccentric rod and lever is attached.

Eureka brake-spring seat-spring. Fig. 4018. See Seat-spring.

Eubank car-door. A patent door said to be spark and storm proof. The door slides upon an overhead track, and is divided horizontally so that it may be pushed past the cleats between which it closes. To bend the door at the hinged division, an eccentric rod and lever is attached.

Expander (Westinghouse brake). See Piston-packing expander.
Expanding collar (for lamp). Fig. 3405. One used to secure a rubber, under a being to be used. See Collar.

Expansion-drum (Baker-heater). Figs. 3988, 3993-9. A circulating-drum, which see. Express car. Figs. 87, 139-41, 168-70, 567-73, 570-96. A car for carrying light packages of freight for express companies on passenger trains. Also see Combination baggage-car, figs. 595-604.

The express business was originated in 1839 by William F. Harnden, who traveled for some time as a messenger between New York and Boston; but it was not for a long time thereafter that it grew to sufficient dimensions to require separate cars. Alvin Adams, founder of the Adams Express Company, began business in 1840. At present complete trains of express-cars are occasionally required.

Express hand-car. A hand-car with large wheels to run at a high speed. Several different designs exist not called by this name, but accomplishing, or seeking to accomplish, the same end. See Hand-car.

Extension-reach (logging-cars). Fig. 39. The reach is a long bar connecting the two trucks. The extension-reach is adjustable.


External cylinder-gage. A steel ring with a cylindrical hole which is very accurately made of a precise size, and used as a standard of measurement for the diameters of solid cylindrical objects.


Eye. "A small hole or aperture."—Webster.


Eye-bolt. 1. "A bolt having an eye or loop at one end for the reception of a ring, hook, or rope, as may be required."—Knight. See Bolt; also Brake-beam eye-bolt. Lock eye-bolt. Brake safety-chain eye-bolt. Lock chain-eye-bolt. Bolt.

2. For Miller hook (Janney-Miller coupler). The part by which the swivel connected to the uncoupling lever is secured to the Miller hook. It is a 4-inch bolt.

3. For side-spring (Janney-Miller coupler). The eye-bolt by which the side-spring stirrup is secured to the horn. It is a 4-inch bolt.

Eye-bolt link-hanger. A special form of swinging-hanger, which see, having a very short link attached to an eye-bolt passing through the transoms.

Eye-head coupling-pin. So called in distinction from a solid-head or bent-head coupling-pin.

Eyelet. 1. Figs. 3983-4. "A short metallic tube, the ends of which are flanged over against the object through which it passes. Used as a bushing or reinforce for holes."—Knight. In metallic eyelets of the usual form, the two halves which when compressed together form the eyelet are known as grommets. See Carpet-eyelets.

2. (Window-shade.) 8, figs. 4590-1, 4593-4. A slot in the window-shade leather to fit over the sash-lift, to hold the shade fast.

Eyelet-sail. Fig. 2855. A wire sail with turned knob, for use with carpet-eyelets.


Face. (of rim of car-wheel). The vertical surface of the outside of the rim.

Face-plate. 1. A metal plate by which any object is covered, so as to protect it from wear or abrasion. A journal-box lid is sometimes called a face-plate.
Feeder-cup and collar (for lamps). Figs. 5934-5.

Feeder-screw and hoop (for lamps). Figs. 5909-10.

Feetube (student-lamp). K, fig. 5999. The tube connecting the reservoir with the burner. The standard by which the entire lamp is supported passes through it.

Feetube collar (student-lamp). G, fig. 5999. The foot tube connecting the reservoir with the burner. The standard by which the entire lamp is supported passes through it.

Feetube-valve. 1. (Westinghouse air-brake.) Fig. 1711. An auxiliary-valve attached to the engineer’s brake and equalizing discharge-valve, and consisting of a feed-valve body, 65, cop-nut, 69, a piston, 74, piston-rod, 66, a spring, 64, piston-nut, 73, a stud, 59, a case-gasket, 59, a friction-ring, 67, and other essential parts.

2. (Of engine-signal-valve, Westinghouse train-signal apparatus.) G, fig. 690. The valve regulating the supply of air from the main reservoir.

Feet-valve. A very long platform-car used for pushing cars on or off a ferry-boat when the latter is approached by an incline too steep for locomotives to outrun on the incline.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Fender. See Door-fender (street-cars.)

Female-gage. An external gage, which see.

Fender-guard. See Door-fender (street-cars.)

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Felt-edge (for car-seats). A device for building up the edges of car-seat cushions. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female gage. An external gage, which see.

Fender. See Door-fender (street-cars.)

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Felt-edge (for car-seats). A device for building up the edges of car-seat cushions. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Felt-edge (for car-seats). A device for building up the edges of car-seat cushions. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Felt-edge (for car-seats). A device for building up the edges of car-seat cushions. It is simply a roll of felt stitched in such a manner as to fit over a cleat; and when tacked down it forms an even elastic face to the cushion.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.

Female center-plate. The body and truck center-plates are sometimes called male and female plates. See Center-plate.
inches, and the colors indicate their purpose as follows:

**Red** signifies danger and is a signal to stop; **green** signifies caution and is a signal to go slowly; **white** signifies safety and is a signal to go on; **blue** denotes that car inspectors are at work under or about the train or car, and that it cannot be moved or coupled to until the blue signal is removed by the car inspectors. In the night-time lanterns with colored glass globes are used instead of flags and the colored lights have the same meaning as the colored flags.

**Flag-holder** (for corner-post of passenger-car). Figs. 5244-4. A cast or malleable iron receptacle for a signal-flag staff. It has a lug cast on it which engages into a flag-holder plate attached to the corner-post.

**Flag-holder plate.** See above.

**Flange.** 1. (Of bell-cord guides, etc., etc.) Figs. 5479, 5481, 5330, 5332, etc. A projecting rim for attaching the part to any surface by wood screws.

2. (Of a car-wheel.) Fig. 5424. A projecting edge or rim on the periphery for keeping it on the rail. The inside edge of the flange which connects with the tread of the wheel is termed the throat, and the extreme outer point the toe of the flange. Worn flanges having flat vertical surfaces extending more than 1 inch from tread of wheel, or 1 inch thick or less, are a cause for rejection under the rules for interchange of traffic. See Wheels. The standard distances fixed by the Master Car Builders' Association, from outside of flange to inside of tread in surface, is 4 feet 5| inches, as shown in fig. 5421, with ±-inch variation either way. See Interchange Rules. See Flange gage. See also Wheel-center flange in figs. 5396 and 5399.

**Flange brake-shoe.** Figs. 1644-5, etc. See Ross brake-shoe.

**Flange-collar** (of a passenger-car door lock). G, fig. 2630.

**Flange-fittings** (Pintsch system). Figs. 5165, 5169, 5170-75. Special fittings required for the Pintsch system are all flanged and made of brass, the flanges held together by screws. The joints are made tight by the use of special lead and rubber washers.

**Flange-gage, or distance-gage.** Fig. 5488. A gage for determining the correctness of the distance between inside and outside of flanges. The dimensions shown in the engravings are those adopted by the M. C. B. Association.

**Flanger.** See Snow-flanger.

**Flap-door** (English). See Falling-door.

**Flashing.** Figs. 5280-1. "Plumbing. A lap-joint used in Flap-door (English). See Fall-door.**

**Floor-frame.** The main frame of a car-body underneath the floor, including the sills, body-bolsters, needle-beams, etc. The under-frame.

**Floor.** 1. "That part of a building or room on which we walk; the bottom or lower part consisting, in modern houses, of boards, planks, or pavement.

2. "A platform of boards or planks laid on timbers as in a bridge or car; any similar platform."—Webster.

3. 27, figs. 289-47, etc. The boards which cover the sills of a car. In passenger-cars the floor consists of two and sometimes three courses of boards, called respectively, the flooring, intermediate floor and deepening ceiling, the latter being on the under side of the sills. An intermediate or upper floor, 28, more commonly called the double-deck, is used in stock cars for carrying sheep and hogs. Hopper-bottom cars have an inclined floor subdivided into inclined end-floor and side-floor when both are used, which is not usual. This floor is frequently made of iron plates called hopper-plates.

**Floor-beam.** A sill, which see.

**Floor-frame.** The main frame of a car-body underneath the floor, including the sills, body-bolsters, needle-beams, etc. The under-frame.

**Floor-furnishings.** Figs. 5332-44.

**Flooring.** Tongued and grooved (which see) boardsof hemp, cocoa-fiber, rattan, india-rubber, wood, or other material laid on the floor of a car for passengers to clean their boots and shoes on. Mats are placed on the floors of street-cars to take up the dirt and dust. See Cocoa-fiber. Wood floor-mat. Rubber floor-mat. The latter is either perforated or corrugated.

**Floor-pipe** (for closet-hoppers). Figs. 5288-9. A pipe passing through the floor of the car only, with which the hopper proper is connected.

**Floor-stop.** 1. (For door-holder.) Figs. 5280-4, 2900-10. A catch for a door-holder attached to the floor, in distinction from a partition-stop attached to the wall or partition. See Door-holder.

2. (Grain-door.) g, fig. 1839.

**Floor-strip.** 20, fig. 5255. The strips that make the grated floor frames of a street-car.

**Floor-timbers.** 3, 4, figs. 528-475, etc. The main timbers in the frame of a car-body underneath the floor, and on

**Flexible-frame** (logging and other cheap cars). A frame so constructed that the natural spring of the wood may serve in part as an equivalent for metallic springs, the latter being dispensed with. Many narrow-gage freight cars use spring end-sills, which see, in a similar manner.

**Flexible-top seat-cushions.** Figs. 3927-88, etc. A seat-cushion, the top of which is in detached parts so that one part can yield without carrying down the other.

**Flitch-plates.** Figs. 890, 1428-28. An iron or steel plate sandwiched between two thicknesses of wood and bolted together to give the member which they comprise greater strength. Also called sandwich-plates.

**Floating connecting-rod.** 1. (Hodge brake). 8, fig. 1468. A horizontal rod which connects the two floating-levers together.

2. (Westinghouse brake). 8, figs. 1688-4. A rod which connects the floating-lever with the floating-lever.

**Floating-lever.** 1. (Hodge brake). 7, fig. 1468; 15, figs. 1698-8. One of two horizontal brake-levers which are used under the center of a car-body. They are each connected at one end with one of the brake-levers on the truck, and at the other end with the brake-wheel. The centers of the floating-levers are connected together by a rod called a floating connecting-rod.

2. (Westinghouse freight-brake.) 7, figs. 1698-8. A lever, to the middle of which the push-rod is attached, each end being connected directly to the live-lever of each truck.

**Floating-lever bracket.** Figs. 1467-70. A bracket bolted to the underframe of a car to carry the floating lever of the Hodge brake-gear.

**Floating-lever guides.** 15a, figs. 1698-8.

**Floating-lever connecting-rod.** (Westinghouse freight brake-gear). 14, figs. 1695-8. More properly a cylinder-lever tie-rod, which see.

Floor. 1. "That part of a building or room on which we walk; the bottom or lower part consisting, in modern houses, of boards, planks, or pavement.

2. "A platform of boards or planks laid on timbers as in a bridge or car; any similar platform."—Webster.

3. 27, figs. 289-47, etc. The boards which cover the sills of a car. In passenger-cars the floor consists of two and sometimes three courses of boards, called respectively, the flooring, intermediate floor and deepening ceiling, the latter being on the under side of the sills. An intermediate or upper floor, 28, more commonly called the double-deck, is used in stock cars for carrying sheep and hogs. Hopper-bottom cars have an inclined floor subdivided into inclined end-floor and side-floor when both are used, which is not usual. This floor is frequently made of iron plates called hopper-plates.

**Floor-beam.** A sill, which see.

**Floor-frame.** The main frame of a car-body underneath the floor, including the sills, body-bolsters, needle-beams, etc. The under-frame.

**Floor-furnishings.** Figs. 5332-44.

**Flooring.** Tongued and grooved (which see) boards of which a passenger-car floor is made. The floor of freight cars is commonly two-inch planking.

**Floor-joint.** A floor-timber.

**Floor-mat.** Figs. 5287-8. A texture or structure of hemp, cocoa-fiber, rattan, india-rubber, wood, or other material laid on the floor of a car for passengers to clean their boots and shoes on. Mats are placed on the floors of street-cars to take up the dirt and dust. See Cocoa-fiber. Wood floor-mat. Rubber floor-mat. The latter is either perforated or corrugated.

**Floor-pipe** (for closet-hoppers). Figs. 5288-9. A pipe passing through the floor of the car only, with which the hopper proper is connected.

**Floor-stop.** 1. (For door-holder.) Figs. 5280-4, 2900-10. A catch for a door-holder attached to the floor, in distinction from a partition-stop attached to the wall or partition. See Door-holder.

2. (Grain-door.) g, fig. 1839.

**Floor-strip.** 20, fig. 5255. The strips that make the grated floor frames of a street-car.

**Floor-timbers.** 3, 4, figs. 528-475, etc. The main timbers in the frame of a car-body underneath the floor, and on
which the latter rests. They are chiefly the sills (side, corner, and intermediate) and the end-sills. They are a part of the underframe. See also Diagonal floor-timber. Inclined floor-timber. Transverse floor-timber.

Floor-timber braces. 7, figs. 486, 448, etc. Diagonal timber let into the sills under the floor to stiffen the floor-frame laterally.

Floor-timber distance-block. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross-frame tie-bolt. In iron frame cars, tie-plates are riveted across the top of the sills to subserv the same purpose. They are little used to-day. See Bridging.

Flush-bolt. Figs. 2544-5. A bolt attached to a slide which is let into a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-catch. Figs. 2548-9. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. A spring flush-bolt is commonly called a cupboard-catch. Figs. 2548-9.

Flush-bolt keeper. Figs. 2549. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-timber distance-block. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross-frame tie-bolt. In iron frame cars, tie-plates are riveted across the top of the sills to subserv the same purpose. They are little used to-day. See Bridging.

Flush-bolt. Figs. 2544-5. A bolt attached to a slide which is let into a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-catch. Figs. 2548-9. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. A spring flush-bolt is commonly called a cupboard-catch. Figs. 2548-9.

Flush-bolt keeper. Figs. 2549. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-timber distance-block. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross-frame tie-bolt. In iron frame cars, tie-plates are riveted across the top of the sills to subserv the same purpose. They are little used to-day. See Bridging.

Flush-bolt. Figs. 2544-5. A bolt attached to a slide which is let into a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-catch. Figs. 2548-9. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. A spring flush-bolt is commonly called a cupboard-catch. Figs. 2548-9.

Flush-bolt keeper. Figs. 2549. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-timber distance-block. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross-frame tie-bolt. In iron frame cars, tie-plates are riveted across the top of the sills to subserv the same purpose. They are little used to-day. See Bridging.

Flush-bolt. Figs. 2544-5. A bolt attached to a slide which is let into a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-catch. Figs. 2548-9. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. A spring flush-bolt is commonly called a cupboard-catch. Figs. 2548-9.

Flush-bolt keeper. Figs. 2549. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Floor-timber distance-block. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross-frame tie-bolt. In iron frame cars, tie-plates are riveted across the top of the sills to subserv the same purpose. They are little used to-day. See Bridging.

Flush-bolt. Figs. 2544-5. A bolt attached to a slide which is let into a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Flush-catch. Figs. 2548-9. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. A spring flush-bolt is commonly called a cupboard-catch. Figs. 2548-9.

Flush-bolt keeper. Figs. 2549. A plate which is attached to a door, sash, or window frame, and has a suitable hole in which a flush-bolt engages. When for spring-bolts, as in the engraving, it is also called a strike-plate.

Floor-timber distance-block. A short transverse piece of timber placed between adjoining floor-timbers and sills to stiffen them, the whole being fastened together with bolts in connection with a cross-frame tie-bolt. In iron frame cars, tie-plates are riveted across the top of the sills to subserv the same purpose. They are little used to-day. See Bridging.
Four-wheel car. The original type of railway vehicle, still almost universal in England and on the Continent. There are a few four-wheeled coal-cars in existence still in this country, but a four-wheeled box-car is met but rarely and then only on the roads to which it belongs. No new four-wheeled cars are being built for inter-change of traffic; the tendency being to make short heavy trains in preference to long trains of equal weight. The truck of an ordinary American eight-wheel car is simply a four-wheel car carrying half the weight of the car-body as a dead load upon it.

Four-wheel trucks. Figs. 4576-4956.

Fox pressed-steel frame (for street-car trucks). Fig. 5669.

Fox solid-pressed-steel car-truck. Figs. 4578, 4739-85.

A truck, the frame of which is wrought and hydraulically-forged of plate steel consisting of few pieces which are all riveted together. It is a pedestal truck with journal-box springs, with transoms, but no bolster or spring plank. The details are fully shown.

Frame. 1. The outline or skeleton upon which a structure is built up. In a car the framing is usually supposed to mean the sideframe as distinguished from the floor or underframe, unless otherwise so expressed. The leading types of freight-car frame are shown in figs. 299-378, etc. See Bostard frame. Bostard Pratt. The leading styles of passenger-car framing are shown in figs. 419-804, and, in perspective view, figs. 531-9. The framing of street-cars is shown in figs. 5646-67 with the dimension of parts and over all. A marked innovation in the framing of passenger-cars is the introduction of iron in combination with wood. This is shown in the so-called composite framing of figs. 428-34, 523-30, 5646-67; in "anti-telescoping" end-framing of Pullman's Palace Car Company, shown in figs. 512-22 and 456-60; in the framing of passenger-cars is the introduction of iron in combination with wood. The usual freight-car lock is simply a hasp, staple, pin, and seal, but stationary or fixed freight-car locks are in increasing use.

Freight-truck. Figs. 5635-41. A two-wheeled vehicle, named a freight-car truck, which see. See also Barrow-truck. Wagon-truck.


Freight-truck. Figs. 5635-41. A two-wheeled vehicle, universally used about stations for loading and unloading freight. A baggage-barrow is much the same. Baggage-barrows and freight-trucks are both sometimes designated as freight or baggage-trucks. See Westinghouse brake.


Fresnel lantern. Fig. 5440-1. A lamp inclosed in a cylindrical Fresnel lens, which see. They are more used in marine than in railroad service.

Fresnel lens. Fig. 5440-1. A lens formed of concentric rings of glass or other transparent substances, one or both sides of which are bounded by spherical surfaces. The object of making a lens in this form is to reduce its thickness in the centre, and thus lessen the liability of having flaws and impurities in the glass, and also to reduce the absorption and aberration of the rays which pass through it. Such lenses are also made of a hollow, cylindrical form, and used to inclose signal lamps. The outside of the glass is formed of successive rings, the external surfaces of which are bounded by spherical surfaces.

What is known to the trade as a semaphore lens is a Fresnel lens with the inner surface concave.

Fricition-block. See Swing-hanger friction-block and Friction plate.

Fricition plate. 1. The body and truck side-bearings, which see, are sometimes called friction-plates. See

system of screw-threads, which see, is often called the Franklin Institute system because the former was first proposed in a report to, and was recommended by, the Franklin Institute.

Free air-space (refrigerator-car insulation). An air space which has free communication with the outside air so that the air it contains can circulate and be replaced by fresh air.

Freight barrow-truck. Figs. 5687, etc. More commonly a supply freight-truck, which see. See also Barrow-truck.

Freight-car. Figs. 1499, 299-379, 570-1131. A general term used to designate all kinds of cars which carry goods, merchandise, produce, minerals, etc., to distinguish them from those which carry passengers. English term, wagon. Figs. 484-51.

The cost of various styles of freight-cars, as established by the rules for interchange of traffic, has varied in different years as follows:—
Frost dry-carburetor system of car-lighting. Figs. 8109-10 and 8112-24 show how the supply of air is taken from the end of the auxiliary reservoir and enters the air-tank after passing through the combined dust-guard and check-valve. This valve frees from dirt the air which passes through it and acts as a check to retain the supply of air stored in the tank, 1, at such times as the pressure is withdrawn from the brake system. The air-tank also serves as a storage reservoir, and its capacity is such that, when charged to the pressure ordinarily carried in the air-brake system, the air contained therein will sustain the lights several hours after the car is detached from the train. A tank-aside placed at each end of the tank controls the retention of air. The air-pipe conducts the air to the saloon where the air-pipe indicates the pressure in the air tank, and the close-valve directly controls the supply of air to the carburetors. From the close-valve the air passes through the regulator, where it is reduced in pressure to 14 pounds, which pressure is practically constant on all parts of the system beyond this point. The course of the air next taken is through the mercurial-check-valve and the roof pipe to the carburetors. After entering the carburetors, the air moves slowly through a spiral passage, sixty feet in length, packed solidly with cotton wicking saturated with gasoline, and absorbs sufficient of the volatile oil to produce the desired gas which is consumed by the lamp directly beneath. This system is in general use on the Pennsylvania, Norfolk & Western, and several other prominent roads. The property and patent rights of the system having been recently acquired by a rival gas-lighting company, its future is uncertain. For lines which are isolated and have no plant for compressing gas, as is required for the Pintsch system, the Frost system will find favor.

Frost dry-carburetor system of car-lighting. Figs. 8109-10 and 8112-24 show how the supply of air is taken from the end of the auxiliary reservoir and enters the air-tank after passing through the combined dust-guard and check-valve. This valve frees from dirt the air which passes through it and acts as a check to retain the supply of air stored in the tank, 1, at such times as the pressure is withdrawn from the brake system. The air-tank also serves as a storage reservoir, and its capacity is such that, when charged to the pressure ordinarily carried in the air-brake system, the air contained therein will sustain the lights several hours after the car is detached from the train. A tank-aside placed at each end of the tank controls the retention of air. The air-pipe conducts the air to the saloon where the air-pipe indicates the pressure in the air tank, and the close-valve directly controls the supply of air to the carburetors. From the close-valve the air passes through the regulator, where it is reduced in pressure to 14 pounds, which pressure is practically constant on all parts of the system beyond this point. The course of the air next taken is through the mercurial-check-valve and the roof pipe to the carburetors. After entering the carburetors, the air moves slowly through a spiral passage, sixty feet in length, packed solidly with cotton wicking saturated with gasoline, and absorbs sufficient of the volatile oil to produce the desired gas which is consumed by the lamp directly beneath. This system is in general use on the Pennsylvania, Norfolk & Western, and several other prominent roads. The property and patent rights of the system having been recently acquired by a rival gas-lighting company, its future is uncertain. For lines which are isolated and have no plant for compressing gas, as is required for the Pintsch system, the Frost system will find favor.

Frost gas-lamps, bracket and vestibule (Frost System of Gas-Lighting). Figs. 8134, 8137, 8140. The burners used upon these lamps are strictly modified forms of the Argand-burner in common use. The air to supply the flame enters through the injector, 27, and the perforations in the air-controller, 26. A portion of this air passes between the burner and porcelain cylinder, 25, and passing downward supplies the upper side of the flame, while the remainder entering through the perforations in the lower part of the controller supplies the underside of the flame. The products of combustion pass upward through the gas-body, 1, flues, 10, and ejector, 6, and escape from the car by means of the smoke-bell (fig. 8132).

In order to light the lamp, it is necessary to drop the glass-globe, which is held by a globe-ring, 4, hinged to the top-plate, and this gives easy access to the burner.

Deck lamp No. 8. Figs. 8133, 8136. The gas flows through the needle-valve and gas-arm to the gas-body and thence to the burner, 24, fig. 8139, from which it issues from the lower ends of the small tubes. The air required to supply the flame enters through the injector, 27, and the perforations in the air-controller, 26. A portion of this air passes between the burner and porcelain cylinder, 25, and passing downward supplies the upper side of the flame, while the remainder entering through the perforations in the lower part of the controller supplies the underside of the flame. The products of combustion pass upward through the gas-body, 1, flues, 10, and ejector, 6, and escape from the car by means of the smoke-bell (fig. 8132).

In order to light the lamp, it is necessary to press in the injector latch, 28, and drop the injector one notch. A lighted match or taper can then be introduced between the injector and the globe and the gas lighted, after which the injector must be pushed up into its former position.

Frost dry-carburetor system of car-lighting. Figs. 8109-10. The light in this system is produced by burning at the injector, 28, and the gas which is generated in the carburetors, which are placed on top of the car. The gas is simply air carrying a certain amount of gasoline vapor. The air is taken from the air-brake service; the gasoline, absorbed
**G B**

**Gage.** 1. (Of track.) The distance in the clear between the heads of the rails of a railroad; 4 ft. 8½ ins. is the standard gage; if greater than this by more than 4 in., it is a broad gage, which see; if smaller, a narrow gage, which see. See Wide gage usually means a minor and irregular or exceptional enlargement of a given fixed gage, in distinction from tight gage, a corresponding contraction.


**Gagger.** A chaplet, which see.

**Gain.** "In architecture, a beveling shoulder, a lapping of timbers, or the cut that is made for receiving a timber." —Webster. In car work the term generally means a notching of one piece of timber into another. Bozing is almost a synonymous term. The timbers are boxed out in order to grade them into each other. A mortise, which see, is usually deeper and does not extend clear across the stick.

**Galvanised iron.** Sheet iron covered with sa-l-ammoniac, after first cleaning it in a bath of dilute acid, coated with zinc by immersing it in bath of the liquid metal. An amalgam of 11.5 zinc and 1 mercury is sometimes used. It is usually made in sheets about 2 feet wide by 6 to 9 feet long, and its thickness measured by its number, wire-gage (W. G.). See Kalamine iron.

**Ganet air-brake.** A system of air-brakes for electric and cable cars, in which the air is compressed by a compressor operated from the axle of the car by an eccentric. The apparatus includes (1) an air pump or compressor to furnish the compressed air; (2) an eccentric and connecting rod to work the piston of the air compressor; (3) a controlling valve by which the brakes are applied and released; (4) a jam cylinder or brake-cylinder to move the brake levers; (5) a main reservoir; and (6) an auxiliary reservoir.

**Gardner's geared seat-arm.** Fig. 3995. A device for giving a backward slope to car-seats with reversible backs by a rack and pinion movement in the seat-arm and seat-arm pivot. Several other devices for the same purpose exist. See engravings.

**Garnish rail (English).** 111, figs. 501-4. A horizontal piece of ornamental wood curved on the upper surface and placed on the inner side of the mouth of the slot into which the movable window falls. It carries the glass string roller, which see.

**Gas-burner.** Fig. 3809-11. "The jet-piece of a gas-lighting apparatus at which the gas issues and combustion takes place." —Knight. A system of gas burning has been in use on the Pennsylvania Railroad by compressing ordinary city gas. Another and more elaborate system is the Pintsch, which see, figs. 3160-3251.

**Gas lamps.** See Frost-bracket, chandelier lamps, etc. See Filling-funnel.
water they contain and create a circulation through the hot-water pipes of the car. Among the different types may be mentioned the Expanding generator coil, figs. 334, 3006, in which the diameter of the pipe increases as the heated water ascends in it; the Gold duplex-double coil, figs. 334, 3006, which has a steam-pipe inside of the hot-water coil, to be used when steam from the locomotive is used to heat the water instead of a fire in the heater.

Gib (for journal-bearings). A journal-bearing, which see. This word should not be pronounced gib; the g has the hard sound.

Gib and key. A fastening to connect a bar and strap together by a slot common to both, in which a f-shaped gib with a beveled back is first inserted and then driven fast by a taper key.

Globe-Johnson Steam Coupler. Details of construction of this coupler, with its proper position on the car, are shown by figs. 3397-78, 3046-50. This coupler is of the same type as the Westinghouse air-brake coupling. It is automatic in action, and tight under pressure. The gasket, No. 566, can be renewed without removal of coupling. The blowing off of hose is prevented by the device shown on figs. 3394-50.

Gibson fastening (English). Figs. 5341 and 5387. One of the earliest applications of the principle of securing a tire to a wheel by means of clips instead of bolts, studs or rivets. The original Gibson fastening shown in fig. 5341 has been superseded by that shown in 5387, which is a very common fastening. Figs. 5374-9, 5393-99, 5352-4, are modified types of the Gibson fastening.

Gimlet-pointed screw. The common wood-screw, which see, of carpentry and joiner work, having its screw cut into a point like a gimlet, so that it can force its own way into wood.

Girder. "In architecture, the principal piece of timber in a floor. Its ends are usually framed into the summers, or breast-summers, and the joints are framed into it at one end. In buildings entirely of timber, the girder is fastened by tenons into the posts."—Webster.

"The term girder is restricted to beams subject to transverse strain, and exercising a vertical pressure merely on their points of support."—Stoney. The term is almost synonymous with truss. Thus, engineers speak of a "Howe truss," a "Pratt truss," a "Warren girder," and a "lattice girder." The distinction is that a truss consists of separate parts held together by pins, or even simply by pressure, which may be taken down and re-erected; whereas a girder is a single solid structure, either all one solid piece (rolled girder), or of plates riveted together (plate girder), or of combined plates and riveted lattice work (lattice girder).

Girt (snow-plow). A belt-rail. A long horizontal rod extending from the door to the corner-post along the girth of a freight-car and intended to tie the two posts together.


Glass-frame stile (English). See Door-light stile and quarter-light moulding.

Glass seal (seal lock). Fig. 5897a.

Glass-string, or glass-strap (English). 204, fig. 501. A leather strap by which the window in the door of a carriage is raised or lowered. The strap is pierced with a number of holes which fit a small brass or ivory knob placed on the door immediately under the glass-string roller, which see.

Glass-string roller (English). 195, fig. 501. In a carriage, an ornamental roller attached to the upper edge of the garnish-rail in a door. The leather strap (glass-string) by which the window is raised and lowered passes over this roller.

Glass-water-gage. A gage consisting essentially of a vertical glass tube connected at top and bottom with a boiler so as to make the height of water therein visible. Globe. (of Pintech gas-burner.) Fig. 3020. A globe of hemispherical form, admitting air only from the top. It is an almost universal type of car lamp-globe in Europe. A glass-bowl.

Glue. A preparation from the hoofs, horns and hides of animals, washed in lime-water, boiled, skimmed, strained, evaporated, cooled in molds, cut into slices and dried upon nets. If good, it is a hard cake, of a dark but almost transparent color, free from black or cloudy spots and with little or no smell. The more transparent and amber colored the better. Inferior glue made from bones will almost entirely dissolve in cold water; other kinds are contaminated with lime. Glue is better for remelting. The strength of glue for common work is increased by adding a little common chalk.

Glue-size. One pound of glue in a gallon of water. Double size has about twice this quantity of glue. Patent size is a kind of gelatine.

Gold's compression coupling. Fig. 3016. In the "Compression" Coupling, the seats are immovably in the head of each body and are held in position by thimbles, instead of being mounted on circular diaphragms.

In order to use the internal pressure of steam to force the seats together there is a diaphragm on the outer side of each coupling head, so situated that the internal pressure thrusts the diaphragms outwardly. To utilize this internal pressure on the diaphragms to bring the seats together a lever arm is made so that one end of the arm is the lug or tooth which engages with opposite coupling body, and the other end enters a recess and is held in place by a set screw. As the internal pressure of the steam is exerted on the diaphragms from the interior of heads, they are thrust outwardly and press the inside of the lever arm. The arms being pressed outwardly, will draw the seats to. This constitutes the "Compression" theory, from which the name. The movable arm is adjustable. The Compression Coupling interchanges with the Globe Steam Coupling.

Gold's interchangeable coupling. Fig. 5817. The coupling consists of two bodies, exactly alike, fitted with case-hardened, steel discs, or special composition discs. The joint is made by the faces of the discs being brought
together. In the arm of each coupling is an adjustable lug, which, sliding around an inclined plane at the back of each coupling body, tightens as it is allowed to drop, the principle being that of a gravity lock. A set screw and lock nut are applied to the arm for the purpose of taking up any wear. The couplings uncouple automatically when cars are drawn apart, the coupling being brought to a horizontal position again, and the lug dropping down the inclined plane. A chain prevents the coupling dropping onto the track.

Each body of the coupling is fitted with an automatic relief valve so that when steam is shut off the traps discharge the water while hot without having to be uncoupled.

**Gold’s platform-gate.** Figs. 2797-8. A gate extensively used on elevated and other rapid-transit roads. The two gates on one side, of two cars coupled together, can be opened simultaneously by one trainman. The details are shown in the figures.

**Gold’s systems of car-heating.** Figs. 2996-3002. Several systems of car-heating designated as the Double-coil hot water-circulating system, the “Plain-pipe system” (see Direct steam-heating system), the “Steam-heat storage system” (see Direct steam-storage systems), the Duplex double-coil storage system, the Duplex double-coil jet system, and the Duplexer double-coil jet system with sediment-well and blow-off.

**Gold’s universal straight-port steam coupling.** Figs. 3018-19, 3020-2. A steam-hose coupling somewhat resembling the Sewart coupling.

The coupling is affected by locking arms or lugs, which project beyond the end of the body, and engage with the projecting rollers and stud on the opposite side during the act of coupling. To couple, the heads are brought together so that the locking projections on either side engage with one another; then the bodies are tilted downward, bringing the seats together.

To insure the bodies locking firmly together, a spindle or stud is cast on the side of each body, and a roller is placed over the stud, so that when lugs of coupling bodies engage with the rollers they turn on the studs and the friction is reduced to a minimum.

The seat is made of the Asbestos composition, formed externally as a segment of a sphere, and mounted in a tubular metal thimble or ring, which is made with two opposite guide fingers projecting inwardly and engage with the base of the socket in coupling head. This limits the movement of the seats.

This coupling interchanges with the Sewart.

**Goodyear-car.** Figs. 21-26, 298-324. A flat-car enclosed with Gold’s universal straight-port steam coupling.

**Grab-irons.** 60, figs. 229-266, etc. Also termed corner-handles or ladder-handles and hand-holds. The handles are sometimes adopted for the use of trainmen in boarding the cars. They are often more definitely specified as roof, side or end grab-iron.

**Gold buffer and continuous platform.** Figs. 1890-1437, 3296-3300. The engravings show the application of the Gould buffer and platform arrangement to a Miller platform, which application is deemed the best. The framing is essentially the same as the Miller, except that the platform truss-beams is made longer so as to cross the intermediate and platform sills, the addition of two more platform truss-rods and the addition of two buffing-sills underneath the intermediate-sills and between the platform frames. These additional parts greatly increase the buffing strength of the platform and greatly assist in preventing the platform from sagging under the increased load due to the vestibule.

The buffing arrangement comprises a center and two side buffer-stems connected by a short buffer-plate, or by a long vestibule buffer-plate. These buffer-stems pass through guides and thimbles and are backed up by spiral buffer-springs. The Gould coupler with its long shank is connected with the long center buffer-spring by a pressure or push-bar 3 in such a manner that when the drawbar and coupler are pulled out the push-bar acts against the buffer-spring and tends to force out the center buffer-stem and the buffer-plate.

The coupler and shank being so long must have some lateral motion and a wide carry-iron is recommended with a Miller side-spring, as shown in the engraving, or with lateral springs, as shown in figs. 2695-2 and 2681. This buffer and platform accompanies and is a part of the Gould vestibule.

**Gould car-coupler.** Freight, figs. 2141-4; passenger, figs. 2546-51.

**Gould pendulum vestibule.** Figs. 1623-30, 2681-6. A vestibule designed to evade the original vestibule patents, the principles of which are described under Vestibule.

It consists of a face-plate (1) with a diaphragm (2) and a back face-plate (4). The face-plate is made up of several pieces and consists of an outer plate (1), hinged, as shown, so as to permit lateral motion or vertical motion. It is kept forced out by the back gravity-bar (36a) by which it is supported. The face-plate is hinged and supported also by the front face-plate gravity-bar (41) and is prevented from frictional resistance against its opposite plate by clips or lugs (38) and (45), riveted to one face-plate and covering or engaging the opposing face-plate and called face-plate guides. Lateral motion is opposed by a system of levers and a restraining-chain (26), which latter limits the lateral swing of the face-plate, as well as its longitudinal motion. These are so arranged that the weight of the face-plate is utilized to keep it in position. The link motion gives all the lateral motion necessary to go around curves and to permit lateral oscillation.

The face-plate is kept crowded out by its own gravity supported from the back gravity-bar. At 26, a point several inches outside the gravity line of the face-plate. The buffer and platform are continuous, and have the usual spring pressures devised for the purpose. A push-bar connects the buffer spring to the drawbar, so that when the coupler is drawn out the face-plate is made to follow, and the springs of both the buffer stem and drawbar assist one another. The top of the face-plate is held from falling out far too by the face-plate retaining-chain (36) which passes through the sheave (37). This vestibule was first applied to cars in 1899, and is in exclusive use on the Vanderbilt systems of railroads.

Gould platform. See Gould buffer and platform.

Gould tender-hook. Figs. 2145-4.

**Governor** (Westinghouse brake). 3g, figs. 1899-1707. See Pump governor.

**Grab-handle and bracket.** 30, 81, figs. 5564-67.

**Grab-irons.** 60, figs. 229-66, etc. Also termed corner-handles or ladder-handles and hand-holds. The handles attached to freight-cars for the use of trainmen in boarding the cars. They are often more definitely specified as roof, side or end grab-iron.

For Recommended Practice of M. C. B. Association with regard to hand-holds or grab-irons; see Hand-holds.
Graduating-valve. Figs. 3218-20. A form of compound spring in which only a certain number of the individual spirals come into action with a light load and the others only under a heavy load. Another method of accomplishing the same end, graduating the resistance of the spring to the load placed upon it, is the use of the kep-shaped or spool-shaped spring, fig. 2542. Under a load the part of larger diameter closes first and that of smaller diameter is much stiffer. These springs are much used on horse-cars, but rarely for steam-cars. Graduated springs have formerly been constructed by combining rubber and spiral springs, but they are now out of use. Graduated springs have been superseded by single and double nest coil, of equal length, and few, if any, are being applied to new construction.

Graduating spring. 22, figs. 1706-7. (Triple-valve of Westinghouse brake.) A spiral spring which acts against a collar on the graduating-stem to hold the latter against the triple-valve piston when it is forced downward.

Graduating-stem (triple-valve of Westinghouse brake). 21, figs. 1706-7. A slender rod or pin which works in a hole drilled in the center of the triple-valve piston, and which, by the movement of the latter, opens and closes communication from the chambers above and below the piston.


Graduating-valve (Consolidated car-heating). Fig. 2975. A valve constructed so as to open slowly and designed to give better regulation of the temperature of the car after a car is heated. This is accomplished by attaching a movable piston to the valve-stem, which has a loose fit in an inwardly projecting ledge cast with the valve-case. As the valve opens the piston exposes V-shaped notches above this ledge through which steam passes up under the valve-seat in its course to the heating apparatus opening the valve wider, exposing more of the V-shaped ports and increasing the flow of steam. When the valve is closed the steam is entirely shut off by means of the valve-disc and seat attached to the same stem.

Graham draft-rigging or gear. Figs. 1659-75. A draft-rigging that has been in much favor which employs a screw-threaded column castings which engage in the draft-sills and draft-timbering. Usually a moveable drop yoke or strap-pocket can be used instead of a tail-bolt.

Graham draft-rigging or gear. Figs. 1670-75. The upper part of a grain-door. Hinged horizontally with the door proper.


Graham-door (for Erie car). figs. 1787-95. An iron rod attached to the door-posts on the inside of a box car, to which a grain-door is fastened or hinged. The door and rod are generally arranged so that the former can be moved to one side and out of the way when the car is not loaded with grain. In other styles the door slides upon the rod to the roof and is there suspended.

Grate. (Baker heater.) Figs. 2881, 2885a, etc. A cast-iron bar below the grate, and on which the latter rests.

Grates (Baker heater.) Figs. 2881-2. A cast-iron bar below the grate, and on which the latter rests.

Grates (Baker heater.) Figs. 2881-2. A cast-iron bar below the grate, and on which the latter rests.

Grate-bar (for Erie car). Figs. 3067a-b. A cast-iron bar below the grate, and on which the latter rests.

Grate-door. Figs. 5, 11, 257-60. A door consisting of a wooden frame with iron or wooden bars, used on cars for carrying fruit, live stock, etc.

Grate-shaker (Baker-grater). Figs. 2850, 2858d, 2818. An iron bar which can be attached to grate to move it in shaking the fire.

Grate support (Baker-grater). Figs. 2858a, etc. A crow-foot shaped bracket, fastened to the sides of the stibit to carry the fire-grate.

Grating.

See Clinker grating. Ventilator grating (fruit-axle-box grating (refrigerator-cars)). Window grating.

Gravel-car. Figs. 38, 214, 288-81, 288-8, 288-42. A car for carrying gravel; usually either a tip-car or a flat-car, the latter most used. They are often fitted with a central rail, over which a bulk-stream, drawn by the locomotive after detaching it from the cars, works to unload the cars. Sometimes a hoisting plant is mounted upon one of the cars, for moving the plow.

Gravity relief-trap (Gold’s car-heating). Figs. 3007, 3019-22. An auxiliary trap, automatic in its action, which is closed by the escape of steam and held closed by the steam pressure. When in the pressure is taken off or the weight of the valve stem tips the valve and allows the escape of the water of condensation. The pressure under which it closes is dependent on the weight of the valve stem.

Grease-axle-box (English). 34, figs. 549-51, and 501-4. An axle-box which is lubricated from above by a grease composed of tallow, soda, and water, which is solid at ordinary temperatures and melts should the box get warm. This form is being superseded by the oil-axle-box, which see.

Grease-box. A journal-box, which see.

Grease-chamber (English). 35, figs. 501-4. A cavity above the journal-bearing which contains the lubricating material in a greased box or greased-axle-box, which see.

Grille (interior decoration). Figs. 3647-55. Generally a piece of wrought work in wood or metal for decoration. Used in the place of panels, over doorways and in bulkheads, and sometimes employed as brackets as at G, fig. 3943-8a.

Ground glass. Glass whose surface has been roughened by mechanical or chemical process so as to break up the light passing through it and destroy its transparency.
Several processes exist: by the wheel, sand blast, rotating with pebbles, or by fluoric acid. The sand-blast is at present most commonly used.

**Group-spring.** Figs. 5190-5312. A spiral car-spring formed of a number of separate springs, single or nested, united together by a common pair of spring-plates. It is called a double, or two-group, a three-group, four-group spring, etc., according to the number of separate springs.


2. (Eng.) American equivalent, conductor. A railway official traveling with and having charge of a railway train. He uses the functions of the conductor, baggage-master, express agent, and brakeman, but seldom collects or nips tickets, and never issues fares. An assistant guard is sometimes, but not always, carried.

8. (For lanterns.) The exterior wire cover surrounding the globe and protecting it from accident. They are termed either single, double, or triple guard, according to the number of horizontal wires.

**Guard-band** (street-cars). See Door-guard band.

**Guard-fender.** See Fender-guard.

**Guard-lining strips.** Fig. 5586, figs. 281. Horizontal bars or strips which are placed in a car to keep freight from a door, ice-box, ventilator, etc. When placed vertically as they usually are they are termed guard-posts.

**Guard-plates** (fruit-car). A row of posts standing inside of the ventilators and serving as a fender for the load packed within so as to prevent obstruction to the ventilators.


**Guard-rail and frog-wing gage.** Fig. 5844. The guard-rail and frog-wing gage shown were adopted as standard in 1894, to define the dimensions of track to which M. C. B. standard wheel and flange gages have been made to conform.

**Guard's van** (English). American equivalent, observation or baggage-car. See Brake-van.

**Guard-easing spring.** See Spring. Elliptic spring.

**Guard-railing** (street-car). A short railing along the sides of the car, with cast-iron rim and hub and wrought-iron spokes, or sometimes with a wooden center.

**Guard-car** for transporting ordnance, often having sixteen wheels.

**Gunpowder-van** (English). A covered vehicle adapted to run on freight trains, and specially fitted for the conveyance of explosives. The outside of the body is made of a number of iron plates to guard against fire, and the inside is lined with sheet lead to prevent any sparks being caused by friction. The door-openings are lined with felt to secure a tight joint.

**Gun-shape lamp-chimney.** Fig. 3421. See Lamp-chimney.
Hand-holds on end-sills should have at least 3 inches clearance behind them, and all other hand-holds should have at least 2½ inches clearance behind them.

All hand-holds should be made of iron not less than ¼-inch diameter; hand-holds on sides and ends of cars should be at least 2 feet long in the clear; those on ends should be made shorter only when it is impossible to use this length.

Hand-holds are sometimes distinguished by their location as roof, ladder, end-still, etc., hand-holds.

Hand-hole. See Dust-hand-hole. Fare-wicket.


Hand-brace for side rails of cars. See Brace-hand-bracket. Inside hand-rail bracket (street-cars, etc.).

Hand-strap (street and suburban cars). Figs. 8680-83.

Hand-reel, cranking device. Figs. 596-32. A spring carrying a dog to hold the handle in any desired position.

Hand-pole (street and suburban cars). 185, figs. 5654-57.

Hand-rail, 1. A bar or rail to take hold of with the hand; as the body hand-rail of passenger-car platforms, door hand-rail, inside hand-rail, head hand-rail of street-cars, and roof hand-rail or brake hand-rail of box and stock cars. 190, figs. 229-81, all of which see.

2. (Tank cars). 131, figs. 874-6. An iron pipe supported on hand-rail posts on the outside of the running boards, for training to hold on to in passing over cars.

Hand-rail bracket (postal cars). Figs. 8924-5. See also Inside hand-rail bracket (street-cars, etc.).


Hand-rail post (tank car). 129, figs. 874-6.

Hand-wheel (for slaying gear of pole-driver car). 48, figs. 401-4. See Sweeping-gear.

Hand-wrecking or derrick-car. Figs. 392-8. See Wrecking-gear.

Hanger-link. A swing-hanger, which see.

Hanger. 1. "That by which a thing is suspended."—Webster.

2. "A means for supporting shafting of machinery."—Knight.

See Bell-cord hanger. Push-rood hanger.


Brake-beam adjusting hanger. Safety-hanger.

Brake-hanger. Spring-hanger.

Door-hanger. Step-hanger.

Link-hanger. Swing-hanger.

Parallel brake-hanger. Swing-link hanger.

T-hanger.

Hanger-link. A swing-hanger, which see.

Hasp. See Door-hasp. Strap-hasp.

Hat-hook. Figs. 3733-80, etc. A metal hook for hanging hats on.

Hat-post. Figs. 3856-75, etc. An upright metal pin for hanging hats on. These are used chiefly in sleeping and parlor cars, and they are invariably combined with a hook and technically called hat-post and hook.

Hat-rack. A basket-rack, which see.

Hay-car. A box-car for carrying baled hay; usually made with larger bodies and doors than ordinary box freight cars.

Head. See Cylinder-head. Draw-head.


Head-block. 1. (Of a derrick or crane.) 90, figs. 892-3. The casting carried at the top of the mast to which the boom-shoe rods, tension-rods, and guy-rungs, etc., are attached. It usually revolves upon a head-block pin.

2. (Of a switch.) The long timber to which the switch-stand or its equivalent is fastened, and on which the ends of the switch-rails bear.

Head-board. 9, figs. 2409-12. A light partition which separates one berth in a sleeping-car from that next to it. It is stowed away by day in the pocket between the upper berth, when closed up, and the roof. It is secured in place at the back and front by head-board bolts entering at the back into a bushing, fixed to the top of the stationary seat-back, and along the upper inside edge by a head-board coupling, entering into a head-board coupling keeper. The head-board bolt for the front corner of the head-board is of peculiar construction designed to avoid all interferences of a flush surface by day, while still giving a secure attachment.

Head-board bolt. Figs. 4109-60, 4164, etc. 54, figs. 2409-13. See above.

Head-board bolt bushing. Figs. 4170-1. See above.
Head-board catch. Fig. 4166.

Head-board coupling. Figs. 4157-8. A metal hasp and keeper by which a head-board is fastened to the side of the car.

The titles to figs. 417-8 are misplaced. Fig. 417 should read "Head-board-coupling hasp," and fig. 418 "Head-board-coupling hasp." See above.

Head-board coupling. Fig. 4185. See above.

Head-board fastener. Figs. 4174-5, 4180.

Head-board lug. Fig. 4167. Serves same purpose as a bushing, which see.

Head-board pocket. 32, figs. 3409-12. A pocket which closes off flush with the head-board surface, but opens at night, by releasing a head-board rack-catch so as to afford a receptacle for clothing or parcels. This form of head-board pocket has been superseded by a pocket made by folding up the upholstered head-rest as shown in fig. 3412, 32.

Head-board-rack catch and keeper. Fig. 4165.

Heating-burner (Minot). Fig. 3897. See Heater-plate.

Heel (of shackle of paddock). D, figs. 2771-2. The inner cap fitting the end of the headstock in order to prevent the foot from escaping, after the truck has been put together, from the back of the seat, thickly padded with horsehair and covered with broadcloth or leather. It serves to support the side or back of the head of a passenger. That at the end of the seat is a head-rest, but it is also called a seat-head end or end-head rest, 14, figs. 2409-12.

Heel of seat. (For lamps or lanterns.) A metallic attachment extending to the oil in the reservoir below, to prevent freezing, or, in some cases, to assist combustion by heating or volatilizing the oil.

Heater-cast. Fig. 4185. See above.

Head-lining nail. A nail with a large button-shaped head especially made for fastening head-linings to the ceilings of cars.


Heel of seat. (For lamps or lanterns.) A metallic attachment extending to the oil in the reservoir below, to prevent freezing, or, in some cases, to assist combustion by heating or volatilizing the oil.

Head-piece (sleeping-car berths). E, D, fig. 2406.

Headstock (English). 9, figs. 940-51, 951-4. American equivalent, end-ill. The transverse end member of the underframe, which see. It is pierced transversely in the center for the drawgear, and the buffing-gear is carried near the ends.

Headstock and diagonal-knee (English). 89, fig. 501-4. A wrought-iron knee connecting the headstock to the diagonal and the sole-bar, and thus binding three of the four main members of the underframe together.

Headstock-cap (English). 13, figs. 501-4. A cast-iron cap fitting the end of the headstock in order to prevent its splitting, and to prevent any access of water to the end grain of the wood. A wrought-iron strap is sometimes used.

Heat and light tender. A special car coupled in a train carrying a steam generating plant by which the cars are heated, and an electric light plant for lighting the train.

Headliner. 1. Figs. 2983-3050. Any apparatus for warming a car, room, or building by convection; that is, by conveying hot water, steam, or warmed air into or through the apartments. The term generally refers to any arrangement for warming apartments other than stoves, which heat by direct radiation. There have been many varieties in use, but the one remaining and which has the field practically to itself is the Baker heater. There are numerous heating systems, but they, for the most part, use Baker heaters in connection with their apparatus. Nearly all the systems use heaters which circulate hot water. They are usually placed in a small closet called the heater-room, which see. In emigrant-cars cook-stoves are used for heating. The ranges of dining-cars, although used for cooking purposes only, are shown in connection with the heaters.

Heater-car. One constructed for the carrying of fruits, vegetables, and other perishable products in winter. They are heated by special forms of mineral oil lamps, the supply of which is automatically controlled by the expansion and contraction of metallic rods. They are principally in use for the transportation of potatoes and other vegetables.

Heater-room. 138, fig. 448. A small closet, cased with sheet metal interior heat-guards, to contain the heater and prevent all direct radiation. All heaters proper are placed in some equivalent for such rooms.

Heater-pipe casing. L, figs. 2999-3001; Q, fig. 540. A wooden or iron shelf over a heater-pipe in a passenger-car to prevent the feet of passengers from coming in contact with the hot pipes. The casing also forms a foot-rest.

Heater-plate (of oil lamp). Fig. 3898. A device to conduct the heat of the flame downward so as to keep the oil from congealing. See also fig. 3897.

Heat-guard. A sheet-metal covering for the woodwork of a passenger-car, to protect it from the heat of a stove. It is nailed to the side and ends of the car, and sometimes surrounds the stove, as the conical Russia-iron heat-guard of the Baker heater.

Heating-burner (Minot). Fig. 3897. See Heater-plate.

Heel (of shackle of paddock). D, figs. 2771-2. The inner point of the shackle, which see. A class of seats lately introduced with extra high backs and frequently a head-roll or head-rest.

Height of drawbar. See Drawbar.

Helper. A term used to designate either an assistant engine for trains, or a horse to help street-cars up grades. Helper-ring (street-cars). An iron ring fastened to the platform end-timer to attach an extra horse to pull up steep grades.

"Hercules" bearing. One of the forms of so-called "Babbit metal bearings," which see.

Heat-tube. Figs. 5170-1; and in fig. 4579. An invention, patented June 19, 1877, which consists in adding grooved lugs or ears on the outside edges of a journal-box, in which the lid slides, but is prevented from escaping, after the truck has been put together, by striking against the arch bars or wheel-pieces of the truck. It has been very largely used. It has several features, by reason of which it is being abandoned. It is being superseded by the M. C. B. lid.

Hibbard spring. Fig. 5334. A spiral spring composed of several coils of steel of rectangular section. The coils are placed inside of each other and are made of different diameters and wound in opposite directions, or "right and left."

High-back seat. Figs. 92, 8911, 3919, 3922, 3968-72, etc. A class of seats lately introduced with extra high back and frequently a head-roll or head-rest.

High-sided wagon (English). A four-wheel gondola car, with sides about 4 feet high. Resembles wagon
shown in figs. 348-51, except that the sides are higher. Used chiefly for bulky freight, wheat, potatoes, sacks and bales. See Wagon.

**Hinge.** Figs. 2588-3590. "A hook or joint on which a door, gate, etc., turns."—Webster. They are provided with a tube-like knuckle through which the hinge-pin, which see, passes.

See *Ball-bearing butt hinge.*

**Door-hinge.**

**Screw-hinge.**

**Double-acting hinge.**

**Sofa-hinge.**

**Drop-door hinge.**

**Stop-bar hinge.**

The common door-hinges are usually a butt or butt-hinge, the varieties of which are the acorn-butt, a large ornamental hinge. Blake-butt, which see, and the hopper-butt, so called from its pointed form. The parlour-hinge is a sort of T-shaped butt-hinge to afford more room for screws. It is little used except for ornamental purposes. The strap-hinge is a common form of rough hinges for heavy doors, but it is sometimes made very elaborate and ornamental, figs. 3590-4. A T-hinge is a common and strap-hinge, one-half being of each form. Butt-hinges are either fast-joint, loose-joint or loose-pin. A double-acting hinge is one which permits the door to swing either way. Berth-hinges, figs. 4126-7, are also loose or fast-joint. Sofa-hinges, figs. 4138-7, and seat-hinges, fig. 4111, are used in sleeping cars to connect the seat and seat-back.

**Hinge-burner (mineral-oil lamp).** Figs. 3878-4. A burner of which the chimney-seat is hinged to the lamp-top so as to give access to the wick. They are in decreasing use.

**Hinged-eash bar (street cars).** 128, figs. 5654-67.

**Hinge-pin.** Figs. 3588, 3598, etc. The pin passing through the knuckle of a hinge and holding the two parts together. A loose-joint butt-hinge has the pin fast in the lower half of the knuckle and projecting upward, so that the other half is held on only by gravity. The hinge-pin in the best hinges, screws into the knuckle.

**Hinkley brake-sack adjuster.** Figs. 1781-6. A device consisting of a screw working in a swiveled sleeve situated at a ratchet-wheel and pawl. When the rod to which it is attached travels as it must when the brakes are applied the screw is turned so as to take up the slack and if it be more than a certain amount, the pawl engages in the next tooth when the rod returns in its movement to release the brake.

**Hinge-plate washer (English).** 73, figs. 548-51. A long wrought-iron washer taking all the bolts securing the main part of the hinge to the door.

**Hixson car-coupler.** Figs. 2100-60.

**Hitchcock chair.** Figs. 3998-7. A revolving and reclining chair with leg and foot rests, somewhat after the style of the Hartley and Horton chairs.

**Hitchcock combination hot-and-cold-water faucet.** Fig. 3494.

**Hix drop-lock.** Freight-car doors. Figs. 2755-7.

**Hodge brake.** Figs. 1460, 1465, 1538, 1588-8. An arrangement made by Nehemiah Hodge, patented 1849, figs. 1838-9, for operating the brakes on each truck of a car simultaneously, and equalizing the pressure on all the wheels. The brake may have either one or two levers on each truck. Underneath the car-body are two levers called *hodge* or *floating levers*, movable fulcrums in their centers, which are connected together by a rod. One end of each of these levers is connected by a rod and chain to the brake-shaft, and the other end of the floating lever is connected by a rod with the long arm of a brake-lever on a truck.

**Hodge lever-plate.** 12, fig. 1698-6. See above. The Hodge brake-gear is used altogether with the Westinghouse air brake apparatus.

**Hodge lever-guide.** See Floating lever-guide.

**Hog-chain (Shipbuilding).** A chain in the nature of a tension-rod passing from stem to stern of a vessel, and over posts nearer amidships; designed to prevent the vessel from drooping at the ends."—Knight.

Hence applied to certain forms of trusses in car construction, as in the pile-driver car, 36, figs. 401-4, and in fig. 400. A hog-chain is an inverted truss-rod, and usually so called when applied in connection with and in similar form to a body truss-rod, as in fig. 512, and 320, fig. 505, the object of a truss-rod being to prevent a beam from sinking in the middle, and of a hog-chain to prevent sinking at the ends when supported at the middle. Also called an *overhang truss-rod*.

**Hog-chain queen-post.** 321, fig. 505. See above.

**Hog-chain rod (of a passenger-car).** 167, fig. 458. See above. More properly a *continuous counterbrace-rod* or an *overhang truss-rod*.

**Hoisting-block (of a derrick or crane).** 9, figs. 388-96. The main block at the lower end of the *hoisting-chains* carrying the sheave-hook, or hoisting-hook, to which the load is attached.

**Hoisting-block clevis.** A clevis carried at the top of a hoisting-block to which the fixed end of the hoisting-chain is attached. In some cases, as in L, figs. 151-3, it is attached to a clevis at the upper end of the boom.

**Hoisting-chain (of a derrick or crane).** 9, figs. 388-96. The chain attached to the hoisting-drum at one end and to the hoisting-block or boom-clevis at the other, by which the loads are raised.

**Hoisting-chain sheave.** 21, figs. 388-96. A pulley placed in some wrecking-cars at the foot of the mast, when the hoisting-gear is at some distance from it. The term is generally applicable to the mast-shape and boom-shape at the top of those parts of a derrick, but the latter are generally otherwise distinguished.

**Hoisting-hook.** See Sheave-hook. See also Hoisting-block.

**Holder.** "Something by which a thing is held."—Webster.

A great variety of parts which serve this purpose are so called, as door-holder, lamp-holder, etc., which take their names from the thing which they hold.

**Hollow piston-rod.** (Westinghouse freight and tender brakes.) A brake-cylinder piston-rod which is hollow to receive the push-rod or push-bar, which see.

**Hollow spoke-wheel.** Figs. 3939, 3931-2. See Car-wheel and wheel.

**Hood.** 1. See Platform-hood. Ventilator-hood. A roof-apron which is attached to both platform-roofs and platform-hoods is sometimes called a hood.

2. (Spear-heater.) Figs. 3838-60. More properly a ventilator or writer's cop. A horizontal tube or covering on the outside of a car, and on top of the cold-air pipe, so as to give the latter a T-shape. The air is admitted to the pipe through the ends of the hood, which are covered with wire-netting to exclude cinders. It has a valve which is moved by the current of air so as to admit it whichever way the car runs.

3. (For urinal.) Figs. 3874-5. More properly ventilator-cop.

**Hood-support (street-cars, etc.).** 83, figs. 5654-6. A platform end-post.


**Hooked brake-head.** Figs. 1614-15.

**Hoop (for oil-lamps).** Figs. 3363. A ferrule with an interior thread into which the burner screws.

**Hoopstick (English).** See Roofstick.
Horse box. A four-wheeled covered vehicle used for carrying horses, by leaving certain slatted openings, etc. They are then classed under the general name of box-stock car. Some horse-cars are very elaborate.

2. Fig. 5632. Street-cars, which see, drawn by horses, are very frequently called horse-cars.

Horse-hook, or towing-hook (English). S1, figs. 948-51. Nearest American equivalent, roping-staple. An iron hook attached to the sole-bar and forming an attachment for a rope by which the vehicle can be drawn.

Horses are largely used for switching in England.

Horse shoe-seal. Figs. 3990-a, 9977-9. A cast-in wire and lead seal.

Hose. Flexible tubing, made of leather, canvas, or indiarubber, for conveying water, air, or other fluids. It is sometimes armored, which see. See also Brake-hose. Coupling-hose. Tender-hose.

Hose-clamp. Fig. 1742. A clamp to bind the hose to the hose-nipple and coupling.

Hose-nipple. Fig. 1739. Its use is shown in figs. 1737-8. Hot-air box (Spear-heaters). A box, called also the running-pipe or hot-air pipe, passing along the sides of the car under the seats with a register adjacent to each seat and communicating with the air space around the stove, so as to deliver hot air through the car. See Ventilator.

Hotel-car. A sleeping-car with a kitchen for cooking and arrangements for serving meals. Dining-cars have kitchens, etc., but no sleeping-berths. Hotel-cars have passed out of use, in favor of dining-cars, with sleeping cars attached.

Hotel-car range. See Range.

Hot-water heater. See Baker-heaters.

Hot-water pipes. E, figs. 3432-3a. Pipes running along side of a car and under the seats, which contain hot water, and by which the car is heated. They are usually naked iron pipes, and the car is heated by convection as well as radiation. Between the seats the pipes on the side of the car have a hot-water guard-rail running along over and above them.


Howard's parlor-car water-closet. Figs. 3888-40. A device, the essential feature of which is the connection between the seat-lid and the pan and service measure, by which no water is carried to the pan except on opening the lid. See Pullor-car water-closet.

Howard safety berth-latch. See Safety berth-latch. The Dayton is another kind. The two differ very slightly. Hub (of a car-wheel). The central portion into which the axle is fitted. It is usually cylindrical in form, and projects beyond the disks or spokes of the wheel on each side. In England termed the boss.

Hub-bolts (steel-tired wheels, which see). Figs. 5906-13. Bolts fastening the face-plates to the hub.

Hurricane-lamp (another name for tornado-lamps, which see). Figs. 8361-2 are hurricane or tornado-lamps.

Hutchins freight-car roof. Fig. 2596. A form of roof consisting of two layers of boards, 8 inches wide and matched, and separated by a continuous sheet of Hutchins three-ply plastic roofing. See Car-roof.

Hyatt-elastic roller-bearing. Figs. 5682-3. A bearing for the roller to which the car is attached and which yields and distributes the load over several of their side-doors and mangers, and is divided into three stalls by movable slatted partitions. See also Racehorse box.

Hopper. 1. (Passenger-cars.) Figs. 8852-6. A closet-hopper, or soil-hopper.

2. (Freight-cars.) See Hopper bottom-car.

Hopper-bottom car. Fig. 24-28; also figs. 305-320, 291a. A car with an inclined bottom sloping from every side (or simply from the ends), to drop-doors in the center, so that the entire contents can be discharged. They are chiefly used for carrying coal, but sometimes other minerals. New hopper-bottom cars are chiefly eight-wheeled hopper-bottom cars, though many old four-wheeled hopper-bottom cars are still in service. Hopper-bottom gondola-cars, figs. 24-28, etc., have a similar bottom in their center, and those shown in figs. 305-9 are designed to completely discharge their contents without assistance. The four-wheeled hopper-bottom cars are being superseded by eight-wheeled gondola cars with single or twin hoppers. Hoppers are distinguished as box-hoppers, those whose sides slope from the ends only, and as pyramidal, or those whose sides slope from the sides and ends. A hopper-bottom car should be distinguished from a drop-bottom. The latter not being provided with a hopper. See Gondola-car.

Hopper butt-hinges. Figs. 3801, 3816. A hinge so named from forming the side of a hopper.


Hopper-chain. See Drop-door chain.

Hopper-plates. The sheets of iron constituting the bottom of a hopper-bottom coal-car. When this part is of wood it is termed the inclined floor.

Hopper sidings. 28, fig. 384a. The planking that forms the side of a hopper-bottom car.

Hopper stayrods. 71, 71a, figs. 305-15. Inclined rods passing through the center sill and to the hopper supporting-strap at the hinged end of the doors to prevent the hopper from sagging in the middle.

Hopper supporting-strap. 73, 73, figs. 306-15. A heavy U-shaped iron strap bent to the shape of the hopper of a gondola car, and the ends bolted to the side sills. Its office is to support the hopper, and it is usually applied at the end of the inclined floor, and in the middle of the hopper at which point the doors are hinged.

Hopper ventilator. Figs. 3841-3. See Bell's exhaust hopper ventilator.

Horizontal brake-shaft. 95, figs. 339-43. A brake-shaft usually at the end of a car-body, whose position is horizontal instead of vertical, so that it can be applied from below. When it is thus mounted it is commonly in combination with a long brake-shaft of the ordinary kind at the other end of the car. It is for use in grain elevators, tunnels and in city yards, and chiefly on the Pennsylvania Railroad.

Horizontal brake-shaft chain. 104, figs. 333-43. A chain attached to a brake-rod at the end of a car and running over a pulley to a horizontal shaft on which it is wound.

Horizontal equalizing-lever. 27, figs. 2437-45. Pullman Vestibule. See Equalizer.

Horizontal telegraph-cock, or faucet. Fig. 8489-90. See Faucet.

Horn (Janney coupler). 49, fig. 2940. A part rigidly fastened to the coupler or drawbar, by means of which the coupler and buffer springs are connected. See Pede tal-horn.

Horn-bolt. (Janney coupler.) The bolt securing the horn in place.

Horn-plate (English). The name given to the part of a locomotive or tender which on other railroad vehicles is termed axle-guard (American, pedestal), which see.

Horse box (English). A four-wheeled covered vehicle adapted to run on passenger trains. It is fitted with large

Hopkins' journal-bearing. A lead-lined journal bearing, which see, which use a thin coating of lead inside an ordinary brass-bearing.
number, thus reducing the pressure upon the top roller. The rollers are kept parallel by a frame carrying parallel pins or rods on which the spiral-rollers revolve loosely. Wrought iron axles are fitted with a steel sleeve, and the cast boxes are lined with a steel bushing. The boxes have dust-guards and are made narrow enough to fit in existing car-trucks of steam and electric roads.

Hydraulic jack. Figs. 8728-92. A tool or machine in which the power is exerted by means of the pressure of some liquid acting against a piston or plunger, for raising heavy weights, like a car. The head and interior tube or ram, fig. 8794, forms a reservoir from which the fluid flows to the pump, and to which it is returned in lowering. From the pump it is forced, by the downward stroke of the piston, past the lower valve into the cylinder, and, this being closed at the bottom, the ram rises. The lever, which is made with a projection on one edge, slips into a socket at the side of the head. This socket passes through an arm on the interior of the head, and to this is fastened the piston of the pump.

The claw attachment, figs. 8729, 8734, is a third tube, which screws into the head, below the ram-collar and outside of the cylinder, at the lower end of which is a claw projecting out at one side. They are rated so that one man can raise the weight for which they are designed. The speed of lifting is inversely proportional to the amount lifted. Ten tons can be lifted one foot in about a minute and a half. See Dudgeon's hydraulic-jacks, and Watson and Stillman's hydraulic-jacks.


Hydrostatic-buffer. A platform and buffing apparatus designed by Mr. A. G. Leonard and first applied to the Empire State Express between New York and Chicago. It consists of a buffer plate extending the full width of the platform end-sills, with two side, two intermediate, and one center buffer stems. These center stems are backed up by springs as is usual in other buffing apparatus, and in addition the center and side stems are enlarged at their ends and fitted so as to act as pistons in buffer-stem cylinders. The two side and center cylinders are filled with a liquid and they are connected with suitable piping. The drawbar has attached to it a pressure-bar which is also fitted to a cylinder which has pipe connection with the center and side buffer stems. The effect of this arrangement is to equalize the pressure upon the buffer-plate. If one side-buffer stem receives more than its proportion of the thrust, the fluid conveys the hydrostatic pressure to the other side and center, and this being closed at the bottom, forces out the pressure-bar piston forces the fluid from its cylinder into the buffer stem cylinders and forces out the buffer-plate, insuring contact at all times between the buffer-plates. Folding steps are required, since the buffing apparatus takes up the full width of the platform.

I-beam. A general term applied by makers to any form of rolled iron having an I cross-section. The top and bottom parts are termed the flanges and the middle the web. The usual dimensions are given by the total height from out to out, and vary from three to fifteen inches. When one of the flanges is simply a round bar it is termed a deck-beam. I-beams are used in car construction, with channel-bars and also for trucks. I-beams are used for center and intermediate sills, also for truck-bolsters, as in figs. 4578, 4644-66; channel-bars for side-sills, truck-transoms, figs. 4729, etc., for platting truck bolster, figs. 4789-9; and for spring-planks, 4590, 4644, 1746, etc.

Ice-car. A car for transporting ice, usually constructed with double roofs and floors, and interior filled in with saw-dust or other non-conducting substance.

Ice-oil (refrigerator-car). The receptacle for carrying ice, especially roof ice-oans, in distinction from ice-racks at the ends of the car.

Iguiter, or signal-holder (for blue-light signals). A wooden handle having a piston in the end for igniting the blue-light by compression.

Inclined floor (coal-car). 27th, figs. 805-9; 37th, figs. 810-15. Subdivided into inclined end-floor and inclined side-floor, the latter not always used.

Inclined floor cross-bar (hopper-bottom coal-car). Cross-bars passing from one sill to the other, in the modern cars usually of iron, supporting the inclined hopper-plates, or wood floor.

Inclined floor-timbers (coal-car). The wooden sills to which the inclined floor of a coal-car is nailed.

Inclined-plane car. A passenger street-car which is drawn by a wire rope on a steep inclined plane. The car is so arranged that the floor will be level when the wheels are on the incline, by making the wheels at one end larger than at the other, or by raising up one end of the car-body.

Inclined side-floor (coal-car). See Inclined floor.

India-rubber body-cushion, or Attcock's body-block. (English.) 186, figs. 501-4. A piece of rubber about 6 in. by 8 in. by 1 in. thick, interposed between the body and the underframe, serving to deaden noise and vibration and permit a free circulation of air to the floor timbers.

India-rubber. A gum which exudes from a tropical tree growing in the East and West Indies, Mexico, South America, etc. It is prepared for use by vulcanizing with a greater or less proportion of sulphur, according to the stiffness required.

India-rubber car-spring. A spring consisting of a cylindrical block of India-rubber. Such springs have been used both for carrying the weight of cars and for buffer and draw-springs. Now rarely used in this country, but largely in Europe.

India-rubber floor-mat. Figs. 2955-7. See Floor-mat. They are either perforated or corrugated.

Ingate. "The aperture in a casting-mold at which the melted metal enters."—Knight. Often called a gate.

Injector. Figs. 4827-9a. A large hood or wind-scoop on the roof of the car to catch the air and force it through the various pipes into the car. Corresponding parts are called hoods, jacks, ventilators, ventilator-jacks, wind scoops, etc.

Inner centre-stem guides. Figs. 1424-5. 43, figs 2265-8. See Buffer stem-guides.

Inner-coil (graduated bolster-spring). See Spiral spring.

Inner draw-bar carry-iron (Miller coupling). 48, figs. 2289-92. A U-shaped strap of wrought iron riveted to the suspender beam to support the drawbar coupling-hook.

Inner face-plate. Fig. 2432, and 4, fig. 2435. Also called a back-face-plate. See Gould vestibule.

Inner hung-brake. Figs. 1360-1, 4600-4, 4644-8, etc. When the break-choes and beams are between the wheels. Figs. 4749-3. When attached at the outside, it is an outer hung-brake.

Inner intermediate-sills. Figs. 239-56. Those two intermediate-sills next to the center-sills. See Outer intermediate-sills.

Inner lamp-ring (English). 168, fig. 501. An ornamental or wooden ring in the inner surface of the roof surrounding the aperture for the roof-lamp, which see.

Inner side-stem of the guide. 1419-19, 98-57, figs. 2926-300. See Buffer stem-guides.

Inside body-corner knee (English). 76, figs. 345-51. American equivalent, sill knee-iron or corner plate, which latter is used outside instead of inside. A wrought-iron knee placed in a horizontal plane securing the end and side of the body together.

Inside-casing (Baker heater). Figs. 9001, 2018. Sheet-iron, or steel-plate, bent and riveted into the shape of a frustum of a cone which forms the top of the fire-pot.

Inside casing. (English). 129, figs. 501-4. Boards in
the inside of the body attached to the framing of the sides and ends. Also called inside-lining.

Inside-cornice (passenger-car interiors). Figs. 453-78, 589-41. A molding which fills the angle where the roof joins the side of the car.

Inside-cornice fascia-board. Figs. 485-541. A projecting board which forms a molding or ornament under the inside-cornice. The sub-fascia board lies under it. The arrangement of these details, however, is frequently varied.

Inside-cornice sub-fascia board. Figs. 584-67. See above.

Inside end-piece (of truck-frame). Figs. 4588-40. The end-piece which is nearest to the center of the car. It is usually straight while the outer one is curved so as to make room for the draft-rigging.

Inside frieze-panel (street-cars). A panel on the inside over a window.

Inside hand-rail (street-cars). 185, figs. 5654-7. A rail, usually made of wood, attached to the rafters by metal brackets, and carrying leather straps in the form of loops for passengers to hold fast to.

Inside hand-rail bracket. 187, figs. 5654-47 and figs. 6926-70. See above.

Inside-lining. 1. 53, figs. 229-66, etc. The boarding which is nailed to the inside of the posts of freight, baggage and other cars. In box-cars it extends half way up the girth. Inside-lining becomes sometimes inside-shafting when it is carried up to the roof, and is the only shafting for the car, the frame being left exposed.

2. (English.) See Inside-casing.

Inside-lining cap. A girth or belt-rail, which see. See also above.

Inside-lining stud. A stud extending from the side-sill to the girth to serve as a "nailer" for the inside-lining.

Inside-shell (Kirby's car-door lock). H, fig. 2628. A kind of escutcheon on the inside face of the door including the latch-pull within it.

Inside spring-case. A shell cast on the spring-plates to keep the coils in place.

Inside wheel-piece plate. 19, figs. 4842-4966. See Wheel-piece.

Inside window-panel. 89, figs. 569-41, etc. A panel inside of a passenger-car between the windows.

Inside window-sash rail. 79, figs. 453-73, 589-41, etc. A horizontal piece of wood under the window on the inside.

Inside window-stop. A wooden strip attached to a window-post on the inside of a window-blind or an inner sash of a double window. It forms a groove in which the blind or window-sash slides. Also called window-casing. Sometimes the window-molding forms a stop on the inside.

Inspection-car. 1. A car used for inspecting track of a railroad. In inspecting the track it is pushed in front of a locomotive.

2. Figs. 5685-7, 5696-8, 5612-16, 5689-4. A hand-car used for very much the same purpose. Three-wheel hand-cars are also used by roadmasters for inspection.

See Hand-car.

3. Fig. 5612. A small car propelled by steam with seats for 4 to 6 persons.

Inspector's lantern. A general term, commonly meaning some form of bi-colored or tri-colored lantern, with colors changeable at will, usually by means of slides, but sometimes by other devices. See Burrell signal-lantern.

Instruction-car. Figs. 218-89. (Air-brake.) A car maintained by the Westinghouse Air-Brake Co. and by some railroads, to send out over the line in charge of experts, and with a full equipment of air-brake apparatus for the purpose of instructing employees required to operate or inspect air-brakes, as to their construction, operation and proper maintenance. The same end is accomplished by some roads by establishing instruction-shops or schools at certain points along the road and requiring employees to attend the same.

Interchange of traffic (rules for). A code of rules adopted and amended from year to year, by an organization composed of master car-builders and others, who have held their meetings during the session of the Convention of the Master Car-Builders' Association. The rules of 1894 make the following provisions, viz.:

Code of Rules Governing the Condition of, and Repairs to, Freight-Cars for the Interchange of Traffic.

Rule 1. Each railway company shall give to foreign cars, while on its line, the same care as to oiling and packing that it gives to its own cars.

Rule 2. Cars must be delivered in good running order, and returned in as good general condition as when received.

Rule 3. Cars may be refused for any of the following defects:

(a-y) Defects in wheels. See Wheels.

(b-p) Defects in axles. See Axles.

(c) Defects in brakes. See Brake-gear.

(d) Defects in steps, etc. See Steps, ladders, etc.

(e) Defects in drawbars and attachments. (M.C.-B. Automatic couplers.) See Drawbars and attachments.

(f) Center sills or draft timbers spoiled.

(g) Intermediate or outside sill recently spliced in a manner not prescribed by the Rules.

(h) Leaky roofs on merchandise or grain cars.

(i) Cars with doors missing; or in condition which will improperly protect the lading, or with door shoes worn or loose so as to allow the door to swing outwardly.

(j) Cars with four-hole center plates and long center pins through bolster, unless two of the bolts are effective.

(k) Cars with four-hole center plates and short center pins which rest in upper plate, unless three of the bolts are effective.

(l) Cars with two-hole center plates, unless both bolts are effective.

(m) Cars with two-hole center plates if center plate is broken.

(n) Special or general defects of bodies or trucks, which render cars unsafe to run.

Rule 4. A car with defects which do not render it unsafe to run or unsafe to trainmen must be accepted, but in such cases the company to which the car is offered may require that a defect card shall be securely attached to the car with four tacks, preferably on the outside face of the intermediate-sill between the cross-tie timbers.

Duplicate cards shall be furnished for lost or illegible defect cards.

Rule 5. Defect cards shall be 8½ inches by 8 inches, and of the form shown below. They shall be printed on both sides and shall be filled in on both sides with ink or black indelible pencil. The card must plainly specify in full each item for which charges are authorized.

M. C.-B. DEFECT CARD.

<table>
<thead>
<tr>
<th>Name of Road.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car No.</td>
</tr>
<tr>
<td>Initial</td>
</tr>
<tr>
<td>Will be received at any point on this company's line with the following defects.</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>[Mark-Fill in defects on both sides with ink or black ink in spaces provided]</td>
</tr>
<tr>
<td>Each this card with four tacks, and place bag of intermediate sill, between cross-tie timbers.</td>
</tr>
<tr>
<td>Inspector at.</td>
</tr>
</tbody>
</table>

Rule 6. Any company finding a car with defect card attached may make the repairs noted by the card, provided such repairs are necessary for the safe running of the car, and render bill for same to the company attaching card,
stating upon the bill the date and place when the repairs were made; the card to accompany the bill as voucher for the work done, but no bill shall be rendered for repairs which have not been made.

Any company finding a car with defect card attached, may make such partial repairs as may be necessary for the safe running of the car. It shall strike the items repaired from the card by drawing two lines in ink through such items on both sides of the card, and replace the card upon the car. It shall notify the company which issued the original card of the items repaired, and the latter company shall issue a defect card covering the partial repairs made, that card to be used as a voucher and to accompany the bill for such partial repairs.

Defects for which owners are responsible:

RULE 7. Locks and grain doors in cars are at owner's risk.

RULE 8. Car owners shall be chargable with the repairs of their own cars when such repairs are necessitated by:

(a) Roofs lost from cars on account of decayed condition or faulty construction, and owners notified before the repairs are made.

(b) Brake shoes worn out, no charge to be made for labor of renewing; no credit to be allowed for scrap.

(c) Journal bearings needing renewal, no charge to be made for labor of renewing, and an arbitrary scrap credit shall be allowed for one-half the weight of the bearing applied.

(d) Truck or body bolsters, truck transoms, spring planks, or track springs broken or lost, or arch bars broken or cracked, providing the car was not derailed or wrecked.

(e) Wheels and axles worn out as provided in Rule 9.

(f) Oil box lids lost off when not caused by wreck or breakage due to rough usage.

(g) Brake beams, levers or attachments less than 3/4 inches from rail.

(h) Center plate bolts broken or missing.

RULE 9. When wheels or axles are renewed, they shall be treated as follows:

Wheels shall be charged to the company owning the car, if the cause of removal is:

(a) Shelled-out spots. (d) Worn flange.

(b) Seams. (e) Tread worn hollow.

(c) Worn through chill. (f) Burst.

(g) Broken flange, if the breakage is caused by seams worn through chill or worn flange.

(h) Broken rim, if caused by rim being hollow.

(j) Cracked thread, if caused by being worn through chill.

(k) One or more cracked (m) Loose. brackets.

(l) Out of gage.

Wheels shall not be charged to the company owning the car, if the cause of removal is:

(a) Y'd running. (b) Chipped flange.

(c) Broken flange, if the breakage is not caused by seams, worn through chill or worn flange.

(d) Broken or chipped rim, not caused by rim being hollow.

(e) Breakage of any kind caused by derailment.

RULE 10. In the case of cars belonging to private parties and corporations other than railroad companies, or that are not cared for or controlled by a railroad company, the repairs or renewals of all parts that fail under fair usage, or on account of ordinary wear and tear, or bad or inferior design, may be made by railroad companies, and shall be paid for by the owners, except as already provided in Rule 8.

RULE 11. A car unsafe to load on account of general worn-out condition, due to age or decay, shall be reported to its owner, who must be advised of all existing defects. If the owner elects to have it sent home, he shall furnish two home cards, noting upon them existing defects and the route over which the car is to be returned to its owner. If the route coincides with that over which the car passed to the point where it became unserviceable, no liability shall be incurred as between the owner and the road handling the car, either for freight charges in handling the car or for car service during this movement.

Such cards shall be attached to each side of the body of the car. They shall be 8½ by 8 inches, and of the form shown below. They shall be printed on both sides, and shall be filled in on both sides with ink or black indelible pencil:

```
FROM

TO

VIA

To be shipped for

(Head of Car Department.)
```

In case of private line cars, the cars shall be regularly billed home, and the owner notified.

RULE 12. Bills rendered for wheels and axles shall be in accordance with the following schedule of prices for material, with the proper debits and credits:

<table>
<thead>
<tr>
<th>Material</th>
<th>New</th>
<th>Second-hand</th>
<th>Scrap</th>
</tr>
</thead>
<tbody>
<tr>
<td>One 36-inch wheel</td>
<td>$10.00</td>
<td>$7.00</td>
<td>$4.50</td>
</tr>
<tr>
<td>One 33-inch wheel</td>
<td>8.00</td>
<td>6.00</td>
<td>4.00</td>
</tr>
<tr>
<td>One 35-inch wheel (or less)</td>
<td>7.00</td>
<td>5.00</td>
<td>3.50</td>
</tr>
<tr>
<td>One axle, 80,000 lbs.</td>
<td>10.00</td>
<td>8.00</td>
<td>6.00</td>
</tr>
<tr>
<td>One axle, 60,000 lbs. (or under)</td>
<td>9.00</td>
<td>5.00</td>
<td>3.00</td>
</tr>
</tbody>
</table>

and with an additional charge of $1.50 for all labor for each pair of wheels and axle removed from the truck. If new wheels and axles are substituted for second-hand wheels and axles, proper charges and credits shall be allowed, although such substitution be made on account of only one loose or defective wheel or a defective axle, with the following exceptions: In case the owner of a car removes wheels on account of defective axle, the road responsible for damaging the axle shall not be charged for any difference in value between the wheels used and those removed. In case the owner of a car removes axle on account of defective wheels, the road responsible for damaging the wheels shall not be charged for any difference in value between axle used and that removed.
RULE 13. Bills for wheel and axle work shall be in the following form:

<table>
<thead>
<tr>
<th>Address</th>
<th>Company</th>
<th>Name of Car</th>
<th>Make of Wheel or Axle</th>
<th>Material</th>
<th>Labor</th>
<th>Charge</th>
<th>Cost of Wheel or Axle</th>
<th>Total Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bills for wheel and axle work must make specific mention of each axle and wheel removed or applied. Bills which do not embody all the information called for by the headings of the columns may be declined until made to conform to the requirements of the rule. If no marks are found on wheels or axles removed, a notation to that effect must be made on face of bill.

RULE 14. In noting on bills the cause of removal of wheels and axles, the terms used in Rule 8, Sections a to r, shall be used, and the dimensions of the defect or variation from the prescribed limits should be carefully specified.

REPAIRING AND SETTLING FOR FOREIGN CARS.

RULE 15. Foreign cars, if damaged, shall be promptly repaired by the company causing the damage; such repairs shall be thoroughly made and the work shall conform in detail to the original construction and with the same quality of material originally used, except as herein-after provided; new standard parts may, however, be used if agreed to.

RULE 16. In repairing damaged cars M. C. B. Standards may be used when of design and dimensions that do not mar or impair the strength of the cars, in lieu of the parts forming its original construction.

Any company finding a link and pin drawbar in a car originally equipped with a drawbar of the M. C.-B. type and so marked and carded for wrong material, may replace the link and pin drawbar with an M. C.-B drawbar, and bill upon the card to the railroad company carding the car for the wrong drawbar.

When M. C.-B couplers of another make are placed upon a car the uncoupling arrangements shall be made operative. Cars equipped with M. C.-B. couplers should be marked to show whether a drawbar pocket or stem attachment is standard thereto, and whenever such attachment or the uncoupling arrangements are changed, a defect card shall be applied to the car for wrong parts used in such uncoupling arrangements or such attachments including a wrong drawbar in the latter case.

RULE 17. Wheels on the same axle must be of the same circumference.

New wheels must not be mated with second-hand wheels. Prick-punching or shimming the wheel fit must not be allowed.

Wheels applied must be marked on the inside with the initials of the road doing the work.

The wheel seats of foreign axles must not be reduced more than 1/16 inch to fit wheels.

RULE 18. All sills other than center sills to which draw timbers are attached may be spliced once. When the sills are less than 12 inches in width the plan shown in fig. a is to be followed:

![Fig. a.](image)

When the sills are 12 inches or more in width the plan shown in fig. b is to be followed:

![Fig. b.](image)

The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 inches of same. The splicing of two adjacent sills at the same end of the car or between cross-tie timbers will not be allowed.

RULE 19. Any company repairing foreign cars with wrong material and not in compliance with Rules 15, 16, 17 and 18, shall be liable for the cost of changing such car to the original standard or to the requirements of Rule 18.

Cars originally equipped with link and pin couplers shall be accepted, provided drawbars fit properly and have sufficient strength and are in good condition; a card may, however, be required for any alterations which may have been made to rear end attachments.

RULE 20. A company using wrong materials in such repairs shall place upon the car, at the time and place that the work is done, a defect card, except as provided in Rules 16 and 19, which defect card shall state the wrong material used, and shall pass the car back to the owning road.

RULE 21. The company on whose line the bodies or trucks are destroyed shall report the fact to the owner not later than 30 days after their destruction, and shall have its option whether to rebuild or settle for the same.
Rule 22. If the company on whose lines the car is destroyed elects to rebuild, either body or trucks, or both, the original plan of construction must be followed, and the original kind and qualities of materials used. The rebuilding must be completed within 60 days from the original date of damage or destruction. In such cases no allowance shall be made for betterments.

Rule 23. The settlement prices of new eight-wheel cars shall be as follows, with an addition of $40 for each car equipped with air-brakes. The road destroying a car with air-brakes may elect to return the air-brake apparatus, including all attachments, complete and in good condition. (See Freight-car for the prices of cars for several years.)

Note.—The lengths of cars mentioned refer to the lengths over-all of the car-bodies, except in the case of flat-cars, in which case the lengths referred to are the lengths over end-sills.

When cars of 60,000 pounds capacity or over and so stenciled have trucks with journals 4 inches or over in diameter when new, $25 per car shall be added to the figures as given above for the values of car-bodies.

Depreciation due to age shall be estimated at six per cent, per annum upon the yearly depreciated value of the body and trucks on hand, provided, however, that allowances for depreciation shall in no case exceed sixty per cent of the value new. The amount, $40, for air-brakes shall not be subject to any depreciation.

Refrigerator-cars, special stock-cars, and other freight-cars designed for special purposes, not especially referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, but the deduction for depreciation due to age shall be on the same basis as for regular freight equipment.

Rule 24. If only the body of a car is destroyed and the company destroying it elects to return the trucks, they shall be put in good order, or accompanied by a defect card and delivered free of freight or other charges to the nearest point on the line of the company operating the car, and the number, line, and class of car destroyed shall be stenciled or painted on each truck so returned.

FURNISHING MATERIAL AND BILLING WORK DONE.

Rule 25. Companies shall promptly furnish to each other upon requisition, and forward free over their own road, material for repairs of their cars injured upon foreign lines that cannot be procured in open market. Requisition for such material shall state that it is for repairs of cars, and shall give the number and lettering of such cars and the pattern numbers of castings required when possible.

Rule 26. Bills for work done on defect cards or for material furnished on requisition shall be on the basis of the following charges and credits:

<table>
<thead>
<tr>
<th>Material</th>
<th>Charge per lb.</th>
<th>Credit per lb.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast Iron</td>
<td>$0.10</td>
<td>$0.10</td>
</tr>
<tr>
<td>Malleable Iron</td>
<td>$0.04</td>
<td>$0.04</td>
</tr>
<tr>
<td>Bolts, Nuts and forgings</td>
<td>$0.02</td>
<td>$0.02</td>
</tr>
<tr>
<td>Steel Castings</td>
<td>$0.10</td>
<td>$0.10</td>
</tr>
<tr>
<td>Steel (not Spring)</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>Brass and Bronze</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>Lumber—Yellow, White and Other</td>
<td>$0.02</td>
<td>$0.02</td>
</tr>
<tr>
<td>Pines, Poplar, Oak, Hickory and Elms</td>
<td>$0.01</td>
<td>$0.01</td>
</tr>
<tr>
<td>1 Box or Stock Car Side Door</td>
<td>$0.15</td>
<td>$0.15</td>
</tr>
<tr>
<td>1 Box or Stock Car End Door</td>
<td>$0.10</td>
<td>$0.10</td>
</tr>
<tr>
<td>1 Box or Stock Car Half Side Door</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>Chain</td>
<td>$0.50</td>
<td>$0.50</td>
</tr>
<tr>
<td>Air-Brake Hose and Coupling</td>
<td>$0.25</td>
<td>$0.25</td>
</tr>
<tr>
<td>M. C.-B. Standard Journal Bearing</td>
<td>$0.15</td>
<td>$0.15</td>
</tr>
<tr>
<td>M. C.-B. Standard Journal Bearing</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>M. C.-B. Standard Journal Bearing</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>M. C.-B. Standard Journal Bearing</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
<tr>
<td>M. C.-B. Standard Journal Bearing</td>
<td>$0.05</td>
<td>$0.05</td>
</tr>
</tbody>
</table>

When M. C.-B. couplers are changed in Canada, on defect card acknowledging wrong material, the couplers may be charged at prices fixed in the Rules, plus the customs duty which must be paid on entering Canada. No percentage shall be added for either material or labor.

The following table shows the number of hours which may be charged for labor in doing the various items of work enumerated, which includes all work necessary to complete each item of repairs, except in so far as labor is already included in charges for materials:

<table>
<thead>
<tr>
<th>Refrigerator Cars</th>
<th>Charge for Labor</th>
<th>Hrs.</th>
<th>Charge for Labor</th>
<th>Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 side sill replaced</td>
<td>44</td>
<td>$20.00</td>
<td>36</td>
<td>$27.00</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 center sill replaced</td>
<td>52</td>
<td>$27.00</td>
<td>43</td>
<td>$25.80</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 center sill replaced</td>
<td>52</td>
<td>$27.00</td>
<td>43</td>
<td>$25.80</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
<tr>
<td>1 side sill and 1 center sill replaced</td>
<td>51</td>
<td>$26.50</td>
<td>42</td>
<td>$25.20</td>
</tr>
</tbody>
</table>
MISCELLANEOUS.

Rule 27. In rendering bills, cars shall be treated as belonging to railway companies whose name or initials they bear, except in case of Line Cars, where the equipment list of the general officers of the Line designates a party to make settlement.

Rule 28. For the mutual advantage of railway companies interested, the settlement for a car owned or controlled by a railway company, when damaged or destroyed upon a private track, shall be assumed by the railway company delivering the car upon such track.

Rule 29. Any railway company may become a party to this Code of Rules by giving notice through one of its general officers to the Secretary of the Master Car-Builders' Association.

Any railway company which is a party to this Code of Rules shall be bound by same through its successions, until one of its general officers files with the Secretary of the Master Car-Builders' Association its notification of withdrawal.

Acceptance or rejection of this Code of Rules must be as a whole; and no exception to an individual rule or rules shall be valid.

Rule 30. In order to settle disputes arising under the rules, and to facilitate the revision of the rules at the annual conventions of the association, an Arbitration Committee of five representative members shall be appointed annually by the Executive Committee; three members of this committee to constitute a quorum. The committee shall ask for suggestions of changes, amendments and additions to these rules prior to each annual convention, which it shall consider, and it shall report its recommendations to the succeeding annual convention.

In case of any dispute or question arising under the rules between the subscribers to said rules, the same may be submitted to this committee through the Secretary, who shall, before referring the case to the committee, notify both parties to the dispute to submit their reasons in support of their claims to the committee in order to enable it to decide intelligently. Should one of the parties refuse or fail to furnish the necessary information, the committee shall use its judgment as to whether, with the information furnished, it can properly give its opinion. The decisions of the committee shall be final and binding upon the parties concerned. This committee shall report its decisions to the association, and their report shall be incorporated in the annual report of proceedings of the association.

Rule 31. In the revision of these rules by the association, a two-thirds vote shall be necessary for adoption. Voting powers shall be the same as prescribed in the constitution of the Master Car-Builders' Association on matters pertaining to the adoption of standards and the expenditure of money.

Rule 32. This Code of Rules shall take effect September 1, 1894, and shall be introduced for discussion and revision at one session of the Master Car-Builders' Association Convention each year.

Interchange of Traffic. Rules governing the condition of, and repairs to, passenger-cars:

1. Each railway company shall give to foreign cars, while on its line, the same care and attention that it gives its own cars, except in case of cars on which work is done under special arrangement existing between the company owning the cars and the road operating the same.

2. Cars must be delivered in good running order, and returned in as good general condition as when received.

3. The receiving road is authorized to make such alterations and repairs as are necessary for the safe movement of cars over its line, and must immediately notify the delivering road of all such alterations and repairs, upon receipt of which notification the delivering road shall furnish proper authority to render bill for such alterations and repairs.

4. Authority must be furnished for the replacement of wheels and axles if in the following condition:

   **Wheels**
   
   (a) Loose wheels.
   
   (b) Variation from gage beyond the limits as prescribed in the Rules of Interchange for freight-cars.

   **Wheels, Cast-Iron.**
   
   (a) Shelled out, with treads defective on account of circular pieces shelling out, leaving round, flat spots, deepest at the edges, with raised centers, if 1½ inches or more in diameter.
   
   (b) Tread worn hollow; if tread is worn sufficiently hollow to render flange or rim liable to breakage.
   
   (c) Worn flange; flanges having flat, vertical surfaces, extending more than ½ inch from tread.
   
   (d) Flat spots; if flat spots, caused by sliding, exceed 1¼ inches in length.
   
   (e) Burst; if wheels are cracked from the wheel fit outward by pressure from the axle.

   (f) Flanges, rim, tread, plate or brackets, either cracked, chipped or broken in any manner.

   **Wheels, Steel-Tired.**
   
   (a) Loose, broken or cracked hubs, plates, bolts, retaining ring or tire.

- Flat spots: If flat spots, caused by sliding, exceed 1½ inches in length.

5. Brakes must be in perfect working order (adjustment based on seventy pounds as the initial pressure), with a piston travel of not less than 5 inches, nor more than 8 inches.

6. Bills for wheels and axles shall be of the accompanying form, and must make specific mention of each wheel and axle removed or applied:

<table>
<thead>
<tr>
<th>Description</th>
<th>New Cost</th>
<th>Scrap Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-inch Cast Wheel</td>
<td>$1.00</td>
<td>$0.50</td>
</tr>
<tr>
<td>1½-inch Cast Wheel</td>
<td>$1.50</td>
<td>$0.75</td>
</tr>
<tr>
<td>2-inch Cast Wheel</td>
<td>$2.00</td>
<td>$1.00</td>
</tr>
<tr>
<td>2½-inch Cast Wheel</td>
<td>$2.50</td>
<td>$1.25</td>
</tr>
<tr>
<td>3-inch Cast Wheel</td>
<td>$3.00</td>
<td>$1.50</td>
</tr>
<tr>
<td>3½-inch Cast Wheel</td>
<td>$3.50</td>
<td>$1.75</td>
</tr>
<tr>
<td>4-inch Cast Wheel</td>
<td>$4.00</td>
<td>$2.00</td>
</tr>
<tr>
<td>4½-inch Cast Wheel</td>
<td>$4.50</td>
<td>$2.25</td>
</tr>
<tr>
<td>5-inch Cast Wheel</td>
<td>$5.00</td>
<td>$2.50</td>
</tr>
<tr>
<td>5½-inch Cast Wheel</td>
<td>$5.50</td>
<td>$2.75</td>
</tr>
</tbody>
</table>

7. Bills rendered for labor and material furnished shall be in accordance with the following prices, with the proper debits and credits:

<table>
<thead>
<tr>
<th>Description</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal bearings</td>
<td>New, 9 cents. Scrap, 5 cents.</td>
</tr>
<tr>
<td>Malleable-iron</td>
<td>34 cents. Wrought iron, 44 cents.</td>
</tr>
<tr>
<td>Cast-iron</td>
<td>40 cents.</td>
</tr>
<tr>
<td>Cast-iron</td>
<td>45 cents.</td>
</tr>
<tr>
<td>Spring steel</td>
<td>50 cents.</td>
</tr>
<tr>
<td>Lever</td>
<td>40 cents. per hour.</td>
</tr>
</tbody>
</table>

All steel castings and steel wheels of the different makes and models may be charged at current market prices.

Jack-screw. Figs. 3733, 8786-9, and 3743-4. 1. A tool or machine for lifting or raising heavy weights. It consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the figure.

Jack-screw. Figs. 3738, 3738-9, and 3743-4. 1. A tool or machine for lifting or raising heavy weights. It consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the figure.

Jack-stake various names from their forms, sizes and shapes, and are designated as Bell-base, Broad-base, Clow, and Love, and also from the use for which they are designed, as Journal-box jacks, Travelling-jacks, Truck-jacks, etc. See Hydraulic jack.

Jacks for Steam-heating (Safety's). Figs. 3839-42, 3843-45, 3851-53. The figures show in detail the construction of the single-jacks, coil-jackets and double-jackets respectively. The inner or the water circulation pipes are of brass or copper, and therefore most efficient conductors of heat. Leakage of steam from steam spaces past the water pipes is prevented by packed glands shown. Coil jackets are always furnished in pairs, right and left, as shown. See Drums.

Jack-screw. Figs. 3738, 3738-9, and 3743-4. 1. A tool or machine for lifting or raising heavy weights. It consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the figure.

Jacks take various names from their forms, sizes and shapes, and are designated as Bell-base, Broad-base, Clow, and Love, and also from the use for which they are designed, as Journal-box jacks, Travelling-jacks, Truck-jacks, etc. See Hydraulic jack.

(For pile-driver cars.) 91, figs. 401-4. A jack-screw working on a Jack-screw pin attached to the body, for relieving the springs of the cars from action and making the platform a rigid body. Tongos or crabs attached to the track are used to prevent the car body from rising upward when on the jack-screws. Another device for the same purpose is a bolster jack-screw.

(For pile-driver cars.) 91, figs. 401-4. A jack-screw working on a Jack-screw pin attached to the body, for relieving the springs of the cars from action and making the platform a rigid body. Tongos or crabs attached to the track are used to prevent the car body from rising upward when on the jack-screws. Another device for the same purpose is a bolster jack-screw.

Jack-screw. Figs. 3738, 3738-9, and 3743-4. 1. A tool or machine for lifting or raising heavy weights. It consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the figure.

Jack-screw. Figs. 3738, 3738-9, and 3743-4. 1. A tool or machine for lifting or raising heavy weights. It consists of one or more screws, turned by a lever and working in a case, which rests upon the floor or ground, as shown in the figure.

Jamb (of a door). 1, fig. 1788. The door-post on each side of the door proper. Ash-pit jamb, which see, is a similar use of the term.

Janney car-coupler. Figs. 2181-82, 2203-4. A drawbar arranged to couple cars automatically, invented and patented by E. H. Janney in 1870. The outer end of the drawbar is made of a forged or U-shape, and to one arm an L-shaped knuckle is pivoted. When the two drawbars come together, the two knuckles engage into each other. The axis of the drawbar therefore remains always fixed, and does not move sidewise to couple as in the Miller coupler.

In the passenger coupler, when the knuckles engage, the rear point of one or both of them is thrown back, and in its rearward motion it displaces a catch, which
Janney-Buhoup platform equipment. Figs. 2301-50. A modification of the Janney-Buhoup platform equipment. The main draft-spring acts as a buffer-spring in compression, and which is replacing the other types of Janney draft-gear. Like the Janney equipment the coupler has a direct and a reverse connection with the buffers by which they are forced out whichever way the coupler is moved. The direct connection by which the buffers are pulled out with the couplers is made by interlocking the back-follower plate with a thrust-bottom, 150, fig. 2901, which impinged against the buffer-stem equalizer-bar, 134, through the top of the Yoke-lever, 135, and the U-bolt, 144. Any outward movement of the coupler is given directly (after the lost motion has been taken up) to the buffer-stem equalizer, 134, and through the buffer-springs to the buffer-stems, 135, and buffer-plate, 168. The movement of the buffer-stem equalizer is greater than that of the coupler in consequence of the greater leverage which it has over the bottom thrust, as shown in fig. 2850.

The reverse connection by which the buffers are thrust out when the coupler is forced in, is effected by the yoke lever, 135, the lower end of which is connected to the coupler by a yoke connecting bolt, 143, the upper end to the buffer-stem equalizer by a U-bolt, 144, and pivoted near the middle to the draft timbers by a full-crown-bolt, 12. When the coupler is forced in, the movement is carried by the yoke-connecting rod to the lower end of the yoke lever and the yoke-lever reverses the motion and conveys it to the equalizer, 135, and by the buffer springs to the buffer-stems and buffer-plate. The connection between the coupler and lower end of yoke-lever is such that it holds only when the coupler is thrust in; the bolt being loose to outward movements of coupler, as may be seen.

Janney-Miller coupler. A modification of the Janney coupler so as to enable it to be rapidly changed into an equivalent of the Miller coupler, thus enabling cars provided with it to be run in connection with either Janney or Miller draw-gear. The principal changes to effect this end were as follows:

A joint was made in the barrel of the ordinary Janney coupler to provide for the removal of the head when it was desired to change to the Miller. There was added the part called the center buffer-yoke in order to provide a connection between the center buffer spring and center buffer when used as a Miller coupling, the same springs being used, whether in use as a Janney or as a Miller coupler. A spiral spring called the side-spring, with its bracket and clevis, was added to give the necessary side resistance to the Miller hook. The platform lever was lengthened for the purpose of conforming to the difference in heights between the Janney catch-lever and the chain by means of which the Miller hook is moved in uncoupling, the same lever serving for either draw-gear. Followers and guides were provided and placed back of the center buffer-spring to form a better base for that spring when used in connection with the Miller buffer. The Miller stop was added to the Janney platform. After a little practice the change from the Miller to the Janney gear was made in from two to five minutes.

Since the general adoption of the M. C.-B. Coupler, this coupler and buffing apparatus has been changed, whenever opportunity has been afforded, to the Janney-Buhoup, figs. 2301-49, the Janney, the Gould, or other platform equipments. Before many years it will doubtless become obsolete, if indeed it may not be so called now.


Jaw-bit. A bar extending across the mouth of a pedistal-jaw underneath a journal-box and bolted to the horns of the pedestal.

Jaw-bolt. 85, figs. 4740-1. A bolt with a U-shaped split head, perforated to carry a pin. Used largely as a brake-lever fulcrum on break beams.

Jaw-spring. A journal-spring, which see.

Jib (of a derrick or crane). 9, figs. 899-98. More properly boom, which see.

Johnston-coupler. Figs. 2183-90.


Joint-bolt. Fig. 1770; fig. 538, etc. A bolt used for fastening two timbers when the end of one joins the side of another. The bug-bolt is another form for the same purpose.

Joint-cover. See Window-molding joint-cover.

Joint-stop (of Winlow roof). 1, figs. 3837 and 3838. A strip of wood with rabbeted grooves for inserting the corrugated roof-sheets. A cover-stop is a U-shaped strip of metal for uniting flat roof-sheets.

Journal (M. C.-B. standard). Figs. 5183, 5189, 5149, 5149-30. The part of an axle or shaft on which the journal-bearing rests. A gudgeon is a rough form of journal, usually of wood with an iron strap around it, as for the mast of a derrick or crane. The journals of bodies of irregular shape, like cannon or leaders of plowshare cars, are more commonly designated trunnions, which see. For standard minimum dimensions for various roads, see Interchange of Traffic.

Journal-bearing. Figs. 5894-8, 5411-18. A block of metal, usually some kind of brass or bronze, which see, in contact with a journal, on which the load rests. In car construction the term when unqualified means a car-axle journal-bearing. A standard form has been adopted by the Master Car-Builders' Association, and is shown in the engravings, but its composition is not specified. The Hopkins or lead-lined journal-bearing is one coated on the inside with a thin sheet of lead to make it self-fitting on journal. Babbitt-metal in some of its many forms is used for car-journal bearings occasionally, and almost universally for the bearings of machinery. In order that

snape back over the point of hook and secures it in place. The motion of the catch is controlled by the catch-spring, which slides on the catch-spring bolt. The draw-bar is cast hollow to contain the knuckle, catch and attached parts.

The buffers are caused to act simultaneously with the draw-bar so that the stronger the tension on the latter the stronger the compression on the buffers, by means of the horn and yoke-lever. The buffer comes forward whichever way you move the coupler. The manner in which this is effected is highly ingenious, and is described under Janney-Buhoup platform equipment. The main draft-spring acts as a buffer-spring in compression. The buffer shafts and buffer-plates are interlocking buffer-springs in either compression or draft. Whether in buffering or in draft the faces of the buffers are always kept in contact; the buffers follow the movement of the coupler forward.

To uncouple, a platform-lever draws a pull-rod which operates a catch-lever and unlocks the knuckle, permitting the same to swing upon the knuckle-pin. A recent improvement is the Janney-Buhoup, which see.
the journal-bearing may be more easily removable, and to distribute the load more equally, a journal-bearing key, also called a wedge, etc., is used to hold the journal-bearing in place. The term "wedge" is in very common use, being more common than the name here given. To remove the brace a journal-box jack, figs. 3753-1, 3753-4, 3755-2, is used to take the load off the bearing by inserting it under the journal-box, when the wedge or key can be readily removed, and afterwards the bearing itself. See Stop journal-bearing and stopkey-building.

Journal-bearing and wedge-gage. Figs. 5556-71. In 1894 a Recommended Practice was adopted for gages for journal-bearings and wedges, to insure their proper interchangeability and freedom from binding when in place. The set comprises:

1. Two bearing and wedge cross-section gages.
2. " " " longitudinal-section gages.
3. " flanged side-lug gages.
5. One " thickness-gage, common to both sizes.

See figures.

Journal-bearing key or wedge. M. C. B. standard, figs. 5389-418. See above.

Journal-bearing stop-key. 27, figs. 5133, and figs. 5135-7. The figs. 5138-45; Adams, figs. 5146-51; Schoen solid pressed steel, figs. 5161-4; Ruml, figs. 5165-6. See also Journal-box cover.

Journal-box cover, or lid. Figs. 5167-75. M. C. B. Figs. 5152-3; Bissell, figs. 5165-6. See also Journal-box cover.

Journal-box guides. Figs. 4753-6. The set comprises:

1. Journal-box-coverspring. 1. Figs. 5383, 5167-9, 5172-5. A door or lid covering an aperture on the outer side of a journal-box, by means of which oil and packing is supplied and journal-bearings are inserted or removed. Such covers are made of cast-iron, malleable-iron, pressed-steel, and sometimes of wood. They are usually closed by a spring, as in figs. 5402-5, 5152-3, 5167-75, which see, and sometimes not, as in the Hewitt lid, figs. 5175-1.

Journal-box cover-bolt. A bolt used to fasten covers which have no hinge to the box. Two of these are usually employed to each cover. A gasket of canvas, rubber or leather is used to make a tight joint. Journal-box covers are, however, now almost invariably held on by hinges and springs or some arrangement of lugs or grooved joints.

Journal-box cover gasket. Nearly obsolete. See above.

Journal-box cover hinge-pin. Fig. 5405.

Journal-box cover-spring. 1. Figs. 5383, 5167-9, 5172-5. A flat-spring to hold the lid in place. Various journal-box lids are in use, as the Hewitt, which see, which dispense with a spring.

2. (For Fletcher journal-box lid, which see.) Figs. 5152-3. A spiral spring slipping over a sleeve which slips over the bolts. The drawing is not quite correct, as it does not show this sleeve and does show a pin not used. The spring is frequently made a part of the cover, as in figs. 5167-9.

Journal-box guides. Figs. 4753-6. Iron bars or blocks placed one on each side of the journal-boxes of some iron frame trucks in which journal-springs are used. These irons, while holding the box in place longitudinally and transversely, allow it to have a vertical motion between them. When a pair of these guides is cast in one piece it is called a pedestal, which see.

Journal-box jacks. Figs. 4751-1, 4735-4, 3733. A low jack specially designed to set under journal-boxes, take the weight off the journal, so that braces can be removed as from a hot box.

Journal-box lid. Figs. 5167-75, 5152-3; M. C. B., figs. 5402-5. See also Journal-box cover.

Journal brass. A journal-bearing, which see.

Journal-packing. Waste, wool, or other fibrous material saturated with oil or grease, with which a journal-box is filled to lubricate the journal. Various forms of patent packing have also been introduced.

Journal-spring. Figs. 4766-7 and shown in 4578, 4753, etc. A spring supporting part of the weight of a car which is placed directly over the journal, and which usually rests on the journal-box under the truck-frame. Such springs are sometimes placed above the truck-frame and supported by strapes, and the weight of the car is transmitted to the journal-box by a vertical pin or stirrup. Equalizer-springs, which see, accomplish the same end in six-wheel trucks as journal-springs, and more effectually.

Journal-springs. Figs. 4001-2. Jute. A coarse fibre raised in India for making gunny-bags, matting, ropes, etc. It has been recently used for making journal-packing by a patented process.

"Kalamazo" All-steel hand-car wheel. Figs. 5632-4. A double-plate wheel, the two concave steel discs forming a substantial bracing for the outer and inner side of the tire. The tire is pressed out of wrought steel, and is curved over on the inner edge so as to make the rail flange. The outer edge of tire is turned down to form a point of attaching the separated discs to the tire. The edges of the discs are separated by a felloe and the center by a cup-shaped casting. The hub is a malleable cast shell with a cup or flange on one end, and in connection therewith is another malleable iron flange which is pressed over the opposite end of the hub. Between these two flanges or caps and the cup-shaped casting the steel discs are placed, and securely riveted.
malleable ring fits against the outer edge of the inner disc, and steel bolts secure this ring, the two discs and false between the discs, to the turned down edge of the tire.  

"Kalamazoo" hand-car. Figs. 5581-2. A lever hand-car whose special features are the steel-wheels, roller-bearings, and framing details.  

"Kalamazoo" inspection velocipede-cars. Figs. 5614-16.  

"Kalamazoo" three-wheeled hand-car. Figs. 5609-11. A very light and easy-running inspection hand-car for the use of one or two men only.  

Kalamined iron. Sheet-iron, coated with an alloy of zinc, lead, tin and nickel in the proportion of 29 lbs. of tin, 50 to 75 lbs. of zinc, 100 lbs. of lead, and three to six ounces of nickel. The alloy melts at a lower temperature than common zinc, and is claimed to give a more durable compound as well as a thinner and more adhesive coating. Galvanized iron is sheet-iron coated in the same way with pure zinc.  

Keeper. A ring, strap, pocket, or the like device for detaining an object; as  


2. "The box on a door-jamb into which the bolt of a lock protrudes when shot, as figs. 2541-3, 2545-2735. When the keeper is for a bevelled latch bolt, which is moved by contact with it, it is more commonly called a strike-pin, as figs. 2648. They are also further designated by the name of the lock or latch which they accompany.  

3. "The latch of a hook, which prevents its accidental disengagement."—Knight.  

Keeper. 112, fig. 316. (4), (Janney-freight coupler). A bracket for the uncoupling rod; the one directly over the coupler.  

Keg-shaped spiral-spring. Fig. 5243. A spiral-spring, the form of which resembles a keg or cask, patented by W. P. Haswell in 1876. Its object is to obtain a graduated spring, which see.  

Keowanee break-beam. Figs. 1591-4. A steel break-beam of rectangular cross-section, and a bar or true-rod, which is bent around the ends of the beam proper.  

Key. 1. "In a general sense, a fastener; that which fastens; as a piece of wood in a frame of a building."—Webster. Hence a pin inserted in a hole in a bolt, and used to secure the bolt or its nut. A split-key, which see, is a special form.  

2. Figs. 2716, 2720. "An instrument for opening or shutting a lock by pushing the bolt one way or the other."—Webster. See Lock. See Bit.  

3. A block over the top of a journal-bearing, called in full journal-bearing key, figs. 5309-93, etc., which see. This part is also very commonly called a "wedge."  

4. A beveled bar used with a gib to form a gib and key, which see. See also Kingbolt key.  

5. (For coupling-valve of Westinghouse brake.) A kind of wrench having pins fitted into corresponding cavities.  

6. (For lamps and valves of Pintech gas apparatus.) Figs. 3214-15. A substitute for the ordinary cocks of gas fixtures to prevent unauthorized tampering.  

Key-block. 186, figs. 3299-86. See packing-blocks.  

Key-bolt. Fig. 3714. A bolt slotted near the end to receive a key, which takes the place of a nut.  

Key-hole escutcheon. See Escutcheons.  

Key-hole plate. An escutcheon or escutcheon-plate, which see.  

Key-pin (of a lock). The pivot on which the key turns when inserted in the lock.  

Key-pin in a lever. Fig. 5342. A mode of securing the tire to the wheel, composed of two rings, one of U-section, and the other nearly rectangular. The former ring holds tire and wheel together, and the latter ring holds the former in place, filling up the groove in the tire. When both rings are in place the outer tip of the groove in the tire is slightly hammered over, thus gripping the second or key-ring, and retaining it in place. See a Tire fastening.  

Keystone car-seat. Figs. 3892-a.  


Kimball's Turnbuckle. See Turnbuckle.  

King-bolt, or center-pin. 18, figs. 239-96. 16, figs. 485-88. A large bolt which passes through the truck and body-bolsters and center-plates of a car-body and the center of a truck. It is accessible from the floor of the car by removing the king-bolt plate. The truck is supposed to swivel on the king-bolt, but in reality the two center-plates normally carry all the strain. In some wrecking-cars, fig. 388, the king-bolt is provided with keys to hind the truck to the car so that they cannot be separated from each other.  

King-bolt key (wrecking cars). Fig. 389. See above. They are distinguished as the upper and lower key.  

King-bolt plate. See above.  

King-post (of a true). A single post or distance-piece between a true-rod and the chord of a truss or beam. If two such posts are used they are called queen-posts. In car construction king-posts are made in two ways; one adjustable, so that they may be lengthened or shortened, and the other without adjustment. Also see Brake-beam king-post. Cross-frame king-post. Truck-bolster king-post. Truck-frame king-post.  

King's doors (Hopper-bottom coal-cars), Figs. 284a. A pair of doors which are inclined slightly from a vertical hinged at the top, and hung from two cross-tie-timber near the middle of the car and which are opened and closed by a toggle joint, moved by a lever in connection with a bell-crank. In order to raise the toggle joint high up the lever arm works upon the arc of a circle shown.  

Kirby's car-door lock. Figs. 2388-9. A device to give a lock extra strength and durability and to dispense with the use of screws for fastening on the door-knobs.  

Kirby's seat-lock. Fig. 4592.  

Kirtley double-spoke wheel. A car wheel, the hub (boss), spokes and rim of which are composed wholly of wrought iron welded together, the tire being shrunk on and secured by Mansell retaining-rings or other devices.  

Kitchen (dining car). Figs. 474-5. A large compartment used as one of the cars provided with all the facilities of a well-organized kitchen. Officers' and other private cars are commonly provided with a kitchen smaller than in dining cars and usually at the extreme end.  

Knee-timber (Janney platform). Fig. 3201. A deep form-sill, cutaway to embrace the end-sill.  

Knee. 1. See Platform-hood knee.  

2. (Snow-plow framing.) 23, figs. 410-8.  

Knee-iron. An L-shaped or angle-iron casting or forging which is fastened to the corner where two timbers are joined to strengthen the joint. See Still knee-iron. Truck knee-iron.  

Knee-strap (Janney coupler). Fig. 2801. A wrought-iron facing to the knee-timbers, connecting the end-sill and the stirrup or drawbar carry-iron.  


Knob-escutcheon. Figs. 2634-43. A Door-latch rose, which see.  

Knob-sash-lift. See Sash-lift.  

Knob-shank. Fig. 2632. A dooriockspindle, which see.  

Knotted spiralseat-spring. Fig. 4010. One with the form-sill, cutaway to embrace the end-sill.  

Knuckle. 1. (M.C.-B.couplers.) 2, figs. 2088-2144. The form which resembles a keg or cask, patented by W. P. Haswell in 1876. Its object is to obtain a graduated spring, which see.  

Knee-strap (Janney platform). Fig. 2301. A deep form-sill, cutaway to embrace the end-sill.
Knuckle, automatic coupler, contour line and limit gages. Figs. 5499-5501. Standard contour line was announced by Executive Committee under instructions from the Master Car-Builders' Association April 8, 1889. Limit gages for preserving standard contour line were adopted in 1891.

These gages, properly proven by master gages, may be procured from Pratt & Whitney Company, of Hartford, Conn. A duplicate set of master gages is held in the office of the Secretary for reference when desired.

Knuckle-joint. "A joint in which a projection on each leg or leaf of a device is inserted between corresponding recesses in the other, the two being connected by a pin or pivot on which they mutually turn. The legs of dividers and the leaves of door-hinges are examples of true knuckle-joints. The term, however, has been somewhat common to denote compound or universal joints designed to act in any direction."—Knight. Among the applications of this joint which have been made in car building are gas-pipe knuckle-jointed tubes to be used instead of rubber for brake-hose. They are not yet in general use.

Knuckle-pin (M. C. B. coupler). 3, figs. 3068-3144. The steel pin connecting the knuckle to the jaws of the coupler.

Krupp safety-lock (for steel-tired wheels). Figs. 3938. Among the applications of this joint which have been made in car building are gas-pipe knuckle-jointed tubes to be used instead of rubber for brake-hose. They are not yet in general use.

Krupp safety-lock (for steel-tired wheels). Figs. 3938. Among the applications of this joint which have been made in car building are gas-pipe knuckle-jointed tubes to be used instead of rubber for brake-hose. They are not yet in general use.

Ladder-handle. 60, figs. 229-66. A roof grab-iron or hand-hold, which see.

Ladder-rod. An iron ladder-round.

Ladder-round. 59, figs. 229-66, etc. See Ladder. The lower round of the ladder by recommendation of the Master Car-Builders' Association should be a bent ladder-round, as figs. 246, 256, as a safeguard against the slipping of the foot in swinging around the corner of a car.

Ladder side-rails. The wooden vertical side pieces to which wooden or iron ladder-rounds are attached. This form of constructing the ladder is more common than ladder-rounds directly secured to the end of the car.

Lag-post. Figs. 1192-5, etc.

Lag-screw (English, coach-screw). Fig. 3771. An iron bolt with a square or hexagonal head and with a wood screw-thread cut on it, intended to screw into wood. Lag-screws are round under the head, so that they can be turned after they enter the wood.

Lambrequin (lam'-bré-quin). 98, fig. 4551. A cloth or drapery fastened over the upper part of a window. It covers the rod and rings or roller of the window curtains. The lambrequin has been replaced by Valances, which see. B, fig. 3432.

Laminated buffing-spring (English). A half-elliptic spring. See Flute buffing and draft-spring.

Lamp. Figs. 3183-90. A vessel for the combustion of fluid inflammable bodies for the purpose of producing light."—Webster. The chief forms of lamps now used are for burning gas and mineral oil or petroleum, though candle lamps are used in cases of emergency, as also oil lamps for lard oil, for panel lights, lanterns, etc. Car lamps are distinguished as side-lamps and centre-lamps, the latter now usually consisting of two or more distinct lamps, forming a chandelier. In England roof-lamps, inserted from the roof of the car, are exclusively used. Lamps are also distinguished as adjustable globe, loose globe and plastered or fixed globe, which see, the latter being a form in which the lamp is removed from below and the globe cannot be taken off. Many modern lamps are constructed upon the tornado or hurricane principle, which see, to avoid the effects of draft. Postal-car lamps or chandeliers are a special class, in which every means possible is used to obtain a powerful light. See also acme-lamp, aloë-lamp, gas-lamp, signal-lamp, tail-lamp, etc.

Lamp-alove. A metal casing or lining for a recess in the side of a car to contain an aloë-lamp, which see.

Lamp-arm. 4, figs. 3261-3, 3210-17. Rods by which a lamp is attached to the ceiling of a car. Some lamp arms have bracket-anglesto support the shade and are then called bracket-arms.

Lamp bottom. 20, figs. 3261-3217. The lower portion of a lamp which is removable. Contains the wick, burner and oil. See Candle-bottom.

Lamp-bracket. See Side-lamp bracket.

Lamp-burner. Figs. 3261-90; 6, figs. 3261-3217. That portion of a lamp by which the opening on the top of the reservoir is closed, which holds the wick, and by which the latter is adjusted. A great variety of styles exist and are shown. See engravings. The acme and dual burners, which see, are favorites for car service where a brilliant light is wanted, but many forms are used. The same burner is also applied to the tips of a gas-light in the Pintsch gas system. See fig. 3211.

Lamp-burner (English). 165, fig. 501. The wick-holder in the roof-lamp, which see.

Lamp-canopy. Figs. 3432-33. A large and elaborate smoke-bell, which see.

Lamp-case (street-electric). 1. A box over the end windows in which a lamp is placed. It has a glazed door on the inside and usually colored glass on the outside as a signal to designate the line to which the car belongs. It is fastened by a lamp-case hook and eye.

Lamp-case base or packing (English). 107, fig. 501. A cylindrical sheet of iron for the protection of the roof-lamp, which see.

Lamp-case or packing (English). 107, fig. 501. A cylindrical sheet of iron for the protection of the roof-lamp, which see.
Lamp-case chimney (street-cars). A metal pipe through which the smoke and gases escape from a lamp-case, very similar to a lamp-jack, which see.

Lamp-case door (street-cars). See Lamp-case.

Lamp-case door-holder. A kind of hook attached to the roof.

Lamp-case eye. See Lamp-case.

Lamp-case hook. See Lamp-case.

Lamp-cover. A glass tube which incloses the flame of a lamp, conducts away the smoke and gases and produces the necessary draft.

Figs. 8512-29 give what are known as the standard types, For the names of which see engravings.

Lamp-chimney bracket. A projecting metal arm attached to the side of a car and carrying a chimney-holder by which a lamp-chimney is held in place.

Lamp-chimney holder. Fig. 3436. See above.

Lamp-chimney reflector. Fig. 3290. Usually it has a hole in the center in which the chimney is inserted.

Lamp-cover, or lamp-protector (English). 161, fig. 501. American equivalent, lamp-jack. A sheet-iron cover hinged to the lamp-case and secured by a spring-catch to protect the lamp from rain, while it allows the smoke to escape. See also Roof-lamp.


Lamp-fount. 6, figs. 3261-3817. The receptacle for the oil burned in a lamp. Also called lamp-reservoir.

Lamp-globe (English). 166, fig. 501. In a carriage, a hemispherical glass globe of unusual thickness, which surrounds the burner of a roof-lamp, which see.

Lamp-globe chimney. Figs. 3299, 3808. A metal tube attached to the top of a lamp-globe for conducting away the smoke. A shade-cup is an equivalent device for a lamp-shade.

Lamp-holder. See Side-lamp holder.

Lamp-jack. V, figs. 338-41. A cap or covering over a lamp-vent on the outside of a car to exclude rain and prevent downward currents of air. Also see Lamp-case chimney.

Lamp-key (Pintsch gas). Figs. 3214-15. A substitute for the ordinary cock of gas fixtures used to prevent unauthorized tampering with the burners.

Lamp-plug (English). 165, fig. 501. A cylindrical piece of metal, also called a plug, to which the lamp-bottom or reservoir is attached and which is supported by the lamp-arms.

Lamp-screw. Figs. 3865-66. A more elaborate lamp-hoop, which see.

Lamp-shade. 2, figs. 3961-3817. A conical shaped reflector placed over a lamp to reflect the light downward.

Figs. 3433-39 give what are known as standard forms, the dimensions of which in inches are as shown in the figures.

Lamp-pocket. Figs. 3333, etc. A socket or dove-tail joint to which a lamp or flag is attached at the corner of a car. They are flat, inclined, angular or projecting, as may be desired.

Lamp-stay. 1, figs. 3861-3817. A horizontal bar, usually reaching from side to side of the clear-story, by which a car-lamp is steadied and also made more ornamental.

Lamp-vent. An opening in the roof through which the gases from a lamp escape.

Lantern. Figs. 3362-63. A portable lamp, the flame in which is protected from wind and rain by glass, usually in the form of a globe surrounded by wires called guards. According to the number of these wires the lantern is called single, double or triple-guard. The conductor's lantern is one with a large ball, so as to be carried on the arm, leaving both hands free. It is usually provided with a reflector above. Inspector's lanterns are generally arranged to give blue light. See Lamps. Signal-light.

Lantern and flag-holder. A device for displaying signals on rear of trains. See Flag-holder. The novelty is the convenience of attachment for either a lamp or flag.

Lappin brake-shoes. Figs. 1638-82. A brake-shoe cast from a mixture of metals, which is a solid casting with alternate sections of hard-chilled and soft parts. The chilling of the harder sections is done in the usual manner by chilling blocks brought into contact with the molten metal. The process gives no sharply defined lines between the hard and soft sections, to make a cutting edge, as the chilled parts radiate into and mingle with the soft metal and thus disappear. The number and area of the soft sections can be increased or diminished by changing the number and size of the chilling-blocks in the mold, and the holding power of the shoe thus varied to suit the conditions of service.

Ld-lamp screw. Fig. 3877.

Lard-oil ratchet-burner. Fig. 3396.

Large main-valve piston-head (air-pump). 77, figs. 3281-8.

Latches. Figs. 3944-70; 3957, 3954-73. The primary sense of this word is—to catch, to close, stop, or make fast: hence, an attachment to a door, window, etc., to hold it open or shut, is called a latch. The ordinary distinction between a latch and a lock is that a lock is closed and opened with a separate key and usually has a square bolt, whereas a latch has no separate key and usually has a beveled bolt which snaps shut automatically by contact with the keeper or strike-plate. The most exact definition between a latch and lock seems to be the form of the bolt and not the use or disuse of a key. See Sash-lock. Latches named from the use which they subserve are the following, which see:

Berth-latch. Saloon-latch. Door-latch. Sliding-door-latch or lift-latch. Safety berth-latch. Safety strap-latch. Spring door-latch. A sliding door-latch or lift-latch, figs. 3955-70, has a beveled hook instead of a beveled bolt, but operates upon substantially the same principle. Nearly all forms of latches are spring latches. A night-latch is a large and carefully made form of an ordinary latch, which can be opened from the outside by a key. A cupboard latch is any form of small latch. A rim-latch, like a rim-lock,
is one attached simply to the outside of the door in dis-
tinction from a mortise or rubbed latch (both rarely used),
which is boxed into the door.

Lateral-motion. A movement side-wise, more particu-
larly meaning, as generally used, a side or swing motion
of the bolster of a swing-motion truck, in distinction
from the end-play of an axle under the journal. A
lateral-motion spring, which is slopped over a lateral-
motion spring-pin, is sometimes used to check the lat-
eral motions of such bolster spring, but this end is
more commonly accomplished by applying the swing-
hangers outward.

Lateral-motion spring. 40, figs. 4806-4866. See above.

Lateral-motion spring-pin. 41, figs. 4806-4866. See above.

Lateral-play. Side motion of any part of a car or ma-
machinery; the space left to permit of such motion.
See Lateral-motion (of a truck bolster). End-play (of
an axle).

Leader-monitor deck-sash opener. Fig. 4835. See Deck-
sash opener.

Lavatory. Figs. 4848-3872. A room provided with wash-
bowls, towel-tumblers, etc., in which passengers
may make their toilet. Parlor and sleeping-cars are pro-
duced with separate lavatories for men and women,
which are separated from the saloons. The best and
most modern coaches have a lavatory. See Wash-room.

Lavatory carriage (English). A passenger vehicle in
which two or more compartments have access to a small
lavatory, urinal, etc. See also Carriage.

Lead car-seal. Figs. 8877-89a. Lead seals are either in
the form of rivets or buttons. Both are in common use.

See Car-seal.

Lead-rivet car-seal. Figs. 8879-85, etc. See Car-seal.

Window-shade leather. Solid leather nails.

Leather bell-cord. See Bell-cord.

Leatheroid. A substance somewhat resembling leather,
and somewhat similar to vulcanized fiber, which see, in
its general character and appearance. It is made by
treating paper with sulphate of zinc.

Leather-seat. A dust-guard bearing, which see.

Left-hand brace-pocket. See Pocket. 40, fig. 385. If
the car was on the right side of the post and inclined
the opposite way, the pocket would be right-hand.

Left-hand seat. A car-seat with a stationary back in
such a position that the seat-end is on the left side of
a person sitting on the seat.

Left main-valve cylinder-head. (Air-pump.) 85, figs.
1891-2.

Left main-valve head-gasket. (Air-pump.) 106, figs.
1891-2.

Leg. See Seat-leg.


Leg-rest. (Reclining seats.) 90, figs. 3924-5, 8974-5, 3896-
9. A bracketed and adjustable shelf, which may be
used on a chair or car-seat to support the limbs when
the seat or chair is reclining. It is adjusted by a Leg-
rest ratchet and leg-rest pivot-casting, as in figs.
3924-5, or by a Leg-rest slide, fitting in a Leg-rest socket-
casting, as in figs. 3896-5.

Length (of elliptic springs). The distance from center to
center of scrolls when the spring is unloaded.

Length (of springs). 17, figs. 3468-3572. A room provided
with wash-bowls,
towel-tumblers, etc. See LAVATORY.

Lateral motion. A movement side-wise. The lateral
movements, as distinguished from the end-play of an
axle, are chiefly applied to bolster springs.

Lateral-motionspring. 40, figs. 4806-4866. See above.

Lateral-motionspring-pin. 41, figs. 4806-4866. See above.

Lateral-play. Side motion of any part of a car or ma-
machinery; the space left to permit of such motion.
See Lateral-motion (of a truck bolster). End-play (of
an axle).

Letter-drop (postal-cars). Figs. 8820-2. A plate with a
letter-board (passenger-care exteriors). 91, figs. 435-73,
letter-board occupying the frieze of the car, and is often
so called.

Letter-box plate. See below.

Letter-case label-holders. Figs. 8815, 8886.

Letter-case label-holders. Figs. 8815, 8886.

Letter-case label-holders. Figs. 8890-3. A plate with a
spring flap for receiving letters for the post. A letter-
box lid.

Lettering (of freight-cars). Figs. 5548-5. In 1898 the
M. C. B. Association adopted a Recommended Practice for
Marking Fast Freight Line-cars, as shown in figs. 5548-5.
It was resolved:

"1st. The half of side of car on which the doors do
not slide to show the name of the 'Fast freight line'
spelled out in full and the car number in the Fast-freight
line series immediately below it. In the same panel
and within 2 ft. of the sill shall appear, in letters not
over 4 in. high, the name of the railroad company own-
ing or contributing the car, and between the same
and the sill shall appear the light weight of the car, with
such other information as it is found advisable to give
in connection with same.

"2d. Side doors to bear the initials of the road to which
the car belongs, or the name of the line on which the
car is used, together with the number of the car.

"3d. The ends to show the initials of the 'Fast freight
line' with the car number in the fast-freight line series
and the light weight just below them; no other marks
will appear on ends of car.

"4th. The half of sides of cars on which the doors do
slide to be reserved for advertising symbols or trade-
marks where used. The use of prose lettering in this
panel is to be discouraged, however, and it is recom-
mended that only the simplest trade-marks or advertis-

tions shall be used."
Limit gage. Figs. 5490-1. A termapplied to many forms of metal, wood, or other substance, turning on a support called a fulcrum.”—Webster.

See Brake-lever. Hand-car lever, or pro- pelling-lever.

Center brake-lever. Lever, not applicable to lever frame.

Compression-lever. Platform-lever.

Cylinder-lever. Release-lever.

Dead-end lever. Root-lever.

Door-shaft lever. Thumb-lever.

Eccentric-lever. Tripping-lever.

Floating-lever. Uncoupling-lever.

Lever-and-rack jack. Figs. 3740-1. See Barrett’s jack.

Lever-bracket (air-brake). 4, fig. 1897.

Lever-counterweight. A short iron bar of metal, wood, or other substance, turning on a support called a fulcrum.”—Knight.

Lever-frame (hand-car). 17, fig. 5590. A vertical rod by which the lever frame-cap is bolted to the floor-frame.

Lever-guard. A guide on the platform-rail for the platform uncoupling lever. See above and Brake-lever guide.

Lever-hand. See above.

Lever-handicap. The cast-iron jaws upon which the platform uncoupling-lever has its fulcrum.

Lever-handicap pin (Janney-Miller coupler). A pin for the lever-jaw. See above.

Lever-handicap, (hand-car). 21, figs. 5590-2. A short iron shaft to the which the propelling levers are attached.

Lever-leaf-jaw. (Janney platform). The cast-iron jaws upon which the platform uncoupling-lever has its fulcrum.

Lever-jaw (Janney platform). The cast-iron jaws upon which the platform uncoupling-lever has its fulcrum.

Lever-jaw pin (Janney-Miller coupler). A pin for the lever-jaw. See above.

Lever-jaw (hand-car). 21, figs. 5590-2. A short iron shaft to the which the propelling levers are attached.

Lever-leaf-jaw. (Janney platform). The cast-iron jaws upon which the platform uncoupling-lever has its fulcrum.

Lever-jaw pin (Janney-Miller coupler). A pin for the lever-jaw. See above.

Lever-jaw (hand-car). 21, figs. 5590-2. A short iron shaft to the which the propelling levers are attached.

Lever-leaf-jaw. (Janney platform). The cast-iron jaws upon which the platform uncoupling-lever has its fulcrum.

Lever-jaw pin (Janney-Miller coupler). A pin for the lever-jaw. See above.

Lever-jaw (hand-car). 21, figs. 5590-2. A short iron shaft to the which the propelling levers are attached.

Lever-leaf-jaw. (Janney platform). The cast-iron jaws upon which the platform uncoupling-lever has its fulcrum.

Lever-jaw pin (Janney-Miller coupler). A pin for the lever-jaw. See above.

Lever-jaw (hand-car). 21, figs. 5590-2. A short iron shaft to the which the propelling levers are attached.

Liner-blocks(Janney freight-coupler). 202, figs. 2161.

Linen-closet lock. Figs. 2647-8.

“Be it resolved, therefore, That it is the sense of this meeting that all line cars owned by foreign companies should be returned to their owners instead of being stored on foreign tracks, and that a competent man should be detailed to inspect the stored cars and to arrange to have the necessary repairs made during the time such cars are out of service.”

For standard lettering of line cars, figs. 5567-5, see Lettering.

Linen-closet lock Figs. 2647-8.

Liner-blocks (Janney freight-coupler). 202, figs. 2611-3. Blocks of cast or malleable iron bolted to the top and bottom of the tail end of the coupler or drawbar.

Lining. See End-lining. Inside-lining. Inside-lining. Feed-door lining. Inner, outer and intermediate linings of refrigerator cars are those linings or partitions intermediate between the inside lining and the sheathing, which usually consists of a or b stuff, whose purpose is to make dead air spaces for insulating the contents of the car.

Lining-strips. Wooden or metal strips put on the inside of freight or baggage-cars to protect the inside of the car from being injured by freight or baggage. Lining-strips serve very much the same purpose as inside-lining.

Lining-studs. 54, figs. 278-88. Vertical studs placed between the posts and over or under the braces, and to which the lining is nailed.
Lock. 1. "A short connecting piece, of circular or other equivalent shape; as one of the oval rings or divisions of a chain."—Knight.

2. (Coupling-links.) Figs. 2073-4. A short bar with an eye at each end for connecting two things together or for supporting one from another. When used alone the term is usually synonymous with a coupling-link, which see. See also Brake-block suspending-link. Ex-centric lever link. Hanger-link.

Link-and-pin coupler. An old type of drawbar by which cars were connected together by a link and a pin. There were a great variety of shapes and devices, but they were rapidly going into the scrap pile and being replaced by the M. C. B automatic coupler.

Link-hanger. 46, fig. 4745a. A swing-hanger, which see, in the form of a link.

Link-hanger eye-bolt. 47, fig. 4745a. A bolt passing through the transoms from which a very short swing-hanger is suspended.

Link-pin. A coupling-pin, which see. 3, fig. 2078.

Linoleum. A form of floor covering manufactured from linseed oil, prepared by a special process, mixed with ground cork and backed with canvas. Another floor covering of substantially the same nature as linoleum is known as corlicine.

Lintel. 90 and 99, figs. 539-67. The horizontal part of a door or window-frame above the sash. See Deck-sash lintel.

Lip. See Retaining-lip (steel-tired wheels).

Lip lamp-chimney. Figs. 8141-15, 8419-21. One with an indented ring near the bottom, for use with screw lamp-burners.

Live-lever. 98, figs. 4320-2. The one of a pair of brake-levers to which the brake-power is first applied is sometimes given this title, the other lever being termed the dead-lever. 92a.

Loading poles, logs and bark on cars. Figs. 5572-6. In Live-lever. 92, figs. 4580-2. The one of a pair of brake-levers to which the brake-power is first applied is sometimes given this title, the other lever being termed the dead-lever. 92a.

Lock. 1. Figs. 3954-78, 3944-2773. "Anything that fastens—particularly an instrument having one or more bolts moved by a key, used for fastening doors, drawers, etc."—Worcester. Accordingly, in this dictionary, locks, door-locks, freight-car locks, grain-door locks, seat-locks, sliding-door or lift-latch locks, etc. According to their manner of application, they are distinguished as mortise locks, inserted entirely within the door; rabbed locks, visible on the exterior of the door, but boxed more or less into it; and rim-locks, entirely exterior to the door. A dead-lock is one which has no springs to keep a better look out on the train. They are in very general use.

Long brake-rod (Stevens brake). 12, fig. 1461. A rod which drops in front of the knuckle-horn and holds it shut, thus locking the couplers together.

Lock-case. 8, figs. 2786-7. The outside or covering part of a lock, more especially a padlock.

Lock-chime. Figs. 3780-7. A chain by which a padlock is fastened to a car.

Loft. A small compartment or closet for storage. A closet is usually the same height as the room and a locker is of less height. Lockers are frequently attached under cars, as in figs. 105, 110, 118, etc. In street-car see 105, fig. 5654.


Lock-keeper. Figs. 2641, 2678, and 2644-2735. The box on a door-jamb into which the bolt of a lock protrudes when shut. See Keeper.

Lock-nut. The outer one of a pair of nuts on one bolt, which, by screwing up separately to a tight bearing, locks the inner one.

Look. Fig. 3807. A piece of glass, lead or paper, which forms a shield for a lock, so that the latter cannot be opened without its being known. See Car-seal.

Locomotive crane. Figs. 209-11, 389-91. A self-propelling car, with a steam crane, mounted upon it, which crane has three independent motions, viz.: that of hoisting, slewing or rotating and raising of the boom. They are not often made of more than 15 or 30 tons capacity.

Locking catches. A passenger or box-car fitted up with sleeping accommodations for men at work on the line of a road. More commonly called boarding-car.

Logging cars. Figs. 94-5, 953-4. A vertical variety of light and strong cars used for getting out lumber, running usually on cheap logging railroads, of which a great number now exist.

Long brake-rod (Stevens brake). 13, fig. 1461. A rod which connect two levers, one on each truck, together.

Long brake-shaft. 94, figs. 229-86. One which extends up above the top of a car so that brackets can be applied by a person on the roof.

Long center-buffing-spring. Fig. 1402. See Buffer-spring.

Long flat-car. Fig. 19. A flat-car of extra length for long timbers, piling, etc. A barrel-car is an example, shown racked in fig. 15.


Longitudinal Rising-timer. 110, figs. 893-81. See Rising-timer.

Longitudinal-seat (street and suburban cars). Figs. 99, 9845-47, 9854-6. A seat which extends lengthwise of a car.

Longitudinal-step. 1. Figs. 151, 5647-9, 5654-6. A seat which extends lengthwise of a car.

Long. 2. (English.) See Foot-board.

Longitudinal-step bracket. A bracket to carry a longitudinal-step. See above.

Longitudinal tie-rod (English). 9, figs. 849 and 502. Corresponds in part to an American truss-rod. A long bolt binding the timbers of the underframe together longitudinally. It is generally horizontal, and if inclined slopes downward to the ends of the vehicle to prevent them sagging or drooping. In English eight-wheeled vehicles truss-rods are used, but in four-wheeled vehicles the ends are more likely to sag than the center.

Long seat-end. Fig. 3906. A vertical frame of wood or (usually) iron which combines a seat-end and seat-stand together, supports the end of the car-seat and also forms the arm or seat-end. A short seat-end is a seat-end proper, which is supported on a separate stand.

Long T-bolt (Janney equipment). A bolt by which the combination-pole acts against the center buffer-spring.

Lookout (freight caboose). Figs. 5054, 380-8. A small cupola or upper deck in the roof to afford opportunity for the display of signal-lights and to enable train hands to keep a better lookout on the train. They are in very general use.

Loose berth-hinge. Figs. 4183-8. A berth-hinge the two parts of which are detachable. It enters into a loose berth-hinge bushing, figs. 4187 or Plates 4138 and 4185. See Berth-hinge.
Lower brake-shaft bearing. 97, figs. 229-66. A butt-hinge, which see, permitting the door to be lifted off its hinges when desired.

Loose-pin butt-hinge. Fig. 3598. A butt-hinge, which see, having a removable hinge-pin.

Loose-wheel. A term applied to various devices for enabling the two car-wheels on the same axle to revolve independently of each other. Many of these devices have been patented, but none of them are in general use. Experiment seems to indicate that the advantages are more theoretical than practical. See especially a series of tests by Reuben Wells in the transactions of the Master Car Builders' Association, 1870.

Lorry, or larry. Figs. 5585, 5589, 5603-4. Push-cars used in construction for moving rails, ties, etc. Often made with only a half bearing for the journals so that the frame can be removed from the wheels at any time.

Lower-air-cylinder gasket (air pump). 39, fig. 1689: 104, fig. 1691-3.

Lower arch-bar. The inverted arch-bar. See Arch-bar.

Lower-berth (sleeping cars). 1, figs. 2409-12. The bed part in compression and is called the brake-lever coupling-cradle by a lower brake-rod carrier. With inner-hung to each lever. It is sometimes supported in case of a collision by a lower brake-rod carrier. When inner-hung brakes the substitute for the lower brake-rod becomes a part in compression and is called the brake-lever coupling-bar. 93, fig. 4596.

Lower brake-shaft bearing. 97, figs. 229-66. An eye and support for a vertical brake-shaft, near the lower end. The support at the lower end is called the brake-shaft step. The lower bearing is above the step.

Lower-cap (plain triple valve for Westinghouse brake). 3, fig. 1706. (Reducing-valve. Westinghouse train signal apparatus.) 3, fig. 2406.

Lower-chord (of a truss). The lower outsidemember. In the sidetrussing of a freight or passenger car the lower chord is usually made concave.

Lower discharge-valve (air-pump air-brake). 32, figs. 1899. A puppet-valve, which see, at the bottom of the air-pump through which the air below the piston escapes.

Lower door-hinge (English). 160, fig. 501. See Door-hinge. This hinge has a longer butt than the others, to allow for the curvature or fall-under of the door.

Lower discharge-valve (air-pump air-brake). 32, figs. 1899. A puppet-valve, which see, at the bottom of the air-pump through which the air below the piston escapes.

Lower door-hinge (English). 160, fig. 501. See Door-hinge. This hinge has a longer butt than the others, to allow for the curvature or fall-under of the door.

Lower door-panel. 10, figs. 1738-98.

Lower door-sash. 13, fig. 1798. The lower section of a door-sash, which is made in two parts. This is commonly movable, the other fixed.

Lower end-panel (street cars). 46, figs. 5654-67.

Lower foot-board (English). 117, figs. 501-4. An American equivalent, platform-step. A board running nearly the whole length of the carriage, and situated about 30 in. from the ground.

Lower head (air pump). 64, figs. 1691-3. The air-cylinder head, which see.

Lower outside-panel (street car). 46, figs. 5654-67. It is usually made concave.

Lower receiving valve (air pump). 88, fig. 1689.

Lower seat-back rail (street car). 111, figs. 5654-67. Also called a seat-back bottom-rail.

Lower side-bearing (logging cars). Figs. 539-41. The truck side-bearing.

Lower steam-valve (Westinghouse air-pump). 7, Figs. 1689. See Main steam-valve.

Lower swinging-hanger pivots. 48, figs. 4580-4585. A bar by which a spring-plank is attached to the lower end of a swing-hanger, which see.

Lower valve chamber cap (air-pump). 34, fig. 1689.

Lower windowsill rail (passenger car interiors). 74, figs. 435-72, 539-41. A longitudinal rail immediately above the truss-plank. The upper windowsill rail comes directly below the window.

Lower window-blind. 140, figs. 539-41. The lower section of a window-blind which is made in two parts. As is usually the case.

Lower window-blind lift. Figs. 4435-7, and 4445-7. The lites for lower blinds differ from those for a single blind in having a lug which engages with the upper blind when the lower one is raised up halfway, and thus the upper one is raised with the lower one. See Window-blind lift.

Lumber lorry. See Lorry-car.

Lumber-cars. Figs. 19, 294-7. 1. A car of extra length, sometimes 40 ft. long, more particularly intended for carrying long timbers. Box and stock-cars frequently have end-doors to facilitate the loading of lumber. Gondola-cars, with flat bottoms and drop doors, are largely used for lumber.

Lumber lorry. See Lorry-car.

M

McElroy Commingler System. (Consolidated Car-heating Co.) This system depends upon the direct action of the steam upon the water of circulation, caused by the steam.
discharging within the body of the water itself. The contact of the steam and water takes place within the pear-shaped body of the commingler, a sectional view of which is shown in Fig. 2970. The flow of steam is broken into small jets within a body of quartz pebbles, to destroy the noise and to silently force the water through the commingler. The steam jets give a forced as well as a gravity circulation, which feature of forced circulation enables the commingler to move the water through large circuits. The heating system is kept constantly filled from the condensation which takes place within the commingler, and the water in the expansion-drum kept level with the top of the overflow-pipe. It is claimed that five lbs. steam-pressure in the train-pipe at the car is sufficient to heat a car in the coldest weather.

McEwroy commingler storage-system (Consolidated Car-heating). Fig. 2978. A system of heating in which a small commingler is placed under the center of the car and so arranged that when the car is not in use there is no water in the system. In heating up a car the heating is accomplished by forcing live steam into the pipes and the water of condensation that collects is circulated by the commingler through the pipes, thus automatically operating as a hot water circulating system whose temperature may be run high or low, depending upon the amount of live and flowing steam. On laying off a car a valve is turned and the water of circulation allowed to drain to the ground.

McEwroy steam hose-coupler (Consolidated Car-heating). Figs. 3965-9. A steam hose-coupling used for connecting train-pipes between the cars. Its important feature is in presenting a straight-port and having a construction in which gaskets do not ride on each other in the act of coupling or uncoupling. Its construction is shown in the figures.

McGuire grain-door. Fig. 1876-95. A grain-door fastened by a grain-door rod by a U-strap or arm and hung to the car lines when not in use by an Overhead door catch. The door is held in place by a door-keeper, G, and a Button to which the door is attached. The door post is protected by a Door-post angle-iron. The door of a postalcar for taking up or "catching" mail-bags while the train is in motion. The English system of collecting mail-bags is different from the American, and relies upon the use of nets. The leather bag is fastened by a spring to an iron bar in the car and when the exchanging station is near the bar is turned out, the bag hanging suspended. At the same time, the catching apparatus, consisting of a net attached to a bar, is put out. The bag from the car is caught in a net attached to a stationary post and the bag for the car caught in the center goes into a similar manner. The American plan has been copied in Australia and India.

Mail-catcher or collector. Figs. 142, 3819. 18, fig. 600. A contrivance consisting of a bent iron bar, attached to the door of a postal car for taking up or "catching" mail-bags while the train is in motion. The English system of collecting mail-bags is different from the American, and relies upon the use of nets. The leather bag is fastened by a spring to an iron bar in the car and when the exchanging station is near the bar is turned out, the bag hanging suspended. At the same time, the catching apparatus, consisting of a net attached to a bar, is put out. The bag from the car is caught in a net attached to a stationary post and the bag for the car caught in the center goes into a similar manner. The American plan has been copied in Australia and India.

Mail-catcher socket or mail-collector socket. 14, figs. 599-604. The brackets or sockets on either side of the postal-door which hold the collector.

Mail-van (English). A vehicle adapted to run on passenger trains and fitted with apparatus for sorting and conveying letters, and generally with apparatus for taking up and dropping mail-bags while the train is at full speed. A mail-van in which letters can be posted and letters are postmarked is termed a traveling post-office. When fitted only for conveying mail-bags and not for sorting, it is termed mail-van tender. Every projecting piece of the body is carefully padded to prevent injury to the post-office officials in collisions, etc.

Main-carline (freight-cars). 82, figs. 229-66. A carline stronger than the ordinary carlines, so as to support the roof and tie the two plates together.

Main-cock (Pintsch gas-lighting). Figs. 3169, 8284. A cock usually placed in the saloon for the control of the low-pressure supply. It regulates all the burners at once, in addition to which there are separate cocks to each. 25, 25b, 25c, fig. 8169, are respectively for \( \frac{1}{4} \), \( \frac{1}{4} \), and \( \frac{1}{4} \) in. pipe, and are used in all classes of cars according to size of main low-pressure pipe required. 25c (\( \frac{1}{4} \) in.), is in most general use. This cock is handled by key 46, fig. 8215.

Main-cock. (Pintsch system.) 29, fig. 8234. A \( \frac{1}{4} \) in. tee-handle cock for postal or express cars.

Main-cock covers (Pintsch system). No. 135, 185C, fig. 3170. For main cocks, No. 25, 25b, 25c, fig. 3169. They are of cast-iron, with hinged lid to fit over keyshaft of cock. Are to be screwed to side of car or to bulk-head.

Main draft-spring (Janney). So called in distinction from the auxiliary draft-spring. The center buffer-spring lies above both.

Main-pipe (air-brake). 16, figs. 1688-8. The brake-pipe.

Main-piston-valve (air-pump). 76, figs. 1691-3.

Main-rafter. A main-carline, which see.

Main-reservoir (air-brake). Carrying the usual for the control of the air brake.

Main slide-valve (air-pump). 83, fig. 1700. A cylinderical boiler-platetank, carried on the locomotive, under the foot-board, to hold a supply of compressed air. So called in distinction from the auxiliary reservoirs under each car.

Main-sheave (pile-driver car). 10, figs. 408-4. The sheave at the top of the leaders over which the hoisting-rope passes.

Mail-slide-valve (air-pump). 89, figs. 1691-2.

Main steam casting (consolidated car-heating). Fig. 3972. A casting connected into the train pipe and provided with side ports, not connected to the train pipe ports, but connected to a drip port through which water drops to the ground. The return pipe from the heating apparatus is connected into these side ports from one or from both sides of the car. The pipe leading to the casting is heated by the train pipe and the casting prevents the drip from freezing.

Main steam-valves (Westinghouse air-pump). 7, fig. 1859. Two piston valves admitting and exhausting
steam above and below the main piston. The upper is of larger diameter than the lower, both being rigidly connected by a rod, so that the pressure of steam (always between them) keeps them in the highest position, admitting steam above the main piston and exhausting from beneath it. At the end of the stroke they are moved downward by steam being admitted above the reversing piston by the reversing valve, 15, which see.

They are usually called simply main-valves.

**Main-valve, upper and lower.** (Westinghouse air-pump, etc.) 7, fig. 1699. The main steam-valves, which see.

**Main-valve bush, upper and lower (air-pump).** 26, 26, fig. 1699.

**Main-valve packing-rings, upper and lower (air-pump).** 8, 8, fig. 1699.

**Main-valve stem (air-pump).** 81, figs. 1691-2.

**Main-valve stop (air-pump).** 50, fig. 1699.

**Male center-plate.** The body and truck center-plates are sometimes called male and female. See Center-plate.

Malleable iron. Castings whose brittleness has been removed by packing them in powdered hematite (per-oxide of iron) in tight fire-brick cases and subjecting them to a continued red heat for about a week. They are then allowed to cool slowly. The oxygen of the hematite combines with and removes a part of the carbon of the iron, making the castings almost as tough as wrought iron, but they are ordinarily not truly malleable, or capable of being rolled or forged. Malleable iron is much used for pipe fittings and similar small castings, and even for brake-shoes.

**Mammoth lamp-chimney.** Fig. 3417. See Lamp-chimney.

**Mandrel-pin, or cross-bar (swing link-hanger).** 44, Mandrel 1. (For lathes.) A shaft serving as a temporary axis for objects to be turned.

**Train-pipe fitting for steam heat.**

2. (Foundry.) A plug around which a body of metal is cast.

**Manhole hinge.** 113, figs. 387-8. A hinge by which a man-hole cover is attached to man-hole ring.

**Manhole ring.** A metal ring riveted around a man-hole, and which forms a seat for the cover.

**Man ‘boudoir’ sleeping-cars.** Figs. 205, 2418. A style of sleeper the distinguishing feature of which is the subdivision of the car into small state-rooms or bedrooms, each of contiguously tapered teak blocks which serve as spacers, and are secured to the tire by two rings fitting into grooves in the tire, and bolted to the teak blocks. This wheel is almost universally used in English passenger service. Various applications of the ring are shown in the figures.

**Mansell wheel (English).** Figs. 5830, 5847. A railroad wheel in which the hub is composed of two wrought or cast-iron rings bolted together, and gripping the ends of contiguous tapered teak blocks which serve as spacers, and are secured to the tire by two rings fitting into grooves in the tire, and bolted to the teak blocks. This wheel is almost universally used in English passenger service.

**Mansion’s brake-beam.** Fig. 1600. A brake-beam, brake-head and clamp, patented by A. H. Mansion, of Charlestown, Mass. The beam is a steel deck-beam. The malleable iron head is adapted to several forms of shoes, and is fastened to the beam by a slot in the lower edge of the T-flange. The brake-beam, with its attachments complete, weighs 87 pounds.

**Marking (cars).** In 1898 a Recommended Practice was adopted as follows: That all railroad companies having the same initials as other railroad companies should stencil the name of the road in full on some part of the car where it may be readily seen. See Lettering.

**Marshaling (English).** American equivalent, switching or drailing. Arranging the cars of a freight train in proper station order.

**Mast. 1. (Of a derrick or crane.)** 4, fig. 892. The main upright member against which the boom abuts.

**M. O. B. Reports.— In 1893 a standard size of 6 inches by 9 inches was adopted for M. O. B. reports.**

In 1894 a standard size for Pamphlets, Catalogues, Specifications and publications of that nature were adopted, as follows:

For postal-card circulars, 8½ inches by 4½ inches.

For pamphlets and trade catalogues 8½ in. by 6 in.

4½ in. by 6 in.

9 in. by 12 in.

For specifications and letter paper, 8½ inches by 14 inches.

In connection with these standards it was decided that a standard practice should be to have the proper standard dimensions, and the word “standard” printed on the upper left-hand corner of title-page or cover wherever practicable.

**Master car-builders’ standards and Recommended Practice.** A variety of standard details for cars, or recommendations in respect to them, which have been adopted and promulgated by the Master Car-Builders’ Association, and are separately described in this volume. By a letter-ballot, cast in 1898, the standards of the Association prevailing at that date were modified—

*First.—By abolishing certain standards because they had either become obsolete or nearly so, or because they were simply forms of gages for shop use to produce certain other standard forms, and it was believed that such gages were not essential as standards of the Association, and it had been ascertained that they were not generally used.*

The old standards thus abolished were:

- Wheel-diameter testing-gage.
- Wheel-flange and journal-gage.
- Wheel-bore testing-gage.
- Wheel-boring, use of six dogs.
- Journal-length and diameter-gage.
- Journal-shoulder and centering-gage.
- Journal-diameter gage.
- Guard-rail gage. (Made standard again in 1894.)
- Attachments and dimensions of drawbars.
- Train-pipe fitting for steam heat.
Second.—By ordering that the three items formerly printed at the end of the standards, namely:

Storage of line-cars on foreign roads,
Dictionary of terms,
Entertainments,
be printed with the proceedings as heretofore, but not among the standards.

Third.—By dividing the remaining standards into:
(a) Standards of the Association.
(b) Recommended Practice, as follows:

1. Standards:
   - Air-brakes, general arrangement and details. Figs. 5488-4, etc.
   - Automatic-coupler. Figs. 5499-5505.
   - Axles. Figs. 5419-21.
   - Brake-beam data. Fig. 5492.
   - Brake-gear, for freight-cars. Figs. 5438-41.
   - Brakehead, shoe and key. Figs. 5425-31.
   - Check gauge for mounting wheels. Fig. 5489.
   - Drawbar, height of
   - Flange-distance gage (inside to inside). Figs. 5421, 5498.
   - Guard-rail and frog-tinge gage. Figs. 5484-5.
   - Journal-bearings and key. Figs. 5389-5418.
   - Journal-box and details. Figs. 5377-81.
   - Journal-box lid. Figs. 5402-5.
   - Knuckle, contour line of and gages. Figs. 5490-5501.
   - M. C. B. Reports, Proceedings, etc.
   - Pedestal. Figs. 5480-88.
   - Screw-threads. Fig. 5418.
   - Wedge, journal-box. Figs. 5399-5418.

2. Recommended Practice:
   - Air-brake cut-out and defect card. Figs. 5577-8.
   - Brake-shaft and brake-stop. Figs. 5546-7.
   - Buffer-blocks. Figs. 5548-51.
   - Check-chains.
   - Draft-springs, capacity of.
   - Drawbar attachments and dimensions. Figs. 5507-37.
   - Dummy coupling-hook. Figs. 5519-30.
   - Interchange of Traffic, rules for.
   - Ladder and grab-iron attachment. Figs. 5546-7.
   - Lettering for line cars. Figs. 5548-5.
   - Limite gauge for round iron. Figs. 5490-1.
   - Line-cars, storage of.
   - Loading bark, poles, etc. Figs. 5573-8.
   - Marking of cars.
   - Rules of Interchange.
   - Running-boards. Figs. 5546-7.
   - Safety-chains, freight-cars. Figs. 5593-5.
   - Safety-chains, platform. Fig. 5539.
   - Steel-tire, minimum thickness. Fig. 5489.

These Standards and this Recommended Practice are given under their respective heads in these pages as modified by letter ballot on these or other subjects, and revised by the ballot of 1894.

New drawings of the Standards and Recommended Practice have been made on sheets of uniform size, and lithographed and printed on transparent paper so that blue prints may be taken from them; such sheets are for sale by the Secretary of the M. C. B. Association in connection with pamphlets containing explanatory text as given in the Proceedings. See Standards. Recommended Practice.

Master-key. "A key which commands many locks of a certain set, the keys of which are not interchangeable among themselves. While neither one of a series of keys may suffice to open any lock, besides the one for which it is constructed, a master-key is one which may operate any one of the set."—Knight.

Mast-pocket (wrecking-car). A heavy casting under the car supported by a derrick true-rod serving as a socket for supporting the mast of a derrick to hold it upright. Another method of supporting the mast is by a large base-plate, bolted to the floor of the car.

Mast-ashave or pulley (of a derrick or crane). 21, figs. 392-3. A sheave or pulley-wheel placed at the top of the mast.

Mat. Figs. 2886-7. See Floor-mat.

Match-box holder. Fig. 4390. (Which is shown bottom-end-up).

Match-lighter. Figs. 4284-5. A match-striker, which see.

Match-safes. Fig. 4281.

Match-striker. Figs. 4284-5. A metal plate with a rough surface.

Match-striker frame. A metal frame for holding a piece of sand or emery-paper.

Matting. See Cocoamattting.

Mattress (sleeping-cars). Figs. 3408-12. D, E, fig. 3418. In ordinary sleeping-cars both mattresses are stowed away by day above the upper berth. In the boudoir-cars they go in boxes under the seats.

Mattress-box (Man boudoir cars). J, figs. 3418. See above.

Mat timbers (refrigerator-car). The vertical and horizontal timbers inside the refrigerating chamber on which the meat is suspended. They are usually independent of the framework of the car and fastened to it with coach-screws.

Medium-sided wagon (English). Figs. 348-51. American equivalent, four-wheeled gondola-car. A vehicle for freight service, with sides and ends about thirty inches high, and no roof. The doors are generally arranged as shown, but often extend the whole depth, and sometimes the whole length and depth of the side. About half of all the freight-cars in England are of this variety, a tarpaulin, which see, being used to protect the freight from the weather.

Meehan brake-shoe. Fig. 1648. The Meehan brake-shoe is solely for use upon steel-tired and cast-iron wheels. It is a cast shoe of a crucible steel plate with rollers cast in it so that they bear upon the surface. The steel slugs made in the flange and on the outside edge of the wearing surface of the shoe, thereby wearing the wheel-tread with the hard steel slugs where the rail does not come in contact with the wheel. The principle has proven to be very advantageous. See Ross-Meehan brake-shoe. Figs. 1640-54.

Meehan-Shepard brake-shoe. Fig. 1659. A shoe used entirely on bald or blind-tire wheels. Lips are cast on the side of the shoe, as shown in section Fig. 1658, lapping over the outside of the wheel and holding the shoe in place. Steel slugs are inserted in the shoe each side of the center. This shoe has the Ross feature when it is used, namely, the hollowed center. The Fig. 1659 is not a Meehan-Shepard brake-shoe, for it has not the lips on either side to lap over the edge of the wheel.

Melnor-shaped lamp-globe. Fig. 3481. See Lamp-globe.

Menesley roller-bearings. Figs. 5588-1; A roller-bearing which consists of a cast-iron housing, lined with plate steel, inside of which and surrounding the journal are three sets of welded steel-tubes or cylindrical rollers. The rollers of each set are of equal length, and are placed in a ring about the journal, forming three independent rings or groups of roller-bearings. The middle set is then revolved until the axis of each roller is midway between the axes of the inner and outer sets of rollers, the axes of the latter being in a straight line. Collar-rolled steel rods, called separators, are then passed
Middle door-panel. 11, figs. 1788, etc. See Door-panel.

Middle door-rail. 148, figs. 435-73; 6, fig. 1788. A horizontal bar intermediate between the top and bottom rails. See Door-frame.

Middle door-panel. 11, figs. 1788, etc. See Door-panel.

Middle door-rail. 148, figs. 435-73; 6, fig. 1788. A horizontal bar intermediate between the top and bottom rails. See Door-frame.

Middle door-rail. 148, figs. 435-73; 6, fig. 1788. A horizontal bar intermediate between the top and bottom rails. See Door-frame.

Middle corner-plate. 56, figs. 229-66. See Corner-plate.

Micrometer gage. A general term for any form of gage giving very minute and exact measurements. There are several varieties; the most common is one with an accurate screw-thread and an index to give the number of revolutions and fractions thereof.

Middle longitudinal. (English.) 5, figs. 349-51, 501-4. American equivalent, intermediate sill. A part of the underframing supporting the body or floor, and in many cases transmitting the buffing and the draft strains.

Middle of axle. The portion of a car-axle between the two sloping necks which come next to the wheel-seat. See Wheel-seat, Car-axle.

Middle safety-beam (six-wheel trucks). 59, figs. 4907-56. A beam attached to the two transoms to hold the center axle in case of breakage.

Middle transoms (six-wheel trucks). 31, fig. 4907-56. The two cross-pieces nearest the center in distinction from the two outside transoms. They are sometimes made of iron to allow the two swinging spring-beams to be connected to each other by the bolster-bridge.

Milk-car. Figs. 307-78. A car for carrying milk in cans, usually built with platforms similar to baggage cars, and equipped with passenger-car trucks. They are usually provided with tight-doors, ice racks or boxes, and insulation.

Miller coupler-buffer and platform. Figs. 2390-5. An arrangement for coupling cars automatically. It operates in coupling by the beveled faces of the hooks pushing each other to one side, compressing the center buffers at the same time, until they snap past and engage with each other in a position in which they are held by a leaf-spring or coupling-spring, sometimes also called side-spring. On sharp curves the hooks sometimes disengage from each other, and the fact that this is unusual with the Janney couplers (which see) is one of the advantages claimed for it. The Miller coupler has been in extended use on American passenger-cars, but is now giving way to the M. C. B. form, which is a modified form of the Janney. The patents on the device have expired. A Janney-Miller coupler, which see, has been introduced by the manufacturers of the Janney coupler, in order to enable the latter to be used with rolling stock equipped with the Miller. The platform is arranged so that the line of draft and the compressive strains on the car are in a direct line with the sills.

Miller buffer. See Janney-Miller coupler.

Miller buffer-guide. See Janney-Miller coupler.

Miller buffer-yoke. See Janney-Miller coupler.

Miller combination-hook. See Janney-Miller coupler.

Miller combination-hook. See Janney-Miller coupler.

Miller combination-hook. See Janney-Miller coupler.

Miller combination-hook. See Janney-Miller coupler.

Mirror-pane L (Mann boudoir cars.) 3, fig. 2418. A panel or brush and comb at the bottom of the mirror.

Mirror-guard (wash-rooms, etc., of sleeping-cars). A panel or brush and comb at the bottom of the mirror.


Mirror-frame. A Mirror-sash holder.

Mirror-guard (wash-rooms, etc., of sleeping-cars). A fender of various forms to protect mirrors. Usually nickel-plated and fastened across the frame by a band held by towels or brush and comb at the bottom of the mirror.

Mirror-frame. (Mann boudoir cars.) 3, fig. 2418. A frame above the central window of four-place boudoirs, filled by a mirror.
Mirror-sash. A frame of a mirror which covers a lamp-alcove in the side of a car. It slides up and down like a window-sash.

Miscellaneous furnishings. Figs. 887-817. See Diamond truck.

Miscellaneous types freight-car trucks. Figs. 474-60. See Diamond truck.

National argent burner. Fig. 3871. See Argand burner.

Mold. See Chill-mold.

Molding. 1. "A mode of ornamentation by grooved or swelling bands or forms, following the line of the object."—Knight. Small moldings are often termed beads, and also pilasters. A core molding is one of concave section, into which a piece of special technical terms for different forms of moldings. Moldings are either straight or curved, which see.

See also Deck-coves-molding. Window-cove-molding.

Eaves-molding. Window-molding.

Platform hood-molding. Widdor-all molding.

2. (For car-seats.) Figs. 8283-4. Also called Seat-back bands or seat-molding. A metal band to finish the edge of the seat-back. Plush or leather-covered strips are also used.

Molding-joint cover. A piece of wood or metal in some ornamental form for covering the joints of two pieces of molding. See Window-molding joint cover.

"Monarch" burner. Fig. 8776. A double-spring burner.

Morris-journal-box lids. Figs. 5167-9. A device for regulating the opening of deck-sashes by means of a small fixed ratchet-plate in which a ratchet-bolt engages, holding the sash fixed in any one of four different positions. See Deck-sash pivot.

Monitor-top. A clear story, or upper deck, which see.

More car-door. Figs. 1060-5. A box-car door, which by the bevel-shape of the shoe and hanger is wedged against the car side by its own weight. By a system of levers the door may be lifted and its weight thrown on to sheaves when it can be moved.

More ventilator. Fig. 4807. See Ventilators.

Morgan's automatic deck-sash pivot. Figs. 4858-4. A device for regulating the openings of deck-sashes, the essential feature of which is the use of a double circular undulating ratchet, one attached to the sash and the other to a fixed part of the car, the two ratchets being pressed together by springs so as to admit of easy motion of the sash by hand at the same time that it is held in any position when released.

Morris journal-box lids. Figs. 5167-9.

Mortise-lock. Figs. 3000, 2706. "A lock adapted to be inserted into a mortise in the edge of a door, so as only to expose the salvages or edge-plate."—Knight. See Lock.

Mould. See Mold.


Movable foot-rest (car-seats). 29, figs. 3924, and 23.

Mould. See Mold.

Mullion. A slender bar between panes of glass or panel work. See Door-mullion. 3, figs. 1789-98. Window-blind mullion. Window-mullion.

Multiple-circuit drum system. (Consolidated Car Heating Co.) Figs. 2861-8. A system of car heating by circulating hot water heated by steam from the locomotive by means of a Drum, 36, fig. 2863. placed longitudinally beneath the floor of the car, as shown. The piping in the car is connected from this drum in a number of circuits so that there is a quick flow of water through the different circuits and all parts of the apparatus is run at practically the same temperature. Its time of circulation is about one-sixth of the time of circulation of a heater in which piping is arranged in series.

The advantages claimed for multiple circuits, are: 1. a low pressure of steam; 2. no limit, practically, to amount of heating surface, that can be supplied; 3. a more uniform heat is supplied to all parts of car; 4. short circuit of hot water circulation.

The circulating system, as shown, is also connected with a Fire-proof heater, which may be used when steam is not available, and in those States where the law permits a stove or heater.

Muntin. A corruption of the word mullion, chiefly used in England. See End-stanchion or muntin.

Nail. "A small pointed piece of metal, usually with a head, to be driven into a board or other piece of timber, and serving to fasten it to other timber."—Webster.

The common nails of commerce are divided into cut nails, and circular-headed nails, and wire nails. They are distinguished in size by the number of pennies, as 10d., 20d., etc., nails. Other varieties, which see, are eyelet-nails, fig. 2855, head-lining nails and solid-leather nails. See also Panel-pin (English).

Name-plate. A panel, usually of elliptical form, on the outside of a passenger-car body below the windows, on which the name or number of the car is painted. They are no longer seen, having been replaced by a scroll or decorated ellipse, as in figs. 115, 123, 129, 135.

Name-plate. See Door name-plate and Notice-plates.

Narrow gage. The distance in the clear between the heads of the rails of a railroad when less than 4 ft. 8½ in. See Gage. What may be called the standard narrow-gage is 3 ft. In India and elsewhere the meter gage, 3 ft. 6 in., is the narrow standard gage. Less frequently 3 ft. 6 in. is used. The narrow gage at the present time is confined to short isolated lumber and coal roads and in mountainous districts.

Narrow-tread wheel. A wheel with the ordinary width of tread, which is usually about 4 in. See Wheel. Car-wheel.

National hollow brake-beam. Figs. 1546-60. A brake-beam consisting of a hollow tube 2½ in. diameter, trussed by a rod passing through cast end pieces and over a king-post, through which the brake-cables pass. See Door-bolt.

Needle-beam. "(Civil engineering.) A transverse floor-beam of a bridge, resting on the chord or girders, according to the construction of the bridge."—Knight. The term seems, however, to be more particularly used in bridge construction, as applying to the cross-pieces of queen-post trusses, supporting the floor and themselves supported by the truss. Hence (car-building), 29, figs. 229-60; 20, figs. 435-73. The cross-frametie-timber, a transverse timber bolted to the under side of the longitudinal sills and floor timbers of a car-body between the bolster and, to which the body king or queen-posts, or truss-blocks, are attached when truss-rods are used under a car-body.

The terms cross-frame tie-timber, body-transom cross-beam, and needle-beam all mean the same, and less than 3½ in. in width, cross-frame tie-timber is in most general use, and seems more precisely descriptive of its character than any other.

Needle-beam truss, or cross-frame truss. Fig 586, which see for names of parts.

Neponset red-rope car-roof. Figs. 2899-7. A car roofing, the lining of which is a tough manilla paper, made from so-called "manilla red-rope" and treated and prepared. See Car-roof,
**Neck-spring.** Figs. 5249-51, etc. A spiral spring with one or more coils of springs inside of it. See Spiral spring.

**Netting.** Figs. 3758-6. See Basket-rock netting.

**New York air-brake.** Figs. 1750-60. Air-brake apparatus made and sold by the Eames Vacuum-Brake Company, is works and sold by the New York Air-Brake Company. The devices sold are as identical with the Westinghouse equipment as the law will allow. Infringement cases have been brought and the matter is still in litigation. The apparatus was calculated to work in the same train with Westinghouse equipment, and to that end nearly all the parts are the same as those made by the Westinghouse Air-Brake Company. The parts which differ from the Westinghouse are shown in figs. 1750-4 and 1758-60. And of these few, fig. 1751, the Quick-action triple-valve, is a subject of litigation. The Plain triple-valve, Duplex air-pump, Engineers' brake-valve and Draught-cup and Air-strainer, with the names of parts, are shown in the illustrations referred to.

**Night-latch.** Figs. 2714-25. A spring door-lock which requires a key to be opened from the outside, but which can be opened from the inside without one. A Spring door-lock. See Latch.

**Nine-group spiral spring.** See Spiral spring.

**Nipple.** 1. In mechanics "a small rounded perforated protuberance, as the nipple of a gun."—Knight. It is often used, however, in a more general sense.

2. (Pipe fittings.) Figs. 3852-365. A short wrought-iron pipe with a screw-thread cut on each end, used for connecting couplings, tees, etc., together or with some other object, as a tank or heater. See Auxiliary-reservoir nipple. Brake-hose nipple. Solid nipple seat-arm.

**No-chimney lamp-burners.** Figs. 3878-82. A style of burner so formed as to produce a sufficiently intense draft to avoid the production of smoke without the use of a chimney.

**Norton door-check.** Fig. 2818. See Door-check.

**Noising.** 1. (Of a lock.) Akeeper, which see.

2. (Of steps.) Figs. 3750-2. The part of a tread-board which projects beyond the riser, hence the metallic moldings used to protect that part of the tread-board. The nosings should be distinguished from the step facings, figs. 2758-9.

**Notice-plate.** Figs. 2773-98, and in place, 3, fig. 1788. Varieties are the platform notice-plate, saloon notice-plate, etc. See Name-plate.

**Nosile.** See Tank-nosile.

**Number.** Figs. 426-3. See Berth-number.

**Number-panel.** See Name-panel. Now rarely used on modern cars. The number is simply painted on between horizontal bars.

**Nut** (standard sizes for). Fig. 5496. "A small block of metal or wood containing a conca
cave or female screw."—Webster. Nuts take their name from the bolts, rods or other parts to which they are attached. They are usually either square or hexagonal. A spanner nut, which see, is one with eight or more sides. They are usually more truly couplings than nuts, properly so called, which screw on to a bolt or rod.

**Oblique closest-hopper.** Fig. 9087. See closest-hopper, Observation-end of a car, Figs. 121-3, etc. A car, one end of which is fitted with an extended platform, and large windows, from both of which passengers may get a good view of the country and especially of the track and structures. They are coupled at the end of the train and the observation-end is a feature of many omnifencers.

**Odometer velocipede-car.** Figs. 5059-6. A car with a sprocket-wheel and chain connecting one of the wheels with a series of dials which indicate the number of revolutions the wheel has made and the distance traveled.

**Officers'-car.** Figs. 118, 119, 120, 494-6. A car for the private use of the higher officers, directors, etc., of railroads in traveling over their lines. They are usually provided with kitchens. They are sometimes very elaborate and costly—sometimes merely business cars. A pay-car. Figs. 497-98. A special variety, found on nearly all roads from 300 to 600 miles long.

**Offset butt-hinges.** Fig. 3907.

**Oil axle-box (English).** A journal-box in which oil is used instead of grease as a lubricant. The oil is fed to the under side of the journal by means of a worsted pad held lightly against the journal by spiral steel springs. See Axle-box cover, and Grease axle-box.

**Oil-box.** A journal-box, which see.

**Oil-car.** A car made especially for the transportation of mineral oil. Some oil-cars are built for carrying barrels of refined oil. Crude oil and refined oil are usually carried in tank-cars, which see, figs. 48-9, and 397-6; or in combination box and tank cars.

**Oil-cellar.** A cavity in the lower part of some exceptional forms of journal-boxes for collecting the oil and dirt which runs off the axle at the dust-guard. The oil-cellar is below the space occupied by the axle-packing.

**Oil-cup.** (Air-cylinder of Westinghouse pump.) A small metal pump attached to an air-pump to hold oil for lubricating an air-piston.

**Oil-lamp.** A cheap metal lamp for burning lard or whale oil. A lamp for mineral oil is an oil-lamp, but generally not so termed.

**Oil-screws.** Figs. 3983-4. Fittings for oil-lamps, which see.

**Oil-tube** (of student-lamp). Figs. 3398-9. The vertical tube in which the wick lies. The horizontal-bar is the feed-tube.

**O.K.** (air) brake slack-adjuster. Fig. 1770. A device consisting of a rack and lever-pawl, by which the length of the cylinder piston-rod is adjusted so as to take up the slack of the brake-gear. See brake-slack adjusters.

**O.K. Gardener sash-balance.** Fig. 4512. A sash-balance which is placed in the roof near the eaves of the lower deck, as shown in fig. 447, 109a, and in fig. 497.

**Onalascent-Wart dome.** (Pintech gas lighting.) Fig. 3801. May be used on any center-lamp, as may also opal-dome, 104, fig. 3808.

**Opal-globe.** (Pintech gas lighting.) Fig. 102. Fig. 3816. It is used for bracket-lamps of all descriptions.

**One-horse street-car.** Also called bob-tail street-car. See street-car.

**Open-door stop.** Figs. 2528-6. A block of iron or wood fastened to the side of a freight-car to prevent a sliding-door from gliding too far when opened.

**Opener.** See Deck-sash opener. Ventilator-opener.

**Open excursion car.** Fig. 151. An open car with curtained sides for short suburban runs to summer resorts.

**Open link for Miller hook.** See Janney-Miller coupler.

**Open plate-wheel (street-cars).** Figs. 3883-8. A light cast-iron single plate wheel, with openings cast in the plate between the rim. See Wheel. Car-wheel.

**Open return-bend (pipe fittings).** Fig. 3946. A short cast or malleable iron U-shaped tube for uniting two parallel pipes. It differs from a close return-bend, fig. 2945, in having the arms separated from each other.

**Open wagon (English).** Figs. 348-51. American equivalent, four-wheeled gondola-car. A vehicle with sides and ends from 6 in. to 5 ft. high, and having no roof suitable for the conveyance of freight. A fargoun. Which see, is used to protect the freight from the weather. See also Wagon.

**Ore-car.** Figs. 30, 27, 225-7, and 389-5. A car made especially for carrying iron or other ores. Ordinary gondola-cars, which are sometimes lined with sheet iron, and drop-bottom and tip-cars are also used for this purpose. Ormolu. Literally, ground gold, a style of bronze; metallic surfaces.
Ornamented-brake. Figs. 1528-9. 4740-6. Brake-shoes and outer double floor, or floor underlining (English). 143, 147-9. Figs. 229-66. A term applied to the two intermediate-sills next to the side-sills, distinguished from the two intermediate-sills adjacent to the center-sills, which are the inner intermediate-sills.

Outside-casing. (Heaters.) Figs. 2908-2924. An outside cylinder of rust-proof sheet metal or iron, placed outside of the body, securing the side and end pieces to the center-sills, which are the inner intermediate-sills.

Outside-body-truss-rod. When two or more truss-rod plates are used under each side of a car-body, those farthest from the center are called outside body-truss-rod, in distinction from the inside truss-rod. See Buffer stem-guides.

Overhang (of a roof). The projection beyond the sides. See Door-hanger, Car-door hanger.

Overhang brace-rod (passenger-car framing). 167, and 290, figs. 437, 456, 512. A true-rod extending over the side-sills and between the sheathing and wainscoting. Its office is to sustain and stiffen that part of the underframe which overhangs at the ends and outside the bolsters. It may pass from end to end of the side-sills, as in fig. 437, or equal distances on both sides of the bolster, as in fig. 456. Usually it passes from the end of the side-sill diagonally up to the belt rail and over a queen-post called the overhang brace-rod strut, and then along close under the belt rail to the other end of the car and down to the end of the other side-sill. Frequently they extend diagonally down on both sides of the overhang brace-rod strut (which then becomes a king-post), and diagonally through the sill. The overhang brace-rod strut stands upon the sill directly over the body bolster. It is sometimes called an inverted true rod, a continuous body brace-rod, body chain-rod, and a hog chain-rod.

Overhang brace-rod-strut. 221, figs. 497, 456, 512. A vertical cast or wrought-iron strut seated upon the side-sill directly over the body bolster and acting as a king-post or queen-post for the overhang brace-rod. (See Overhang brace-rod.)

Overhang true. Shown in fig. 518. An inverted true, forged or cast, the office of which is to support and stiffen the overhang ends of a passenger-car underframe. It is used only in very long and heavy cars and is intended as an auxiliary to the overhang true-rod. Its use is confined to palace and sleeping cars.

Overhead equalizer spring (Pullman vestibule). 28, figs. 3437-45. A face-plate buffer-spring is a more appropriate term, as it corresponds to the side-stem buffer-spring of a platform equipment. It affords the spring pressure upon the face-plate stem, which is attached near the top of the face-plate and keeps it forced out.

Over-hung door. A sliding-door which is hung from or supported on a rail above the door. If the door is supported by a rail below it is called an under-hung door. Over-hung doors are almost universal for freight-cars. See Door-hanger.

Package-rack (drawing-room cars). Figs. 8733-70. A small rack analogous to the basket-racks of ordinary passenger-cars and the only substitute therefor used in drawing-room cars.

Packing. Journal-packing, which see.

Packing-blocks. 186, figs. 229-66. Rectangular blocks gained into the center-sills and draft-timbers, and serving the purpose of connecting them firmly together longitudinally. The term is borrowed from bridge work, in which the form of packing-block shown is very common. They are called key-blocks.

Packing-expander (Westinghouse brake). 12, fig. 189. A spring wire ring for spreading out the leather-packing of the piston so as to make it fit air-tight. See Piston packing-expander.

Packing-gland. See Piston-rod.
Palace stock-car. An extravagant general term applied to cars designed for carrying stock with less injury and greater comfort than the common stock-car. Cars built after the plans of so-called "palace stock-cars" are in general use, and are shown in Figs. 39-47 and 536-72. They are provided with apparatus for feeding and watering, and those for very valuable stock have separate stalls partitioned off.

Pan. 1. (Refrigerator cars) I, fig. 384. The ice-pan.

Pan. 2. (Howard's parlor-car water-closet) Figs. 3884-9. The basin forming the bottom of the bowl, so constructed that it is only brought into position and filled with water on raising the lid.


Panel decorations. Figs. 3860-3.

Panel. 1. A board inserted in the space left between the stiles and rails of a frame or between moldings. Sometimes metal plates are used for this purpose. Door-panels, Figs. 1783-8, in passenger-cars are usually only the middle and lower or twin door-panels. The upper door-panel is usually of glass. Window-panels come between the windows and are distinguished as outside and inside. Wainscot-panels come below the windows, between the doors and lower or inside panels. Other interior panels are deck-side panels and end-panels, the latter sometimes called ventilator-panel, and the end-roof panel over the door. The exterior panels are the end-panel below the windows and the end-window panel alongside of the window. A name-panel is now quite obsolete. In street cars additional panels to those above named are an upper-end panel, which also sometimes occurs in passenger-cars, a lower outside-panel or concave below the outside panels proper; inside frieze-panels, end-seat panels and door-case seat-panels and top-panels.

Panel. 2. (Of a truss.) The space between two vertical posts or braces and the two chords of a truss.

Panel. 3. (Of a truss.) The space between two vertical posts or braces and the two chords of a truss.

Panel. 4. (Of a truss.) The space between two vertical posts or braces and the two chords of a truss.

Panel. 5. (Of a truss.) The space between two vertical posts or braces and the two chords of a truss.

Panel. 6. (Hose-coupling.) An india-rubber ring in a coupling-case, which makes a tight joint between the two parts of the coupling.

Panel. 7. A spirally wound rubber or hard rubber spring placed between the pistons of a stock-car, which is compressed by a piston-spring.

Panel. 8. An india-rubber ring, which is pressed against the piston of a stock-car by a spring.

Panels. 9. (Of journal-boxes.) Figs. 5155, 5159. The cover of ornament and elaborate finish and furniture.

Panels. 10. Of ornament and elaborate finish and furniture.

Panels. 11. A vertical ornamental or decorative panel, as in a parlor, drawing-room, parlor and chair-cars (which see), for an entire car, and does not mean one truck-frame complete with two or more pairs of wheels, etc., complete for an entire car, and does not mean one truck-frame.
strength. The sheet making the leather side is passed between heavy rollers many times, and each time it receives a very thin coat of pantoscope material, and this is kept up until the cloth or canvas is literally saturated and coated. The color is added to the pantoscope material and is incorporated into the fabric. It is very like leather and is not readily distinguished from it.

**Paper-case casting.** Fig. 8828. A cast-side or bracket-frame for a paper-case in Postal-car.

**Paper-holders.** Figs. 3880-1 (which take rolls of closet paper.) See Paper-hook.

**Paper-hook (for saloons).** Figs. 3888-8. A hook for carrying paper in sheeting sheets. A carrier for perforated continuous-roll paper is in larger and increasing use. Figs. 3890-1.

**Paper seal-holder.** Fig. 8897. A style of seal-holder (of which several patterns exist), in which a sheet of paper or printed label is used to protect the lock against unauthorized opening. The paper is usually protected by glass.

**Paper wheel.** More properly, Allen paper-wheel. Figs. 3855-6. A car-wheel with a steel tire and a center formed of compressed paper held between two plate-iron face-plates. It is in general use. The compressed paper must move the same amount. The parallel-rod also carries two gear-wheels, one at each end, and which carries the Seat-back arm remaining parallel. If one seat-back arm is moved the arm at the other must move the same amount. The parallel-rod also carries two seat-fitting levers which tilt the seat-rock or tilting-casting, thus tilting the cushion.

**Parcel-case casting.** Fig. 3832. A cast-side or bracket-frame for a paper-case in Postal-car.

**Parcel-net (English).** 194, figs. 501-4. See Basket-net rod. A carrier for parcels and packages, rather than passengers' baggage. Such business in England is done by the railroads, and is usually termed day-coaches or "first-class" coaches. Second-class coaches are very rarely run, although they pass for emigrant-coaches. A smoking-car is usually attached to all trains, and holders of second-class tickets or tickets bought at reduced rates are often required to ride in the smoking-car. See Car. Coach.

**Parlor-car truck.** Figs. 4006-4008. A truck for carrying a passenger-car body. Such trucks are usually wooden frame and have two sets of springs, bolster springs under the truck-bolster between the two truck-frames and equalizer springs attached to the outside truck-frames. They always have swing-bolsters. The wooden truck-frames are usually reinforced with iron plates, especially on six-wheel-trucks, which latter are almost always used for sleeping and parlor cars. Other passenger-cars usually have four-wheel-trucks. See Truck. Car-truck.

**Passenger-car couplers.** Figs. 2344-2354, showing the Drezel, Gould, Janney, Miller, Standard, Thurmond-McKeen, Trojka, and Vanderbilt. The coupler heads are all forms of the M. C. B. Automatic Coupler, excepting the Miller. The differences being devices to unlock the knuckles and the manner of attaching the couplings to the cars. A marked difference is in the length of the shank, which varies from 87 inches in the Drezel to 824 inches in the Janney. Center draft draw-bars (the Barnes and the Manhattan) are shown in figs. 3992-9. See Automatic car-coupler.

**Pasting-lace (English).** Figs. 501-4. An ornamental woolen fabric, made in bands about 2-inch wide, and used to finish and cover the seams and jointsin upholstery. It is fastened by tacks driven in the tape edge, the main part being then turned over to hide the tacks, and pasted in position. See also Seaming lace.

**Patent overflow (for wash-basins).** Fig. 3899. A tube formed in the basin itself for connecting the upper waste holes with the regular waste pipe from the bottom of the basin, so that but one pipe connection need to be made. Patent waste. A preparation of cotton-seed hulls used for journal packing. See Elastic fiber.

**Paw.** 1. (For brake ratchet-wheel.) 1038, figs. 239-60. "A pivoted bar adapted to fall into the notches or teeth of a wheel as it turns in one direction, and to restrain it from back motion. Used in windlasses, capstans and similar machinery."—Knight.

In most of the English dictionaries ratchet is given as another name for paw. This is believed to be incorrect, according to present practice. See Ratchet-wheel.

2. (For ratchet-wheel of winding-shaft.) See above, and 67, figs. 805-815.
Pedestal. 1. 5, figs. 4806-496, 4967-9. M. C. B. standard, Pedal alarm-gong. (Street-cars.) 199, fig. 5655. A large Pe*ckham car-trucks. (Street-car.) Figs. 5670. Other Pea-shaped lamp-globe. Fig. 8433. See Lamp-globe. Pedestal-box. A journal-box, which see. Figs. 4758-60, Pedestal-brace-bar. 8', figs. 4806-4966. A pedestal- Pedestal-stay-rod. 7, figs. 4806-4966. A transverserod Pedestal-jaw. It is closed at the bottom by a jaw-bit, which see. In Great Britain, pedestals are called axle-guards on cars and horn-plates on locomotives, and are there made of wrought iron. The M. C. B. pedestal, shown in Figs. 5490-3, was recommended in 1874, and again approved as standard in 1881, and approved by the Master Mechanics' Association, in the same year. Again adopted as standard in 1888. Weight, 141 pounds.

2. A serving as a fulcrum. See Equalizing-bar pedestal (caboose-cars, etc.). Leader trunnion pedestal pile-driver car.

3. (Hartley and other revolving chairs.) 12, figs. 8906-9, 4109. The stand by which the chair is supported consists of three portions, base, column and seat-frame.

Pedestal-brace. 8, figs. 4806-4966. A diagonal bar or rod staying the lower end of a pedestal longitudinally. It is often combined into one piece with a pedestal tie-bar to form a pedestal brace-tie-bar.

Pedestal brace-tie-bar. 8', figs. 4806-4966. A pedestal-brace and a pedestal tie-bar combined in one piece. See above.

Pedestal-horns. See Pedestal.

Pedestal-jaw. It is closed at the bottom by a jaw-bit, see Pedestal.

Pedestal-spring. A journal-spring, which see.

Pedestal stay-rod. 7, figs. 4806-4966. A transverse rod connecting the pedestal tie-bars on each side of a truck so as to prevent them from spreading apart.

Pedestal tie-bar. 8, figs. 4806-4966. An iron or rod bolted to the bottom of two or more pedestals on the same side of a truck or car, thus holding or tying them together. The pedestal tie-bar is to get a low truck. Sometimes it is given a half-turn for additional stiffness. It is also sometimes combined with a pedestal-brace to form a pedestal brace-tie-bar.

Pedestal-timber. 1. (Four-wheel cabooses, etc.) 169, figs. 5853-88. A longitudinal timber sometimes used on four-wheeled cars, which is placed under the floor or alongside the sill and to which the pedestals are bolted. 2. 10, figs. 4806-4966. A term sometimes used to designate the wheel-piece of trucks, which see.

"Panfold" card-rack (freight-cars). A rack for carrying destination cards, which see.

Pennsylvania hand-car. Figs. 5595-7, gives details and dimensions.

Perch. Another name for the draw-timbers of a tip-car, on which the floor is not directly built. The name comes from the perch in wagons connecting the front and hind running-wheel. See Car perch.

Perfection car-seat or shackle. Figs. 3888-a.

Perforated-rubber floor-mat. Fig. 2857. Another style is the corrugated-rubber floor-mat.

Perforated smoke-pipe casing. Fig. 3806. An outside pipe which allows the smoke of a pipe to pass to the smoke of a stove, perforated with holes through which the air circulates, and thus comes in contact with the pipe. The casing also protects the wood-work of the car from radiated heat.

Perforated veneer. Figs. 3898-4. A form of seat-covering which consists of three and sometimes four layers of wood veneering, glued together and perforated with holes for ornament and ventilation. It is in very general use for the seats of second-class and smoking-cars.

Philadelphia water-closet. Fig. 3870. Phosphorbronze. "A term applied to an alloy of bronze or brass (which see), or to a triple alloy of copper, tin and zinc, which has been given special purity and excellence by skillful fluxing with phosphorus. It is supposed that the presence of phosphorus gives the tin a crystalline character which enables it to alloy more completely and strongly with the copper. Whether for this reason or not, the phosphor-bronzes, when skillfully made, are greatly superior to unphosphorated alloys."—Thurston.


Pilaster. 1. (Architecture.) "A square pier, like a flat column built against a wall, and having cap and base."—Knight.

2. (Car construction.) Any stick or timber fastened against another piece to serve merely as the supporting block or a cross-piece, as pilaster (pile-driver car). 5, fig. 408.

Pilaster-pocket (pile-driver car). 16, fig. 408. Pile-driver car. Figs. 281, 897-404. A class of cars, one of which is used when the cab is swung through a wider arc, adjustable wings, 20, are fixed to the side of the car, which are removed when not required for use by the crane, 84. The leaders are usually long enough to take a as 35 to 40 ft. pile and swing upon leader-trunnions, 16, so that the leaders may be dropped back upon the roof of the cabin for transportation over the road. The hammers weigh from 4,500 to 4,500 lbs.

Pile-hoisting sheave (pile-driver car). 11, fig. 401-4. A wheel placed at the side of the main sheave for use in hoisting piles. It projects a little further from the other, so as to swing the pile more easily clear of the leaders.

Pillar. 1. A kind of irregular column.

2. "A pedestal; that which sustains or uplifts; that on which some superstructure rests."—Webster. See Transom-piller.

Pillar crane. Fig. 382-3. A style of crane (used on wrecking-cars), having the mast supported from below, either by a mast-pocket or a base-plate. See Derrick.

Pillar-supported center-lamp. Figs. 8235, 8237-8, 8252-7. Pillow-box (Mann boudoir-cars). G, fig. 2418. (Sleeping-cars.) 19, fig. 2412.

Pin. "A peg or bolt of wood or metal having many uses."—Knight. In railroad service the word, when used alone, commonly means a coupling-pin.


Pinion. 1. The smaller cog-wheel of two wheels in gear. See Shifting-pinion.

2. (Hand-car.) 4, figs. 5592-5600. A small gear-wheel attached to the axle of the car, into which the larger wheel drives the crank-shaft gears.

3. Pinion is sometimes incorrectly used in the sense of a small pivot-pin or journal.

Pintle. "A pivot-pin, such as that of a hinge. The king-bolt of a wagon."—Knight. See Brake-lever pintle (hand-car).
Pintsch gas-lamps. (Method of securing and connecting.)

Pintsch gas-lamps. Figs. 3233-45, and 3230-1. A lamp close to the mica-chimney, where it is still further and to the flames. In its tortuous course the effect of the orifices in chimney, 313, it comes in contact with orifices near the outer rim of this reflector into the bowl chimney, 109, fig. 3199, and continuing its course is by excess of air, over and above what is required for drafts against the lamp is entirely nullified. Is admitted to the annular space between the parts of dome, 101, or 104, fig. 3242. Passing thence through the orifices in chimney, 318, it comes in contact with the sheet-iron flues, 315, and in its downward passage becomes highly heated. It then issues into the space within the dome, 101, between the dome and the mica-chimney, 109, fig. 8199, and continuing its course is by the diaphragms, 815, deflected and constrained to pass close to the mica-chimney, where it is still further heated. It now passes outward between diaphragms, 815, and the ring reflector, 110, fig. 3297, and through the orifices near the outer rim of this reflector into the bowl and to the flames. In its tortuous course the effect of the gas, which would otherwise destroy it. The pressure of 150 lbs., or less, per square inch. The system is well and favorably known. It is applied to over 6,500 cars in this country, 700 of which are street-cars. The gas is an oil-gas, made from crude petroleum or similar oils, and is able to withstand a high degree of compression without undue loss of luminosity. The pressure of 150 lbs., of the receiver-tank is automatically reduced by the regulator (fig. 3166) to a uniform pressure at the burners of about 4 oz., regardless of the pressure in the gas-receiver. Works for the supply of the gas are now established in all the large cities. The supply carried on a car varies with the service, but is, in general, calculated to supply the car for from two to four nights.

The arrangement of the apparatus is shown in fig. 3165. The receiver or gas-holder, A, suspended beneath the car-floor, is connected by a system of extra heavy 4'-in. pipes, with soldered joints and special fittings, to the regulator, B. The charging of the receiver is effected (from either side of the car) by means of hose, connecting the charging lines from the gas station with the filling-valves, F (fig. 3166). The gage, G, communicating with the high-pressure pipes connecting the various parts of the apparatus below the car, serves the double purpose of registering the amount of pressure in the receiver at any instant and of showing the amount of gas consumed in lighting the car for any given period.

From the regulator, B, the gas (with its pressure reduced to about 4 oz. per sq. in.) passes upwards through the car toward the roof. At some convenient point, as in a saloon or locker, a main cock (No. 35c, fig. 3169) is placed as shown, whereby the flow of gas to the lamp is controlled.

A 4'-inch pipe is run along the roof, with 4'-inch branches to each lamp or bracket. These branches are made by means of special flanged-tees (No. 16c, fig. 3177). Where 4'-inch connections are necessary passing downward from the outside of the roof to the brackets or vestibule-lamps, the flanged elbow or angle fitting (No. 17A, fig. 3176) is used.

For lamps and methods of suspending and connecting them see Pintsch gas-lamps and figs. 3288-40.

Pintsch washers. Figs. 3219-21, etc. These washers are of lead and rubber, to be used in pairs. The rubber is always placed first on the fitting, the lead outside with the collar inwards. When pressure is brought upon the washer, the lead collar protects the inner edge of the rubber, and the body of the lead washer protects the outside surface of the rubber, and the rib protects the outer edge of rubber. The rubber is entirely enclosed in metal, and protected from the action of the gas, which would otherwise destroy it. The
scored surfaces of the flanges entering into the soft lead make a perfectly tight joint. These washers are used on all classes of flanged fittings, whether high or low pressure.

Pipe. "A tube for conveyance of water, air, or other fluids."—Knight. The wrought-iron pipes used for conveying gas, steam, etc., and commonly called gas-pipe, is usually meant by compound words beginning with pipe, as below.

See Brake-cylinder pipe. Running-pipe.
Brake-pipe. Signal-pipe.
Cold-air pipe. Smoke-pipe.
Conductors-valve discharge-pipe. Steam-pipe.
Conductors-valve pipe. Supply-pipe.
Deflector-pipe. Triple-valve branch-pipe.
Discharge-pipe. Waste-pipe.
Hot-air pipe. Urinal ventilating-pipe.
Injector-pipe. etc.

Pipe-bushing. Fig. 2955. See Bushing.
Pipe-clamp or strap. Figs. 2935-6. See Clip.
Pipe-coupling. Figs. 2941-2. A short cast-iron tube with a thread cut on the inside at each end, which is screwed on the ends of two pipes and used for uniting them together, or uniting one pipe with another object, as a cock or valve. In some couplings the thread at one end is right-hand and the other left-hand, but generally they are both right-hand threads. Also see Reducing pipe-coupling.

Pipe-fittings. Figs. 2928-56, etc. The connections for systems of wrought-iron gas, water, and steam-pipes. The more usual pipe-fittings are bushings, elbows, tees, return-bends (close-open), reducers, couplings, nipples, plugs, clips, etc., which see in Dictionary.

Pipe-reducer. See above. Bushings, tees and couplings may be and are all made as to serve as reducers.

Pipe-screw threads. Screw-threads used for connecting wrought-iron pipes together. Such screws are cut "tapered"; that is, the end of the pipe, or the inside of the coupling where the thread is cut, forms part of a cone, so that in screwing up the pipe a tight joint can be made. Pipe-threads are of a V-shape, sharp at the top, and bottom, and their sides stand at an angle of 60° to each other. The following is the number of threads per inch for pipes of different sizes. The size is given by the inside diameter, but the actual bore of the smaller sizes is considerably larger than the nominal. The exterior diameter of ordinary gas-pipe is from .37 to .38 inches greater than the inside diameter.

**AMERICAN STANDARD SYSTEM OF PIPE THREADS.**

<table>
<thead>
<tr>
<th>Size of pipe.</th>
<th>Outside diameter. in.</th>
<th>Inside diameter. in.</th>
<th>Inside diameter. extr. strong. in.</th>
<th>Inside diameter. extra. strong. in.</th>
<th>Threads per inch</th>
<th>Whitworth's thread.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3⁄4 in.</td>
<td>.405</td>
<td>.27</td>
<td>.105</td>
<td>27</td>
<td>3</td>
<td>35</td>
</tr>
<tr>
<td>1 in.</td>
<td>.54</td>
<td>.34</td>
<td>.154</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>1 1⁄4 in.</td>
<td>.68</td>
<td>.43</td>
<td>.193</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>1 1⁄2 in.</td>
<td>.81</td>
<td>.52</td>
<td>.224</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>1 3⁄4 in.</td>
<td>1.05</td>
<td>.61</td>
<td>.255</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>2 in.</td>
<td>1.27</td>
<td>.71</td>
<td>.286</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>2 1⁄4 in.</td>
<td>1.48</td>
<td>.80</td>
<td>.317</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>2 1⁄2 in.</td>
<td>1.69</td>
<td>.91</td>
<td>.348</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>2 3⁄4 in.</td>
<td>1.90</td>
<td>1.01</td>
<td>.379</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>3 in.</td>
<td>2.12</td>
<td>1.11</td>
<td>.410</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>3 1⁄4 in.</td>
<td>2.35</td>
<td>1.22</td>
<td>.441</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>3 1⁄2 in.</td>
<td>2.56</td>
<td>1.33</td>
<td>.472</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>3 3⁄4 in.</td>
<td>2.76</td>
<td>1.45</td>
<td>.503</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>4 in.</td>
<td>3.00</td>
<td>1.57</td>
<td>.534</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>4 1⁄4 in.</td>
<td>3.30</td>
<td>1.79</td>
<td>.564</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>4 1⁄2 in.</td>
<td>3.60</td>
<td>1.91</td>
<td>.594</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
<tr>
<td>4 3⁄4 in.</td>
<td>3.90</td>
<td>2.13</td>
<td>.624</td>
<td>34</td>
<td>4</td>
<td>44</td>
</tr>
</tbody>
</table>

(The European standard is the Whitworth pipe-thread, which is quite different.)

**Taper of Thread in in. per foot.**

Pipe-clamp, or strap. Figs. 2935-6. An iron band for fastening a pipe against or to some other object. They are usually single, but sometimes double, for two or more pipes. See Clip.

Pipe-support (Baker heater). Figs. 2937-38. A cast-iron stand screwed to the floor, with a receptacle at the top to receive and hold a pipe.

Pipe turnbuckles. See Turnbuckle.

Pipe. (Baker's plan). For heating passenger-cars. Fig. 2957.

**Pistons.** A metal disk with packing, etc., made to fit tightly and work back and forth in a cylinder. Those shown in this volume are chiefly in connection with air-brakes, figs. 1688-1780, to which more detailed reference seems unnecessary. The piston consists of a piston-head attached to a piston-rod. The piston follower or follower-plate lies at the back of the piston-head, inclosing between them the piston-packing-rings, or (in the Westinghouse air-brake cylinders), the piston packing-leather, which latter is provided with a packing-leather expander. The follower-plate is secured to the piston with follower-bolts. All these parts are essentially the same in all the various cylinders shown, and for distinctness should be designated with the name of the cylinder within which they work. The reversing-piston, which see, of the Westinghouse 8-in. air-pump, shifts the main steam-valves which admit steam to the cylinder. See also Triple-nut piston, etc., of Westinghouse apparatus.

Piston-expander (Westinghouse brake). See below.

**Piston packing-leather (Westinghouse brake).** 13, Fig. 1699, a circular ring of leather used as a substitute for piston-packing-rings, which see, pressed into the cylinder so as to have an L-section, which is attached to and surrounded the piston and bears against the inside surface of the cylinder, being pressed against it by a round steel rod called the piston-packing expander.

Piston packing-ring. 13-13, 1899. A circular metal ring of rectangular section which is placed in grooves in the edge of a piston-head to make it work air-tight in its cylinder. The rings are turned slightly larger than the cylinder and cut in two diagonally at one point, so that when compressed they will tend to spring open.

Piston-rod cross-head (brake-cylinder). 3, figs. 1688-5.

Piston-rod cup-leather (Westinghouse driving-wheel brake). 3, 1688-5. A metal ring of rectangular section which is placed in grooves in the edge of a piston-head to make it work air-tight in its cylinder. The rings are turned slightly larger than the cylinder and cut in two diagonally at one point, so that when compressed they will tend to spring open.

Piston-rod packing-gland (air-pump). 29, 1899. A screw-nut on the lower end of the piston-rod, which holds the piston on the rod.

Piston-rod packing-gland (air-pump). 29, 1899. A metal ring which encircles the piston-rod, and which is forced into the stuffing-box and against the packing, which is then compressed by the packing-nut 27. More commonly called a Stuffing-box gland.

Piston-rod packing-nut. 1. (air-pump.) 27, figs. 1689, etc. A nut which is used for holding the piston-rod cup-leather in its place, which thus makes an air-tight joint in which the piston-rod works.

Piston-rod packing-spring (driving-wheel brake cylinder). A spiral spring serving to compress the piston-rod cup-leather.

Piston stuffing-box (air-pump). 56, fig. 1899; 95, figs. 1691-3.

Piston travel indicator. Figs. 1778-82. A graduated scale abutting against the piston of a brake-cylinder and passing through the end of the cylinder so that it can be seen, which shows the maximum movement of the piston since it was last adjusted.

Pit. See Ash-pit.

Pitch. 1. (Of a screw.) The advance made by the thread
in one complete revolution, usually expressed by the number of threads in a given space, as (in U.S. and England) an inch. See figs. 5492-3.

(Of a roof.) The ration of the rise of a roof to the horizontal distance covered.

Pitch-chain. 48 and 44, figs. 401-4. One composed of alternate single and double metallic plates bolted and riveted together side by side, usually intended to work in the teeth of wheels, shaped so as to accurately engage with the chain. Such chains are sometimes used for berth-chains. Figs. 4199, 4908.

Pitch-gear (for pile-driver car). 45, fig. 401-4. See Pitch-chain and gear. Pitching-roof. A roof formed of one or more inclined plane surfaces. When the pitch becomes steep, the term is used to distinguish a roof formed of plane surfaces from one formed of curved or arched surfaces.

Pivot. 1. A pin or short shaft on which anything turns. —Webster. Seat-arms are pivots are inaccurately called rivets.


2. (Of car-door fastener.) The pin on which the hump turns. (Monitor deck-sash pivot.) E, fig. 4397. Also in figs. 4891-8. The pin held in place by a spring upon which the deck-sash turns. (Of rack-tumbler spring padlock.) G, fig. 2796. More properly the key-pin.

Pivoted-bearing. 49, figs. 4006-4008. See Swinging-pivot-bearing (passenger-car trucks). Pivoted seat-arm (Cobb’s, which see). Fig. 4068. A seat-arm which is attached to the seat-back by a loose pivot, instead of by a rigid connection, enabling the seat-back to be thrown higher without increasing its total width.

Pivoted-seat or seat-cushion. S, figs. 4353-3a. A seat commonly called an “opera-seat,” with the cushion pivoted so as it may be raised to permit easy access. Used in dining-cars.

Pivoted-seat-back arm. Figs. 4009-8.


Pivot spring (Monitor deck-sash pivot). H, fig. 4386. The spring retaining the pivot in its proper place after the sash has been placed in position.

Plastered lamp. A lamp with a fixed globe which is fastened to a lamp-frame with plaster of Paris.

Plate. 1. A piece of metal flat or extended in breadth.


Plate-faced. 94b, fig. 849. An inside cornice fascia-board.

Plate-rod (freight cars). 47, figs. 299-56. A horizontal metal rod which passes through two plates to tie them together.

Plate-washer. Fig. 8716. Usually a wrought-iron cast washer, in distinction from a cast washer, but also used to designate many forms of large washers or plates serving as double or triple washers. See Washer.

Plate-wheel. Figs. 5355-50. A car-wheel of which the center portion is formed of a disk or plate instead of spokes. Variety of the single, double, open and combination plate-wheel. See Wheel and car-wheel.

Platform (passenger and caboose-cars). 1. 34, figs. 485-73, and vestibules, figs. 2419-50. A floor at the end of a car supported by projecting timbers below the car-body to facilitate ingress and egress. On freight-cars they are
not common, except on cabooses, but narrow platforms are sometimes added for convenience of trainmen. See also Gould, Janney and Miller platforms, containing certain special modifications of the platform, which have greatly added to its strength and security.

2. (File-driver car.) 27, figs. 401-4. See Swinging-platform.

Platform-brace. Fig. 3776.

Platform-car. Figs. 16-19 and 287-97. A flat-car; which, if provided with sides, becomes a gondola-car.

Platform-chain. Figs. 3804. A chain connecting the inner platform railings, posts and rails, closing the passage way between the platforms of two cars coupled together. It is used only on rear end of last car, and front end of first car when the first car is a passenger-car.

Platform cross-timber. J, fig. 529-30. Also shown in figs. 2396-3300. Corresponds to a platform truss-beam of the Miller platform and answers the same purpose, viz.: to strengthen the platform and keep it from sagging.

Platform draft-knee. 71, fig. 5654-5. A draft-timber of a street-car.

Platform end hand-rails, panels and brackets. Figs. 2776-9.

Platform end-post, or corner-post. 88, figs. 5554-6. A hollow iron post standing upon the Platform end-sill and helping to support the Platform-hood.

Platform end-timber, or buffer-beam. 86, figs. 435-73. A cross-timber at the outer end of a car platform. A Platform end-sill.

Platform foot-plate. See Foot-plate.

Platform floor. 34, figs. 485-73.

Platform-furnishings. Figs. 8771-3813.

Platform-gate. Figs. 3794-3807. A gate used to close the entrance to a platform, in general use only for private cars, suburban cars or street-cars.

Platform-gate panel. Fig. 3775.

Platform-hood. 107, figs. 485-73, and 589-41; and 60, figs. 5554-67. A cover or canopy attached to the end of a car-body, covering the platform. They are made of either wood or sheet-iron. When it consists of an extension of the main roof of a car it is called a platform-roof; but when it is a separate part, and fastened to the car-body, as is usually the case on steam-cars, it is called a platform-hood. A roof-apron is a vertical finish of sheet-iron to either a platform-hood or platform-roof.

Platform-hood bow. 106, figs. 485-73, and 69, figs. 5554-67. A bent wooden or iron bow which forms the outer edge of a platform-hood, to which the platform-hood carlines are fastened.

Platform-hood bracket. 85, figs. 5554-67. A bracket or knee-iron to connect the hood to the corner-post.

Platform-hood carlines. 64, figs. 5554-67. Transverse timbers which support the roof of a wooden platform-hood.

Platform-hood ceiling. See Platform-hood side-piece.

Platform-hood knee. 64a, figs. 5554-67. An L-shaped piece of wrought-iron by which a platform-hood is fastened to the car-body.

Platform-hood molding (street-cars). 61, figs. 5554-67. A small wooden molding to cover the nails with which the roofing canvas is fastened around the edge. It corresponds with a roof-molding.

Platform-hood post. 109, figs. 485-73, and 88, figs. 5554-67. A wrought-iron bar or rod attached either to the platform or platform railing, to support a platform-hood. Now rarely used.

Platform-hood side-piece. The end-piece to which the ceiling is attached.

Platform-hood shoulder-carline. 64a, fig. 5653. A hood-carline that lies adjacent to and against the end-plate in a street-car.

Platform-knee, or platform timber (street-cars). 69, figs. 5554-67. A longitudinal piece bolted to the under-frame and extending out under the platform to support it. Corresponds to the platform sill of a coach.

Platform-lever (Janney and Janney-Miller coupler). 1529, fig. 441. A lever corresponding to the Miller uncoupling lever, actuating the pull-rod which operates the catch-lever.

Platform-motor jaw (Janney-Miller coupler). The fulcrum for the platform-lever.

Platform-lever-pin (Janney coupler). The pin on which the platform-lever pivots.

Platform-plate, or buffer. A steel angle plate bolted to the buffer-ends and overlapping the platform end-sill. When in contact with the like plate of another car, it makes a continuous floor between them. Being pivoted at the platform end-sill, it adjusts itself to all curves of the road. The platform plate also acts as a buffer, and is sometimes so called. See Vestibule.

Platform-post. 30, figs. 485-67. See below.

Platform-rail. 41, figs. 485-67, 589-41; 84, figs. 5554-67. A wrought-iron bar fastened to the tops of the platform posts, forming a railing on the end of a car-platform. On steam cars an opening is left in the middle of the railing to allow persons to pass from one car to another. The railing is therefore made in two parts, and two platform rails are used. On street cars no such passageway is left, as the rail is in one piece. The outside ends of the platform rails of steam cars are usually carried down to the end-timber, so as to form the outside post. On street-cars the outside end is attached to an ordinary post.

Platform-railing. Figs. 3771, etc. An inclosure consisting of iron posts and rails on the end of a platform of a car to prevent persons from falling off. See above.

Platform railing-chain. 49, figs. 444, 8804. A chain connecting the two sections of the platform rails of a passenger-car. Commonly used in service on the rear platform of the rear car only.

Platform-roof. 103, figs. 485-73. That portion of a car-roof which projects over the platform. See Platform-hood.


Platform safety-gate. 77, fig. 5654. A gate to close the entrance on one side of a street-car, to prevent passengers from getting on or off on the side of the double track. See also Platform-gate.

Platform short-sills. 37, figs. 435-73, 589-41. Short longitudinal pieces of timber, not extending under the car proper, which are framed in and bolted to the end-sills and platform end-timbers of a passenger or streetcar to sustain the floor of the platform. The longer timbers which extend under the body of the car proper are called platform-sills.

Platform-sills. 35, figs. 435-541 and 69, figs. 5654-67. Pieces of timber attached to the bottom of a car-frame at each end outside of the draw-timber, and projecting beyond the end of the car to support the platform. They extend usually from the platform end-timbers to the bolster, or, in street-cars, to one of the transverse floor-timbers. See above.

Platform steps. 45, figs. 485-541 and 74, figs. 5654-8. The stairs at each corner of a passenger or street car which afford the means of ingress and egress. Forms of steps have been introduced, but are not in general use, which are folding or extensible, being dropped down into position when the car is stationary, and removed or elevated when the train starts. In modern passenger-cars the platform-steps consist of usually three and sometimes four end-to-end plates below the platform. The steps being of wood are often called box-steps. On street-cars one step only is used, and it is commonly made of plate-iron. See Vestibule platforms, figs. 3419-50.
Platform step-rod. 78, fig. 5656.
Platform end-sill (street-cars). 79, fig. 5654. A sub-end-sill, to which the platform is hung: it makes part of the riser of the step from the platform into the car.
Platform tail-lamp. Fig. 3330-2.
Platform tie-rod. 102, figs. 468; 103, fig. 571. Horizontal rods which pass through the platform end-timber and end-sill, body-bolster, for the purpose of holding them and the other portions of the frame of the car securely together.
Platform timbers. See Platform-sill.
Platform timber band (street-cars). 87, fig. 5654. A band made of plate-iron, which covers and embraces the outer end of a platform end-timber. Called also a Buffer-band.
Platform timber, or platform sill, clamp. 70, fig. 5654. A U-shaped iron clamp or bolt, with which a platform sill is fastened to the end-sill of a street car.
Platform trap-door. 1. (Shown in fig. 3438.) A door which covers the space occupied by the step, and thus extends the platform out to the side of the car. It is used on private cars, and invariably with the Pullman extended vestibule.
Platform trap-door. 2. A door used in cabooses to serve the purpose of a water-closet.
Platform truss. Fig. 1451. A truss transverse to the car-body and under the end-sill, to help support the draft-timbers and platform-sills. It is not frequent.
Platform truss-beam (Miller platform). 22, figs. 2290-2. A rod fastened at one end to the body-bolster or center-sills, which then passes through or over the end-sill and from there downward to the platform truss-beam. Its use is to support the platform and prevent it from sagging.
Platform truss-rod (Miller platform). 23, figs. 2290-2. A rod fastened at one end to the body-bolster or center-sills, which then passes through or over the end-sill and from there downward to the platform truss-beam. It forms a receptacle to hold anything in its place. The main pockets of a car are the body-post, corner-post and right and left hand body-brace pockets, figs. 702-10, which are castings fastened to the upper side of the sill and the under side of the plate, to serve instead of mortises to receive the posts and braces. Brace-pockets are distinguished as right or left hand, according to the inclination of their top to a person standing facing the car. Double-brace pockets, figs. 698-8, to receive two braces inclining in opposite directions, are also made, often with a receptacle in the middle for a post. A post-pocket is a receptacle for the posts, door-post or corner-post, figs. 711-18. A slide-pocket, figs. 914-15, of a flat or gondola car should be distinguished from a post-pocket, it being bolted to the outside on the side of the side-sill. Similar uses of the term are leader-brace pocket, pilot-pocket and mast-pocket, for pile-driver and derrick-cars. See also Draw-bar-spring pocket. Draft-timber pocket.
Pocket-strap. Fig. 2908. See hinges.
Pouch or hand-straps. Figs. 3630-3. Straps to which people who are required to stand may cling and keep from falling as the car starts and stops. See Hand pole.
Pole or hand-straps. Figs. 3630-3. Straps to which people who are required to stand may cling and keep from falling as the car starts and stops. See Hand pole.
Plumbago. Graphite; one of the forms of pure carbon. See also Basin plug. Four-way cock plug.
Plush. "A species of shaggy cloth or stuff with a velvet nap on one side, composed regularly of a wool of a single thread and a double warp: the one, wool of two threads twisted, the other of goat's or camel's hair. But some plushes are made wholly of worsted, others wholly of hair."—Webster. Plush is used in car-building chiefly as a covering for upholstered seats, for which it is almost invariably used.
Pocket. 1. (Sleeping-cars.) 82, figs. 2409-12. A receptacle for the clothing and small baggage of occupants of sleeping-car beds. They are known as the head-board pocket for the lower berth and upper berth pocket. It is formed by turning the head-rest up, as shown in fig. 3412.
2. Any object having a cavity or opening which forms
Postal-car chandelier. Figs. 3266, 3273, 3288-90. See Chandelier. 

Postal-car furnishing. Figs. 3814-36. See Lamp-chimneys.

Postal-car sidelight. Figs. 3288-90. See Postal-car chandelier.

Post-bracket (open street-car). 251, figs. 5659, 5662. See Pocket.

Post cross-bar (open street-car). 65a, fig. 5959. The cast-iron bar (Gould buffing apparatus). 40, figs. 2297-9.

Post parting strip. 24, fig. 5656. See Sash parting strip.

Postal-lamp. See Postal-car lamp.

Postal-lamp-chimney. See Lamp-chimney.

Postal-pocket. An iron casting which is attached to the top of the sill of a car to receive and hold a post in distinction from a stake-pocket which is bolted to the outside of a car. Such pockets are more commonly used with stock-cars. See Pocket.

Postal-refrigerator car. One of the class of cars used for the transportation of live poultry. The car shown is provided with arrangements for feeding, watering, and by removing intermediate floors may be arranged to carry geese and turkeys instead of chickens.

Press. See Seal-press.

Press bar (Gould buffing apparatus). 40, figs. 2997-9. A stiff iron bar of a cross-shaped (+) cross-section, which connects the drawbar to the buffer-spring, so that when the draft-spring is engaged the buffing-spring and the buffing-tongue takes part of the pull on the drawbar, thus relieving the draft-spring. The pressure-bar also forces out the buffer-stem and plate when the drawbar is pulled out, thus maintaining a continuous platform between the cars.

Pressure-bar cylinder and piston. (Leonard hydrostatic buffer.) E, J, figs. 3801-4. A cylinder which receives the pressure-bar piston, of which is a part of the pressure-bar turned to fit the cylinder. See Hydrostatic buffer.

Pressure-gage (Pintsch gas-lighting apparatus). Fig. 3164. A gage usually placed in the saloon. It registers atmospheres and not pounds, for convenience in computing the volume of gas in the tank.

Pressure-regulator (Gold's car-heating apparatus). Fig. 3012. A valve designed to regulate the delivery-pressure of steam, etc. It depends entirely upon the elasticity of springs, the pressure of which can be gaged or regulated by screw-studs that bear upon one end of the springs. In the Gold pressure-regulator there is a spring on each side of the car. See Pressure-regulator.

Pressure-regulator (Pintsch gas-lighting apparatus). E, fig. 3100 and fig. 3166. The valve by which the pressure of the compressed gas is reduced for consumption. The pressure-regulator is one complete fixture, adjusted by the maker. Names of the principal internal parts are diaphragms, diaphragm-connecting-rod, diaphragm-lever, regulating-valve, and dust-arrister. See Pintsch system of gas-lighting and regulator.

Pressure-retaining valve (Westinghouse brake). A valve for use on long and steep gradients, provided with a weighted valve connected with the discharge port of the triple valve. It is controlled by a small handle, which, if turned in one direction, permits the air to escape freely and, if in the other, forces it to pass under the weighted valve. In descending long gradients the weighted valve retains a pressure of 15 lbs., which keeps the train under control when the brakes are released to rechage the reservoirs. On slight grades or on a level the cock is turned to permit the air to escape freely without raising the valve. This valve does away with the necessity of using "straight-air" (which see) on such grades.

Profile car. 100, fig. 435-73. A car, which see, extending from the plate to the other, bent to conform to the necessity of the case story. They are, of necessity, always compound cars, seen, which see, shown in section in figs. 1248-9.

Priming (painting). The first coat in car-painting. Usually a pure thin oil put on hot, at about 150° F. or less. A thin drier, which see, of red lead or borate of man-ganese, is used with it. The next coat is the scraping filling-coat or rough stuff, which see. See also Painting.

Private car. Figs. 119-22, 180-1, 194-202. Either an office or excursion car, which see.

Private lock (English). 188, fig. 501. A door-lock universal in passenger service, which can only be operated by a tapered rectangular hardened steel key, which is carried by all passenger trainmen, and most habitual travelers. One key will open any "private lock." See also Painting.

Propelling-lever, or hand-car lever (lever hand-car). 19, figs. 5598-90. The main lever to which power is applied.

Propelling-lever brake-rod (lever hand-car). 25, figs. 5599.

Protection cap. A lamp-jack.

"Protection" cuspidor. Figs. 3895-4. One with a large flattened mouth to it in order to prevent overturning. See Cuspidor.

Pull. A "catch or lip upon a drawer, door or window, by which it is pulled open."—Knight.

See Door-pull.

Draayer-pull.

Sliding-door pull.

Deck-sash pull.

Window-blind pull.

See, in engravings, Furnishings, door, postal car and window.

Pulley. A wheel with a grooved, flat or slightly convex rim, adapted to receive a cord or band which runs over it. Its function is to transmit power or change the direction of motion. —Knight. A sheave is a pulley-wheel in a block, but sheave and pulley are used in almost synonymous terms. See Sheave.

See also Belt-cord pulley.

Pole-hoisting sheave.

Berk-chain pulley.

Side-pulley.

Chasing-pulley.

Window-curtain pulley.

Hammer-rope pulley.

Pull-hook or deck-sash opener. Fig. 4578-90. A shaft with a small hook on the top for opening deck-sashes. Also called ventilator-staff.

Pull-iron. 58, figs. 298-98. A roping-staple. A U-bolt passing through the sidepilts for the purpose of attaching ropes in switching. A push-pole corner-iron, 101, is a lower corner-plate with a socket cast or forged thereon.
and in which the end of a pole is inserted for pushing instead of pulling the car.

**Pullman car.** A name strictly applicable only to cars operated by the Pullman's Palace Car Company, but in common usage not unfrequently applied to "palace" sleeping, parlor or drawing-room car built after the same designs as those adopted by Pullman's Company, the Pullman cars having been the first of this class introduced on a large scale and in modern style of finish, and being much more in use than any other class of parlor or palace cars. Included among Pullman cars are sleeping-cars, parlor or drawing-room cars, dining-cars and combination-cars, etc. Later designs differ from the earlier designs in the use of a "buffet," etc., and in being finished in much lighter-colored woods than the former dark styles prevalent. The latest pattern of passenger-cars built by Pullman's Company are shown in the following illustrations:

- **Dining-cars,** figs. 107, 109-10.
- **Parlor-cars,** figs. 115-17.
- **Private-cars,** figs. 121-3.
- **Sleeping-cars,** figs. 122-26, 129-31.
- **Smoking-car, etc.,** figs. 138-4.

The most marked changes shown in these figs. are the arched deck-ceiling, the half-round or oval deck-windows and the elaborate decorations. The plans of Pullman cars are shown in figs. 128-129. Promising, figs. 131-32, 221-22, 281-8; **Sleeping-car berth,** fig. 2408-12; **Vestibules,** figs. 2424-30; **Truck,** figs. 224-30.

**Pullman extended-vestibule.** Figs. 2424, 2437-41. A vestibule which incloses and utilizes the whole of the platform of a car. It is provided with equalizing devices above and below and employs the same frictional resistance to prevent lateral oscillation as the platform of a car. It is provided with equal platform closure. Windows are introduced at the end of the car in this construction which permits of better ventilation. The platform may be utilized, the steps being covered with trap doors so that the entire area of the platform is available. A single door (7) may be used at the sides and avoid the double folding doors of the other pattern.

**Pullman passenger-car trucks.** Figs. 6985-8. Nearly, if not all, Pullman cars are equipped with six-wheeled trucks, similar to the illustration, which is the latest standard at this writing, 1894.

**Pullman sliding-door (street-car).** Fig. 5665.

**Pullman water-pressure.** Figs. 3584-48. This system of water supply under air-pressure replaces the old method of using pumps for raising water for wash purposes in sleeping cars. The system consists of forcing water into the wash-bowls by air-pressure taken from the brake system as applied to cars. When the auxiliary air-brake reservoir is filled with air to a pressure of 60 lbs., an Air-governor, Q, admits air through a **Drift-cup** into an Air-tank, 36 inches long by 36 inches in diameter. This is a storage tank for use when cars are disconnected from the locomotive. The pressure carried is about 75 lbs. From this tank the air passes through a reducing valve, Ee, set for 32 lbs. pressure, into the water-tank. At the end and center of the tank is a special **three-coupy valve,** F. This valve performs the triple service of admitting water and air, and also allowing the air to escape when the tank is filled with water. The valve, F, is operated from inside the car by a stem, marked W, which is attached a pinion and gear. The air before passing into the water-tank passes through a **Check-coupy,** which is to prevent the water in the tank from backing into the air-pipes; the water being forced out of the tank passes through a strainer or screen, T. This strainer is cleaned by the valve, Z, which when opened allows water to pass over the screen in such a manner as to wash it. After passing through valve Q, the water enters the car and is led by pipes to the different wash-stands and closets. One pipe passes to the heater and the water goes through a check-valve, I, and a shut-off valve, H, when it enters the copper coil which encircles the fire magazine. The hot water passes by gravity to a tank marked N, which has a connecting pipe back to the coil. Through these pipes there is a constant circulation from the heater which keeps the water hot. A connection is made from the top of this tank to the various washstands and bath-tub where hot water is required. At each end of the car a fire hose is placed which can be used at a moment's notice, under the tank pressure. At the top of tank N is a safety-valve marked M. The water-tank is insulated to prevent the water freezing in cold weather. This insulating box contains about 20 ft. of heater pipe which is connected with the heating pipes of the car.

**Pullman-vestibules.** Figs. 2424, 2437-48. To the Pullman company belongs the credit for having introduced and perfected the vestibule. There are two types, the original which encloses the platform exclusive of the steps; and the other which encloses the plate steps, to the full width of the car. The peculiarities of the Pullman-vestibules is explained under **Vestibules,** which see. The frictional resistance of the Diaphragm face-plates to oscillation under opposing spring pressure is accomplished by an ingenious mechanism shown in the figures. The plate equalizer, shown in figs. 2437-45, is intended to keep the upper part of the face-plate thrust out and adjusted to its companion plate. It is shown in the hood and plan and the parts are numbered from 38 to 39 inclusive. The two sides are equalized at the top by the face-plate equalizing lever (27), and at the bottom by a platform-equalizer (51). Another adjustment of the vestibule face-plate is the Buhop vestibule equalizer-kicker, a mechanism forming a part of the Pullman vestibule. It is shown in figs. 3442, and in more detail in fig. 3440, and the parts are numbered 45 to 52. The object of this device is to have the bottom of the vestibule plate follow the movements of the draft rigging, and by a system of levers it is so arranged that whether the drawbar be in tension or compression the bottom of the face-plate and buffers are forced out, in the former case to prevent any opening between the two opposing face-plates, and in the latter case to provide just that recessing that is secured by sudden stops or collisions. When there is a pull on the coupler (45), the spring (46) is compressed; the drawbar-horn (49) is forced against the combination yoke (48), which impinges against the buffer stem (52) and spring (50); when the coupler is under compression the spring (46) is compressed and the bolt below the bar is forced against the yoke (48) and forces out the buffer stem (53) as before. So that in case of collision the shock is met by the combined resistance of the drawbar and buffersprings, and in tension the buffer and face-plates follow up any movements of the drawbar, thus insuring frictional contact and resistance at all times between the face-plates of the cars coupled together.

**Pull-ring.** Figs. 6492-50. A metal ring with a screw attached by which it is fastened to any object, as a saah, drawer, etc., to take hold of in opening it. Chiefly used for deck-sashes.

**Pull-rod (Janney coupler).** 141, fig. 2801. The rod connecting the uncoupling-lever with the catch-lever, also called an uncoupling-rod.

2. (English brake-gear.) Any rod transmitting tension when the brake is applied.

**Pull-rod button (Janney coupler).** The "T" button upon the end of the pull-rod.

**Pull-rod carry-iron.** 146, fig. 2801. A carry-iron for an uncoupling-rod.

**Pull-rod plate (Janney coupler).** A small chafing-plate on the Janney platform knee-timber through which the pull-rod passes. A pull-rod carry-iron.
Push-rod (Westinghouse freight-brake). Fig. 1681-3. An air-pump, which see.

2. (Wash-rooms.) Figs. 3481-2, and 9, fig. 3486. A basin-pump, which see.

Pump drain-cock (Westinghouse brake). 105, figs. 1691-2.

Pump (Westinghouse brake). Figs. 1716, 1755.

Pump drain-cock (Westinghouse brake). 105, figs. 1691-2.

Pump (Westinghouse brake.) Figs. 1691-2.


Push baggage-car. A light lorry-car used at station for moving baggage or freight from one train to another.

Push-bar. Figs. 1397-8; 40, figs. 2297-9. (Gould coupler, etc.) A pressure-bar.

A pressure-bar. (Westinghouse brake).

Push-bar (Westinghouse brake). Fig. 1726, 1728-9, etc. Usually called push-rod. A compression-bar which butts against the piston of a brake-cylinder, being guided by a Hollow piston-rod, which see, in such a manner as to transmit the pressure of the piston when the air-brake is used, but to simply move away from the piston, without moving the latter, when brakes are applied by hand.

Push-block. 191, fig. 229-66, etc. See Push-pole corner-plate.

Push-car, or lorry-car. Figs. 5058, 5599, 6001-8. A four-wheeled car, also called lorry-car, used to carry materials and tools, moved or pushed by hand. Also see Ferry push-car.

Push-down (H. & K. reclinable car-seat). Figs. 2925-5. A thumb-latch, which, when pushed down, permits the seat-back to be tilted to a reclining position.

Push-pole. A pole or wrought-iron tube, which is used as a strut to span diagonally the distance between the corners of a locomotive and a car, standing on two parallel tracks, and which is used to push such car without switching the locomotive on to the same track as the car occupies.

Push-pole car. A flat car with a push-pole attached to the side-sill so that it can be used in “poling” cars. The pole of former days has become a wrought-iron tube, and one end is pivoted to the side-sill of the car. A post and lever is attached to the pivoted end so that it can be swung out over the side track by the operator who stands upon the Push-pole car. See Push-pole.

Push-pole corner-plate or iron. 191, figs. 229-66. A plate for inserting poles or bars in switching to enable the car to be moved from the side by an engine on a parallel track. It is usually a cavity cast upon the lower corner-plate, and not a separate attachment. A Roping staple, which see, serves the same purpose for the use of a rope.


Push-rod (Westinghouse freight-brake). The rod which butts against the brake-cylinder piston and transmits its thrust.

Putty. A mixture of linseed oil with whitening, which later is chalk finely pulverized. Water is sometimes added in adulteration, causing the putty to stick to the fingers, and making it hard and brittle when dry. Panel-putty, used for filling nail holes in car work, is an extra quality made from whiting, white lead in oil, japan or varnish, and a small quantity of turpentine. The whiting is used merely to prevent the white lead from sticking to the fingers, and no more than necessary for this purpose is required. This putty forms a hard cement which does not shrink. When dry it can be rubbed down with pumice-stone or dusted with sand-paper. Glycerine putty is made of good thick glycerine and white lead or litharge. It hardens in 15 to 45 minutes, and stands water and acids.

Pyramidal hopper bottom. Figs. 310-15. See Box hopper-bottom.

Q

"Q & C " brake-slack adjusters. 1. Figs. 1771-4. An adjuster by which the slack is taken up by washers or small plates, which drop into the space left by any lost motion in the rod.

2. Fig. 1775. A combination of a ratchet and pawl, which ratchet wheel is also a gear wheel, which engages in a pinion, that is the female screw sleeve of the cylinder- lever connecting-rod. See Brake Slack-adjusters.

Quadrant. A piece of metal curved in the form of the arc of a circle. See Sector. See also Deck-sash quadrant, figs. 4389-90. Lever-quadrant (Rames ejектор). Fig. 1668.

Quadrapulet coil nest-spring. Fig. 5354. A rarely used spiral-spring.

Quadrapulet (of elliptic springs, which see). Figs. 4947-8. Four springs side by side acting as one.

Quarter-light, or side-light (English). 137, figs. 501-4. American equivalent, window. In a carriage, the window in the body as distinguished from the windows in the doors. The quarter-light, in English practice, are always fixed, but on the continent of Europe they are invariably made to fall or open, and this is also the case with the vehicles made in England and exported to warm climates.

Quarter-light molding, or glass-frame stile (English). 142, fig. 501. The upright member of the fixed window framing. The glass is very generally fitted direct to the body, a strip of rubber being interposed, and the molding screwed on outside, keeping the whole in position.

Quarter-light panel (English). 126, fig. 501. A panel on the outside of the body, placed above the window. Other exterior panels are quarter-panel, waist-panel, and bottom side-panel. Interior panels are the partition panels, the top-light panel and roof panels.


Quarter (elliptic spring). Also called quadruplet, which see.

Queen-post (or a truss). One of a pair of vertical posts against which the truss-rod bears. When one post only is used, it is called a king-post, which see. Such posts are used for the body truss-rods under car-bodies and occasionally trucks. See Body queen-post. Inverted body queen-post. Truck-frame queen-post.

Queen-post stay. A bar attached to a queen-post to stay it laterally. See Body queen-post.

Quick-acting passenger triple-valve (Westinghouse air-brake). Fig. 1706. See Triple-valve.

Quintuplet (of elliptic springs, which see). Figs. 4947-8. Five springs side by side, acting as one. 30, figs. 4949-8.

R.

Rabbit. "A rectangular groove made longitudinally along the edge of one piece to receive the edge of another. Grooves are common in paneling, and in doors and frames for the door to shut into."—Knight. Rabbit is a corruption of the word rebate.
Bail. "A kind of lock whose face-plate is sunk within a rabbot cut in the edge of a door."—Knight. See Lock.

Race-horse box (English). American equivalent, horse-car. A four-wheeled covered vehicle adapted to run on passenger trains and to carry valuable and excitable horses. The mangers, stools, etc., are carefully padded, and a compartment provided for the jockey, who can reach the horse's head. See also Horse-box.


2. In machinery, a recineline sliding-piece, with teeth cut on its edge for working with a wheel."—Brandé. A ratchet, which see. See also Beveled-rack. Sash-lock rack. Slowing-gear rack.

Bail-back (for head-board). A small "cupboard catch" to hold the head-board pocket closed.

Radiating draft-bar (street-cars). 88, fig. 5854-6. A draw-bar pivoted so that it may be swung obliquely to the car length over a draw-bar sector. A center-draft draw-bar is an example of a radiating draft-bar.

Radiator. 1. Baker and other steam and hot-water heaters. Fig. 2943-4; shown in plan, fig. 2967. A piece of iron pipe bent into a U-shape under the seats of a car, through which the hot water or steam circulates.

Radiator-stand (Baker and other heaters). Figs. 2967-8. A support for a radiator.

Batt. A timber to support the roof of a car, which extends part way across the top, either from the plate to the ridge of the roof, or to the base of the deck-side only, as 101, figs. 435-73, etc., and figs. 1215-6. When such timbers extend all the way across they are called carines. See Main-rafter.

Rail. "The horizontal part in any piece of framing or paneling."—Webster.


Rail-lining-chain. See Platform railing-chain.

Railroad-car. See Car.

Railroad-lantern. Figs. 2952-62. A lantern used in large numbers by trainmen and other employees of railroads. A variety of patterns exist and are shown.

Railroad-podiums. Figs. 2760-73. See Padlock.

Rail roof-molding (street-car). 160, fig. 5866, a roof deck-rail molding. Its use is to make a tight joint between the roof boards and deck-rail, or upper-deck bottom rail.

Raised-roof. An upper-deck or clear-story, which see.

Ranges and cook-stoves. Figs. 8106-8, and also 8081-8105. A range is a fixed and more elaborate cook-stove attached to the wall, and, in houses, usually built in with brick so as to need no stove-pipe to connect with the chimney.

Reel journal-box. Figs. 5165-6. A journal-box with a U-shaped bar called the yoke or bail attached to the box so as to embrace and hold the lid, which latter carries an end-stop so as to dispense with a collar on the axle. In much favor for narrow-gage cars, such as-plantation, mine, and logging-cars. In very limited use on standard-gage roads.

Ratchet. A serrated edge, sometimes straight and sometimes on a wheel, into which a pawl engages, for produc-
Register-face. A grating with which the opening of a register is covered. It is usually of some ornamental pattern.

Regulating. An unusual term for switching, or the act of moving cars from one track to another in making up or separating trains. Also called driving, or, in England, marshaling, or, less correctly, shunting.

Regulating-nut-spring, etc. (Pump governor.) 65 and 66, fig. 1716.


Regulator (Frost-system of gas-lighting). Figs. 8117-8118. Air from the tank enters the regulator at the inlet, as indicated by the arrow, and, the valve being held away from its valve seat by the action of the graduatingspring, 6, upon the diaphragm, 7, to which the valve is connected, passes between the valve and its seat into the chamber back of the diaphragm and thence through the roof-pipe to the carburetors. As the pressure in the carburetors rises, it sets back into the chamber of the regulator, and, acting against the diaphragm, overcomes the resistance of the graduatingspring, 6, and displaces the diaphragm from its normal position. The diaphragm thus displaced curvles the valve toward its seat, and in this manner gradually closes the air port until the pressure in the carburetors has reached 1 lb. per square inch, at which pressure the valve is seated and prevents the further passage of air. As soon as the pressure in the carburetors falls below 1 lb., the resistance of the graduatingspring, being greater than that of the air pressure upon the diaphragm, forces the valve off from its seat and allows sufficient air to pass to keep the pressure up to that for which the regulator is adjusted.

Regulator (Pintsch system of gas-lighting). 944, fig. 2106.

An automatic regulator which receives the gas from the receiver at its inlet at any pressure from 1 to 300 lbs. and automatically reduces it to an outlet pressure of % oz. It is screwed to a board, having a recess 124 in. diameter and 3 in. deep to receive the upper surface of the regulator, this board being held against the under side of the car floor by straps and suitable lag screws. The regulator is sealed and is guaranteed by the makers for 5 years, if returned intact and seal unbroken.

Regulator. See Heat and draft-regulator. Fig. 2867.

Pressure-regulator.

Regulator (of refrigeration of Pintsch system). 943, fig. 2227-a. An iron strap used to secure the regulator to under side of car. One is passed across each end of the board carrying the regulator, and is lag-screwed to the board and to the car sills.

Release-cock (Westinghouse brake). Fig. 398; 16, figs. 1939-8, and figs. 1738. More properly an auxiliary reservoir bleeding-valve. A cock attached to the auxiliary-reservoir for permitting the compressed air to escape therefrom, when the locomotive is detached or when the apparatus is out of order, so as to release or "bleed" the brakes.

Release-spring. 1. (Passenger-car trucks.) 91, figs. 4906-4906. A spring attached to the end-piece of a truck for the purpose of throwing the brakes out of contact with the wheels. The name is also applied to any spring used to throw the brakes off from the wheels.

2. (Westinghouse brake.) 13, fig. 1727. A spiral spring with the acts so as to make the brake-piston inward and thus release the brakes from the wheels after the compressed air is allowed to escape from the cylinders. It was formerly carried outside the brake-cylinder by a release-spring bracket, etc., but is now placed inside the cylinder.

Reservoir. (Air-brake apparatus.) The main reservoir, figs. 1738, 1900 and 1, figs. 1699-1707, goes under the locomotive, and the auxiliary reservoir, figs. 1784-6, under the tender and each car. In the latest and most approved designs the driver brake also is operated from the...
a separate triple-valve and auxiliary reservoir is combined with the triple-valve and brake-cylinder placed on the engine. In the Westinghouse freight-brake, figs. 1728-9, the auxiliary reservoir is connected with the brake-cylinder and triple-valve.

2. See Lamp-reservoir, or lamp-fount.

3. (Finch gas-lighting apparatus.) See Receiver.

4. (Student lamp) 6, figs. 3296. The removable cylinder carried within the shell called the outside-cylinder.

Reservoir drain-cock (Westinghouse brake). 18, figs. 1699-8 and 1738. A cock for emptying the reservoir of any water condensed from the air. Also used as a release-cock, or cylinder release-cock, which see, for letting off or bleeding the brake.

Reservoir drip-chamber (student lamp). G, fig. 3299. A cavity in the outside cylinder below the reservoir. Used only in the best lamps.

Reservoir-pipe (for Westinghouse brake). 8, figs. 1690-1097. Also called air-pipe and discharge-pipe. The pipe conveying the air from the air-pump to the reservoir.

Reservoir-union. Fig. 1721. See Union.

Rest. That which supports something or on which it rests.

See Arm-rest. 

Bench-rest. 

Foot-rest. 

Chair-rest. 

Side-foot-rest. 

Side-rest (tip-car).

Return-and-left. 

Bolt-rest.

Foot-rest.

Rear-seat.

Side-foot-rest. 

Window-sash rest (street cars).

Restaurant car. Fig. 104. A cafe or lunch car.

Retaining-ring (for wheel tires). Figs. 3355-66, 3274-61, 3290-99, 3293, 3287-47. A ring securing the tire to the wheel. See Mansell retaining-ring, and tire-fastening.

Return-bend (pipe-fittings). Figs. 3245-4. A short cast-iron U-shaped tube for uniting the ends of two wrought-iron pipes. They are called close return-bends, or open return-bends, according to the section of the pipe is kept a distinct circle at all points. The close return-bend has simply a partition dividing the two parts for a short distance.

Return heating system (one of the Safety’s heating systems). Figs. 3082-30. In this arrangement of the Standard system, the method of application of jackets to the circulation piping is not materially changed, but, by means of a second drain pipe, the condensed steam, after performing its work, is returned to the locomotive instead of being discharged to the ground.

Special valves on the car, and a suction pump on the tender, are necessary adjuncts of this system. By means of the pump, a vacuum of 15 to 22 inches is constantly maintained on the second or return train pipe. The returned condensation being at a high temperature when reaching the tender tank, a saving of fuel is thereby effected. Lower steam pressures can be used with this system than with the others, the exhaust of the suction pump alone is sometimes sufficient to keep up the circulation.

Return tag. Fig. 3804. A tag attached to cars, usually by slipping it on to the shackle of the seal, and used as evidence of the due arrival of the car or as a direction to what point the car itself is to be returned.

Reversable car-seat. Fig. 3993. A name sometimes applied to the common form of car-seat in which the back only reverses, but more properly applied to such a seat as the Bunton reversable car-seat, which see, in which the seat is moved and not the seat-back only, what was the seat becoming the seat-back, and vice versa.

Reversing-cylinder (Westinghouse 8-in. air-pump). 22, fig. 1699. A small hollow metal cylinder in the steam cylinder-head in which the reversing-piston, which see, works.

Reversing-cylinder cap (8-in. air-pump). 21, fig. 1699. A metal screw-plug screwed into the recess which receives the reversing-cylinder and holds the latter in its place.

Reversing-piston (8-in. air-pump). 23, fig. 1699. A small piston placed above the steam-valves and which moves the latter downward. The excess of steam-pressure on the under side of the upper steam-valve, owing to its being larger than the lower one, moves them upward; when the pressure on the reversing-piston is released by the movement of the reversing-valve, at the top of the stroke of the main steam-piston, which then strikes the reversing-valve stem, which see.

Reversing-piston packing-ring (8-in. air-pump). 24, fig. 1699. See Piston.

Reversing-valve (8-in. air-pump). 16, fig. 1699. A slide-valve working in a small cylinder in the steam-cylinder head, and thus controlling the admission and exhaust of steam to and from the reversing-piston. See Reversing-valve stem.

Reversing-valve bush, or bushing (Westinghouse 8-in. air-pump). 19, fig. 1699. See Bushing.

Reversing-valve cap, or chamber-cap (Westinghouse 8-in. air-pump). 20, fig. 1699. A screw-plug which holds the reversing-valve bushing in its place.

Reversing-valve plate (Westinghouse 8-in. air-pump). 18, fig. 1699. Reversing-valve stem (Westinghouse 8-in. air-pump). 17, fig. 1699. A rod attached at the upper end to the reversing-valve. It extends downward into a hole bored into the piston-rod, and is moved by the piston at each end of its stroke. The admission and exhaust of steam above the reversing piston is changed at each end of the stroke of the main steam-piston, and by this means the main-valves are lifted and made to admit steam, alternately, above and below the steam-piston.


Rib (of a cast-iron wheel). A bracket. See Wheel-rib, Car-wheel.

Ridge. See Roof-ridge.

Ridge-clamp. Figs. 3255-67. The grooved stick on top of the boarding of a pitched roof directly over the ridge-pole. In the Window car-roof they are simply roof strips, which see.

Ridge-pole. 94, figs. 229-9. A longitudinal timber in the center of a roof, supported by the carlines or rafters on which the roof-boards rest. In some cases the rafters are framed into the ridge-pole, and in some cases, as figs. 3270-4, the ridge-pole is grooved to receive the roof-sheets.

Ridge-timber. 110, figs. 822-5. A timber which caps the intersection of two inclined floors meeting in the center of the car as in side-dump or ore-cars. If the inclined floors were the two sides of a gable-roof the ridge-timber would then become a ridge-pole.

Right and left of a seat is as for a person sitting in a seat; of a stove or of the end of a car is as for a person facing it; of a brace is one which leans to the right or left of a person standing facing the side of the car.

Right and left screw. A pair of screw-threads cut turning in opposite directions, so that a common nut or pipe-coupling tapped with similar threads will, according to the direction in which it is turned, draw the two rods nearer together or press them farther apart.

Right-and-left-screw turnbuckle. Figs. 3736, 3727a. See Turnbuckle. Other forms are screw turnbuckle, fig. 3723, and tube turnbuckle, fig. 3722.

Right-hand brace-pocket. See Right and left and Left-hand brace-pocket.

Right-hand seat (of car-seats with a stationary back). See Right and left.

Right-hand seat-end. See above.

Rigid-bolster truck. Figs. 4778-4782, etc. A car-truck with a bolster which has no lateral or swing motion, which see. See also Bolster and truck-bolster.
Rigid caster (for tables). Fig. 4114. See Caster. A “rigid caster” is a mere socket and not properly a caster at all, except from being used in the same manner as a finish for legs of tables and chairs.

Rim. 1. (Of a car-wheel.) That portion of a car-wheel outside of the plate. The face of the rim is the outside vertical edge or face.

Rim-latch. Figs. 2588-9, 2570, 2731-3. A latch which is attached to the outside of a door and is not let into it.

Rocker (tip-car). A crescent-shaped casting bolted to the frame. The iron-cap having an exterior metallic case which projects from the face of the door, differing thus from a mortise-lock.”—Knight.

Ring. 1. See
- Ash-pit ring,
- Casing-ring,
- Grate-ring,
- Helper-ring,
- Inside-ring,
- Lamp-ring,
- Manwell retaining-ring,
- Ventilator-ring,
- Man-hole ring,
- Window-curtain ring.

2. (Baker-heater). Figs. 2889, 2889a, 2929b. A cast-iron‘ ring attached to the smoke-top to stiffen it and hold the feed-door. Also an ash-pit ring.

Riser. 3, figs. 5257-5. A piece of marble or metal set on edge around about the wash-bowls to prevent water from running against the walls. See Step-riser. Seat-riser.

Rising-timber. 110, fig. 328-31. A timber placed upon another parallel or transverse timber to get greater height.

Rivet. “A pin of iron or other metal with a head drawn through a piece of timber or metal, and the point bent or spread and beat down fast to prevent it from being drawn out, or a pin or bolt clinched at both ends.”—Webster. See Coupling-lunch rivet. The seat-arm piece, which see, figs. 4384-9, is usually in the trade termed a rivet, but incorrectly.

Rivet-fastening (English). Fig. 5344. As applied to railroad wheels, the oldest and most defective mode of securing the tire to the wheel. Little used. See Tire-fastening.

Rivet-seal. Figs. 5379. A seal with a lead rivet which is closed by a die. See Car-seal.

Roadmasters’ hand-car. Figs. 5386-7.

Roberts, Throp & Company hand and velocipede cars. Figs. 5383-4, 5389-90.

Roberts’ woven-wire car-seats and fabrics. Figs. 5262-47.

Robinson’s radial-truck (street-car). Figs. 5671-3. A truck, so-called, which consists of three pairs of wheels, each pair carrying a frame. One pair of wheels is placed under each end of the car, and the third pair of wheels with the frame is in the middle of the car. The three truck-frames or so joined together that when on a curve the middle pair of wheels rotates the end-trucks about their center-pins and tend to keep the axles perpendicular to the track, as shown in the figures.

Rocker (tip-car). A crescent-shaped casing bolted to the rocker-timbers of the car-body on which the body rests and rolls when the body is tipped.

Rocker-bearing (tip-car). The iron-cap for the rocker-bearing timber to support the rocker.

Rocker-bearing timber (tip-car). A horizontal timber at the end of the car on which the rocker-bearing rests.

Rocker-bearing-timber hangers (tip-car). Vertical timbers or iron bars framed and bolted to the end-piece, to which rocker-bearing timbers are fastened.

Rocker car-seat. Figs. 2817-20, 2922, 2879-1, 2893, etc. A seat having the bottom adjustable so as to give it an inclination towards the seat-back in all cases, on which ever side the seat-back may be placed. All modern car-seats have mechanism by which this inclination is automatically given to the seat when the back is reversed or swung back. See Rocker and car-seat.

Rocker-casting. (“H. & K.” reclining and “walk-over” seat.) Figs. 64-5. A casting forming a part of the cushion car-seat stand, which is moved back and forth by the seat-back arms and moves the cushion forward, as well as giving it some inclination toward the back.

Rocker side-bearing. See Side-bearing.

Rocker-timbers (tip-car). See Rocker.

Rocking-bar (heaters). Fig. 5367. A horizontal bar which supports the grate, and on which the latter is attached by a pivot in the center so that it can be turned horizontally and thus shake down the ashes.

Rocking-lever. J, fig. 5344a. A bell-crank which operates the toggle-joint, to open and close King’s-door for hopper-bottom cars.

Rook-plank. A flat-plank, which see.

Rock-shaft arm (Hartley chair, which see). 9, figs. 5998-9.

Rod. In car building this term generally means a slender bar of iron with a nut on each end, in distinction from a bolt which has a head on one end and a nut on the other. Very long bolts, however, are often called rods. Rods in general take their name from the parts with which they are connected or the use which they serve. Among the rods used in car framing are:

- Brake-shaft brace-rod.
- Brake-bolt tie-rod.
- Brake-block tie-rod.
- Brake shaft connecting-rod.
- Cylinder-rod tie-rod.
- Driv-rod.
- End-rod.
- Fahy-rod.
- Inverted body-true-rod.
- Overhang brake-rod.
- Plate-rod.
- Platform tie-rod.
- Platform cross-rod.
- Sill and plate-rod.
- Sill-rod.

Among the rods connected with brake-gear are:

- Brake-shaft brace-rod.
- Brake-block tie-rod.
- Brake shaft connecting-rod.
- Cylinder-rod tie-rod.
- Floating connecting-rod.
- Long brake-rod.
- Release-lever rod.
- Secondary brake-rod.

Among the rods in trucks are:

- Pedestal stay-rod.
- Safety-beam tie-rod.
- Safety-beam true-rod.
- Transom true-rod.

Among rods for interior fittings of car are:

- Berth-curtain rod.
- Grain-door rod.
- Window-curtain rod.
- Window-shade rod.

See also
- Column-rod.
- Hand-car true-rod.
- Lever-true-rod.
- Lever-frame true-rod.

Rodgers ballast-car and distributing plow. Figs. 2181-4. A hopper-bottom car with bottom-doors by which crushed stone or gravel ballast can be distributed between the rails, and a flat-car with a plow attached beneath it, by which the ballast is levelled and plowed out over the ends of the ties and cleaned from the rails.

Rod-hanger (bell-cord). See Bell-cord hanger.

Roe-ventilator. Fig. 4309. See Ventilators.

Roll (of upholstery). Figs. 5384. See Belt-edge.

Rolled-axle. An axle made of rolled iron. See Axle, Car-axle.

Roller. 1. “That which rolls; that which turn on its own axis, particularly a cylinder of wood, stone, metal, etc.”—Webster.

Boiler-thimble (Gould vestibule). Fig. 4565. The cylinder on which the shade is rolled up, containing within it the springs which actuate it. See Hartshorn and McKay shade roller.

3. (Of pile-driver car.) 19, figs. 404-1. The small wheels under the swinging-platform, rolling upon the track attached to the Bow of the car.

Roller-bearing. Figs. 4568-88. 1. Journal bearings in which the load is carried upon small cylindrical rollers inserted between the shaft or axle journal and the bushing or box which surrounds it. These cylinders roll between the journal and the box bearing, thus substituting滚动 friction for rubbing friction.

There are numerous types, but the ones in most favor to-day are the Meneely and Hyatt (which see). The Meneely bearings have been in use for some years on steam roads under passenger-cars, and have given good satisfaction to the roads using them. Their use on steam roads is very limited, being confined to two roads; and to only a few cars. The sentiment prevailing seems to be that the saving effected on steam roads where stops are infrequent, does not warrant their adoption. In starting a single car the difference in initial horse-power required is, however, very great, and roller-bearing are in considerable favor on street and suburban cars making very frequent stops and starts. This field is promising for their general adoption.

2. For window shades. See Hartshorn and McKay shade roller. Figs. 4567-73.

Roller side-bearing. Fig. 4747. A side-bearing, with one or more rollers on which the car-body rests. See Side-bearing.

Roller-side bearing truck. Figs. 4747-50. A lateral motion diamond truck whose frame is very like a swing-motion truck (figs. 4740-4), with a rigid spring plank. Lateral motion is given to the truck bolster by placing it upon cylindrical rollers resting upon the spring-caps. The spring-cap and bolster bearing plate are concaved, so that the motion of the rollers is restrained and the truck bolster given stability. The rollers and their bearings are shown in figs. 4749-50.

Roller-thimble (Gould vestibule). 44, figs. 2431-6. The cover or upper part of a house or other building, consisting of rafters covered with shingles, or tiles, with a side or sides sloping from the ridge for the purpose of carrying off the water that falls in rain or snow. See Roof-ridge.


Roof-apron. 106, figs. 435-7. A vertical or inclined metal or wooden screen attached to the end of a passenger-car roof to prevent cinders, rain, or snow from being driven on to the platform and into the doorway.


Roof-brace (of a center lamp or chandelier). Figs. 2870, 2881, 3133. Diagonal stays passing from the lamp to the roof. Vertical supporting stays are known as lamp-arms, with or without a large center-stay.

Roof commode-handle (English). 176, figs. 501-4. See Ascending-rail.

Roof corner-casting (passenger-cars). A cast-iron molding for the corners of platform-roofs. They are made rights and lefts, and are specified as for a person standing and facing the end of the car.

Roof cover-strip (single-board roofs). A metallic U-shaped strip used to cover the joints of the roof-sheets. See Roof-strip.

Roof grab-iron (box and stock cars). 60, fig. 229, etc. A hand-iron. An iron bar fastened to the roof to be grasped when ascending the ladder at the end of the car. Also called ladder-handle. See Grab-iron.

Roof hand-rail. 190, fig. 229, etc.; figs. 973-3. A hand-rail usually made of gas-pipe in front of the brake-wheel, designed to protect the brakeman when applying the brakes. It is stiffened by a hand-rail brace. The whole arrangement shown in these figures is designed to take the place of the brake-step, which has been disapproved of by vote of the M. C. B. Association. See Brake-step.

Roofing-canvas. A heavy duck for covering the outside of the roofs of cars, chiefly used on street cars.

In England it is universally used for all cars with roofs. It is bedded on fresh thick white lead or smudge (which see), and then receives several coats of the same paint.

Roofing-duck. The trade name for the cloth used for head linings, manufactured in any width up to 13 ft. It is lighter than roofing-canvas.

Roof-lamp (English). 160 to 168, figs. 501-4. A lamp used to illuminate the inside of a carriage or other covered vehicle. A circular hole, about 8 in. diameter, is cut through the roof, and the roof lamp placed in this aperture from the outside, the glass and burner when in position being a little below the inner surface of the roof, and entirely inaccessible from within. This form of lamp is wasteful of oil, yields a dim and uncertain light, is costly to handle and the glass is constantly broken. It is therefore being superseded in Germany and England by Pintsch's, Pope's, and similar methods of using compressed oil-gas.


Roof-landing. 150, figs. 554-6. A small platform built on the roof of a trolley-car on which inspectors step in climbing upon the roof to inspect the trolley. In freight-cars it is called a roof step.

Roof-light. A deck-seat, which sees. See also End roof-light (street-cars).

Roof-panel (end). The panel over the door of passenger-cars.

Roof-ridge (freight-cars). The intersection of the two plane surfaces forming a pitching-roof.

Roof running-board. 87, figs. 229-66, etc. See Running-board.

Roof running-board bracket. 88, figs. 229-66, etc. See Running-board bracket.

Roof running-board extension. 88, figs. 229-66, etc. See Running-board extension.

Roof sheaths. Figs. 2355-97. Metalic sheets, sometimes corrugated and sometimes not, for covering freight-car roofs. Their joints are sometimes closed by a roof cover-strip, and sometimes the edges fit into grooves in wooden carlines or joint-strips. See Car-roof.

Roof-step (freight-car roofs). A horizontal board which extends sidewise from the running-board to near the side of the car above the ladder, its object being to give a secure foothold and protect the roof from wear 14 is not much in use.

Roof-stick, or hop-stick (English). 120, fig. 501. American equipment, corinne. A piece of timber which
supports the planking of the roof, and is either bent or out to the curve of the roof.

**Roof-strap (street-cars).** See Diagonal roof-strap.

**Roof-strips.** 1. Used quite frequently, but somewhat confusingly to designate a puritin, which see.

2. (Passenger-cars.) Narrow wooden strips attached as stiffeners to the under side of the carlines of the lower deck.

3. (Window and other car-roofs.) Figs. 2855-94. A longitudinal wooden strip on top of the metal roof-sheets to which the roof-boards are attached. The central roof-strip is called in other roofs a ridge-clamp. Sometimes at the ridge a single ridge-clamp is used.

**Roof ventilator.** See Ventilator.

**Rope.** “A largest ring or line composed of several strands twisted together.”—Webster. See Berth safety-ropes. Round spring rope.

**Roping-staple.** 58, figs. 229-66. A U-bolt secured to the

**Rose.** Figs. 2640-1, 2671. See Door-latch rose. Sometimes called a rosette.

**Ross flange brake-shoe.** Figs. 1644-5, 1655, 1660. A brake-shoe with a hollow in the middle where most of the rolling wear comes upon the wheel, and with a lip projecting over the flange of the wheel.

The brake-shoe is held in position laterally by the outside and inside flange-lips. The two side portions of the brake-shoe is held in position laterally by the outside and inside flange-lips.”

At the present time there are made about 450 tons of the Ross-Meehan brake-shoe, which see. Especially the combination Ross-Meehan shoe, which see. Figs. 1646-04.

**Ross-Meehan brake-shoe.** Figs. 1646-7, 1648-38. A combination of both the Ross and Meehan patents, using the Ross shape and the steel slugs of the Meehan brake-shoe, making a shoe that not only bears on the proper part of the wheel-tire, but also gives a shoe that will last and be turned down so frequently as they would with ordinary shoes.

It is used largely on steel-tired car-wheels. This shoe is in great favor, especially the combination Ross-Meehan shoe, which see. Figs. 1646-04.

**Round-bar spiral-spring.** Figs. 5192-5228. A spiral spring made of one or more round bars of metal. See Steel spring.

**Round (of a ladder).** 59, figs. 229, etc. The horizontal bars on which the foot rests. They are called round bars, whether of wood or iron, and whether round or square. See Ladder-rounds.


**Rubber gasket.** See Gasket.

**Rubber floor-mat.** Figs. 2858-7. There are two leading styles, corrugated rubber and perforated rubber.

**Rubber spring.** A car-spring made of india-rubber. They are rarely used, it having been found difficult to secure uniform quality, and the cost of a really good quality being higher than steel spiral-springs of equal efficiency and durability. The same is true of the various rubber and steel compound springs. Rubber springs are in occasional use on platform safety chains for passenger equipment, figs. 5388-9, and in England they are used for draft and buffing.

**Rubber-tread (for step).** An india-rubber covering fastened to a step or threshold-plate, of a car to prevent persons from slipping when ascending or descending the steps.

**Rules for Interchange.** See Interchange of Traffic.

**Runners (foundry).** Apertures which connect the ingates of a mold for casting metals with spaces to be filled with molten metal.

**Running-board.** 1. 87, figs. 299-66, etc., and figs. 685, 895-6. A plane surface, made usually of boards, for train men to walk or run on. It is placed on the roof of box or stock cars and at the side of tank cars. Gondola and flat cars usually have none, but hopper-bottom cars sometimes have a running-board passing over the tops of the end-rails and drop-door beam. In 1886 the M. C. B. Association recommended "that the ends of the running-boards of box cars be made project over the ends of the cars, so that the minimum distance between the ends of those on adjoining cars will not be over 12 inches; and that the running boards be made not less than two feet wide, and made of three boards 7 by 1 inch. The projecting ends to be supported on two brackets, at each end of the car, made of 9 by 1½ inch iron, with a hard wood cleat 3 by 1 inch on upper ends, fastened with one ¼ inch bolt and nut in each bracket. The lower end of each bracket to be fastened to the end of the car with two ¼ inch bolts and nuts."

"In 1893, pursuant to a recommendation of the Committee, this standard was revised with the idea of eliminating the dimension of detail parts and refining the recommendations of practice to a few general suggestions. The recommendation of the committee were followed and the following adopted as Recommended Practice, viz.: that "the ends of the running-boards of box cars be made to project over the ends of the cars, and be properly supported, so that the minimum distance between the ends of those on adjoining cars shall not be over 12 inches, and that the running-boards be made not less than two feet wide. See Proceedings, 1886, pages 24 and 123, and Proceedings, 1893.

Figs. 5346-7 shows the running-boards as recommended in 1886, and it conforms to the Recommended Practice of 1893. 2. (Tank-car.) 119, figs. 874-6. The only substitute for a car-floor.
Running-board-blocking. 56a, figs. 278-86. Rectangular-shaped blocks, the acute angle of which is the same as the slope of the car-roof. Inserted under the running boards to level them up and to give them a bearing on the roof boards near the carlines.

Running-board bracket. 1. Figs. 895-6; 80, figs. 229-66, etc. See above.

2. (Tank-car.) Cast-iron knees attached to the main-sills of a tank car, and projecting outward to support the running-board.

Running-board extension. 86, figs. 229-66, etc. The part which extends beyond the end of the car-body so as to bring the ends of the running-boards on adjoining cars nearer together to facilitate the passage of trainmen from one car to another. See Running-board.

Russell snow-plows. Figs. 222-5, 408-9. A type of push plow built by the Ensign Manufacturing Company, whose special features are the heavy and compact framing, figs. 408-9; the use of a power-bar by which the push of the locomotive is transmitted to the forward end of the plow; and the use of an extra heavy truck, fig. 4579, with track frames and journals inside the wheels as well as on the outside. The wing elevator plow, figs. 222, 225, has adjustable wings or projections on each side with inclined planes, operated from the interior of the plow to carry or throw the snow out of the cut, and to increase its width.

Russia iron. A form of sheet iron manufactured in Russia the exact process for making which has heretofore been kept secret, but which consists essentially in forming a chemical compound of iron upon its surface at the same time that it is highly polished, so that it is not likely to rust. Modern substitutes for this iron are also known as planished iron, which see.

Saddles. "A seat or pad to be placed on the back of an animal to support the rider or the load."—Knight. Hence, a block or plate which acts as a bearing or support for a rod, beam, etc., in construction, is called a saddle. See Body truss-rod saddle. Spring-saddle.


Safety-beam (passenger-car trucks). 51, figs. 4943-4966. A longitudinal timber connecting the end-piece and transom above the axles and inside of each wheel-piece. Iron straps (axle safety-bearings) are attached to the beam and pass under the axles so as to hold them in position in case of a breakage of axles or wheels on either side. An additional middle safety-beams is used on six-wheel trucks, 53, fig. 4967-68.

Safety-beam block. 53, figs. 4943-4966. A block fastened to the under side of a safety-beam and to which a safety-strap is attached. It is put there to bring the safety-beam nearer to the axle, and is usually cut out so as to conform to the shape of the last. Under some trucks a sort of a queen-post truss is used as in fig. 4918.

Safety-beam iron. 60, figs. 4957-66. A wrought-iron bar or casting bolted to the transom (six-wheeled truck), by which the middle safety-beam is attached to the transoms.

Safety-beam tie-rod. 60, figs. 4943-66. A longitudinal rod alongside a safety-beam, tying the end-piece and transom together. A safety-beam truss-rod sometimes serves as a substitute and equivalent.

Safety-beam truss-rod. A long longitudinal rod parallel with a safety-beam, extending from one end-piece truck to the other, under the transoms, so as to support them, in addition to serving as a substitute for safety-beam tie-rod, which is shown in fig. 4918.

Safety-beam truss-rod bearings. Cast or wrought iron pieces attached to the transoms. See above. Not much in use today.

Safety-bearing. See Axle safety-bearing for the safety-beam above, 54, figs. 4942-1068.

Safety-bearing thimbles. Fig. 4918. See Axle safety-bearing thimbles.

Safety berth-latch. A device by which it is made impossible for the berth to shut itself automatically in case of accidental overturning of the cars. These devices enable the berth safety-rope, which see, 26, figs. 2409-12, to be dispensed with. Several deaths have been caused by the upper berth closing up and locking a passenger within it in cases of overturning for lack of one or the other of these devices.

Safety Car-Heating and Lighting Co.'s (systems of steam-heating). Figs. 3023-55. (Standard systems.) The fundamental principle of these systems is the replacing of the heat of the Baker-Heater fire, by the heat of steam from the engine, applied by means of jackets on portions of the circulation piping, but in all cases leaving the Baker-Heater system in such condition that a fire or steam can be used, separately, or in conjunction, without its being necessary to alter or adjust any valves or other devices whatsoever. These systems are all closed circulation, the seal of the Baker-Heater being unbroken, and, therefore, no reduction of the water in the pipes, and danger of burning out of the coil. Salt water may be used and is recommended.

Details of the various applications to single and double circulation are given in figs. 3026, 3027, 3029, etc. The water circulation being heated at from three to six different points (instead of one point), as when fire is used in the Baker-Heater) it produces more rapid and more equable heating of the car. See Coat-jacket system and Return-heating system.


2. (English.) 46, figs. 501-4. American equivalent safety-coupling-chain. An additional coupling-chain provided at one end with a hook, and intended to hold the train together should the main coupling part. Two are secured at each end of the vehicle, one on each side of the main coupling. Also called side-chain.

Safe-y-chains, platform (M. C. B. Recommended Practice). Fig. 6339.

Safety-chains, freight-car (M. C. B. Recommended Practice, as to location of). Figs. 5535-5.

Safety-chain eye-bolt, or strap-bolt. 10, figs. 1528-9. See Brake safety-chain eye-bolt.

Safety-coupling-chain (passenger-car platforms). 55, figs. 2485-45; 55, figs. 5538-9. A chain attached to the platform end-timer and hooked to an eye in the platform of an adjoining car, so as to prevent the train from being separated in case the coupling should be detached. They are necessarily used in pairs, an eye and a chain with hook being attached to opposite sides of the same platform.

In 1898 a Recommended Practice was adopted for location and details of platform safety-chains for passenger-cars, as shown in figs. 5538-9.

In 1894 a Recommended Practice was adopted for safety-chains for freight-cars when such chains are used, which is shown in figs. 5533-5. The use of safety-chains on freight cars was not recommended, but when they are used on cars for special service their location is recommended as shown in figs. 5533-5.

Safety's direct steam system (The Safety's Regulating System, L. 188). Figs. 3031-4. By this system it is sought to control the temperature of car by variations of the radiating surface. The regulating cock, 775, is capable of adjusting so as to admit steam to one or both radiating pipes on either side of the car, thereby permitting the use of one to four pipes as radiators, according to the requirements of the weather. The condensation is discharged from each radiator pipe separately, through a slotted angle drip-valve, 603B. The slot prevents the valve ever being entirely shut off, and
is of sufficient area to drain the pipes, if steam is shut off and the trainmen neglect opening the drip-valve.

Direct steam system, L. 111. Fig. 3035-36: This is simpler than the Regulating System, and depends for its efficiency upon the close regulation of steam supply possible with the special inlet valve, 535A. This valve has a Jenkins Seat, and is so constructed that the first full turn of the handwheel only opens the valve enough to give \( \frac{1}{2} \) sq. in. area of the inlet port. It can be adjusted by the wheel so as to give any desired inlet area from that point to the full area of 1 inch pipe. By this means the flow of steam to the radiator pipes (and therefore the car temperature) can be closely regulated.

Safety-guard (for spring-plank). An iron strap attached to the truck transoms and passing under the spring-plank to hold up the latter in case of accidental breaking of the link-hangers. More properly spring-plank safety-strap, which see.

Safety-hanger. See above, also Brake safety-chain Brake-safety-strap. Safety-hanger (for lower brake-rod).

Safety-hanger (for lower brake-rod). A metal loop or eye attached to a truck and through which the lower brake-rod passes. It is intended to prevent the brake-rod from falling on the truck in case it or its connections should break. See also fig. 1967.

Safety-hanger clip. Figs. 1616g, 1628-9. (National hollow brake-beam.)


Safety-plate. (Baker fire-proof heater.) Figs. 2888, 2899. An iron plate which covers the hole in the partition between the fire-pot and base of smoke-flue, marked 12, fig. 2917. Its object is to prevent the ignited coals from falling out if the heater be overturned. It is operated by a safety-plate handle, figs. 2883, 2899, the safety-plate sliding between safety-plate guides, fig. 2896. The safety-plate is held closed by a safety-plate spring, figs. 2864, 2861, bearing upon the safety-plate handle, as in figs. 2865 and 2866.


Safety-plate handle. See Safety-plate.

Safety-plate spring. See Safety-plate.

Safety-plate and gas-preventor. (Baker's perfected heater.) Fig. 2917. This is a cover for the fire-pot with an upturned flange, and is fitted to the top, fig. 2912. It has an upturned flange along its hinged axis, which deflects the air that enters when the door is opened, and prevents its mixing with the gases which escape from the fire-pot through the holes in the top, fig. 2912. The gases remaining hot pass up through the smoke-flue and do not escape into the car.

Safety-rod. (Postal-cars.) 12, figs. 599-604. A rod suspended from overhead, over the pouch-racks, within easy reach, to serve as a hand-grip or grab-iron in case of derailment, etc. Certain fittings, figs. 3816-18, are used to fasten it to the roof or sides of cars; they are the safety-rod brackets, bushings and T-joints.

Safety-rod (for sleeping-car berths). 26, figs. 2409-12. More properly berth safety-rod, which see. See also Safety berth-latch.


Safety-valve ball (Baker heater). See Safety-valve. Safety vent or bushing. Fig. 2919a. See Safety-valve.


2. The main room in a compartment car (rarely used).

3. One of the smaller subdivisions or state-rooms of a sleeping or parlor-car.

4. 130, figs. 439, 448, 488. A retiring room furnished with urinal and closet-hopper, or soil-hopper; and in the more luxurious cars with a water-closet. The saloon is commonly also provided with washing facilities. Other terms are car berthing, car dressing room, etc.

Saloon carriage (English). Answers the same purpose as an excursion-car, or American private-car. A luxurious vehicle, one or more of which is kept for hire on most English railways, having one or more large compartments, about 15 ft. long, fitted with tables, sofas, etc., and termed saloon, is never used in England in the American sense (4) above. See also Carriage.

Saloon door-plate, or notice-plate. Figs. 2788-2802.

Saloon furnishing. Figs. 2888-78.


Saloon-hopper. Figs. 2865-69. See Closet-hopper. Also called soil-hopper.

Saloon hopper-ventilator (Bell's, which see). Figs. 2841-3.

Saloon-latch. Fig. 2704-5, 2781-3, etc. A latch for saloon doors, which consists of a spring-bolt, usually with a stop on the inside, which locks the bolt fast, or with a separate bolt for fastening the door from the inside. See below.

Saloon lock. Figs. 2628-96. The same as a saloon-latch, with provision for locking the door from the outside. Saloon latches without locking facilities are rarely used.


Saloon-plate. See Notice-plate.

Saloon-roof. Fig. 2887. In some of the more modern cars the saloon is entirely roofed over so as to be distinct from the body of the car. Sometimes the partitions are carried up to the roof of the car.


Saloon side-light (Pintsch gas). Fig. 2846-7.

Saloon stop-latch. See Saloon-latch.

Saloon ventilating-jack. Figs. 2833, 2830-1. See Ventilator.

Sand-blast process. A process of cutting glass by blowing sand upon it with a strong blast of air. The glass is covered with paper or other elastic surface which it is found the sand does not cut at all while rapidly cutting away the glass itself. The process was invented by observing the action of sand blown by the wind upon the rocks in the western plains of the United States and is now largely used in place of wheel-cutting.

Sand-box (street-cars). 127, fig. 6055. A box placed under the seats containing grit for sanding the tracks. It is provided with a spout and valve operated by a lever, connecting-rod and lever-holder. See fig. 5066.

Sand-plank. 43, figs. 4580-4757. A common name for spring-plank.
Sash-lockplate. Fig. 4450-2. A sash-lockstop. See Sash-lockstop. Figs. 4450-64. There are two kinds of sash-lockspring. 2, fig. 4477. See Sash-lock. Sash-lockrack. Fig. 4458-4. Sash-locklowerstop. See above and Sash-lockstop. Sash-lockbushing. Figs. 4407-8. See above. Sash-lockbolt. 1, figs. 4476-7 and 4475. See above. Sash-opener. Figs. 4376-80, 4330-41. A contrivance, as a sashlock, 22, fig. 4465-90. A spring-bolt attached to a sash parting-strip. A strip of wood attached to the side of the sash to exclude cinders. It is usually a very fine wirenetting, 64 meshes to the inch. Sash-lift. 21, fig. 2451; figs. 4491-4526. A metal finger slide. Also called bead and parting bead, which see. Sash-lift. 21, fig. 4351; figs. 4491-4526. A metal finger held attached to the bottom-rail of a window-sash for raising and lowering it. They are sometimes let in flush and so called (fig. 4312), but usually attached on the outside. Sometimes, but rarely, the sash-lift is a mere knob, fig. 4470, and so called. A window-blind lift, figs. 4429-49, which see, is a somewhat similar device. See Sash bar-lift. End door sash-lift.

In the common form of sash-lock, fig. 4476-7, the sash-lockbolt, 1, is pressed outward by the sash-lockspring, 2, which moves inward when desired by the sash-locktrigger, 3. The bolt enters into a sash-lock bushing, figs. 4407-8, let into the parting-strip or other part of the window-casing. In place of the bushing, sash-lockstops, figs. 4455-54, or sash-lockplates, fastened upon the outside of the window-casing, or let in flush, are sometimes used, and occasionally a sash-lock rack, figs. 4455-4. A sash-lock lower stop is often added at the bottom to hold the sash shut and prevent it from being opened from the outside.

"A variety of terms are used to designate this part of a car. In most of the trade catalogues it is called a sash-lock, but Webster says the word lock is now appropriated to an instrument composed of a spring, wards and a bolt of iron or steel, used to fasten doors, chests and the like. The lock is moved by a key. Knight says a lock is a "device having a bolt moved by a key, and serving to secure a door, lid or other object. The device used for fastening car-windows is therefore not properly a lock, because it has no key. Of the word latch Webster says: "The primary sense of the root is to catch, to close, to shut, or make fast." That expression is the more correct and therefore the one which should be used when speaking of the latch of a car-window."

The sash-lock, however, seems to continue to be the established and almost universal designation, and there is room for question, as noted, under lock and latch. A sash-latch is sometimes called a sashlock, but the term is applied to designate this device.

A sash-latch is a device used to keep the sash shut and prevent it from rattling. They are made of various forms. A window-sashspring is a metal plate fastened in its center to the sash. Another is of a spiral form, spiral window-sash springs, let into the sash.

"Savage" lamp-burner. Fig. 3879. One of the chimney burners.

Scautling (carpentry). "Lumber under 5 inches square used for studs, braces, ties, etc. It is expressed in terms of its transverse dimensions."—Knight. An upright scantling is termed a stud.

Scauf. "A joint uniting two pieces of timber endwise. The ends of each are bevelled off and projections are sometimes made in the one corresponding to concavities in the other, or a corresponding concavity in each receives a joggle" (or packing-block).—Knight. It is technically known as a ship-spline, prescribed by the rules for international traffic for securing any broken sills but the center sills. See Interchange of Traffic for the splice recommended for sills.

Scauritt-Forney seats. Figs. 3909-76. Seats made by the Scarritt Furniture Company under the Forney patents. The feature of the Forney-seat is the seat back arms and the folding of the cushion and inclinations of the back given by these arms. This is fully shown in the figures. Another feature of these seats is the adjustable foot-rest, which permits luggage to be set under it out of the way as shown in fig. 3972.

Scheme-rod (postal-cars). A rod supported upon the scheme-rod bracket, and carrying the scheme or schedule of the proper distribution of mail matter for the various post-offices used in distributing mail.

Schoen's pressed steel. Body and truck-bolsters; Brake-shoes, figs. 5185-6; Bolster-columns, figs. 5184-5; Center-plates, figs. 5176-82; Journal box, figs. 5161-4, 5185-6; Bolster-columns, figs. 5184-5; Center-plates, figs. 5176-82; Journal box, figs. 5161-4, 5185-6, etc.

The parts are made of a mild low carbon steel in dies, under hydraulically operated presses. Many of them require a number of operations to produce the desired form. The advantages claimed over malleable iron are greatly increased tensile strength, and therefore lighter and better shapes. The tensile strength claimed for pressed steel is 60,000 to 65,000 lbs. per square inch.

Schroer-Thompson piston-travel indicator. Figs. 1779-82. See Piston-travel indicator.

Scraper. See Snow-scraper.

Screen. 1. (For heater-room doors, wash-room panels, etc.) Fig. 3639. A perforated plate of sheet metal, usually japanned, which see, used as an ornamental finish.

2. (For hood of Spear-heaters). A perforated plate or wire netting, through which the air admitted is screened to exclude cinders.

Screen, deck-window. S, fig. 540-1. A wire netting extending the entire length of the clear-story outside the deck-sash to exclude cinders. It is usually a very fine wire netting, 64 meshes to the inch.

Screw. 1. "A cylinder surrounded by a spiral ridge or groove, every part of which forms an equal angle with the axis of the cylinder, so that if developed on a plane surface it would be an inclined plane. It is considered as one of the mechanical powers."—Knight. When used alone the term commonly means a wood-screw, having a slotted head and gimlet point, for driving in with a screw-driver. Machine screws are similar, except that
they have no gimlet point and have a metal screw-threaded shank for using metallic parts. All ordinary forms of bolts have screw-threads cut on them, but are not commonly called screws. A special form of wood-screw is a lag-screw, Fig. 8711, which is a large-sized screw with a head like a bolt, so that it may be inserted with a wrench instead of a screw-driver. See Screw-thread.

2. See Oil-screw.

Screw-burner. Figs. 8376-7, etc. A lamp-burner to which the chimney is fastened by a small screw passing over a lip or rim on the bottom of a chimney. It is the oldest form of burner, but now little used. See Lamp-burner.

Screw-coupling (English). 41 to 45, figs. 501-4. The means by which passenger train vehicles are coupled together. On the Continent it is used for both passenger and freight cars. It comprises a right and left handed screw provided with a hinged weighted handle, which always hangs downward, so that it has no tendency to unscrew and slacken the coupling, and two nuts with frogs tending in the eye of U-shaped coupling links or shackles. The screw-coupling may be either loose, or one shackle may be attached to the drawbar. See Screw-coupling nut, and gudgeons (English). 44, figs. 501-4. See above.

Screw-coupling weighted lever (English). 45, figs. 501-4. See above.

Screw-gages. Instruments for measuring the diameter or size of screws. They are of two kinds: external, for measuring male screws, and internal, for measuring female screws. See also Screw-pitch gauge. Screw-thread gauge.

Screw-jack. Figs. 5783, 5784-9, 8748-4. A jack, the power of which depends upon a screw, turned by a lever. There are several such jacks in use, the Bell-base, Ratchet screw-jack, the Differential screw-jack, which has two screws, one working within the other, and the Chapman screw-jack, which has a capetans head, into which a bar may be inserted. See Screw-pitch gage.

Screw-pitch gage. "A gage for determining the number of threads to the inch on screws and taps. It consists of a number of toothed plates turning on a common pivot, so that the serrated edge of each may be applied to the screw until one is found which corresponds therewith. The figures stamped on the plate indicate the number of threads to the inch."—Knight. In the ordinary single-thread screw the pitch is indicated by the number of threads to an inch. See Screw-thread.

Screw-thread. Figs. 5499-8. The groove, or the material between the grooves, which is cut on the outside surface of a cylinder to form a male screw, or on the inside surface of a cylindrical hole to form a nut or female screw. Metal screw-threads and wood-screw-threads, which see, are of different form. Pipe screw-threads, which see, are usually V-shaped, but all other threads in common use for ordinary purposes are made by the Whitworth or Sellers standard screw-threads, which see, the former being the European and the latter the American standard.

At the M. C. B. Convention, 1889, it was "Resolved, That this Association deprecates the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute system, and that all the members of the Association are urged to abandon entirely the use of over or under size screws."

The Sellers or Franklin Institute system of screw-threads, bolt heads and nuts is the standard of the Association, and repeated action of the Association has deprecated the use of any other size, and encouraged the careful maintenance of these standards. See Proceedings 1874, pages 10 and 31; Proceedings 1879, pages 19 and 31; Proceedings 1882, pages 19 and 51. A set of gauges for standard screw-threads and a standard sample of 2 feet long, are held in the office of the Secretary for reference.

Mr. Sellers, who proposed this system of screw-threads, de-
Seat-arm pivot. Figs. 4034-50. A metal pivot by which seat-arm cap. A piece of metal shaped to the form of a curved form, resembling somewhat a rear portion of an ordinary seat-arm, which supports the arm of a person sitting in the seat, as in figs. 4017-21, and sometimes, incorrectly, to designate an arm-cap, figs. 4017-21, which see.

Seat-arm plate. Fig. 4069, etc. A plate fastened to seat-arm rivet. See Seat-arm pivot.

Seat-arm rivet. See Seat-arm pivot.

Seat-arm rocker (Cobb’s pivoted seat-arm). A bar resembling the rear portion of an ordinary seat-arm, which is attached to the seat-arm proper by a swing-joint or seat-back arm pivot.

Seat-arm stop. Figs. 4051-76, etc. A metal lug or bracket attached to a seat-end and sometimes to the side of the car on which the seat-arm rests. Seat-stops are either attached to a long plate (curved or straight seat-stop), as in figs. 4051-9, etc., or as in round seat-stops, figs. 4083-9, etc., and have a flange entire surrounding them, by which they are attached to the seat-arm or side of the car. They are made in a variety of forms shown in figs. 4051-76. They are also called seat-stops.

Seat-arm thimbles. Figs. 4040-1.

Seat-arm washer. A small washer for the head of a screw by which a seat-arm is fastened to a seat-end. Now little used.

Seat-back. Figs. 4044-46. That part of an ordinary American car-seat which forms a support for the back. It has an arm called the seat-back arm attached to it, by which it is attached to the seat-ends with a seat-arm pivot, so that it can be swung over so as to face the other way. In some styles the seat-back arm is pivoted below the seat cushion and the seat-back swings over the cushion so that both sides are used alternately. See Seat. On some suburban cars, and usually on street-cars, longitudinal seats are used, with the backs against the side of the car. See Slat seat-back. Flexible-top seat-back. Sectional seat-back. The Buntin seat, which see, has the seat and seat-back in one.

Seat-back arm. A seat-arm, which see.

Seat-back arm lock. See Seat-lock.


The swing-joint or seat-back pivot in the seat-arm.

2. A Seat-arm pivot, which see.

Seat-back band. Figs. 4023-8. A seat-back molding, which see.

Seat-back corner (emigrantsleeping-cars). A brass corner-piece carrying a lug to guide the back when making up the seats into berths.

Seat-back corners. Figs. 4019-4. A metalic corner-piece to screw to the backs of seats and protect the upholstery from wear.

Seat-back curved-stop. Figs. 4078-7. A seat-back stop, which see, of a curved form, resembling somewhat a letter S.

Seat-back molding. Figs. 4028-8. A wood or (usually) metal band or molding fastened around the edge of a seat-back to give it a finish and protect it from wear.

Seat-back pivot (Cobb’s strike-arm). The pin by which the seat-arm is pivoted to the back. See Cobb’s pivoted seat-arm. It should not be confused with a seat-arm pivot, which see.

Seat-back rail (street-cars). 110, figs. 5554-67. Two narrow rails, upper and lower, which form the top and bottom of a longitudinal seat inclining the seat-back board between them.

Seat-back reversing-arms. 9, figs. 4051-76. They are also called seat-stops.

Seat-back round-stop. Figs. 4065-8. A seat-back arm, which see.

Seat-back stop. See Seat-stop.

Seat-back top-rail. 112, fig. 5556.

Seat-bearing cross-bar. 100, fig. 5556. (Longitudinal seat of street-car.) The bearing bar transverse to the seat and resting upon the seat-leg and the back-seat rail.

Seat-board (English). 150, fig. 5014. In a carriage, the support for the seat soft-springs. These springs are...
tied down, and a piece of canvas is stretched tightly over them, the cushion resting on this canvas.

**Seat-bottom (street-cars).** 95, figs. 5544-7. The boards or floor in a seat-frame on which a cushion rests, or on which persons sit when no cushion is used. It is attached to the back and front seat-bottom rails.

**Seat-bottom (rail).** See above.

**Seat-bottom cross-bar.** 101, fig. 5556. A filling piece shaped like the seat-bottom, to which the slats are screwed. It rests upon or over the seat-bearing cross-bar.

**Seat-bracket (hand-car).** 13, figs. 5395-7. A wrought-iron knee which supports the seat.

**Seat-bracket brace (hand-car).** 14, figs. 5395-7. A wrought-iron knee which supports the arm of a personsitting in the seat.

**Seat-cushion.** 1. Figs. 8917, 8929-38. A soft pad or pillow which supports the seat.

**Seat-coverguard-rail.** 103b, fig. 5667. A strip of wood tacked to the flap of the seat-cover to keep it straight.

**Seat-cover (street-car).** A piece of tapestry or seat-cover which supports the seat-bottom. See above.

**Seat-cove.** 99, fig. 5656. The rail that takes the place of the back-seat bottom slab.

**Seat-cover guard-rail.** 103b, fig. 5667. A strip of wood either over the seat-bearing cross-bar and running along the ends of the seat-bearing cross-bar, or on which persons sit when no cushion is used. It is attached to the back and front seat-bottom rails.

**Seat-endrest.** 5, figs. 8917-25. The end-posts or upright members of a wood seat-frame.

**Seat-end.** 123, figs. 5401; 3, figs. 3917-25, 4106. A frame or front or back, resting on and attached to the seat-end and to the side of the car, and which supports a cushion-frame or seat-bottom.

**Seat-end arm.** 4, figs. 8917-35. The portion of a seat-end which supports the arm of a person sitting in the seat. An arm-rest.

**Seat-end panel-rail (open street-car).** 254, fig. 5559. A piece of furring to which the seat-end panel of an open car is fastened.

**Seat-end (cross) rail.** 6, figs. 8917-36; 255, fig. 5559. The end-rail between the posts of a wood seat-end.

**Seat-end post.** 5, figs. 8917-35. The end-posts or upright members of a wood seat-frame.

**Seat-frame (Hartley chair) which see.** 12, figs. 8998-9. See Pedestal.

**Seat-front (street-car).** 105, fig. 5556. The rave or seat-riser.

**Seat-front rail.** 103, fig. 5556. A rail fastened to the ends of the seat-bearing cross-bar and running along the top of the seat-front and under the front-seat rail.

**Seat-front panel (street-car).** 104, fig. 5556. The panel beneath the seat, the same as a rest-front.

**Seat-hinge (sleeping-cars).** Figs. 4111, 4337. A strap hinge used to connect a seat with the seat-back. See also Sofa-hinge.

**Seating.** Figs. 3943. See Canvas-lined rattan-seating. The plush which is commonly used to upholster car-seats is also similarly called seating.

**Seat-joint bolt.** Fig. 4042. A bolt for fastening a seat-rail to aisle seat-ends. It is also used at the wall ends.

**Seat-leg (longitudinal seats).** 96, figs. 5544-67. A wooden post which supports a front seat-rail.

**Seat-leg plate.** A metal plate with which the front of a seat-end or leg is covered to protect it from injury.

**Seat-lever (Howard's parlor-car water-closet).** Figs. 8889-9. A lever projecting backward from the seat-lid, to which the connecting-rod is attached.

**Seat-lid (Howard's parlor-car water-closet).** Figs. 8889-9. A lid connected with the pan and service-measure by the connecting-rod in such a manner that on raising it the pan is brought up into position and about half a gallon of water is discharged from the service-measure.

**Seat-lock.** Figs. 4029-33. A lock for holding the back of a seat so that its position cannot be reversed. Such locks are attached either to the seat-end, seat-back arm, or seat-back stop. A form for iron seat-ends with a smaller escutcheon, which is not provided with screw-holes, is sometimes distinctively called a barrel-lock, although the term is almost equally applicable to any form of seat-lock.

**Seat-locks operate by pushing the key inward, turning it a little, and then pulling on the key.**

**Seat-lock bolt.** Fig. 4039. The beveled bolt by which locking is affected.

**Seat-lock key.** A key for a seat-lock. Some work by pushing in and not turning; others, see Seat-lock.

**Seat-lock spring.** Fig. 4059. The spring which moves the bolt.

**Seat-pull (sleeping-cars).** Figs. 4041-3. A flush handle for pulling out the seat in making up the berth so as to drop the back and seat to the same level.

**Seat-rail (hand-car).** 15, figs. 5495-7. A rave, which see.

**Seat-rail (English).** 119, figs. 501-4. A piece of wood or metal at the end of a car-seat which supports the arm of the occupant and to which the seat-back arm is attached. Seats are designated long or short, according to whether they extend entirely to the floor or are supported upon a seat-stand. They are also designated as aisle seat-ends, or wall seat-ends, and, for corner seats, as left-hand or right-hand seat-ends, which see.

**Seat-rail tie-rod.** Figs. 3967-76. A rod connecting the seat-rail to aisle seat-ends. It is also used at the wall ends.

**Seat-riser.** 1. (Street-cars.) 102, figs. 5544-67. A vertical bar of wood or metal to separate the space occupied by a passenger from that adjoining it.

**Seat-slat.** A narrow strip of wood which forms part of a seat-bottom. (Longitudinal seats.) Shown in figs. 99 and 464-6. A bar of wood or metal to separate the space occupied by a passenger from that adjoining it.

**Seat-spring.** Figs. 3904-7, 3929-38, 8948-51, 3956-67, 4000-13. A spring used on cars; a squab-cushion, which is a loose pad and is now little used, and box-cushion, which is a cushion built upon a cushion-frame, with springs, etc. See Back-squab (English). A great variety of forms of seat-cushions exist, the leading ones of which are shown. Special forms, separately defined, are, as respects material, woven wire, rattan or cane, canvas-lined; as respects mode of construction, flexible-top, elliptic, broad-band elliptic, spiral-elliptic, Bushnell, spring-edge, sectional, drop-down frame, etc., etc.

2. (English.) 196, figs. 501-4. American equivalent, squab cushion. In a first-class carriage, a flat, loose squab cushion, about four inches thick, covered with broadcloth on one side and leather on the other, and stuffed with curled horse hair. It is reversible, and often so called.

**Seat-division (longitudinal seats).** Shown in figs. 99 and 464-6. A bar of wood or metal to separate the space occupied by a passenger from that adjoining it.

**Seat-end.** 123, figs. 540-1; 3, figs. 8917-25, 4106. A frame of wood or metal at the end of a car-seat which supports the arm of the occupant and to which the seat-back arm is attached. Seats are designated long or short, according to whether they extend entirely to the floor or are supported upon a seat-stand. They are also designated as aisle seat-ends, or wall seat-ends, and, for corner seats, as left-hand or right-hand seat-ends, which see.

**Seat-end arm.** 4, figs. 8917-35. The portion of a seat-end which supports the arm of a person sitting in the seat. An arm-rest.

**Seat-end panel-rail (open street-car).** 254, fig. 5559. A piece of furring to which the seat-end panel of an open car is fastened.

**Seat-end (cross) rail.** 6, figs. 8917-36; 255, fig. 5559. The end-rail between the posts of a wood seat-end.

**Seat-end post.** 5, figs. 8917-35. The end-posts or upright members of a wood seat-frame.

**Seat-frame (Hartley chair) which see.** 12, figs. 8998-9. See Pedestal.

**Seat-front (street-car).** 105, fig. 5556. The rave or seat-riser.

**Seat-front rail.** 103, fig. 5556. A rail fastened to the ends of the seat-bearing cross-bar and running along the top of the seat-front and under the front-seat rail.
Seat-stop. See seat-arm stop.

Seat-levering. 35, figs. 9917-18. See Parallel rod.

Seat-webbing. Figs. 3929, etc. A form of coarse canvas used in upholstering car-seats.

Second catch (of car-door fastener). Fig. 3744. A double hook eye placed in the horse of a car-door lock in such manner that the door can, if desired, be locked, leaving a crack open for ventilation.

Secondary brake-rod. 1. (Hodge brake.) 6 fig. 1468. A rod which connects one end of a floating-lever with one of the brake-levers.

2. (Elder brake.) 6, fig. 1462. A rod which connects the center brake-lever, Elder brake, with one of the brake-levers on the truck. On a four-wheel car it is the rod which connects the center lever with one of the brake-beams.

Second-class car. A plainly-finished passenger-car for carrying passengers who pay a lower rate of fare than first-class passengers do. Such cars are rarely used, the smoking car usually serving this purpose for the small number of so-called second-class (in reality, third-class) passengers. See Coach. First-class car.

Second-class carriage (English). A vehicle adapted to carry passengers paying an intermediate rate of fare, the fittings being less expensive and comfortable than in the first-class. Each compartment measures about 6 feet in the length of the carriage and seats 10 passengers. It is rapidly going out of use, so much so that several of the English roads have discontinued the running of second-class carriages. See also Carriage.

Section. 1. See Sectional seat-cushion.

2. (Of a sleeping car.) Figs. 3408-12. Two double berths, one above the other, making up into two seats facing each other by day. There are from 8 to 12 berths, one above the other, making up into two seats sections. See figs. 177, 186.

Sectional seat-cushion. Figs. 3899-8, 3848-51, 4000-8. One with spiral springs separately attached to narrow slats so that the seat can be made up or repaired in sections.

Section. In geometry: "A part of a circle included by an arc and the two radii drawn to its extremities."—Davies. Hence, any object whose shape is that of a part of a circle ought to be called a sector, but as a matter of fact it is generally called a quadrant. See Conical quadrants. See Drawer sectors.

S diment well (Gold's car-heating). Fig. 3807. See Thermostatic steam-trap, etc.

Self-acting ventilator. Figs. 4299-30a. An automatic ventilator which is provided with a lever to open and close the ventilator.

Self-adjusting spring (brake) head. Figs. 1909-11, 1616a-e. A brake head which fits a ratchet sleeve and which contains a spring plunger with sharp projections which engage in the indentation of the ratchet sleeve and allows the head to adjust itself to the wheel, but which shortly beds itself and holds the needy firmly in one position.

Self-closing faucet, or cock. Fig. 3842. A faucet having a horizontal bar-handle provided with a spring by which it is closed when released. Telegraph-cocks, which see, figs. 3649-90, and also compression-cocks, fig. 3585, are also self-closing, but not distinctly so-called.

Self-locking, or spring padlock. Figs. 2762-70. One which snaps, locked by pressure only, without using a key, in distinction from a dead padlock.

Sellers system of screw threads. Figs. 4529-3. A system of screw threads designed by William Sellers, of Philadelphia. The following table gives the number of threads to the inch and the proportion of the threads of the Sellers system. See also fig. 5498.

<table>
<thead>
<tr>
<th>Number of threads per inch</th>
<th>Diameters of screw at the root</th>
<th>Pitch</th>
<th>Proportions of the threads</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.21</td>
<td>0.28</td>
<td>0.42</td>
</tr>
<tr>
<td>18</td>
<td>0.31</td>
<td>0.40</td>
<td>0.51</td>
</tr>
<tr>
<td>27</td>
<td>0.45</td>
<td>0.57</td>
<td>0.66</td>
</tr>
<tr>
<td>36</td>
<td>0.57</td>
<td>0.69</td>
<td>0.80</td>
</tr>
<tr>
<td>48</td>
<td>0.71</td>
<td>0.83</td>
<td>0.92</td>
</tr>
<tr>
<td>60</td>
<td>0.83</td>
<td>0.95</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The form of the threads is an essential part of the system and is shown in fig. 5497. The angle at which the sides of the thread stand to each other is 60 degrees, and the top and bottom of the threads are made flat. The proportions of the threads are determined by the following rule given by Mr. Sellers: "Divide the pitch, or, what is the same thing, the sides of the thread, into eight equal parts; take off one part from the top and fill in one part in the bottom of the thread; then the flat top and bottom will equal one-eighth of the pitch, the wearing surface will be three-quarters of the pitch, and the diameter of screw at bottom of the thread will be expressed by the formula:

\[ D = \frac{4}{\pi} \frac{P}{N} \]

in which \( D \) = diameter of the screw and \( N \) = the number of threads per inch.

This system was recommended by a committee appointed by the Franklin Institute in 1864; was adopted as the standard by both the Army and Navy departments of the United States, and has been recommended by both the Master Car Builders' and the Master Mechanics' associations as the standard to be used in the construction of cars and locomotives. It is often called the Franklin Institute standard and also the United States standard; but, as it was designed by Mr. Sellers, it should be known as the Sellers system. See Screw-thread.

Semaphore lens. Figs. 3448-8. A trade name for a cheap modification of the Fresnel lens, the latter term being more generally restricted to those having the back a plane or nearly cylindrical surface.

Service-measure (Howard's parlor-car water-closet). Figs. 3888-9. An auxiliary tank holding about a half-gallon of water connected with the seat-lid and water-tank and discharging the water on raising the lid only.

Set (of elliptic springs). 2, fig. 5239. The amount of compression of which the spring is capable. The distance between the spring-bands when unloaded. The arch is half the set, plus the thickness of the spring-band.

Set of springs. All the springs for carrying the weight of one car, not including draw-springs. A set of bolster-springs consists of the springs which are placed between the truck-frames and carry the weight of the body only. A set of等于izing-bar springs means all the springs for a car on the equalizing-bands. A set of wheel or journal springs means all the springs which are placed directly over the journal-boxes of one car.

Set of wheels. This term means a number of wheels sufficient for one car. A set of wheels and axles means the requisite number of wheels fitted to axles complete for one car. A pair of wheels means two wheels already fitted to an axle, including the axle; but a set of wheels does not include the axles unless specified.

Set-screw, or stud-fastening (English). Figs. 3546-5. As applied to railroad wheels, a mode of securing the tire to the wheel which is becoming obsolete. A modification is the set-screw fastening (English), plain-end, fig. 3546. Though superior to the other, it is being superseded by better methods. See Tire-fastening.
Setting-dia (for carpet eyelets). No illustration. A device, one form of which is very similar to fig. 3958-4, for forming eyelets by compressing the grommets together. Usually, however, with large eyelets, it is done with a hammer.

**Seven-group spiral-spring.** See **Spiral-spring**.

Sewell steam-coupling. Figs. 2900-5. This is a straight-port, abutting-face, and insulated steam-coupler. The cuts show its construction. The passage for steam is unobstructed. On the coupler-head are a tooth and space in such a position as to serve the double purpose of a guide for the interlocking devices when being coupled, and also to retain the coupler-heads in proper relation while uncoupling. The locking features are constructed upon epicycloidal curves, thereby drawing the gaskets together in a direct line after contact. The center line of pressure exactly coincides with the center line through the locking devices, and hence gravity tightens the gasket faces. The coupler is automatic in uncoupling in consequence of the curvature of the hose-nipple, the center line of draft being brought above the center line of pressure as soon as hose begins to approach a horizontal position. The gaskets are of rubber.

**Sextuple (of elliptic springs).** Six elliptic springs coupled together, side by side, to act as one.

**Shackle.**

1. (Of a padlock.) A, figs. 2771-2, etc. A U-shaped bar which is passed through the staple in front of the hasp by which the padlock is used to lock the object. The inner end D of the shackle is termed the heel, which is sometimes provided with the shackle-spring G and I to hold the shackle open or shut.

The shackle of cheap padlocks is attached to projecting ears, but in those of better quality the heel is entirely within the lock itself. The shackle is sometimes termed the hasp, but this usage is incorrect.

2. (Of car-seals.) Figs. 3877-99a. The wire or metal strip passing through the fastening to be sealed and closed together at the end. See **Car-seal**.

**Shackle-bar.** A coupling-link, which see.

**Shackle-guard (of a padlock).** A plate used in some padlocks lying immediately under the point of the shackle when locked in place, serving to exclude dirt and wet from the interior.

**Shackle-lock (car-door fastener).** A term used in distinction from the seal-lock.

**Shackle-spring.** D and G, figs. 2771-2. See **Shackle**.

**Shackle-stop (Miller's padlock).** H, figs. 3768-70. A stop to prevent the shackle escaping too far in unlocking.

**Shade.** See **Lamp-shade**, figs. 4328-8. **Window-shade**, figs. 4546-82.

**Shade-cap (of a lamp).** 33, figs. 3961-3917. A vertical tube encasing the shade upward and constituting in effect an extension of the chimney. A similar part for a lamp-globe is called a **globe-chimney**.

**Shade-holders (Pintach system).** 320-A, fig. 3931, is for postal-car shade. 320, fig. 3832, only. Holder 320-B, fig. 3217, is for use with 4-in. globe 102, fig. 3216, on any bracket-lamp. Contains a check-screw for adjustment of the flame.

**Shade-ring.** Figs. 3435-7. See **Adjustable shade-ring**. Also called **wire tripod**.

**Shade-roller (for window shades).** Fig. 4565. A device serving the purpose which its name implies, the only forms of which in general use are the automatic forms, which hold the shade in any position when released by means of centripetal-pin-pulleys, which see. The leading styles are the Hartthorn shade-roller and the McKay shade-roller, which see. The Hartthorn works with a pawl on the end, while the McKay has a cam. See **Burrowes and Davis car-shades**.

**Shaft.** "That part of a machine to which motion is communicated by torsion."—**Webster**.

See **Brake-shaft**, **Drum-shaft**, **Crank-shaft**, **Door-shaft**, **Horizontal brake-shaft**, **Lever-shaft (street-cars)**, **Driving-shaft**, and **Winding-shaft**.

**Shaker.** Fig. 3960-4 etc. See **Grate-shaker**. **Shaker-handle**.

**Shank (Kirby's car-door lock).** A, fig. 2638. The spindle. See also **Dyke-shank**, **Grate-shank**, **Lock-shank**.

**Shank.** (of a coupler or drawbar). That part of a coupler or drawbar between the draw-head and tail-end. The body of the coupler. It may be round, square, and corrugated in different couplers.

**Shank-facings (Kirby's car-door lock).** F, fig. 2638.

**Shear beams.** (Snow-plow framing.) 13b, 14, 15, figs. 3423-5. The timbers forming the inclined plane and parting ridge of a plow. They are placed in positions so that they resemble the knives of a pair of shears, hence the name.

**Shears (of a plow-driver car).** Figs. 401-4. The tongs which grasp the hammer, which see.

**Sheathing.** 59, figs. 435-73. Boards which are tongued and grooved, and with which the sides of cars are covered. The sides of a gondola car are ordinarily termed **side-plank** and **end-plank**, and are much heavier than the sheathing of a box-car. **Inside lining**, which see, is in addition to the ordinary outside sheathing. Formerly passenger-cars were covered with panels, but it is now the universal practice to use sheathing.

**Sheathing-furring.** 59, figs. 435-73. Pieces of wood nailed, screwed, or glued in a wall to nail the sheathing to, inserted where the distance between rails is so great as to require intermediate pieces to back up the sheathing. Corresponds to **panel-furring**, which see.

**Sheathing rill.** See **panel-furring**. A **sheathing-rail**, or **sheathing-furring** is the same as a **panel-rail** or a **paneless-furring**, the paneling having been superseded by sheathing.

**Sheathing-strips.** 60, figs. 435-73. It should read **panel strips**, which see.

**Sheave.** A wheel, roller, or pulley over which a cord or rope runs, or on which any object, as a door or window, rolls. Sheaves are often used to designate a block or pulley, but more properly it designates simply the grooved wheel in the block. See **Pulley**.

See also **Bell-cord sheave**. **Main sheave**. **Drake-lever sheave**. **Pile-hoisting sheave**. **Drake-shaft chain-sheave**. **Sliding-door sheave**. **Center brake-lever sheave**. **Strap-sheave**. **Door-sheave**.

**Sheave-hook (derrick-cars).** 2, 389-96. The hook carried at the lower end of a **hoisting-block** to which the load is attached.

**Sheave-pin, or pintle.** The axle of a sheave. See **Pintle**.

**Sheet-iron.** Iron rolled thin and, in car work, usually galvanized. Its thickness is given by its number of **wire gauge**, which see. The standard sizes are 6 and 8 ft. long and 24, 26, 28, and 30 in. wide. **Sheet steel**, galvanized or not, is now also largely manufactured.

**Sheet-ring** and **staple (English)**. 80, figs. 348-51. A metal wheel made from a sheet of toughened homogeneous steel, which by a series of operations is brought to the shape shown. The center is dished and radially corrugated in different couplers.

**Sheet-rings** and **staples**. 80, figs. 348-51. A metal wheel made from a sheet of toughened homogeneous steel, which by a series of operations is brought to the shape shown. The center is dished and radially corrugated in different couplers.
Shipsplice. One of the many forms of splicing or scarf bearing. A bearing, the shell of which is constructed to slide laterally a few inches so as to have a slow-motion or quick-motion gear according to the position of the shifting-pinion.

Shims. A thin piece of wood or metal used as a distance-block to save more careful fitting. In truck-work, shims are very largely used in order to remedy the heaving of the rails from frost. Shimming has been used in fitting on car-wheels when the wheel-seat of the axle was a little too small, but the M. C. B. rules for interchange of traffic, which see, specify that no wheel shall be condemned for this fault unless the spots are over 1/8 in. in length, or are so numerous as to endanger the safety of the wheel.

Shifting-pinion (hoisting-gear). A pinion attached to the driving-shaft or driving-shaft of a hoisting-gear which is constructed to slide laterally a few inches so as to have a slow-motion or quick-motion gear according to the position of the shifting-pinion.

Shells. A thin piece of wood or metal used as a distance-block for moving cars from one track to another, as in making up or separating trains.

In this country usually called switching. Marshaling which see, has a nearly similar meaning. Sometimes the word drilling or regulating is used.

Shutter (for cabin of pile-driver car). 13, figs. 401-4. A wooden cover for a window, especially one having no sash.

Sides. See Deck-side, Ladder-side, Truck-side.

Side arm-rest, or allow rest (English). 201, figs. 501-4. A wooden support for the elbow attached to the inner sides of a carriage beneath the windows, and padded with horsehair and covered with broadcloth or leather. See also Folding arm-rest. In American cars a windowledge is made to serve the same purpose, but arm-rests, 2409, are general in sleeping-cars.

Side-bearings. Supports placed on each side of the center-pin of a car to prevent too much rolling or rocking motion of the car-body. Usually there is a plate of iron or steel attached to the body-bolster on each side of the center-pin, called a body side-bearing, 16, figs. 529-66, etc.; 14, figs. 435-73 and a corresponding plate, block or roller on the truck-bolster, called the truck side-bearing, which see, 61, figs. 4580-4757. They are also distinguished as lower and upper side-bearings. Generally there is a little space left between the bearings, so that the truck can turn freely on the center-plate, although in some cases the weight of the car-body rests on the side-bearings instead of the center-plates. Other types are the King's yielding side-bearing, fig. 5190-1, and the Hubbard anti-friction side-bearing. To obviate friction, cup side-bearings are so formed as to hold a lubricant. Roller side-bearings and roller side-bearings are also used.

Side-bearing block. Figs. 4974-5. A filling casting bolted to the truck bolster and forming an abutment for the Truck-side bearing-bar.

Side-bearing bridge or arch-bar (six-wheeled truck). 62, figs. 4842-4956. An iron bar, true, or wooden beam attached to the spring-beams to support the truck side bearing.

Side-bearing roller. Fig. 4747-9. See Side-bearing.

Side-bearing spring. 16, figs. 339-43. (Side-dump or tip-car.) Bearing springs upon which the body bears at the side to steady the box and to receive the shock when the body is returned to its normal position after dumping.

Side-bearing timbers. L, figs. 325-7. Longitudinal or transverse floor timbers framed or bolted to the side-posts of a cool or ore-car, which supports the upper ends of theinclined floor planking.

Side-board. 1. (Dining-cars.) Figs. 13, figs. 401-4. A wooden support for the elbow attached to the inner side of the car and not extending across the whole width of the floor. Commonly there is a plate of iron or steel attached to the body bolster on each side of the center-pin, called a body side-bearing, 16, figs. 529-66, etc.; 14, figs. 435-73 and a corresponding plate, block or roller on the truck bolster, called the truck side-bearing, which see, 61, figs. 4580-4757. They are also distinguished as lower and upper side-bearings. Generally there is a little space left between the bearings, so that the truck can turn freely on the center-plate, although in some cases the weight of the car-body rests on the side-bearings instead of the center-plates. Other types are the King's yielding side-bearing, fig. 5190-1, and the Hubbard anti-friction side-bearing. To obviate friction, cup side-bearings are so formed as to hold a lubricant. Roller side-bearings and roller side-bearings are also used.

Side-platform. Figs. 102-3, 474-8. An ornamental receptacle for dishes, etc., usually placed so as to face the central compartment of the car. See Buffet-car.

Side-buffer spring. 33, figs. 329-66, etc.; 51, figs. 435-73. Commonly, simply body-brace or brace, which see, except when the end-braces are to be distinguished from them.

Side-body brace rod. 34, figs. 229-66. 59, figs. 435-73. See above.

Side-body true rods. 38, figs. 398-815. See Side true-rod or Side-trussing.

Side buffer-spring. Figs. 1540. See Buffer-spring.

Side-buffer stem. Figs. 1395-6 and 2900-3901.

Side casting. See Drawbar side-casting.

Side chute-plank. Q, figs. 835-7. The planking of an inclined floor which discharges its load transversely to the car, either toward or from the middle of the car.

Side deck-lamp. Figs. 208, 405-7. A bracket-lamp fastened above the floor and to the deck-true or to the lower deck-ceiling and the deck-post.

Side-doors. 1. (Baggage-car.) Figs. 1793-8.
2. (Side dump cars) 129, figs. 332-5; 62, figs. 398-42.

Side dump-car. Figs. 27-30, 328-42. A car so constructed that its contents may be discharged to one side of the track through side doors, either by having the floor inclined or by tipping it sidewise. See Dump-car and Tip-to-car.

Side foot-rest (passenger-cars). L, figs. 399-401. A metal plate fastened to the truck-plank between the seats, for passengers to rest their feet on. Chiefly used over heater-pipes as a guard to prevent the feet of passengers from coming in contact with the hot pipes. Also called shield.

Side-frame. 1. (Of a car-body.) Figs. 435-73, 531-8, 543-70, etc. The frame which forms the whole side of a car-body. It includes the posts, braces, plate, rail, girth, etc. See Framing.

2. (Of a truck.) Figs. 4576-4775 and figs. 4597-90, 4649-55. See Truck side-frame. Diamond-truck.

Side-gutter, or outside-cornice (English). 175; figs. 501-4. A piece of wood secured on the outside of the vehicle at the angle of the roof to the sides. It is channeled on the top to catch the rain and to convey it to the ends of the vehicle, to prevent it running down the sides.

Side-gutter moulding (English). 138; figs. 501-4. A moulding which is attached to the outer side of the side-gutter in order to hide the heads of the bolts by which it is secured.

Side journal-spring (street-cars). One of a pair of spiral springs which rest on ledges on each side of a journal-box, as in figs. 5643, 5645, etc.

Side-lamp iron (English). 184, figs. 398-398. A lamp attached to the side of a passenger-car. In distinction from a center-lamp, which hangs from the roof; they are usually made with brackets by which they can be conveniently fastened.

2. (English.) American equivalent, side tail-light. A colored signal lamp carried at the side of the last vehicle of a train. Two red side-lamps and one red tail-lamp are generally carried, arranged in the form of a triangle.

Side-lamp bracket. 17, figs. 398-398. See Side-lamp.

Side-lamp holder. Fig. 3877. A metal ring or bowl-shaped receptacle usually attached to a bracket to hold a lamp.

Side-lamp iron (English). 184, figs. 501-4. American equivalent, tail-light holder. A wrought-iron lamp-holder secured to the outer side of the body to carry the colored signal lamp, which see. See also Signal-lamp.

Side-links. (Gould tender-hook.) 79, figs. 3145-9. Links by which the tender-hook is fastened to the buffer-head, and which permit a lateral motion of the hook. The hook is centered by springs pressing against the side-links.

Side-piece (for platform-hood). A thin block cut to the curve of the hood.

Side-plank (gondola-cars). 52, figs. 805-22. The boards bolted to the stakes constituting the sides of the car. They vary from 2 to 5 ft. in height according to its capacity and are 3 to 8 in. thick. Those at the end of the car are termed end-planks, and are usually hinged at the bottom so as to drop down inwardly on to the floor of the car.

Side-plank tie-rod. 36, figs. 310-15. A vertical rod passing through the side-sill and side planking and tying them together. A side-plank tie-rod fulfill the same office, but the planks are bolted or riveted to the plank, the end of the strap being forged round and threaded to take a nut.

Side-plank tie-strap. 37, figs. 305-15. See above.

Side-plate. 46, figs. 329-66; 66, figs. 430-73, 536-57. More properly, simply plate. The longitudinal stick on top of the posts of the car-body. So called as distinguished from the end-plate.

Side-post strap-bolt. 27, fig. 5854. A strap-bolt joining the post to the side-sill.

Side-pulley (of bell-cord guides, which see). 16c, figs. 398-42.

Side-rail. W, figs. 398-42. A longitudinal timber, extending along the top of a side-frame of a coal or ore car. It rests upon posts and braces and connects with end-rails which go across the end of the car. It corresponds to the plate of a box-car, but does not carry any rafters or carlines, as does a plate.

Side-rest (tip-car). 16c, figs. 398-42. A block of wood or metal, or a spring, on top of the frame on which the body rests when tipped.

Side-seat. Figs. 3947, 5650-58. A longitudinal car-seat, the back of which is against the side of a car. See Car-seat.

Side-sills, or outside-sills. 1, figs. 239-66, etc.; 483-73, etc. The exterior sills, which see. Sometimes the outside-sills of a passenger-car are referred to as word sill, but this use of the word is uncommon. The side-sills are usually made deeper than the inside-sills in flat and gondola-cars, but rarely in box and stock-cars. When the side-sills are deeper than the center and intermediate sills, bolaters similar to figs. 1483-81, and 1493-93 are used. Iron side-sills are usually 8-inch I-beams. In passenger-cars the side-sill, and the end-sill as well, are sometimes plated with steel or iron to give greater stiffness. See figs. 483-81, 528-80, 574-88, and 1175-9.

Side-spring (Janney-Miller coupler). A spiral spring actuating the Miller hook laterally. The Janney coupler, from its peculiar movement of the knuckle or coupling-hook in coupling, requires no side-play.

Side-spring bolt (Janney-Miller coupler). The bolt securing the side-spring in place.

Side-sill fitch-plank. E, figs. 328-40. The two wood parts which enclose the fitch-plate and make up a composite side-sill.


Side-spring eye-bolt (Janney-Miller coupler). The eye attached to the Janney horn in which the side-spring is engaged, for use only with the Miller hook.

Side-spring plate (Janney-Miller coupler). The plate or bracket sustaining the side-spring.

Side-spring stirrup (Janney-Miller coupler). The part inserted in the eye-bolt fixed to the Janney horn connecting the side-spring bolt to the Miller hook.

Side-spring trigger (Janney-Miller coupler). A kind of detent-latch used for relieving the tension of the side-spring while the couplers are being changed.

Side-spring washer (Janney-Miller coupler). A collar and cup washer used in connection with the side-spring.

Side-step (street-cars). 75, figs. 5954-62. A ledge usually made of a wrought-iron plate attached to the side of the platform. Also called foot-board.

Side-stop. 1. (Grain-door.) H, fig. 1087.

2. (Tip-cars.) A cast-iron support attached to the wheel-piece, on which the body rests, and by which it is held in a horizontal position.

Side-straps (gondola-cars). 57, figs. 398-415. The straps to which the end-plank and sometimes also the side-plank are bolted. They are also called side-plank tie-straps.

Side thrust-spring. 16c, figs. 398-42. A spring fastened to the truck-bolster or truck-bolster raising-block, L, to receive the thrust of the body as it is tipped in dumping.

Side timber rail (English). 117, figs. 501-4. A part of the body-framing running horizontally in the upper part of the side of a carriage.

Side truss-rod or side-trussing. Figs. 35, 398-815, 516-94.
A Body-side truss-rod, a horizontal truss-rod extending longitudinally along the sides and fastened to the end-planks. Its office is to prevent the sides from bulging; it is in increasing use on long gondola cars.

Side truss-rod bearings. 34, figs. 366-365. The queen-posts of the side-truss rods.

Side truss-rod block. 35, figs. 398-393. A block of wood or cast-iron inserted in the corner at the junction of the side and end-planking to guide the side truss-rod.

Side-uralnal. Fig. 8872. A urinal to fit against the flat side of a room, in distinction from a corner urinal. The latter are almost universal in car work. Fig. 8845-3. So called in distinction from a corner urinal-handle, which see.

Siding. 1. A side track.

2. See Sheathing.

Signal-bell. 1. (Street-cars.) 197, fig. 5654. A saucer-shaped bell attached to each platform. They are rung by a clapper, to which a strap is attached which extends from one platform to the other.

3. (Locomotives.) A similar bell to which the bell-cord is attached.

Signal-hose. 20, figs. 1898-9. See Hose.


Signal-bell-cord. See Bell-cord and Bell-strap.

Signal-cord. 81, figs. 1693-8. See Bell-cord.

Signal-strap (street-cars). A bell-strap, which see.

Signal-valve (Westinghouse train-signal apparatus). 28, figs. 2388. A valve attached to the signal-pipe on the engine, which, on the opening of the car discharge-valve in any car, and the consequent reduction of the pressure in the signal-pipe, permits the air to escape to blow the signal-whistle, 33.

Signal-whistle (Westinghouse train-signal apparatus). 33, figs. 3388 and fig. 2407. See Signal-valve.

Sill. 1. "Properly, the basis or foundation of a thing; appropriately, a piece of timber on which a building rests. The lowest timber in any structure, as the sills of a house, of a bridge, of a loom, and the like.

2. "The timber or stone at the foot of a door; the threshold.

3. "The timber or stone on which a window-frame stands, or the lowest piece in a window-frame."—Webster.

4. (Car-building.) Fig. 229, etc. The main longitudinal timbers, usually six, but sometimes eight in number, which are connected together transversely by the end-sills, body-bolsters, and cross-frame tie-timbers. Sills are divided into side-sills, intermediate-sills, and center-sills. A few cars, such as dump-cars and tank-cars, have but two sills, and others only four. For the splice for broken sills required by the regulations for the interchange of cars see Interchange of Traffic.

5. The lower horizontal member of the frame surrounding a window or door. See Door-sill. Window-sill.

Sill and plank rod. 31, fig. 8346a. A rod passing through the sill and planking to tie them together securely. A side-plank tie-rod.

Sill-and-plate rod. 36, figs. 229-66; 54, figs. 457-78, etc. A vertical iron rod which passes through the sill and plate of a car-body frame and ties the two together. A brace straining-rod, which see, is a similar part for low passenger-car trusses below the windows.

Sill-strake. 9, figs. 229-66; 9, figs. 483-78. An L-shaped or right-angle iron casting or forging bolted into the inside corner of a car-frame to strengthen it.


Sill-step (freight-cars). 30, figs. 229-66, etc.; figs. 897-8. A U-shaped iron attached to the sill of a car, below the ladder, as a step for getting on or from the ladder. In 1893 the M. C. B. Association recommended that "That two substantial steps (sill-steps), made of wrought-iron, 1 by 11 in. section and be fastened, one to each side-sill, next to the corner of the car to which the ladder is attached. The steps to be not less than 12 inches long, measured horizontally between the sides, and the tread to be not less than 8 inches below the bottom of the sill. The side of the step next to the corner of the car to be as near to the end of the car as is practicable. Each side of the step to be fastened to the sill with two 4-in. bolts and nuts."

Sill-step stay. A diagonal iron rod or bar attached to one of the sills and to a sill-step to stiffen the latter. Not commonly required or used.

Sill strap-bolt. Figs. 229-66. A strap-bolt, fig. 8713, used to fasten the side and end sills together. When set into the sill is called a joint-bolt, fig. 8730.

Sill tie-rod. 10, figs. 229-66; 9, figs. 448-78. A transverse tie-rod in the floor of a car for holding the sills together.

Simms lock (for freight-car doors). Fig. 2759.

Single-board car-roof (freight-cars). Figs. 3388-79. A roof, of which several varieties other than those shown exist, in which one layer of boards covered by some kind of sheet metal is used in place of double boards. All single-board freight roofs use a sheet metal cover, either above or below the boards, but those only having sheet metal on top are commonly so called.

Single or end berth-rest (emigrant sleeping-berths). N, figs. 2414. A bracket to support the berth when open. So called in distinction from the berth-rests proper (double) on the berth-posts.

Single-edge weather-strip. Fig. 4537. See Weather-strip.

Single-guard (for lanterns). According to the number of horizontal wires surrounding the globe, lanterns are designated as single, double or triple-guard.
Single-lever brake. Fig. 1455. A brake which has but one lever to a truck or four-wheeled car, which see, to apply to two brake-beams. In some cases applied to but one of the trucks of a car; in other cases, to both. An objection to this form of brake is that the pressure is not equal on each brake-beam. To overcome this difficulty two levers are used and the brake, as shown in fig. 1460, is then called a double-lever brake, which see.

Single pipe-strap. Fig. 2936. A pipe clip, which see.

Single-plate wheel. Figs. 3535-81. A cast-iron wheel, in which the hub and tire are united by only a single plate, which is strengthened usually by ribs called brackets, figs. 3535-8, 5355, or sometimes by corrugations. See Wheel. Car-wheel.

Single-sash spring. Fig. 2307. A narrow piece of board or timber, such as seat-back slats, seat-slats, window-blind slats, which see. See also Window-blind.

Single-sash window-blind lift. Figs. 4417, 4654. See Window-blind lift.

Single window-blind. A blind which is made in one piece or section and large enough for one window. They require a lower window, and hence are rarely used in the better grades of passenger-cars unless flexible, which see. See also Window-blind.

Skeleton (steel-tired wheels). Another term for the wheel-center or central filling-piece, which see. The word skeleton is principally used when the wrought or cast wheel-center consists of open bars.

Slew-back. 1. (Masonry.) The face on the edge of the abutment against which the arch proper abuts.

2. (Of a crane.) A casting on the end of a truss or a trussed beam to which a truss-rod is fastened. It is usually made in the form of a cap, and forms a bearing for the truss-rod nut.

Sleeve. See Piston-sleeve. Stake-sleeve.

Sleeve. 1. (Of a car-door lock.) The part connecting the knob to the shank.

2. Sleeve for adjustable brake-head. Fig. 1630-1. See Self-adjusting spring brake-head.

Slewing-gear. 1. (For swinging-platform of pile-driver car.) 48 and 49, figs. 401-4. The means for causing the swinging platform to revolve. It consists of a hand-wheel and spur-wheel, the latter engaging in the slewing-rack fixed to the floor of the car.

2. (Of a crane or derrick.) 18, figs. 398-88.

Slewing-rack (of pile-driver car). 50, figs. 401-4. See above.

Slewing-rings (of a derrick). Rings attached to the upper end of the boom for attaching a rope by which to move or steady it when loaded.

Sliding-door. A door opened by sliding sideways instead of swinging on hinges. Such doors are almost universally used on freight-cars. They are hung by a hook called the door-hanger, which slides on a top door-track. See also Car-door hanger. They are also in general use on baggage-cars and street-cars. See figs. 1792-3, 2843-5, 2934-5, 5654-67 and 5665.

Sliding-door bracket. A door-track bracket, which see. See also Car-door hanger, sliding-door lock and latch.

Sliding-door friction-roller. Figs. 2846-51. A small wheel attached to the top or bottom of a sliding-door to
make it run easily. It may or may not carry the weight of the door.

**Sliding door-handle.** Figs. 3583-5. See Door-handle.

**Sliding-door hasp and staple (mail-car).** Figs. 3554-5. See Hasp and staple.

**Sliding-door holder or hook (street-cars).** 142, figs. 5575-7. A metal hook by which a sliding-door can be fastened on the inside.

**Sliding door hook and button (baggage-car).** Figs. 2567-7.

**Sliding-door latch.** Figs. 3554-75. A latch made with a hook lifting vertically instead of a bolt sliding horizontally in the fastening sliding-doors.

**Sliding-door latch-keeper.** Figs. 2558, 2567-8, etc., also called a strike-plate.

**Sliding-door lock.** Figs. 2554-78. A latch made especially for fastening sliding-doors. Such locks usually have a hook which engages in a corresponding catch attached to the door-post. The hook is secured in connection with the catch by means of a bolt which is operated by a key.

**Sliding-door roller.** Figs. 3546-51, 144, figs. 5056-67.

**Sliding-door sheave (street-cars).** See Door-sheave.

**Sliding-door track.** See Door-track.

**Sliding-door footplate.** 169, fig. 5691. See foot-plate and threshold-plate.

**Side-valve spring.** (Air-brake, triple valve.) 6, figs. 1706-7.

**Slip lamp-burner.** Fig. 3570. A burner in which the chimney is held in place by springs or screws, and so constructed that the entire slotted cap to the burner may be removed at once by lifting, still carrying the chimney, without removing any spring.

**Slip lamp-chimney.** Figs. 3582. A chimney with cylindrical base, held in place by lateral springs, so as to be removable by lifting only. Similar to a chimney which see, but smaller at the base.

**Slipping closet-hopper.** Fig. 2564. See Closet-hopper.

**Slow-motion gear (of a derrick or crane).** A system of gearing, intended to be used or not at will by means of a shifting-pinion, to decrease the speed and increase the power of the hoisting-gear. Called also intermediate gear.

**Small equalizing-guide (Jenney-Miller coupler, which see).** See also Equalizing-guide.

**Small main-valve piston-head (air-pump).** 79, figs. 1801-3.

**Smillie car-coupler.** Figs. 2199-2201.

**Smoking-compartment furnishings.** Figs. 4273-85.

**Smoker.** A car usually attached to all passenger trains immediately behind the baggage-car, in which smoking is permitted. Also, in general custom, the only one open to passengers with second-class tickets. Buffet smoking-cars, which see, and some others, are more luxurious. Wrongfully called a Smoker, as if it did the smoking.

**Smoking-carriage (English).** A passenger vehicle in which smoking is permitted. The whole vehicle is seldom devoted to this purpose, separate compartments of each class being set apart for smoking in every train, as required by law. See also Carriage.

**Smoking-chair (parlor-cars).** Fig. 5991. A chair distinguished from other parlor-car chairs chiefly in being less roomy and comfortable.

**Smoking-room (sleeping-cars).** The right-hand half of fig. 540. A compartment now almost universal in modern sleeping-cars and parlor-cars. It is generally kept for the free use of the passengers, and separate seats or berths are not sold in it.

**Smoking-room furnishing.** Figs. 4273-85.

**Smoking-room gate.** Figs. 4273-4. A gate sometimes used to close the entrance to a smoking compartment which is shut off by a portiere and has no door.

**Smudge (English).** The scrapings and cleaningsof paint and dirt which smoking is allowed. The whole of a vehicle is smoking.

**Snow-plow.** Figs. 222-5, 408-18. "A machine operated like a plow, but on a larger scale, for clearing away the snow from railroads."—Webster. The parts of a snow-plow correspond with the parts-share and mold-board of an ordinary plow are mounted on running-gear similar to that used for freight cars. Small snow-plows are also attached to the cow-catchers of locomotives and regularly carried throughout the winter. See Russell snow-plow and Portland Company's snow-plow.

**Snow-plow.** Figs. 222-5, 408-18. "A machine operated like a plow, but on a larger scale, for clearing away the snow from railroads."—Webster. The parts of a snow-plow correspond with the parts-share and mold-board of an ordinary plow mounted on running-gear similar to that used for freight cars. Small snow-plows are also attached to the cow-catchers of locomotives and regularly carried throughout the winter. See Russell snow-plow and Portland Company's snow-plow.

**Other machines, called the rotary steam snow-shovel.** Fig. 288, and the Jull centrifugal snow excavator, figs. 226 and 227, operated in a manner altogether different from ordinary snow-plows, are made for winter grades of snow where the cutting distance is very great. They have found considerable favor in the Western States. The Rotary steam snow-shovel is a powerful machine, carried in a heavy frame, made of steel I and channel beams. A boiler and sufficient cylinders of the locomotive type are carried, which are connected by heavy steel pipes to a local gear or a horizontal shaft.

Upon this shaft is mounted the Rotary wheel, consisting of a series of 12 rotary shovels with automatic reversing cutting plates. This is rotated in a drum, or casing, having a square front which cuts the snow to a depth of 1 foot 6 inches or more if required. The speed of the wheel is from 700 to 1000 revolutions per minute. This machine is equipped with...
an ice-plow and flanger—the former to protect it from derailment by snow and ice—the latter, for cleaning the flange and rail every time it passes over the road. The water and for the Rotary are carried in an ordinary locomotive tender, coupled to the dummy. One shock and locomotive is required to push this machine in any kind of snow.

The snow holders have been in successful operation for 10 years and between 56 and 60 of the machines are in service at the present time.

The full-centrifugal snow controller has a "soo"—in front, 12 ft. more wide and 11 ft. high, consists of a square-shaped open front box, within which revolves the "snow cutter," composed of a traversed truncated cones, inclined down-ward and laterally upon which are riveted two metal blades, which slide over the snow, and cut it into the "soo". By centrifugal force, discharge it into a side of the track, or into both sides at once, through openings in the "soo". The diameter of the cone at its forward edge is from 14 ft. 4 in. to 17 ft. 6 in., and consists of an iron pipe, 14 in. diameter, or if the sidesill is rela-
vatively more important than in America, as will be seen in figs. 348-51.

Sofa-bolt (sleeping-cars). Figs. 3501-2. A sliding bolt to fasten the seat to the side sill, and fasten the side sill to the frame. The screw is turned in the head and held by a large washer with a cavity against the side-sill, and the expanding ring. A seated by a retaining-ring somewhat of the Gibson form, and shown in figs. 3523-4 and 3524. The other part of the wheel is the tire with its internal flange, or lip, the retaining-ring and the iron center. The tire is shrunk on by a heavy cast-steel flange on the tire, which engages in the cast center, and the tire is held in place against this lip or lug by a retaining-ring somewhat of the Gibson form, and shown in figs. 3523-4 and 3524. The other part of the wheel is the tire with its internal flange, or lip, the retaining-ring and the iron center. The tire is shrunk on.

Snow-plow and flanger. Figs. 3531-4. One of the many forms of steel-tired car-wheels in use. The tire is provided with fins, crowding the head of the nail for finishing work, in which the head is of solid iron, secured to the sole-bar, to stiffen it. A plate is sometimes used instead of an angle-iron.

Sofa fender. Figs. 3723, etc. See Bell-cord.

Standing drawbar. Fig. 2073. A wrought-iron drawbar having the head and shank in one solid forging instead of being united by riveting.

Sofa-leather nails. Figs. 3643-4. A form of ornamental nail for finishing work, in which the head is of solid leather, the mode of attaching the metal pin to the same having been patented Oct. 18, 1881. The same principle is applied to the manufacture of solid-leather buttons, also much used for decorative purposes.

Solid wrought-iron single-spoke wheel. Figs. 3774-5, 3779-8, 3392-3. A wheel in which the spokes, hub (boss) and rim are all welded together, each spoke consisting of one single bar. The tire is shrunk on.

Sofa-back support. Fig. 3405. Sofas standing against the side of the cars are fastened together so that they can be changed from a sofa into a bed. See Seat-back.

Sofa-plate, or underframe plate (English). 16, figs. 3073-8, 105. A favorite stove for caboose-cars.

Sofa-caster. Fig. 4112-5. See Caster.

Sofa bed-hinge and socket. Figs. 4131-5. A hinged joint which leaves an air-space between the stove and casing, into which a current of air is admitted, and is warmed by coming in contact with the stove, then escapes into the smoke-pipe. Several different patterns are made. In fig. 3008 the cold air is admitted through a hood on top of the stove, is carried down to the bottom of the smoke-pipe in such manner that the smoke-pipe is enclosed in a casing, with an air-space between the two, through which the cold air descends and passes over the stove and escapes, as shown by the arrows.

The "anti-clinker" feature of these heaters consists in a peculiarly arranged grate, shown in the section, fig. 3059, with an annular opening between it and the base of the stove, through which the clinkers can be removed from the grate.

Spear anti-clinker car-heaters. Heaters or stoves manufactured by Mr. James Spear, of Philadelphia, for heating cars, and made with a sheet-iron outside casing which leaves an air-space between the stove and casing, into which a current of air is admitted, and is warmed by coming in contact with the stove, then escapes into the smoke-pipe. Several different patterns are made. In fig. 3008 the cold air is admitted through a hood on top of the stove, is carried down to the bottom of the smoke-pipe in such manner that the smoke-pipe is enclosed in a casing, with an air-space between the two, through which the cold air descends and passes over the stove and escapes, as shown by the arrows.

Spear's draft-regulator. A device by which an air inlet is opened in the smoke-pipe in such manner that the draft is checked, but no gas is permitted to escape, the current being entirely inwards.

Spear's draft-regulator with cast-iron wheels. See Wheels, specifications for cast-iron wheels.

Spear's draft-regulator with cast-iron wheels. See Wheels, specifications for cast-iron wheels.

Spear's draft-regulator with cast-iron wheels. See Wheels, specifications for cast-iron wheels.
Spiral spring. Figs. 5192-5228, 5235-40a. A spring made of a thin band of steel wound in a spiral coil, the transverse section of which is elliptical.

Spiral sash spring. See Sash spring.

Spindle. Figs. 4009-18. The common form of spiral sash spring. See Sash spring.

Spool (of hoisting gear). 41, fig. 402. The drums on which the hoisting rope or chain is wound.

Spool-shaped spiral spring. Fig. 5243. This form was patented by W. P. Hansell in 1874-5. Its object is to obtain a graduated spring, which see Little used.

Spring. Figs. 5192-5234. Elliptic springs, figs. 5229-34. An elastic body to resist concussion. Springs are also used to produce motion in a reverse direction to that caused by some other applied force, as a brake-spring and the spring of a door latch.

The leading forms of springs are elliptic springs and spiral springs, which see. Modifications are the spiral-elliptic and the half-elliptic springs. Volute and India rubber, or gum springs are little used. Spiral springs are designated according to the number combined together one within the other, as double-coil, triple-coil, etc., or if the springs are placed side by side as two-group, four-group, six-group, etc., elliptic springs, according to the number united to work together as one spring, are designated as double or duplicate, triple or triplicate, quadruple, quintuple, and sextuple. The main springs about a car are nearly all spiral springs except that elliptic springs are almost exclusively used for the bolster-springs of passenger cars. The minor springs, designated in name by the purpose which they serve, are the following, which see:

- Back spring
- Berth spring
- Brake hose coupling-spring
- Cannular spring
- Double release-spring
- Double sash spring
- Door lock-spring
- Door latch-spring
- Double lock-bolt spring
- Door spring
- Graduating spring
- Journal box-cover spring
- Hand earwheels, figs. 5292-3, etc.

The principal springs of a car supporting its weight are the bolster-springs, also called bearing springs or body springs. Equalizing bar or equalizer springs are used in addition on passenger cars, as also sometimes journal springs. Side journal springs are used on street-cars and are sometimes key-shaped or spool-shaped, which see. Tension is communicated through the hand-spring. A separate buffer spring or auxiliary buffer spring, which see, is sometimes used. See also Set of Springs.

In European practice bearing springs are semi-elliptical; buffing and draft springs are rubber, semi-elliptical spiral or volute. The seal-cushions and backs are supported by soft springs. The tendency to-day of American practice is toward single and double coil round-bar springs, for car work. The use of 7, 8, 9, etc., coil bolster springs is rare and the great majority of bolster springs used under new freight cars are the three and four coil springs shown in figs. 5192-5205 and 5207-12. A recent adoption is that shown in figs. 5192-5205 where plain single-coil springs are bought and these put under a car, the number being in proportion to the capacity of the car. For equalizer springs the universal practice is to use plain single and double-coil round-bar spiral spring.

Spiral elliptic seat spring. Figs. 4001-2. A spring made of a metal rod or bar coiled in the form of the thread of a screw so that it can be compressed or expanded in the direction of the axis around which it is coiled. Most of the springs now in use in car-work, except the bolster springs of passenger cars, are spiral springs.

Volute springs, India rubber springs, compound or wool-packed springs, are quite obsolete. Spiral springs are designated as single, double, triple, or quadruple coil springs when nested one inside the other. Spiral springs are also called elliptic springs. Usually, the single spirals or nest-springs are again combined into two-group, four-group, six-group, etc., springs. Two to eight group springs are the most common. Graduated springs, figs. 5218-20, seem to have had their day and are not often specified for new construction. The various springs in them come into action successively as the load increases instead of all at once. Spiral springs are also designated according to the section of bar as round-bar, flat-bar, square-bar, half-round-bar, oval-bar, edge-rolled, etc., and nearly all springs are now made from round-bar steel. Equal-bar is a term applied to nest-springs made from bars of such size that the resistance of the coil is proportioned to its diameter. Spiral springs are also designated according to their use as equalizer springs, journal springs, pedestal springs, bolster springs (which latter are the main springs of a car), buffer springs, draft springs, etc.

Spiral-spring cap. 75, figs. 4743-4; figs. 5198-5222. A casting or plate which forms a bearing for the top of a spiral spring, and which also holds it in its place. A seat is used at the other end, but both these parts in bolster springs are commonly called spring plates, which see.

Spittoon. Fig. 4008, etc. A vessel to receive discharges of sputum and other abominations. A cuspidor, which see, is the same thing in a different form.

Splash-board. A board attached in an inclined position covering up the back of passenger-car steps. It serves much the same purpose as the risers of steps, and prevents mud and dirt being thrown on the steps. Not in use.

Splanisher (English). 188, figs. 501-4. An iron plate attached to the floor above the wheels. Only used when the wheels are too large in diameter to clear the ordinary floor. Also called wheel cover or wheel plate.

Splice. 1. "The union of ropes by interweaving the strands."—Webster. Hence any appliance by which the ends of a rope, cord, beam or bar, are united. See Belling cord splice.

2. (For car-silts.) See Scarf joint. Ship splice. According to the rules for the interchange of cars of the Master Car Builders' Association, the splice of a sill to be received must be 24 in. long. See Interchange of Traffic.

Split ring (for lamp). Figs. 5333-4. An adjustable ring to carry a lamp or lamp shade, permitting of a variation of diameter.

Spoke-wheel. Figs. 5357-8, 5361-4, etc. A wheel, the rim or tire of which is connected with the hub by spokes instead of one or more plates. These spokes are sometimes made of solid cast-iron, in others they are cast hollow, and in still others are made of wrought-iron. See Hollow spoke wheel, fig. 5332. Hand-car wheels, figs. 5330-31. Wrought iron (Kirtley's double spoke) wheel, figs. 5389-10, etc., and Solid wrought iron spoke wheel, figs. 5389-2, etc.

Spool (of hoisting gear). 41, fig. 402. The drums on which the hoisting rope or chain is wound.

Spool-shaped spiral spring. Fig. 5243. This form was patented by W. P. Hansell in 1874-5. Its object is to obtain a graduated spring, which see Little used.
Spring-band (elliptic-springs). 1, figs. 5390. A wrought-iron strap which embraces the plates at the center.

Spring-beam (six-wheel trucks). 43, figs. 4957-66. A transverse timber which rests on top of the bolster-springs. There are two such to each truck, on which the bolster-bridges, which support the bolster, rest. It is sometimes of iron, as B, figs. 1971-73.

Spring-block. 74, fig. 4590. A piece of wood used as a distance-piece above or below a spring.

Spring-blocks. Figs. 4975-8. Blocks to which the equalizer spring-caps are attached. They are made right and left.

Spring-box (Westinghouse pump governor, which see). 38, fig. 1716.

Spring-burner. Figs. 3370, etc. A lamp-burner to which the chimney is fastened by a spring.

Spring-cap. A cup-shaped piece of cast or wrought iron for holding the top of a spring and against which the latter bears. They are further distinguished by the name of the spring, as bolster-spring cap, etc. The spring-seat comes below the spring, but both these parts are very commonly called spring-plates, especially in large group-springs.

Spring-cases. A cast-iron box made in two parts to hold certain more-spiral, or India-rubber springs. Such springs are nearly obsolete.

Spring-door-latch. Figs. 3705, 3721-3. A latch, the bolt of which is thrown into contact with a catch by a spring and is disengaged by a knob or handle. Such latches are not arranged so as to be fastened with a key. See Latch.

Spring-door-lock. Figs. 2914-25. A lock usually called a spring-lock. In some cases the latch is omitted.

Spring-door-latch. Figs. 2714-23. A lock usually called a night-latch. See Latch.

Spring-door-stop. Figs. 2903-6. See Door-stop.

Spring-draw-clevis (street-cars). One which can slide springend-sill. A long bar of some tough, elastic wood.

Spring-door-stop. Figs. 2803-6. See Latch.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-ends. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.

Spring-end-sill. A long bar of some tough, elastic wood.
Square-root iron. A term applied by manufacturers to Square-lantern. Figs. 33-30. A form having glass on Stake-rest (flat-cars). 2, fig. 14. A bracket or support Square-end, A rectangular piece on the end of a shaft to Stake-bolt (gondola and platform cars). A bolt passing Stake (flator platform cars). 42, figs. 305-15. A stick through the end of the stakes, serving in connection Stake (Nautical.) A term very generally, but not exclu- Sprue-hole. A gate of a mold for casting metals. Spud. Figs. 3478-9. A bushing or coupling by which the hole of a sink or water cooler drips with the drain or drain-pipe. square-wheel. 1. (Hoisting-gear, etc.) 7, figs. 307, 394-5. Literally any cog-wheel, but usually meaning the largest one of a pair of wheels in gear, in distinction from the pinion, which is the smaller one of the two. 2. (Lever hand-car.) 5, figs. 5592-5600. 3. (Slewing-gear of pile-driver car, which see.) 49, figs. 401-4. Spurr's veneers and wood carvings. Figs. 3660-3. Pan- soided joint and the fact that the shoe is reversible. The weight of the shoe is about 20 lbs. and of the head is about 10 lbs. The shoe is held in position by a Key. 93. Adopted in 1894. See Check-gage. Standard draft-gear attachments (M. C. B.). Figs. 5507-37. No longer a standard, but Recommended Practice. Standard check-gage, for mounting wheels (M. C. B.). Fig. 5496. Adopted in 1894. See Check-gage. Standard draft-gear attachments (M. C. B.). Figs. 5507-37. No longer a standard, but Recommended Practice. See Drawbar-attachment, etc. Standard dry-closet. Figs. 3957-9. See Dry-closet. Standard gauge. The most common distance between the rails of railroads, which is throughout the world 4 ft. 8½ ins. See Gage. This gage originated from the use of an even 5 ft. gage with outside flanges. As inside flanges came to be preferred, and had to run on the same rails (then with much narrower heads than now) the present standard was found to be necessary. Standard journal-bearings and wedges (M. C. B.). Figs. 5389-5418. See Journal-bearings. Standard journal-boxes (M. C. B.), Figs. 5377-85. See Journal-boxes. Standard ladder and grab-iron attachments (M. C. B.). 2 Figs. 5546-7. No longer a standard, but Recommended Practice. See Hand-holds and Ladders. Standard markings for line cars (M. C. B.). Figs. 5543-5. No longer a standard, but Recommended Practice. Standard car-axle (M. C. B.). Figs. 5419-20. See Axle. Standard bolts and nuts (table). Figs. 5492-8. See Sellers standard. Standard brake-shaft attachments (M. C. B.), Figs. 5546-7. It is no longer a standard, but it is Recommended Practice. Standard brake-shoe head and key. Figs. 5543-51. A brake-shoe and head of the Christie form, adopted as a standard by the M. C. B. Association in 1886 with the exception of slight modifications in details made in 1888 and 1891. As shown the head is made to fit a wooden brake-beam, which are quite out of use. The head is now made for rectangular or round iron brake-beams. The peculiarity of the head and shoe is the use of a dove- tailed joint and the fact that the shoe is reversible. The weight of the shoe is about 20 lbs. and of the head about 10 lbs. The shoe is held in position by a Key. Standard buffer-blocks and height of drawbar (M. C. B.). Figs. 5540-3, 5548-51. No longer a standard, but Recommended Practice. Standard car-coupler (freight). Figs. 2202-8; passenger, figs. 2256-66. Standard draft-gear attachments (M. C. B.). Figs. 5507-37. No longer a standard, but Recommended Practice. Standard gage. The most common distance between the rails of railroads, which is throughout the world 4 ft. 8½ ins. See Gage. This gage originated from the use of an even 5 ft. gage with outside flanges. As inside flanges came to be preferred, and had to run on the same rails (then with much narrower heads than now) the present standard was found to be necessary. Standard journal-bearings and wedges (M. C. B.), Figs. 5389-5418. See Journal-bearings. Standard journal-boxes (M. C. B.), Figs. 5377-85. See Journal-boxes. Standard ladder and grab-iron attachments (M. C. B.). 2 Figs. 5546-7. No longer a standard, but Recommended Practice. See Hand-holds and Ladders. Standard markings for line cars (M. C. B.). Figs. 5543-5. No longer a standard, but Recommended Practice. See Marking line-cars.
Standard limit-gage (for round iron; M. C. B.). Figs. 5490-1. No longer a standard, but Recommended Practice. See Limit-gage.


Standard screw-threads (M. C. B.). Figs. 5492-8. See also Sellers and Whitworth. See Screw-threads.


Standing, immediate or partition pillar (English). 95, figs. 501-4. American equivalent, post. An upright piece in the body running its entire height. The term is not applied to the corner or doorway pillars, which see.

Staple. A U-shaped piece of wrought-iron pointed at the ends, to be driven into wood to hold a hasp, hook, pin, etc. The term is also applied to a wrought or cast-iron keeper which is screwed or bolted to the door-post or frame and over which a hasp fits.

Star-ventilator. Fig. 4310. See Ventilators.

Stationary-lock (freight-cars). Figs. 2736-59. A lock fixed to the door or side of the car, in distinction from padlocks, which are quite out of use on freight-cars.

Stay. A beam, bar, rod, etc., by which two or more objects are connected together to prevent lateral deviation of one of both or them.

Stay-rood. 1. A rod which acts as a stay. See Pedestal stay-rood, 7, figs. 4923-4966.

2. (Of a derrick or crane.) See Tension-rods.

Stay-coupling. Fig. 4310. See Ventilators.

Steam-cylinder (air-pump). 3, fig. 1689; 61, figs. 1691-2; 1-2, fig. 1732. The admission of steam to this cylinder is controlled by the reversing-piston and reversing-valve, which operate the main steam-valves. See Cylinder.

Steam-cylinder gasket (upper and lower, of air-pump, etc.). 36 and 37, fig. 1689; 101-2, figs. 1691-2. See Gasket.

Steam-cylinder head (Westinghouse brake). 2, fig. 1689; 60, figs. 1691-2. A cover for the top of the steam-cylinder.

Steam-jacket. Figs. 3009-45, etc. See Jockey.

Steam-jet (Gold'scar-heating). Fig. 3008; M, figs. 3006 and F, fig. 3003. See Double-coil steam-jet system.

Steam-pipe. 1. (Air-pump, steam-heating pipe, etc.) 54, fig. 1689. The steam supply-pipe to the steam-cylinder. See Cylinder.

2. (Westinghouse pump-governor.) 50, fig. 1718.

Steam-pipe union (air-pump). 14, fig. 1689, etc. A pipe-coupling, which is often called a union.

Steam-piston (air-pump). 10, fig. 1689; 65, figs. 1691-2. See Piston.

Steam-piston packing ring (Westinghouse air-pump). 13, fig. 1689; 67, figs. 1691-2. See Piston.

Steam-seal, or main steam-valve (air-pump). Figs. 1689-92. A peculiar device for controlling the admission of steam to the steam-cylinder of the engines and air-pump, by means of the reversing-piston, which see, working in the reversing-cylinder. The upper and lower steam-velves are of different diameters and connected by a fixed rod. See Main steam-valve.

Steam-valve bushing (air-pump). See above and upper and lower steam-valve bushing.

Steam-wrecking-car. See Derrick-car and Wrecking-car.

Steel Motor Company's electric-motor (for street-cars). Fig. 5679.

Steel-tired wheel. Figs. 5235-5234. A wheel with a steel tire. In the M. C. Fuller and Washburn wheels, which see, the tire is welded to the body or center of the wheel, which is made of cast-iron. The term, unless otherwise stated, however, always means that the tire is shrunk on, bolted or fastened with riveting-rings.

Steel-tired or iron-tired wheels have been long in use in Europe, and are in quite general use in this country for passenger-cars. The report of an M. C. B. Association committee, 1894, estimates the number of wheels in use under passenger-cars as 145,533 and the number of steel-tired wheels at 51,962, or about 36 per cent. The general form shown in figs. 5829 and 5847 is that which English experience has settled on as the best, and it is in almost universal use on English passenger-cars. See Mansell retaining-ring and tire-fastening. See also Allen paper-wheel, Arboll-Cockrell, Boies, Brushwick, Crupp, McKee-Fuller, Paige, Taylor, Tenwood, Vaulclain, Snow's-boltless, Washburn, etc.

Steel-tire, minimum thickness. (M. C. B. Recommended Practice.) Fig. 5489. In 1894 a recommended practice was adopted for minimum thickness for steel-tires of car-wheels, to be 1 in., to be measured normal to the tread and radial to the curved portions of the flange through the thinnest part within 1/2 inches from the back of the flange; the thickness from the latter point to the outer edge of tread to be not less than 1/ in. at thinnest part, as shown in Fig. 5489.

A further practice was adopted of cutting a small groove, as shown in the outer face of all tires when wheels are new, at a radius 1/ in. less than that of the tread of tire when worn to the prescribed limit, to facilitate inspection.

Steel-wheel. Figs. 5316-19. A wheel which is made wholly of cast-steel. Quite a number of Taylor's manganese steel-wheels have been introduced lately and are in service, but steel-wheels are not common.

Step-iron. 1. (Platform steps.) 47, figs. 435-73. A flat iron called the step or (English) foot-board. In freight-cars a U-shaped iron called the step-hanger. See also (street-cars) enclosed-step, longitudinal-step or (English) foot-board. In freight-cars a U-shaped iron called the step-hanger. See also street-cars and Crescent."
Step ladder (sleeping-car). Figs. 4533-6. A folding step ladder, for use in a sleeping-car, to reach the lamps, cup berths, etc. 2. Stair-bells, etc. (Rules for Intersection of Traffic.) Effects for which cars may be rejected are the following: stairs, ladders, hand-holds or running boards, in such a way as to be closed, and fixed in place and fastened. Steps, ladders, and hand-holds must be secured by bolts or lag screws. Hand holds must be of wood or steel.

Step-riser. The vertical portion of a step in stairs.

Steel plate. (Mr. Miller's hook) No. 3583. A body bolster, consisting of an I-beam, turned up its side and filled with wood, to make it rectangular. It is placed upon a platform, and used to raise the two halves together and against the wall.

Stevens brake. Fig. 1461. An arrangement of brake levers by which the pressure is equalized on all wheels.

It is practically obsolete in modern cars.

Stile. Fig. 8, figs. 1783-35. The upright pieces on the outer edges of a door or sash, as door-stile, sash-stile, window-stile, etc.

Stirrup. 1. A kind of ring or bent bar of iron resembling somewhat the stirrup of a saddle. A drawbar carry-iron is sometimes called a stirrup.

2. (Jameson coupler.) Shown in figs. 2001 and 2348. A drawbar carry-iron.

3. (Thurmond McKeen coupler and attachments.) Fig. 2281. McKeen carry-iron.

Stirrup-up-block (Miller platform). 30, figs. 2290-2. A block attached to one of the center-sills next to the platform and timber, to receive the bolts which hold the drawbar connections of the car.

Stock car. Figs. 37-47, 75-6, 356-72. A car made for transporting live stock, usually having a tight roof, but with grating sides and ends. Double-deck stock-cars are built for the carrying of sheep and hogs, and modern stock-cars are so designed that they can be used as double-deck cars if desired. In order to prevent suffocation and injury to stock when carried modern stock-cars are provided with some of the devices that were formerly peculiar to so-called palace stock-cars. New stock-cars are usually provided with at least the apparatus for feeding and watering.

Stop. Any stopping or limit movement; usually called by the name of the object which it stops, as the following, which see.

Berth-stop. Outside window-stop.

Brake-lever stop. Partition-stop.

Blind-stop. Sash-lock lower-stop.

Center-stop. Sash-lock stop.

Closed-door stop. Sash-lock upper-stop.

Deck-sash stop. Sash-stop.

Door-stop. Seat-arm stop.

Drabear stop. Seat-stop.

Draibear-spring stop. Side-stop.

Floor-stop. Spring-door stop.

Inside window-stop. Ventilator-stop.

Open-door stop. Window-blind stop.

Stop-bar plate. Fig. 4297. See Stop-bar.

Stop-bead, or parting-strip. More properly sash parting strip. The strip dividing the groove for the window-sash and the groove for the blind.

Stop-bolt (of car-door lock). G, fig. 2630. An attachment for throwing a door-latch out of gear.

Stop-brace (Miller coupler). Figs. 2290-2. An iron bar attached to the draft-timbers of a car and to the lower edge of a stop as a brace for the latter.

Stop-cock (for brake-pipe of air-brake). An angle cock. Figs. 2598-9, figs. 1683-8 and fig. 1745. A cock attached to the brake-pipe of a Westinghouse automatic brake so that the pipe can be closed if the brake-hose is to be uncoupled. If the compressed air was allowed to escape from the brake-pipe, the brakes would be applied.

Stop-key. See below and journal-bearing stop-key.

Stop-key journal-bearing. Figs. 5138-7. A key or wedge with a lug or projection which bears against the end of the axle to restrain lateral motion and thus disengage with a collar on the axle. See Stop-wedge.

Stop-latch. A spring door-latch with a stop-bolt by which the latch can be fastened on one side so as not to act as a stop.

Also see Saloon stop-latch.

Stop plate or wedge (for journal-box). 5, figs. 5184-1. A metal plate which forms a stop-bearing for the axle and checks its end-movement.

It is held in position either by flanges cast in the box itself or by attaching it to the journal-bearing or its key. The object is to dispense with a collar. It is increasing in use and favor. See Bissell stop-key journal-bearing, figs. 5138-37. C, B. & Q. journal-box and parts, figs. 5184-45; Adam's journal-box, etc., figs. 5140-51.

Stop-wedge. A stop-key. See Stop key journal-bearing.

Storage heaters (car heating). Figs. 800-10, 2006, 300-7, and 3001. See Direct steam storage.

Storage-tank (Frost system of gas lighting). Fig. 8136. This tank is designed to be placed in the ground and supplied with filling-plug, gage-pipe, pressure-gauge, safety-valve and discharge-pipe; the latter extending under low pressure into the tank by means of the air-pipe or a small hand-pump. This air enters by means of the check-valve, 7, and occupies the space above the oil in the tank. Then, by opening the discharge valve, 8, the oil is drawn rapidly and without loss into the filling-can.

Stove-sash fasteners. Figs. 4531-2.

Stove. An apparatus made usually of iron, variously constructed, in which a fire is made for warming a room, house or car by direct radiation. When the warming is accomplished by convection, as with warm air, hot water, etc., the entire apparatus is called a heater. Stoves are usually used for heating passenger-cars, but coal- or wood-burning stoves are largely used for cabooses.

The heat is largely used for heating eminent-cars.

Cook-stoves are largely used for heating eminent-cars.

A cook-stove permanently fixed against the side of the room and directly connected with the chimney without the use of stove-pipe, is called a range; used in dinin

ing rooms, etc., the entire apparatus is called a heater. Stoves are usually used for heating passenger-cars, but coal- or wood-burning stoves are largely used for cabooses.

Cook-stoves are largely used for heating eminent-cars.

A cook-stove permanently fixed against the side of the room and directly connected with the chimney without the use of stove-pipe, is called a range; used in dinin

ing rooms, etc., the entire apparatus is called a heater. Stoves are usually used for heating passenger-cars, but coal- or wood-burning stoves are largely used for cabooses.

Cook-stoves are largely used for heating eminent-cars.

A cook-stove permanently fixed against the side of the room and directly connected with the chimney without the use of stove-pipe, is called a range; used in dinin

ing rooms, etc., the entire apparatus is called a heater. Stoves are usually used for heating passenger-cars, but coal- or wood-burning stoves are largely used for cabooses.
net for the aperture of a stove-pipe on the outside of a car. The term usually means a more elaborate structure than a stove-pipe cap.

**Stove-pipe ring.** A metal plate or ring attached to the ceiling of a passenger-car around the opening through which the stove-pipe passes from the inside to the outside of the car. It is used for ornament or "to make a finish" around the opening for the stove-pipe.

**Stove-plate.** See **Bottom stove-plate.**

**Stove-ring.** A stove-pipe ring, which see, or a ring for Russia-iron casing of a Baker heater, figs. 2999, 2983, etc.

**"Straight-air"** (air-brake). A term applied to the original form of the Westinghouse air-brake. It has been replaced by the Westinghouse automatic air-brake, which see.

**Straight-closet hopper.** Figs. 3865-6.

**Straight-tank** (tank-car). One with the rings or plates of metal placed alternately inside and outside of each other, in distinction from telescope tanks, figs. 879-9. See **Tank-car.**

**Strainer (air-brakes).** Figs. 1746, 1758-60; 16, figs. 1706-7; 106, figs. 1691-3. See **Air-strainer.**

**Straining-rod.** See **Brace straining-rod.**

**Strap.** A long narrow strip of leather, cloth or metal.

See **Axle safety-strap.**

**Bell-cord strap.**

**Bell strap.**

**Brake equalizer strap.**

**Brake strap.**

**Brake-safety strap.**

**Brace strap (street-cars).**

**Drawbar-strap (English).**

**Pipe-strap.**

**Roof-strap.**

**Safety-strap.**

**Signal-strap (street-cars).**

**Strap-bolt, or lug-bolt.** Fig. 3712. A round bolt with a wrought-iron strap which takes the heads of several bolts.

**Strap-brake (hooting-gear).** 43, figs. 401-4. A method of controlling the spoons by an iron strap which is pressed down upon the spool by a treadle.

**Strap draw-bar.** Figs. 1976-2019, 2099. A spring-pocket draw-bar, which see.

**Strap-hanger.** Figs. 2503-10. See **Bell-cord hanger.**

**Strap-hinge.** 1. Figs. 2603-4, 2610. A door-hinge, the two parts of which are made longer than those of a butt hinge, and of a triangular shape.

2. (English.) 71, figs. 348-51. In a freight car (goods wagon) a hinge in which the pin is welded to two flat bars at each end, and the main part of the hinge is turned while hot over the pin. The hinge has thus no loose part. The main part or strap is secured to the door, which it stiffens. The flat ends of the pin are bolted to the car.

**Strap washer, or washer plate.** 78, figs. 348-51. A wrought-iron strap which takes the heads of several bolts.

**Street-car.** Figs. 5642-67. A light car, usually with four wheels, constructed for carrying passengers on street railways. They are designated as **Cable,** **Electric-Motor** and **Horse** cars, accordingly as they are moved by cable, electric, or horse power. Electric cars are also called **Battery cars** or **Trolley cars,** depending upon whether the motor is supplied with electricity from a storage battery or from a wire by a trolley. Horse-cars are rapidly going out of use and being replaced by electric and cable cars. The **electric-motor car** bids fair to supersede all others on street railways, where the traffic is considerable.

**Closed cars,** figs. 5642-6, 5655-58, 5663-67, have two longitudinal seats extending the length of the car, and seat 20-40 persons. **Street-car cars,** 5642-67 and 5655-58, with the seats extended by cloth and cable cars. The electric-motor car bids fair to supersede all others on street railways, where the traffic is considerable.

**Stricker-arm.** Figs. 5620-51, 5626-27, 5628-29. A seat-arm, which see. The terms **stricker-arm,** **seat-back arm** and **seat-arm** are used in the trade.

**Striker-plate.** See **Strike-plate.**

**String-board (passenger-car steps).** 48, figs. 453-73. A vertical board which supports the ends of the steps. See **step-hanger.**

**Stringer (piling).** 1. "A horizontal timber connecting posts in a frame, as a tie-timber of a truss-bridge; a horizontal tie in a floor-framing."—Knight.

2. (Bridge construction.) The principal longitudinal timbers at the base of the roadway or track structure, analogous to the sills of cars. Hence, this name is often given to the sills of a car.

3. (Pile-driver cars.) 6, figs. 401-4. The top-stringers, which see.

**Stringer-sway-brace (pile-driver car).** 4, figs. 414-73. Cross-bracing for the top-stringers.

**Strip.**

See **Diagonal roof-strip.**

**Parting strip.**

**Line strip.**

**Roof-strip.**

**Fanail-strip.**

**Sash-parting strip.**

**Strut (of a truss).** A member subjected to a strain of compression. A vertical strut is usually called a post.

**Stud.** 1. (Carpentry.) "A small piece of timber or joist inserted in the sills and beams between the posts to support the beams or other main timbers. The boards on the outside and the laths on the inside of a building are also nailed to the studs."—Webster. A vertical **scantling,** which see.

2. (Car construction.) 60, figs. 433-73. A short vertical wooden post in the side or end of a car between the window-posts, or below the windows, extending from the side-sills to the window-sills.

3. A standing bolt, pin, boss or protuberance designed to hold an attached object in place, especially one formed of a headless bolt permanently screwed into a tapped hole in a casting or forging so as to become a part there of. See **Bracket-studs.** **Brake-block suspending-stud.**

**Eccentric-lever stud.** **Spring-stud.**

**Stud lamp.** Figs. 2999, etc. A lamp having a form of argand burner, which see, connected by a **feed-tube** with a removable reservoir having a valve at the bottom.
to permit the slow escape of the oil. The reservoir is so placed that the level of the oil is very near to the flame. The whole lamp slides up and down upon a standard.


Sub-aill. See Buffing sub-aill and Back-stop timber.

Suburban excursion-car. Fig. 151. A car with open sides and ends, which may be closed by curtains or blinds, for carrying passengers on suburban steam-roads in summer.

Sulleys seal-lock. Figs. 3988-a. See Seal-lock.


Summer street-car curtain. Figs. 4563, 5649. A cloth, usually made of heavy canvas, to inclose open cars and exclude rain or sunshine.

Sun-burner (mineral-oil lamp). Figs. 8373-5. A lamp-burner, of which a great variety of forms differing in minor details exist, but which all agree in being provided with a chimney, wide and cylindrical at its base, and held in place by a thin circular metal plate, cut with indentations around its outer edge, so as to act as springs.

Sun-hinge burner. Figs. 3373-4. A lamp-burner, of which a great variety of forms differing in minor details exist, but which all agree in being provided with a chimney, wide and cylindrical at its base, and held in place by a thin circular metal plate, cut with indentations around its outer edge, so as to act as springs.

Sundry (bolts, jacks, pulleys, turnbuckles, etc.). Figs. 106, 107.

Sun-ring burner. Figs. 8373-4. A burner bearing an external resemblance to the sun burner, fig. 8375, and controlling the flame and air-supply in the same manner, but carrying the chimney like a hinge burner. A no-chimney sun-hinge burner, fig. 3374, is also used.

Sun lamp-chimney. Fig. 8418. See Sun-burner and lamp-chimney.


Support. "That which upholds, sustains or keeps from falling, as a prop, a pillar, a foundation of any kind."—Webster. See Cylinder-taper support. Drummond support. Pipe support.

Suspender-beam (Miller platform). A short transverse support. "That which upholds, sustains or keeps from falling, as a prop, a pillar, a foundation of any kind."—Webster. See Cylindrical support. Drummond support. Pipe support.

Sweeping-car, or sweeper. Fig. 217a. A car with rotary brooms for sweeping snow from a railroad track. The brooms are attached to a horizontal shaft which is connected by suitable gearing with the axles, and the brooms are thus made to revolve. Used in cities, and chiefly on electric roads. The car illustrated is driven by two twenty horse-power motors, and the brooms are driven by one twenty horse-power motor on the platform. The motors, electrical apparatus and all the levers for raising the mold boards and broom are covered with a cab.

Swing-back car-seat. Figs. 3917-18, 3983-7. A car-seat the back of which swings over the cushion, without reversing, top-to-bottom. It requires that both sides of the seat-back be upholstered so that either sides may be used. Such a seat-back requires but one head-roll.

Swing-barrel freight-truck. Fig. 5685. A form of freight truck, which see, for rapidly loading barrels, having a ball to throw over the head of the barrel for holding it in place.


Swing-beam fitch-plates. Figs. 5044-7. See Fitch-plates and Swing-beam.

Swing-bolster. 30, figs. 4740-6. A truck-bolster (so called in distinction from a rigid-bolster) which bears on springs that are supported by a transverse timber called a spring-plank, which is suspended by hangers or links so that it can swing laterally to the truck. As the springs rest on this plank and they support the bolster, the latter can swing with the spring-plank. The object of providing this swinging motion to the bolster is to prevent, as much as possible, lateral sways and shocks from being communicated to the car-body, and, vice versa, to prevent the momentum of the car-body from acting with its full force on the truck.

All passenger-car trucks are swing-bolster. At the Master Car-Builders' Convention, 1884, the vote in favor of adopting the swing-bolster in a standard truck was 30 to 30, but the sentiment of car-builders-to-day is largely and strongly in favor of the rigid-bolster.

Swing-bolster spring. 40, figs. 4948-50. See Lateral motion spring.

Swing-hangers. 46, figs. 4580-4737, 4942-4966. Bars or links attached at their upper ends to the transoms of a swing-motion truck, by which the spring-plank is suspended at their lower end so that it can swing laterally. Various forms are (1) solid bars with an eye at each end, 46, fig. 4742; (2) swing-link hangers, 46, fig. 4745, made like a long link of a chain; (3) those made with a fork or clevis at one end and an eye at the other, figs. 5074-5, and used on passenger trucks; and (4) those made with a very short link attached to an eye-bolt passing through the transom. These latter are called eye-bolt link-hangers.

Swing-hanger friction block. A casting, or bearing of considerable diameter, on which the upper end of a swing link-hanger rests. See also below.

Swing-hanger friction-washer (lower and upper). A cast-iron chafing block serving no other purpose than to take the wear. It is only occasionally used. A friction block is almost synonymous, but is usually a larger casting.

Swing-hanger pivot (lower and upper) (passenger-car trucks). 47-8, figs. 4740-4, 4942-4966. An iron bar by which a swing-hanger is suspended, or which supports a spring-plank. The lower swing-hanger pivot is more commonly called a cross-bar or mandrel-pin. The upper one is carried in a swing-hanger pivot bearing attached to the transom.

Swing-hanger pivot bearing. 49, figs. 4745. See above.

Swing-hanger shaft. A swing-hanger pivot or cross-bar, which see.

Swinging-platform (pile-driver car). Figs. 401-4. A platform carrying the entire pile-driving gear in such manner that it can be swung about at right angles to the car so as to project for a considerable distance on either side. It swings upon a center-plate and its movements are controlled by the swinging-gear, which see. A cabin is almost always carried upon it, and the floor is constructed with sills and end-sills corresponding to those usually used in a car-floor. Removable sills, 20, are sometimes provided to support the swinging-platform when swung out in this manner. See Pile-driver car.

Swinging-platform center-plate (pile-driver car). 46, fig. 402. See above.

Swinging-platform end-sill (pile-driver car). 18, figs. 401-4. See above.

Swinging-platform sill (pile-driver car). 18, figs. 401-4. See above.

Swinging-sash. A window or blind sash which is hung and swings on hinges. See Door-case sash (street-cars). Otherwise rarely used.
Swing-joint (Cobb's pivoted seat-arm). Figs. 4602-8. More properly seat-back pivot. A pivot joint in the middle of the seat-back to which the seat-arm is attached. The old style seat-arm was rigidly attached to the seat-back at right-angles thereto.

Swing-links, etc. See Swing-hanger.

Swing link-hanger. 46, fig. 4740-6, etc. A swing-hanger, which see, made in the form of an open link.

Swing-motion. A term applied to an arrangement of hangers and other supports for the springs and truck-bolster which enables a car-body to swing laterally on the truck. See Swing-bolster. Swing-hanger.

Swing-motion gear. See above.

Swing-motion spring. 1. A bolster-spring, which see.


Swing-motion truck. Figs. 4740-6. A truck with a bolster and spring-plank suspended on swing-hangers so that they can swing laterally to the truck-frame. Also called swing-bolster truck in distinction from a rigid-bolster truck. See Canada freight-car truck.

Swing spring-plank. 43, figs. 4740-6. A transverse timber underneath the bolster of a four-wheeled truck, or the spring-beam of a six-wheeled truck, on which the bolster-springs rest. A swing spring-plank differs from an ordinary spring-plank in being supported by hangers or links. See Spring-plank.

Switching-eye. More commonly Push-pole corner-iron, or push-block, which see. A cast-iron socket usually attached to the lower corner-plate of a freight-car, to which a push-bar or push-pole can be attached, to move the car by an engine on an adjoining track. A roping-staple or pull-iron, 58, figs. 229-66, is sometimes called a switching-eye.

Swivel (of a chain). A twisting-link, consisting of a headed pin, entering into an eye or ring in an adjacent link, as in the turnbuckle, fig. 3725. The object is to avoid kinking. Hence the term is applied to many forms of equivalent devices, consisting essentially of a ring surrounding a headed bolt in such manner as to permit rotation.

Swivel-turnbuckle. Fig. 3725. One of the commonest forms of turnbuckle, which see. See also Swivel.

T, or Tee (pipe-fittings, which see). Figs. 3949-50. A T-shaped cast-iron tube for unifying one pipe at right angles to two others in the same line. The pipes are screwed into the arms of the T. A reducing-tee, which see, has the arms of different diameters.

Taber-burner. A burner similar to the dual, figs. 8267-8, except that it has two wicks in one tube instead of a separate tube for each wick.

Table (parlor and sleeping cars). 27, figs. 2409, 2412; 5, fig. 29. A movable board attached to the side of the car by inserting a table-hook fixed to the table into a table-hook plate fixed to the side of the car. The inner end of the table is supported by a table-leg, which see, bolted to the underframing transversely to the sills, at either end of the table, to prevent any longitudinal motion of the table with respect to the car. The block T is shaped to fit the end of the tank.

Table-nozzle. 115, figs. 375-3. A short pipe used for emptying the oil, closed by a tank-nozzle cap, 119, which latter is fastened to the nozzle by a tank-nozzle cap chain. The oil is drawn off through the tank-coupler, 114, which see.

Tail-pin (Janney coupler). 143, fig. 3790. A short wrought-iron pin securing the drafting-bolt to the coupler.

Tanking. The act of moving cars from one track to another by means of switches, as in making up or separating trains, and placing the cars on the tracks and in the places where they are needed. Also occasionally called drifiting, or regulating, and in England shunting or marshaling.

Swivel-eye. More commonly Push-pole corner-iron, or push-block, which see. A cast-iron socket usually attached to the lower corner-plate of a freight-car, to which a push-bar or push-pole can be attached, to move the car by an engine on an adjoining track. A roping-staple or pull-iron, 58, figs. 229-66, is sometimes called a switching-eye.

Swivel (of a chain). A twisting-link, consisting of a headed pin, entering into an eye or ring in an adjacent link, as in the turnbuckle, fig. 3725. The object is to avoid kinking. Hence the term is applied to many forms of equivalent devices, consisting essentially of a ring surrounding a headed bolt in such manner as to permit rotation.

Swivel-turnbuckle. Fig. 3725. One of the commonest forms of turnbuckle, which see. See also Swivel.

Tank. 1. (Passenger cars.) Figs. 3534-5, and 1, figs. 1699-1707. The main reservoir.

Tank-band tie-rod. See Tank.

Tank-band. 107, figs. 373-6. See Tank.

Tank-car. Figs. 48-9, 378-6. A car provided with a large tank, which see, for carrying oil, acids, molasses, paraffin, and in fact all liquids transported in bulk. By far the greater number of tank-cars are engaged in carrying crude and refined petroleum. Those used to carry the thicker oils, molasses and paraffins, are fitted with steam pipes, by which the contents may be melted or warmed to hasten its discharge. The number of such cars required to transport petroleum was very much lessened by the introduction of pipe-lines, of which some thousands of miles are now in use.


Tank-head. 106, figs. 373-6. See Tank.

Tank head-block. E, figs. 373-9. A block securely bolted to the underframe transverse to the sills, at either end of the tank, to prevent any longitudinal motion of the tank with respect to the car. The block T is shaped to fit the end of the tank.

Tank-nozzle. 115, figs. 375-3. A short pipe used to empty the tank, which see. It is usually cast in one piece with the tank-valve seat, which see.


Tank-nozzle-cap chain. See Tank.

Tank-sash. D, figs. 375-3. Floor or step blocks placed between the sills and curved to the contour of the tank, they support the tank-slabbing, which in turn carries the tank.

Tank-slabbing. G, figs. 375-3. Longitudinal strips or filling pieces underneath the tank of a tank-car, upon which the tank bears.

Tank-step (tank-car). A metal shelf or bracket fastened to the tank to facilitate access to the top of the dome.
Tapel-valve. 1. (Tank-car.) Figs. 578-84. A valve attached to the bottom of the tank to draw off the contents.

2. (Water-cooler.) Fig. 3558. A valve used with water-tanks which extend to the roof, and sometimes with other smaller fixed tanks, for enabling them to be completely drained when desired. Also called water-cooler "cock." See Tapel-valve.

Tank-valve cage. 116, figs. 378-84. A metal inclosure, over the top of a tank-valve, as a guide for it.

Tank-valve rod. 117, figs. 378-84. A rod for opening and closing a tank-valve extending from the valve to the top of the dome.

Tank-valve seat. 115, figs. 378-86. A metal plate, with one opening in it, closed by the valve. It is riveted to the underside of the tank and has a nozzle attached to it to which pipes are connected for conducting the oil.

Tanner brake. A device for operating brakes on two trucks at once, invented by Mr. Henry Tanner, and patented in 1882. A difficulty with this form of brake was, that unless the adjustment of the connecting-rods and brake-shoes was perfect, the pressure of the brakes was not alike on the two trucks.

Target-lamp (operator's). A signal-lamp, which see, and brake-shoes was perfect, the pressure of the brakes was not alike on the two trucks.


T-bolt (long) (Janney coupler). The bolt passing through the center buffer-spring, and securing it to the yoke and equalizer.

T-bolt (short) (Janney coupling). The bolt uniting the combination yoke to the horn.

Tee. An oily, hard and most durable wood, raised in India. Largely used for ship-building or other purposes requiring strength and exceptional durability. It has an oily, odorous sap, shrinks little, and does not corrode iron. Generally used for passenger-car bodies in England and for wheels.

Teak. An oily, hard and most durable wood, raised in India. It saves much of the dead weight of a covered car, and gives good protection, except from theft.

Tension-rod. A piece of stout, flexible waterproof painted canvas, measuring about 20 x 13 ft., used to protect the contents of open freight-cars (wagons) from the weather. Cores fastened to its edges are tied to sheet-rings (which see), by which it is firmly secured to the vehicle. It is largely used, as it

gives good protection, except from theft.

Teak-wood center-wheel. Figs. 5320, etc. A form of the familiar instrument for measuring temperature. It is usually conspicuous by its appearance.

Tensile-strength. See Steel wheel.

Tension-bar. A bar for testing the correctness of limit gages, which see.

Tension-cord clevis (of a derrick or crane). A clevis, which see, sometimes carried at the upper end of a boom to which the tension-cord connecting the boom and mast is attached.

Tension-bar (for limit gages). A bar for testing the correctness of limit gages, which see.

Tensioner. A device for controlling the tension of a wire or cable. It is used for ship-building or other purposes requiring strength and exceptional durability. It has an oily, odorous sap, shrinks little, and does not corrode iron. Generally used for passenger-car bodies in England and for wheels.

Tea with drip connection. (Consolidated car-heating.) Fig. 5386. Steam is taken from this tee to supply the heating apparatus and the drip is returned to the drip connection cast in the same tee. The drip is thus prevented from freezing by contact with the hot train-pipe.

Telegraph-cock. Figs. 3489-90. A self-closing cock, the lever of which resembles the key of a telegraph instrument. See Lever-cock. When the water enters the cock horizontally they are called horizontal tele-
round the sides of the trap body by a regulating spring, S, and the set-screw, T, seen in the cover. When cold the trap is always open, and the diaphragm, as in position shown, but as live steam is forced into the trap and comes in contact with the diaphragm, it immediately expands, and meeting the compression disc seat, N, closes the trap and prevents waste of steam. As condensation proceeds and the water cools, the diaphragm gradually contracts and allows it to pass off through the outlet.

A Sediment well, fig. 3007, is attached to each trap, the separating piece seen in it stops any dirt from being blown into the trap. This is important, as it prevents the seats from becoming clogged and saves renewal of parts. These traps should not freeze up, as they are open when cold, and no water remains in them. For the immediate discharge of the water of condensation the outlet.

the immediate discharge of the water of condensation proceeds and the water cools, the diaphragm gradually contracts and allows it to pass off through the outlet.

A Thiemsen truck. Figs. 1937-40, 1821-4, etc. An all-iron thread. See Screw-thread.


Three-group graduated bolster-spring. Fig. 5211-12. See Graduated spring.

Three-group spiral spring. Figs. 5208-10. See Spiral spring.

Three-wheeled hand-car. Figs. 5805-11. A light hand-car with two wheels on one rail, somewhat like a velocipede, and a third wheel on the opposite rail merely to steady the vehicle. They are worked either with levers operated by the hands, or by treadles with the feet, or by both hands and feet. See Hand-car.

Threshold, or threshold-plate. 1. (Passenger-cars.) A Door-sill, which see.

2. (Of a vestibule.) Figs. 1899-1400. The plate which covers the buffer-platform and connects it with the platform forming an adjustable threshold for the end-door, etc.

Threshold-plate washer. Figs. 1421-3.

Throat (of a car-wheel). The interior angle of a flange where it joins the tread of the wheel. See Flange.

Throat-piece (snow-plow framing). 17-20, figs. 410-13. (Side, center and intermediate throat-pieces.) The curved ribs connecting the inclined plane of the plow, with the deck, being curved they give a projection to the deck, which lessens the tendency of the snow to ride over the top of the plow.

Throttle-valve (Westinghouse brake). Fig. 1720, and 13, figs. 1699-1707. An angle globe-valve (i.e., one having the entrance and exit pipes at right angles to each other) attached to the locomotive for admitting steam to and shutting it off from the air-pump. Called a steam-valve.

Through body-bolt (English). 76, figs. 940-91. Nearest American equivalent, and a number of others not shown. The essential feature upon which the patent was claimed was in the riveting of the archbars and channel-bar transoms to the transom casting.

Thimble. 1. A bushing.

2. A sleeve or tube through which a bolt passes, and which may act as a distance-piece. A thimble is usually round, but sometimes square, as smoke-pipe thimble. See Axle-safety bearing thimble. Body-bolster thimble. Brake-shaft thimble. Buffer-thimble.

3. (Janney coupler.) A small casting in which the point of the catch-lever rests.

T-hinge. Fig. 2605. A door-hinge, one part of which is made like a strap-hinge, and the other like a butt-hinge, so that the shape of the whole resembles a letter T.

Third-class carriage (English). A car which performs much the same functions as an American so-called "first-class" passenger car, since it carries 84 per cent. of the passengers, but very dissimilar in arrangement, weight and size. It generally weighs about 20,000 lbs., and is carried on four or six wheels, divided into five compartments, and seats fifty passengers. The seats and backs are comfortably shaped and upholstered in cloth. Sofas springs and carpets are used for the back seats, but parquet seats and shades are provided. The comfort of this class of carriage has been very much improved of late years, but the interior finish is considerably inferior to that of ordinary American cars, the interior being generally painted and grained.

Thomas' steel-air-d wheel. A wheel invented by Theodor Thomas, the essential feature of which is the use of wooden cushioning-blocks inserted in cushioning-pockets in the wheel-center so that the tire bears entirely upon these compressed blocks. The wooden cushioning blocks are forced into the cushioning pockets under pressure.

Thread. See Screw-thread.

Three-leaf graduated bolster-spring. Fig. 5211-12. See Graduated Spring. Spiral spring.

Three-group spiral spring. Figs. 5908-10. See Spiral spring.

Three-link drawbar. A Potter drawbar.

Three-way cock (Westinghouse brake). A cock formerly carried on the locomotive for applying and releasing the brake. It has been supplanted by the engineer's brake and equalizing discharge-valve, figs. 1710-11, which see.
sometimes between them, to connect the sills together and serve the same purpose as the floor-timber distance-blocks and sill tie-rod, with wooden sills.

Tie-rod. A rod which acts as a tie.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.

Tiffany-refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.


Tiffany refrigerator-car. An ice and salt car belonging to the class of cars having the ice-supply on the roof.

Timmer. A stick of wood of considerable size.
Top-plate (iron body-bolster). 1, figs. 1428-67. See Body-bolster.

Top-rail (of door). See Top door-rail.

Top-rail 47, figs. 5654-47. A name applied sometimes to the plate of a street-car.

Top-rail filling-strip. 176-6, fig. 557. See Filling-piece.

Top-rail of door. See Top door-rail.

Top-rail and wheels, terms and gaging points. Fig. 5485. See Wheels-and-track.

Top-laying car. 1. Fig. 5605. A low push-car primarily for carrying rails short distances in construction. They are frequently without a floor or platform and are provided with fixed rollers at the side for running the rails forward.

2. A platform car with a cantilever truss extending out from one end of the car over the track and on which rails may be run out and distributed on the ties.

Top-sweeper. Fig. 217a. A sweeping-car, which see. For city use only.

Train brake-pipe. 16, figs. 1698-8. See Brake-pipe.

Train-car. A cabooserear, which see.

Train-pipe valve and thermostatic steam-trap (Gold's car-heating). Fig. 3005. A train-pipe valve is a combination of valves, cocks and steam traps, by means of which the steam supply from car to car is controlled from the interior of each car, thereby simplifying the application of any system of equipment for steam heat from the locomotive. See Thermostatic steam trap.

Train signal-pipe. Figs. 6161-3. A lamp attached to a car as a signal, usually to the last car on a train, and commonly called a tail-light. See Signal-lamp. They are usually some form of lantern. Lanterns of ordinary form, but with red globes, are also used.

Train-signaling apparatus (Westinghouse). Figs. 2388-2407. A substitute for the bell-cord arranged to give train signals by compressed air. A separate line of signal-pipe, 27, fig. 2388, similar to the brake-pipe extends throughout the train, connected between the cars by hose and couplings. A car discharge-valve, 32, connected to this signal-pipe, is located in each car and attached to the bell-cord, in such manner that pulling on the cord releases air from the signal-pipe. On the engine is a signal-valve, 26, which is also connected with the main signal-pipe and a small signal-valve, 25. The supply of air is received from the main reservoir through a reducing-valve, 24, which maintains a pressure of about 40 lbs. per square inch in the signal apparatus.

When the car discharge-valve is opened, by pulling on the cord, the diaphragm in the signal-valve is operated so as to blow the whistle. Signals can be given in this way with rapidity and great certainty. If the train breaks in two the whistle is blown loudly for a considerable time.

Train signal-pipe. See Signal-pipe.

Transfer-table. Figs. 93, 105, 118, 129, etc. A platform and section of track on wheels, its length being equal to the length of a car. Its chief use is to transfer cars from one section of a shop to another, connecting with parallel tracks and running transversely to them.
Transom. 1. Primarily a cross-piece.

2. (Carpentry.) A horizontal piece framed across a door or double-light window. The term is also applied in the general sense of a cross-piece in other ways.

3. (Car-building, swing-bolster trucks.) 20, figs. 4740-6. One of two horizontal cross-beams attached to the side-frames, between which the swing-bolster is placed. They are usually made of wood, but recently they have been made of iron. They are in some forms of truck, which are not swing-motion, as in figs. 4729-34. See also Middle-transom. Outside-transom (six-wheel trucks, figs. 4857-68).

4. 29, figs. 4957-66, 4857-68. The body-bolster is also sometimes called a transom or body-transom, but incorrectly. The term body-transom is more properly limited, when used at all, to the cross-frame tie-timber or needle-beam, which see.

5. A word frequently used in street-car work as an adjective, for the word "deck," and meaning that the part belongs to the upper deck-windows or to the clear-story.

6. (English.) Commonly spelled transome, which see.

Transom bearing-block. A piece of wood or iron placed on top of a transom, under the attachment or bearing of a swing-hanger, to raise it up higher.

Transom casting. 26, fig. 4740-6. A casting attached to a truck-frame and to which the end of one or both of the transoms are fastened.

Transom chafing-plate. 27, figs. 4744-5, 4957-66. A plate attached to the side of a transom to prevent it from abrasion.


Transom edarch-bar. A wrought-iron or wrought-steel plate or bar placed between the underframetransversely.

Transom flush-plate. See Transom truss-rod.

Transom head-stopper. 119, figs. 588-91. See Rising-timber.

Transom muntin or mullion. 176, 177, fig. 5662. See Mullion.

Transom opener. Fig. 4334. A device for opening a door; very similar to a deck-door opener.

Transom pillar (diamond-trucks). A small casting acting as a distance-piece between the transom and invert-ed arch-bar.

Transom plate. Figs. 5054-5. Iron plates on both sides of wooden transoms of six-wheeled trucks.

Transom saash-stop. Fig. 4401.

Transom tie-bar. 20, figs. 4943-6. A wrought-iron bolt with two projections, sometimes above and sometimes below, to hold them together.

Transom truss-block. See Transom truss-rod.

Transom truss-rod. 24, figs. 4954-7. Transverse rods attached at their ends to the wheel-plates, which extend alongside the transoms and are inclined downward under a central transom truss-block so as to strengthen the transoms. Generally, two such rods are used with each truck. In the Pullman 5-wheel trucks, figs. 4896-9, a transom-plate is used with a straight transom tie-rod.

Transom truss-rod seat. Figs. 4878-9. A bearing for the transom truss-rod on the under side of the transom.

Transom truss-rod washer. 26, figs. 4954-5. See Washer.

Transverse floor-timbers (street-cars). 13, figs. 5554-67. Timbers which extend across the car underneath the floor and on which the latter rests. They are used only when there are two sills. Not to be confused with cross-frame tie-timbers, which are under the sills.

Transverse floor-timber plate. 18, figs. 5554-5. A wrought iron or steel plate to strengthen the transverse floor-timber and act as a tie-rod for the floor timbers.

Transverse rising-timber. 119, figs. 588-91. See Rising-timber.
is increased, the auxiliary reservoir is charged and the air in the brake-cylinder is released to the atmosphere; and so that, when the air-pressure in the train-pipe is reduced, air from the auxiliary reservoir is discharged into the brake-cylinder for applying the brakes. A triple-valve performing only these functions is now known as the plain triple-valve.

2. The quick-acting triple-valve has all the features and performs all the functions of the plain triple-valve, and has the additional function of causing a discharge of air from the train-pipe to the brake-cylinder, when, in emergencies, the maximum force of the brakes is instantly employed.

3. For freight air-brake gear.) Figs. 1728-9. A special form not differing in principle from the passenger brake-valve, but generally combined with the reservoir and brake-cylinder in one single part for economy and convenience of attachment.

Triple-valve bracket and nipple (Westinghouse brake). Fig. 1728-4. A four-legged standard in the nature of a distance-piece to which the triple-valve is attached.

Triple-valve branch-pipe (air-brake). 20, figs. 1693-8. A short pipe by which the triple-valve is connected with the brake-pipe.

Trolley-inspection steps (street-car). 149, figs. 5654-8. Steps fasted to the corner-post of a trolley-car, on which an inspector can ascend to the roof.

Trolley-board (street-car). 154, figs. 5654-8. A board or several boards making a long, narrow platform (very much like a running-board of a freight-car), to which the trolley-pole is attached and on which inspectors and repairmen may stand. The boards rest upon trolley-board cleats. Trolley base-blocks are fastened to the trolley-beams, and the trolley-pole is fastened to the base-blocks.

Trolley inspection steps (street-car). 149, figs. 5654-8. Steps fasted to the corner-post of a trolley-car, on which an inspector can ascend to the roof.

Truck. 1. A small wheel; hence tracks, a low carriage for carrying goods, stone, etc., either on common roads or on railroads. Indeed, this kind of carriage is often called a truck, in the singular.——Webster. The term is applied to different kinds of small vehicles used on and about stations for handling freight and baggage by hand, sometimes in a confused sense. The usage seems to be increasing, however, to speak of baggage barriers and freight trucks, although both are sometimes designated as baggage-trucks, figs. 5637-41. Four-wheeled vehicles, called baggage wagon-trucks and freight wagon-trucks, are also used. Vehicles of this class are also designated as cawhouse-trucks. Special varieties shown are the telescope, swing-barrel and self-loading trucks, figs. 5685-6, 5641. Many others exist in limited use. 2. Figs. 4575-4996. A car-truck, which is, mechanically, a small four-wheel (or sometimes six-wheel) car, under each end of an American car-body and carrying the latter as a dead load by means of two swiveling center-plates connected by a center-pin or kingbolt. The purpose of the truck is to enable short wheel-bases to be used in connection with long car-bodies. See Car-truck. The credit of the invention of the truck has been disputed, but it seems clear that it belongs to John B. Jervis, Chief Engineer of the Delaware & Hudson Canal Co. and of the Erie Railroad during its construction.

Passenger-car trucks are nearly always of wood in combination with iron flitch-plates, truss-rods, etc. For freight-car trucks wood has almost passed out of use except for the transoms, truck-bolsters and spring-planks, and iron is being rapidly substituted for the latter as well. Even when employed it is frequently strengthened by iron or steel plates. Wooden brake-beams are the exception. For spring planks, transoms and bolsters, the common structural forms of channels and eye-beams are used. The standard freight-car trucks as now built is almost invariably of the diamond-truck pattern, figs. 4576, 4680-9, 4644-8, etc., and the rigid bolster truck is in greater favor. Swing-motion trucks retain some features of the Thielsien iron truck, the iron or steel channel-bar transoms, as in figs. 4740-2, and the same features have been adapted to rigid trucks as in figs. 4729-94. At the convention of the M. C. B. Association, 1893, a committee submitted a lengthy report of tabulated replies on the subject of trucks and the experience of master car builders with rigid and swing bolster trucks. In answer to the question, "If you were contemplating making a change, would you adopt a rigid or a swing bolster truck?" 84 replied in favor of the rigid bolster and only 4 in favor of the swing bolster trucks. See proceedings M. C. B. Association, 1893, page 301.

In 1894 the replies stood 14 to 27 in favor of the rigid bolster truck even though the swing-bolster truck cost no more for construction and maintenance, which, it is conceded, it does. Proceedings 1894, page 300, etc.

In 1894 a Recommended Practice for a diamond- truck wheel-base of 5 feet 2 inches was submitted to letter-ballot and was rejected, 548 to 505.

A number of special trucks are still in service and being introduced under new cars. Of these the for solid-pressed-steel truck, figs. 4578 and 4706-7, is in considerable favor, there being some 15000 or more cars equipped with them on nine roads (see proceedings 1894, page 304); the Drexel truck, figs. 4747-50, with which there are 11000 cars equipped on one road and others on sundry roads, and the Condal truck, figs. 4739-4808, of which there are some 8,000 in use on various southern and south-western roads. The swing-motion truck, figs. 4730-3, represents an old type of truck that differs from the ordinary swing-bolster diamond-truck only in the shape of the arch bar trucks.

For the price allowed for trucks by the rules for interchange of traffic, see Interchange of Traffic and Freight-cars.
in favor in this country, and has been recommended by English car builders; the *Sterling* car, figs. 4739-9, whose special feature is the use of a channel beam on the top of the bolster, has its advocates, and the *American* steel truck-bolster, fig. 4790-1, was submitted in 1894 to the G. H. Association by its delegate on Freight-car trucks as deserving of particular attention. The *Cunard* freight truck has no truck-bolster, the bodybolster being supported on V-shaped castings and links, which bear directly upon the springs. The truck-bolster for a six-wheeled truck consists of two beams at each end, called spring-beams, which rest on the springs, and one in the center, called a truck center-beam, to which the truck center-plate is attached. All three are united together by iron bars forming a truss or wooden beams. This is represented in figs. 4937-41 and 4961. See Swing-bolster.

**Truck**

**Truck bolster chafing-plate** (passenger trucks), 36, figs. 4744, 4867. A plate attached to a swing-bolster to protect it from wear.

**Truck bolster fitch-plates.** See *Bolster fitch-plates.*

**Truck bolster guide-bars** (diamond trucks). 37, figs. 4890-4948. More commonly called *columns.* Cast-iron posts between the arch-bars, held in place by column-bolts, which form a guide for the end of the bolster. They are not used with trucks which have a swing-motion, and only with rigid-bolster trucks when the latter have bolster-springs, which are universal. These columns are sometimes also required to perform the office of brake hanger carrier, as in figs. 4736-8. An offset shoulder is cast on the column near the top and on the inside with a jaw to which the brake hanger is fastened by a brake-pin, 87, fig. 4736. Columns are made of pressed steel, fig. 5185, as are the guide-blocks, fig. 5184.

**Truck bolster guide-block.** 38, figs. 4930-4948, 4953-5. A cast-iron shoe for the end of a truck-bolster, which slides vertically between the columns or bolster guide-bars. They are used only in connection with the latter. See above.

**Truck bolster truss-block.** 39, figs. 4745-5. See *Truss-block.*

**Truck bolster truss-rod (rigid-bolster trucks).** 31, figs. 4745-9. A rod attached near the ends of a wooden truck-bolster. In swing-bolster trucks, rods of a similar nature are used, and termed *truss-rod.*

**Truck bolster truss-rod** bearing. 34, figs. 4745-9.

**Truck bolster truss-rod washers.** 35, figs. 4745-9.

**Truck center-bearing truss.** Figs. 5040-1; 66, figs. 4963-6. The trusses of the car. See *Center-bearing arch-bar* and *Center-bearing inverted arch-bars,* which see. The *Center-bearing truss* is the usual form of a truck truss, without counter-brace, is almost universally used for passenger-car framing. Long cars are re-enforced with heavy trusses of the bridge or roof type such as are shown in figs. 4936, 512, and 524, and further strengthened by body truss-rods.

**Truck center-plate.** 63, figs. 4930-4966. See *Center-plate.*

**Truck check-chain eye.** 70, figs. 4943-8. See *Check-chain.* A *body check-chain eye* is also used.

**Truck check-chain hook.** 69, figs. 4943-8. A hook on the end of a check-chain.

**Truck details.** Figs. 4838-4844, 4849-4978, 4937-4968, 4916-4941, 4907-4978.

**Truck end-piece.** 17, figs. 4943-4966. See *End-piece.*

**Truck frame.** Figs. 4767-4966. A structure composed of wooden beams or iron bars, to which the journal-boxes or pedals, springs, and other loose parts are attached, and which forms the skeleton of a truck.

**Truck frame corner-plate.** 120, 131, figs. 4943, etc., 4964 and 4969-8. A malleable iron or pressed steel plate bolted to the corners of a wooden truck frame to keep it stiff and rigid. They are of recent introduction and take the place of *knee-irons,* which see below.

**Truck frame knee-iron (passenger-car trucks).** An interior angle-plate of cast or wrought iron to connect the truck-frame together.

**Truck frame queen-posts (wooden freight-car trucks).** Short iron columns between an upper arch-bar or wheel-piece and an inverted arch-bar, which act as distance-pieces.

**Truck knee-iron.** See *Truck-frame knee-iron.*

**Truck side.** A truck side-frame, which see.

**Truck side-bearing.** 61, figs. 4900-4906. A plate, block, or roller or spring-plate attached to the top of the truck-bolster, on which a corresponding bearing fastened to the body-bolster rests. Their purpose is to prevent the car-body from having too much rocking or rolling motion. They are made of various forms, such as a plain metal plate, to protect a wooden bolster from wear, a cup-shaped casting to hold oil or grease and waste, and various forms of rollers, rocker, studs, spring-cases, and other like. See the names in Italics.

**Truck side-frame.** Figs. 4830, 4844, etc. The longitudinal portion of a truck-frame, on the outside of the wheels, which extends from one axle to the other and to which the journal-boxes and bolster or transoms are attached. See *Diamond-truck side-frame,* in designing which the term is chiefly employed.

**Truck sub-sill.** 11, fig. 5654. A sub-sill bolted to the side-sill of a street-car which bears upon the truck frame, to which it is bolted.

**Trunnion.** The pivot upon which any body, as a gun, revolves. The term is usually applied to bearings for objects of irregular shape and having no or irregular motion, as distinguished from the journals, of wheels, etc. See *Leader-trunnion.*

**Truss.** A frame to which rigidity is given by uniting the parts so that its figure shall be in effect cut up into triangles, making it incapable of distortion by turning of the bars about their joints. The simplest form of truss is that in which a *truss-rod* and *king-post* are put underneath a beam to strengthen it, or two beams are framed together in the form of a letter A, and tied together at their lower ends by a rod or another beam. These are called *king-post trusses.* Another form is that in which two posts are used, which are called *queen-post trusses.* The *truss* is not a perfect truss, since it is capable of altering its shape by simply bending without rupturing its parts, when unequally loaded. In order to prevent this, *counter-braces* should be added. This is the usual way of trussing the underframe of cars. The sills resist bending and act as straining beams, thus preventing great distortion. The usual forms of trusses used for the side framing of cars are the *Pratt* and the *Horse* types. In the former all the braces are subject to tension and in the latter the braces are compression members. The *Pratt truss* is rarely used alone to-day for side trussing, but is often used in combination with the *Horse truss,* as shown in figs. 229, 244, 234, 361, etc. The *Horse truss* is rarely used in its simple form, being usually provided with vertical posts alongside of the vertical tension members. Figs. 232, 247 and 251 are examples of such framing. The side of a car is not a perfect truss as ordinarily built, for the middle panel, which contains the door, lacks the essential elements of braces or counter-braces. This is a strong argument for having the side-door of a car at the end, as in fig. 41. The *Horse truss,* without counter-brace, is almost universally used for passenger-car framing. Long cars are re-enforced with heavy trusses of the bridge or roof type such as are shown in figs. 496, 512 and 524, and further strengthened by body truss-rods.

**The Challenger truss,** which see, figs. 588-9, is a kind of plate girder. See *Girder.* See also *Bastard Horse.* Bastard Pratt. Framing. *Bunk-truss* (of logging cars), figs. 333-4.

**Truss-beam (Miller platform).** 22, figs. 2290-2. See *Platform truss-beam.*

**Truss-block.** A distance-piece between a truss-rod and the compression member of a trussed beam, which forms a bearing for both. See *Body-bolster truss-block.* *Trussom truss-block.* *Truck-bolster truss-block.*

**Trussed brake-beam.** Figs. 1540-99. Nearly all brake-
beams in use to-day are trussed-beams. The usual method is to use a truss-rod from end to end of the beam with a king-post in the middle. The Detroit brake-beam is stiffened with a web or plate, and the Marden is a plain deck-beam. The latter would not be called trussed beams strictly so called.

Truss-rod anchor-iron. 24, figs. 435-73, 537-67. A wide piece of timber bolted to, and sometimes locked into, the posts on the inside of the car immediately above the sills.

A substitute for the truss-plank and body truss-rod is the Challender truss, which see, figs. 568-9. The end truss-block is a continuation of the latter across the ends of the car, for uniformity of finish.

Truss-plank cap. 64, figs. 435-73, 537-67. A strip of wood attached to the top of a truss-plank between the seat-frames.

Truss-rod. 1. An inclined rod used in connection with a king or queen-post truss, or trussed beam, to resist deflection. It is attached to the ends of the beam, and is supported in the middle by a king-post, truss-block, or two queen-posts between the beam and the rod. A substitute for the body truss-rod, as well as for the truss-plank and body brace-rods of an ordinary car-frame, is the Challender truss, fig. 1856, which see. Various forms of truss-rods are the following, which see:

Body-bolster truss-rod. Derrick truss-rod.
Body truss-rod (center and outside). Inverted body truss-rod.
Brake-beam truss-rod. Overhang truss-rod.
Cross-frame, or needle-plate beam truss-rod. Safety-beam truss-rod.

2. (Cabin of pile-driver car.) 87, fig. 401-4. Oblique rods parallel with the braces, connecting the swinging-platform sills with the top-strings.

Truss-rod anchor-iron. 24, figs. 435-73, etc. A wrought-iron strap with lugs and a turn at the end which engage with the iron body-bolster and in recesses cut into the side-sill, to which it is bolted. It serves as an anchor to attach the ends of the body truss-rods to the side-sills.

Truss-rod bearing. A bearing used to furnish support to a truss-rod, at an angle or bend in the latter, as Body truss-rod bearing. Body-bolster truss-rod bearing. Truck-bolster truss-rod bearing.

The bearing over the bolster of a long body truss-rod running from end-sill to end-sill is called a body truss-rod saddle, probably in past from its form. A distinction has been attempted between a truss-rod bearing and a truss-rod, founded upon the fact that the buttress and body truss-rod, or a truss, is the case, as well as the difficulties attendant upon the use of the car."

Truss-rod iron. 24, figs. 435-73. A bar of iron, having an eye, to which a body truss-rod is attached, bolted to the under side of a sill below a body-bolster. It is a form of attaching body truss-rods almost out of use for freight-cars, but in common use on passenger-cars. A truss-rod anchor iron.

Truss-rod queen-post. (Street-cars.) 16, figs. 5654-67. See Truss-rod.

Truss-rod saddle. See note to truss-rod bearing and body truss-rod saddle, 20, figs. 299-66.

Truss-rod washer. A large flat or beveled washer, used under a nut on the end of a truss-rod. Sometimes called a sheen-back. See Body-bolster truss-rod washer. Truck-bolster truss-rod washer.

Tubed oil-screws. Figs. 3385-6. See Oil-screws.

Tubular car. A form of car construction, introduced some years ago, in which the sills and floor-framing are built of iron gas-pipe. A large number of these cars have been built and are in service under leases on the smaller roads. They were built at a time when the demands upon cars were rapidly increasing and they were not equal to the burdens and rough treatment to which they were subjected. They grew in disfavor owing to the fact that the repairs were expensive and arduous, probably because car repairers were not iron-workers or pipe-fitters, as well as the difficulties attending the repair of distorted parts. Few, if any, have been built lately.

Tubular lantern. A lantern having no guards except a rectangular frame of tubing through which the air-supply is also carried. They are in two forms, with shade reflector and square or side reflector.

Tufting button. Figs. 3845-6. A button used in upholstery to hold the cord which passes through the upper covering of the upholstered surface, dividing it up into squares or diamonds.

Tumbler. 1. A drinking-glass.
to a reclining position, and being provided with leg and foot rests. The latter are a substitute for the Hartley and Hitchcock reclining chairs, figs. 3996-9.

Twin-door-panel. 10, fig. 1758. A pair of panels side by side in a door, formed by inserting a parting-rail into the head and stile of the door. See Partition-rail.

Twin-hopper gondola-car. Figs. 26, 69, 310-20. A gondola car with two hoppers, the centers of which are about 10 feet apart. This type of gondola has been adopted to get a long flat-bottomed car that will discharge its contents with the least amount of shoveling. The car may also be used for long timber. See Gondola.

Twin-washer. Fig. 3719. A double-washer, which see. See Washer.

Twin-window. Fig. 124. Two small and rather narrow windows placed side by side. The tendency is to abandon the use of such irregular forms, except in dining-cars or private cars, where the partitions and closets seem to require it, as in figs. 101 and 104.

Twisted flat wire (for car seals, which see). Fig. 3900. A form adapted to prevent the possibility of the lead seal being stripped from the wire and afterwards replaced upon it.

Two-group spiral springs. 18, figs. 5226-8. See Spiral springs.

Two-horse street car. The most common form of horse car, which see.


Two-hopper gondola-car. Figs. 26, 69, 310-20. A gondola car with two hoppers, the centers of which are about 10 feet apart. This type of gondola has been adopted to get a long flat-bottomed car that will discharge its contents with the least amount of shoveling. The car may also be used for long timber. See Gondola.

Twin-washer. Fig. 3719. A double-washer, which see. See Washer.

Twin-window. Fig. 124. Two small and rather narrow windows placed side by side. The tendency is to abandon the use of such irregular forms, except in dining-cars or private cars, where the partitions and closets seem to require it, as in figs. 101 and 104.

Twisted flat wire (for car seals, which see). Fig. 3900. A form adapted to prevent the possibility of the lead seal being stripped from the wire and afterwards replaced upon it.

Two-group spiral springs. 18, figs. 5226-8. See Spiral springs.

Two-horse street car. The most common form of horse car, which see.


Two-horse street car. The most common form of horse car, which see.

Two-group spiral springs. 18, figs. 5226-8. See Spiral springs.

Two-horse street car. The most common form of horse car, which see.


Two-horse street car. The most common form of horse car, which see.

Two-group spiral springs. 18, figs. 5226-8. See Spiral springs.

Two-horse street car. The most common form of horse car, which see.


Two-horse street car. The most common form of horse car, which see.
has not yet secured general use is as a substitute for brake-hose, in connection with air-brake and steam apparatus.

Universal shade-ring. Fig. 3457. A shade-ring, which see, so constructed as to be of adjustable diameter.

Upholstery. In passenger-car construction, the cushions, curtains, carpets, beds, etc., and generally the materials from which they are made.

Upholstery details (of seats). Figs. 3929-4013. See also Sleeping-car furnishings and details.

Upper air-cylinder gasket (air-pump). 38, fig. 1699; 103, fig. 1691-3. See Gasket.

Upper receiving-valve (air-pump). 31, fig. 1699; 36, fig. 1668; 101, figs. 1691-3. See Gasket.

Upper end-panel (street-cars). See Panel.


Upper-platform (pilfer-driver care). 27, figs. 401-4. The floor of the swinging-platform, which see. See also Pilot-driver care.

Upper receiving-valve (air-pump). 31, fig. 1668.

Upper rail (sliding-doors). Usually called top door-rail. A guide-rail above doors which are supported upon rollers at the bottom, or one carrying a door suspended upon doorn-hangers. See Door-rail.


Upper steam-cylinder gasket (air-pump). 36, fig. 1669; 101, figs. 1691-3. See Gasket.

Upper steam-valve (air-pump). 7, fig. 1689. See Main steam-valve. The upper steam-valve is smaller than the lower.

Upper steam-valve bushing (air-brake). 25, fig. 1689. See Bushing.

Upper swing-hanger pivot. 47, figs. 4740-6. See also Lower swing-hanger pivot.

Upper valve-chamber cap (air-pump). 29, fig. 1689.

Uranial 132, fig. 448, and figs. 3871-6. A metal or porcelain receptacle used in saucions, connected to a pipe leading through the floor. They are distinguished as corner or side urinals, the former almost invariably used in car work. A concealed urinal, which see, shutting up flush with the wood work when not in use, is sometimes used.

Uranial-cover. A wooden or sheet-metal lid for inclosing a urinal.

Uranial-drip, or drip-pan. Fig. 3873. A pan under a urinal on the floor.

Uranial-pipe. See Urinal.

Uranial-handle. Figs. 3844-9. A handle in a saucion, placed above the urinal to hold on to. They are distinguished as corner or side urinal-handles, according to their position on the side of the car.

Uranial-safe (parlor-car water-closets). Figs. 538-9. A plate covering the top of the bowl to prevent nuisance in the inclosed parts.

Uranial-Ventilator. A pipe attached to a cap on a urinal, communicating with the top or a car, where some form of ventilator is often added.
Valve. A lid, cover, or plug for opening and closing an aperture or passage. See Check-valve.

Conductor’s valve.

Coupling-valve.

Discharge-valve.

Double check-valve.

Lower discharge-valve.

Steam-valve.

Turbine-valve.

Lower steam-valve.

Triple-valve.

Receiver-valve.

Register-valve.

Reversing-valve.

Safety-valve.

Signal-valve.

Sliding-valve of triple-valve.


Ventilator. 1. Figs. 4299-4329a. A device for admitting or exhausting air to or from a car. Ventilators, according to their position, are designated as deck ventilators (end or side), end ventilators, frieze ventilators, etc. They are often designated as automatic or self-acting. The prominent forms of the latter varieties are shown in figs. 4300-34. See also the various wind-scoops shown with car-heaters and saloon furnishings, figs. 4327-30, 4338-40. An exhaust-ventilator, for saloon-hoppers, attached to the under side of cars (Bell’s exhaust, which see), is shown in figs. 3841-2. Ventilators for boarding-cars, tool-cars, work-trains, etc., are also put in the floor, a trap-door being placed there provided with gratings underneath. Among the ventilators in use are the Eureka and Automatic, the Globe erect, fig. 4312; Globe horizontal, fig. 4313; Creamer eureka, fig. 4314; Creamer automatic, fig. 4318; Cone-cap, fig. 4323; Cone and apron, fig. 4308; Canopy, fig. 4304; Tornado, fig. 4309; Tornado canopy, fig. 4305; Dished cap, fig. 4306; Moore, fig. 4307; Duplex, fig. 4308; Roe, fig. 4309; Star, fig. 4311; Deflector, figs. 4317-17a; Double duplex deflector, figs. 4334-4; Continuous duplex deflector, figs. 4321-3; Small duplex deflector, figs. 4319-30, which see. The proper system of ventilation for passenger-cars is still a mooted question. The supply of air required for each person, for good ventilation, is at least 22 cubic feet per minute.

The ventilation of the Pullman cars is very elaborate, and perhaps the most perfect now in use. No air is intended to be admitted within the car by the windows or otherwise, except through an in-take or wind-scoop. The air thus collected is forced downward into a duct or conduit containing hot-water pipes, under the seats and into the car through a register in the seat-end. The air escapes through the deck-windows. Saloons are ventilated by separate exhaust ventilators, and the hopper and urinal are provided with vent-pipes. Suction ventilators applied to the deck-windows or between them are used to exhaust the air, thus keeping up a continual circulation. Dry clothes are usually dried upon the deck-windows for ventilation, the sash at every other window being hung on different sides, so that the open sash may be hinged on the front end. Sash openers for deck-sash hinged in this manner are shown in figs. 4380-3, 4338 and 4594. The question of ventilation of cars is an important one and must receive the attention it merits. For a report of tests with the various ventilators shown see Proceedings M. C. B. Association, 1894, page 234.

2. (For fruit-car.) Figs. 257-66. A system of slats protected by netting at each end of the car so arranged as to enable the ventilators to be readily opened or closed from the outside.

3. (Spear heater.) Figs. 3039-40. A large wind-scoop. Ventilator-arm. A small attachment carried on deck-sashes, especially of street-cars, for holding them open.

Valance. A term applied to the tesselated decorations of windows and which cover and conceal the shade roller and curtain holder. See fig. 3462.

Valve-body. The shell case or frame of a valve. See Triple-valves, figs. 1706-7, 1708-9. Engineer’s valve, figs. 1710-15. Pump governor, fig. 1716, etc.

Valve-chamber. A chamber in a steam-engine, for containing the steam when it is not in use. See Eames vacuum-brake, which see, and this only to a limited extent.

Valve-connection. A connection of a valve with its seat. The knob for operating the valve.

Valve-connection. A connection of a valve with its seat. The knob for operating the valve.

Valve-counter. A lever attached to the end of a valve stem for counteracting the pressure of the valve on the valve seat. See Eames vacuum-brake, which see, and this only to a limited extent.

Valve. A lid, cover, or plug for opening and closing an aperture or passage. See Check-valve.

Conductor’s valve.

Coupling-valve.

Discharge-valve.

Double check-valve.

Lower discharge-valve.

Steam-valve.

Turbine-valve.

Lower steam-valve.

Triple-valve.

Receiver-valve.

Register-valve.

Reversing-valve.

Safety-valve.

Signal-valve.

Sliding-valve of triple-valve.

Valve. A lid, cover, or plug for opening and closing an aperture or passage. See Check-valve.

Conductor’s valve.

Coupling-valve.

Discharge-valve.

Double check-valve.

Lower discharge-valve.

Steam-valve.

Turbine-valve.

Lower steam-valve.

Triple-valve.

Receiver-valve.

Register-valve.

Reversing-valve.

Safety-valve.

Signal-valve.

Sliding-valve of triple-valve.
Ventilator-cap (for urinals). Fig. 8875.
Ventilator-casing (street-car). 156, fig. 5654-67. The casing of the side ventilators, or deck windows, which takes the ventilator-sash, or to which the wire-screen is fastened.


Ventilator-deflector. Figs. 4317-24. A metal plate or board placed in such a position at a ventilator opening that it will cause a current of air to flow into or out of the car when the latter is in motion. Another form, used in windows to produce an exhaust draft when opened, is a mere loose board with a notch to receive the lower edge of the window-sash, figs. 4537-30. See Deflector.

Ventilator-door. A door for closing the aperture of a ventilator. See also Ventilator-valve.

Ventilator fixed-panel (English). 136, figs. 501-4. The outer panel in a ventilator composed of two perforated panels, one being capable of being slid over the other so that the perforations coincide or become covered. This form of ventilator is used in English cars to the exclusion of other kinds.

Ventilator-hood. See Ventilator-hood and ventilator sliding-panel.

Ventilator-hood. 1. 2, fig. 1599. A shield over the outside of a ventilator to prevent the entrance of sparks, cinders, rain or snow. It is sometimes intended to direct the current of air either into or out of the car. See also Deck-end ventilator.

2. (English.) 134, figs. 501-4. Also called ventilator-cowl. A shield made of either wood or metal, preventing the entrance of rain or cinders.

Ventilator-netting. 1. A wire screen or netting fastened over the outer deck window-sash to prevent the entrance of sparks, cinders and dust.

2. A netting over the ventilator windows of a fruit-car.

Ventilator-opener. See Deck-sash opener, figs. 4380-41, 4849.

Ventilator-panel. A panel in the frame of a valve or door for closing the aperture of a ventilator.

Ventilator-pivot. A pin on which a ventilator-door or sash rests when open. It is the same as a deck-sash pivot, fig. 4537-64.

Ventilator pivot-plate. The same as a sash-lock plate or stop, fig. 4536, etc.

Ventilator-register. See Friese ventilator-register.

Ventilator-register. Fig. B, fig. 4329 and fig. 4328. A metal plate or frame attached to a ventilator opening, provided with slats arranged so as to turn and thus either open or close the ventilator. They are chiefly used as friese-ventilators, but sometimes elsewhere. In sleeping-cars they are sometimes combined with berth curtains.

Ventilator-sash. 116, figs. 435-73. Usually a deck-sash.


Ventilator sliding-panel (English). 136, figs. 501-4. Part of a ventilator in which there are two perforated hard-wood slates, the outer fixed, the inner movable, so as to make the perforations coincide or be covered. See Ventilator-hood and ventilator fixed panel.

Ventilator-staff. Fig. 4376-80. A pull-hook or deck-sash opener.

Ventilator-stop (street-car). A small metal bracket on which a ventilator-sash rests when open.

Ventilator-valve. 116, figs. 435-73. A door for opening or closing the aperture of a ventilator, usually made to turn on pivots at or near its center. See Deck-sash pivot.

Vertical equalizing-lever. 28, figs. 2437-41. (Pullman vertical equalizer.) The L-shaped lever, central part of which bears against an Overhead face-plate buffing-spring (called an Overhead-equalizer spring) and the other end against the horizontal equalizing lever, the middle of which is pivoted by a bracket attached to a longitudinal plate or bar that abuts against the body end-plate. The object of these vertical equalizing-levers is to get the horizontal equalizer high enough to give head-room in the vestibule for the dome lamp, etc.

Vertical steam-trap and blow-off (Gold's car heating). Fig. 8004. A thermoelastic steam-trap, which see, and a blow-off valve combined. It may be operated from inside of the car. The names of parts and their office is given in the list of names with the figs. 3011-12.

Vertical telegraph cock, or faucet. See Telegraph cock.

Vestibule. 1. (Of a car.) Formerly that part of the car nearest the door, cut off from the main saloon by an interior door. It was occupied by the saloon, washing and heating arrangements, etc. Its purpose was to give protection to the interior of the car against drafts and noise.

2. Figs. 2419-48. Usually a platform enclosure, consisting of a face or buffer-plate, constituting an arched doorway, connected with a spring extended rod, a foot-plate combined with the buffer-stems and face-plate, a bellows-like connection called a diaphragm, a deck-panel or face-plate and car frame and side-doors opening to the steps. The successful application of the vestibule to cars was first accomplished by the Pullman's Palace Car Company. It was patented April 29, 1887, by H. H. Sessions, and assigned to the P. P. C. Co. It claimed the invention of the vestibule in the combination with the end of a railway car of a frame plate or equivalent series of buffers backed by springs, arranged with its face in a vertical plane and normally projecting beyond the end of the car, whereby, upon the coupling of two cars a spring buffer will be interposed between the superstructures of such adjacent cars above their platforms, and also frictional surface opposing spring pressures to prevent the racking of the car frames upon sudden stoppages and to oppose the tendency of the cars to sway laterally [oscillate] when in motion, so arranged and adjusted that "when the two cars were coupled the faces of the buffers will bear against each other in contact under pressure."

The courts have upheld the validity of the patent on the grounds that "the device possessed patentable novelty and utility." The claims sustained were those of "frictional contact of the face plates under constantly opposed spring pressure, which diminished the shock to the superstructure in collisions and resisted the forces tending to create oscillation." The frame plate of the original vestibule was to have longitudinal motion, but no lateral motion except with the car body. The use of the canopy feature was old, for it had been in use for more than 20 years in England, Russia, and the United States.

The additional cost of the application of the vestibule feature to a new car is from $700-$1,000, depending upon the decorative features specified.

Vestibule (composite) end-post. The end-post of a vestibule, resting upon the platform end-sill. In the Pullman, figs. 2437-8, and Wagner, figs. 2509-30, cars it is a composite end-post composed of an iron-bar or angle-bar bent at the ends and bolted to the platform and platform-hood end-carriage. It is stiffened with wood bolted to the sides of the bar or angle-bar.

Vestibule body-corner-post. 1, figs. 529-30, and figs. 2449-50, 2457. The inner-post of a vestibule, set against the end of the car body and directly over the platform sills.

Vestibule buffer-post. 29', figs. 539-41; 8, figs. 2440-5. An extra long and wide buffer-post, recessed or chamfered at the ends to take the face-plate of the vestibule, whose face is flush with the buffer-post.

Vestibule dome-lamp. 23, figs. 2425-45; figs. 2289, 2241. A lamp specially designed for vestibules, a dome lamp, etc.

Vestibule-door. Figs. 1789-91. A door by which the vestibule of a car is entered from the side. In the older
type of vestibule they are double or divided, the two doors being hinged together and to the vestibule corner-post.

Vestibule door-bolt or latch. Fig. 2556-6. See Door-bolt.

Vestibule door-hinges. 1. Strap hinges, figs. 2603-4, which fasten the double doors of a vestibule together.

2. For rabbeded doors, fig. 2599.

Vestibule door-latch. Figs. 2537-8. A door-latch specially designed for vestibule doors. A mortise latch is shown in figs. 2706.

Vestibule door-rod. 24, fig. 1788, figs. 3780-3. A bar or rod across the vestibule doors to prevent their being pushed in.


Vestibule face-plate. An inverted U-shaped forging about an arched doorway, leading from the platform of one carto that of the next. The weight of it is carried on the buffer-plate; it is kept thrust out against the opposing face-plate either by springs, as in the Pullman vestibule, or by its own weight, as in the Barr and Wagner vestibules.

Vestibule-gate (Pullman). Figs. 2449-50. A gate to the arched doorway, leading from the platform of one carto that of the next car.

Vestibule-hood. 19, figs. 2425-45. A platform hood.

Vestibule-lamps. Figs. 3135, 3140, 3239, 3241, 3278-9. See Vulcanized fiber. A leathery material of great durability and toughness, which is made by subjecting various kinds of vegetable fiber to the action of acids. It is insoluble in all ordinary solvents, such as oil, alcohol, ether, ammonia, etc. It is made in two classes, hard or flexible (the former being that used generally in car construction for the dust-guards of journal-boxes), fig. 5154, and in sheets from 10 to 24 in. wide by about 50 in. long and from \( \frac{1}{4} \) in. to \( \frac{3}{4} \) in. thick. Another name for the same article is gelatinized fiber.

V-shaped screw-thread. Fig. 5405. A thread with a sharp edge at the top and sharp groove at the root. The Sellers (U. S.) standard thread, fig. 4497, is flat at the top and at the root, and the Whitworth, fig. 5496, is rounded at those points. V-thread are now used chiefly for pipe-thread.

Vulcanised fiber. A leathery material of great durability and toughness, which is made by subjecting various kinds of vegetable fiber to the action of acids. It is insoluble in all ordinary solvents, such as oil, alcohol, ether, ammonia, etc. It is made in two classes, hard or flexible (the former being that used generally in car construction for the dust-guards of journal-boxes), fig. 5154, and in sheets from 10 to 24 in. wide by about 50 in. long and from \( \frac{1}{4} \) in. to \( \frac{3}{4} \) in. thick. Another name for the same article is gelatinized fiber.

V window-button. Fig. 4458. A catch, with a V-shaped notch cut into it, tenoned to a window-post to hold up a window. Little used.

W

Wabash hand-car for inspectors. Figs. 50925. gives full details and dimensions.

Wadley continuous drawbar. Figs. 1983-6. A continuous drawbar (which see) is merely an elongated tail-stock with a fork-ankle in the middle of the car to join it to the tail-stock from the other end of the car.

Wagner car-door. Figs. 1784-1806. A flush door-car, the front side of which is carried in by bending the door-track in close to the car-side and the rear side is forced in flush by an eccentric lever and rod, shown in figs. 1801-8.

Wagon, or goods-wagon (English). Figs. 438-51. American equivalent, freight-car. A vehicle (always four-wheeled) used to convey any sort of merchandise, minerals or live stock, and run in freight-trains. Track is a synonymous term largely used.


Wagons marked thus * are open wagons (gondola-cars) having no roof.

Wagon-coupling, or draw-chain (English). 41, 42, figs. 348-51. The draft-coupling universally used on freight-cars (goods wagons) in England in connection with a draw-hook, which see.


Wagon-truck. Fig. 5887. A four-wheeled vehicle for moving baggage or freight about a station or warehouse. See also Baggage wagon-truck, fig. 3898. Freight wagon-truck, fig. 587. Two-wheeled vehicles of the same kind are known as baggage-baroons and freight-trucks, both sometimes designated as barrow-trucks.

Wagon-wheel (English). See Wrought-iron wheel. Steel-tired wheel.

Wainscot-panel. 78, figs. 435-73, 540-7. A board which forms a panel under the windows between the two inside rods.

Wainscot-rails (passenger-car interiors). 74, 75, figs. 433-73, 540-7. Longitudinal wooden strips fastened to the posts and extending from one end of the car to the other. The lower wainscot-rail comes immediately above the truss-plate; the upper wainscot-rail is immediately under the window. The wainscot end-rails are the wainscot-rails at the head and back of the car.

Wainscot-panel (English). 124, fig. 501. The panel immediately above the lowest panel on the outside of a carriage body.


Wagon-end-car. 1. Figs. 2606-7. A revolving and folding car-seat. Figs. 5889, 5894-6. A car-seat with a seat-back, fixed by the arm or revolving box-top fastened to the seat-ends, 4, 5, 6, which are carried on a heavy connecting frame-rail, 40, and the seat-support extension, 41, which frame-rail rests upon a pedestal, 7, on which it rotates like a revolving-chair, but may be fore-and-aft secured by a spring-lock, 42.

2. A swing-back seat resting upon the ordinary seat-frame, but with a straight seat-back arm fastened to the back near the top, and a smaller auxiliary arm, called the arm-crank, to adjust the lower part of the seat-back. This arm-crank is pivoted in a slot in the seat-back arm and is also guided by a rail end-side, which carries the end down so that the seat-back can swing through between the seat-back arms.

Walker Manufacturing Company's electric-motor. (Street-cars.) Fig. 5674.

Wasp (of a lock). 5, figs. 2766-7. The interior circular frame, but with a straight seat-back arm fastened to the back near the top, and a smaller auxiliary arm, called the arm-crank, to adjust the lower part of the seat-back. This arm-crank is pivoted in a slot in the seat-back arm and is also guided by a rail end-side, which carries the end down so that the seat-back can swing through between the seat-back arms.

Wall seat-end. The seat-end next the wall or side of a car, so called in distinction from the aisle seat-end.

Wall-socket casting. 8, figs. 5107-5. A casting bolted or otherwise fastened to the inside end of seat to which the striker-arms are pivoted and in which the mechanism that lifts the cushion is placed; the seat-end connecting-rail is also fastened to this casting.

Wards (of a lock). 5, figs. 2766-7. The interior circular ridges which fit into corresponding recesses in the bit of a key (the latter also termed wards), the surrounding solid parts of the bit being called the web.

Warehouse-truck. Figs. 5557-9. A small vehicle which is used for moving freight about a warehouse. See Barrow-truck, Wagon-truck.


Washbowl, or wash-basin. 1, figs. 3555-7; B, figs. 5542-7. A basin, which see. They are used in sleeping and

**W**
drawing-room cars, and generally form a part of a fixed wash-stand.


Washburn-wheel. 1. Figs. 8688, 8330-1, 5545, etc. A cast-iron car-wheel, designed and patented by Nathan Washburn in 1850, and now more used, perhaps, than all other forms put together. It consists of two plates, which extend from the hub to about half the distance between it and the rim. There they unite into one plate which extends to the rim. The plates are all curved so as to contract when the wheels are cooled without danger of fracturing the wheel. The single plate and the rim are united together and strengthened by curved ribs cast on the inside of the wheel.

2. Wheels of any type made by the Washburn Car Wheel Company. Figs. 5380-4.

Washer. 1. Fig. 3716. A plate of metal or other material, usually annular, which is placed under a nut or bolt-head to give it a better bearing. Two or more washers are sometimes combined and called washer-plates, strap-washers, double or twin washers, triple washers, etc., as fig. 3719; they are sometimes made beveled or triangular, figs. 3717-18, 3721, for a rod or bolt which oblique with reference to the bearing surface. A socket-washer or flush-washer is one provided with a recess for the bolt-head so as to leave it flush with the surface of the adjoining plate. Cast washers or wrought washers are those stamped out of rolled iron plates. Cast washers are made from cast-iron. Both are largely used. Washers in car work all take their name from that of the bolt or rod to which they are attached, except the base-washer, which stands at the base of the platform-posts on passenger-car platforms. A gasket, which see, is sometimes called a washer.

2. A brush for washing objects, as car-washer, figs. 8896, 5701-3.

Washer-plate. A strap-washer, which see.

Wash-room. Fig. 8468. A lavatory.

Water-alcove front. Fig. 3553. See above.

Wash-stand sink. A cast-iron plate with one or more wash-stands, double or twin washers, etc., as, figs. 3719; they are sometimes made beveled or triangular, figs. 3717-18, 3721, for a rod or bolt whic is oblique with reference to the bearing surface. A socket-washer or flush-washer is one provided with a recess for the bolt-head so as to leave it flush with the surface of the adjoining plate. Cast washers or wrought washers are those stamped out of rolled iron plates. Cast washers are made from cast-iron. Both are largely used. Washers in car work all take their name from that of the bolt or rod to which they are attached, except the base-washer, which stands at the base of the platform-posts on passenger-car platforms. A gasket, which see, is sometimes called a washer.

Water-cooler. 14, figs. 8468, 3525-7 and figs. 3549-54. A tank or vessel for carrying drinking water which is usually cooled with ice. The sides are generally made double, and the space between filled with some non-conducting substance. They frequently extend to the roof. See Water-alcove. Water-tank.

Water-cooler pan. Fig. 5355.

Water-cooler furnishings. Figs. 8549-57.

Water-cooler stand. Figs. 3549-50.

Water-cooler top and breast. Figs. 5306-7.

Water-cooler valve or waste-cock. Fig. 8486. See Tank top.

Water-drip. 1. A pan or receptacle to receive the waste water from a water-cooler. A drip-pipe, or waste-pipe, connects with it.

2. CC, figs. 486-70, and figs. 491, 491, etc. A slight projection or raised seam in the roof of a passenger or baggage car over the side doors, or at the end of the car in the platform roof to divert the water so it shall not fall upon persons entering the car or passing from one car to the next.

Water-reservoir (Baker heater). Fig. 2908. See Circulating drum.

Water-table. 1. (Masonry.) A projecting beveled face of stone to shed water from the parts below. Hence, especially applied to the top course of a foundation, which nearly always has such a face, the masonry above being set back.

2. A window-ledge, which see.

Water-tank. 1. A vessel or reservoir for holding water. Those for drinking water are usually made of sheet-iron, and often extend to the roof. They are then usually drawn from by a water-alcove, figs. 3533-3, the tank being usually in the corner of the saloon concealed from the interior of the car. The tanks for supplying wash-room basins, fig. 8468, are usually placed immediately under them and drawn from by a basin-pump.

2. (Howard's parlor-car water-closet.) Figs. 3588-9.

Watson and Stillman's jacks. Figs. 5728-35, 5742. These jacks are the result of thirty years of experience. In their construction the old style solid inflexible ring packing of the socket has been done away with, and in its stead there has been introduced behind the socket a lubricated packing and gland or stuffing box, thus retaining the flat lever which has been one of the characteristics of this style jack. In order that this packing may be renewed without taking the jack entirely apart, the set-screw which retained the socket has been removed from the inside of the head and placed outside and back of the head, where it engages with the end of the socket.

In jacks in which the pump is inside the ram, the lower valve is pushed from its seat by the end of the piston-rod, and the water returns to the upper part of the jack, passing around the piston-rod.

To make the piston-valve and packing accessible, the bottom of the pump is closed by a simple packed plug which contains the ram-valve. This plug is screwed
into the bottom of the ram, allowing the ram to come clear down to the packing, thus preventing the leaking above the pump-collar. The pump-packing can be renewed without taking the jack apart, by slackening the set screw in the head and withdrawing the socket just far enough to rotate past the lug on the head, and so push the packing out of the pump.

The introduction of gland packing on the socket, and cup packing in the pump, materially reduces the labor of pumping, and adds largely to the wearing qualities of the pump packing. See Hydraulic jack. Dudges-jacks.

**Watt's tail-lamp.** Fig. 3919 shows it in section.

**Watt's combination caboose tail-lamp.** Figs. 3390-8.

**Waved moldings.** Moldings which by a special machine are made of a corrugated section longitudinally, the number of waves or corrugations varying from 3 to 6 per inch. The cost of the moldings is increased by this waving from 1 to 2 cents per foot.

**Way-car.** Fig. 54. A caboose-car, which see. Sometimes a so-called way-car partakes more of the character of a tool-car. The application of the term is not well defined.

**Weather strips.** Figs. 4539-34. A rubber strip with a metallic or wooden binding to apply around the crevices of windows or doors, for excluding the dust and wind, and for preventing water from entering around the windows. Weather strips are divided generally into single-edge strips, fig. 4537, and cushion strips, fig. 4534, etc., both being usually provided, as now manufactured, with a wood or metal molding. The cushion strip is simply rubber, folded over so as not to show a seavage edge. The standard widths of weather strips are \( \frac{1}{4}, \frac{1}{2}, \frac{3}{4}, \) and 1 in. They are usually made in lengths of fifty feet, but some of the cushion strips in lengths of only 7 ft. See Bosley metallic and excelsior weather-strips, figs. 4534-39, and Casper's metallic weather-strips, figs. 4540-1.

**Web (of a key).** The solid portion of the bit of a key, the recesses cut away being termed wards. See Bit.

**Webbing.** A strong fabric, from one to four inches wide, made of hemp or other material which is not liable to stretch, used in upholstering car-seats. A detached spring-section is shown in fig. 3931, showing the application of the webbing. Others are shown in figs. 3939-44.

**Wedge.** 1. A term in quite general use for a journal-bearing key, which see. Figs. 5339-5418. See also Stop-wedge, figs. 5145, etc.

2. (Miller platform.) The uncoupling-lever wedge, attached to the platform by a wedge-chain.

**Wedge-chain.** See above.

**Weed-cutting car.** Fig. 5588. A hand-car equipped with a cutting bar, knives and pitman rod like a mowing-machine, for cutting the weeds at the side of a track over which the car is run.

**Weigh-bar (English).** See Brake-shaft.

**Westinghouse air-brake.** A system of continuous brakes invented and patented (the first patent in 1869) by Mr. George Westinghouse, Jr., which is operated by compressed air. The air is compressed by a steam-air-pump on the locomotive, and is stored up in a tank called the main reservoir on the engine or tender. By the original form of brake the compressed air was conveyed from the tank by pipes connected together between the cars by flexible brake-hose to brake-cylinders under each car, by means of which the pressure of the air was communicated to the brake-levers, and thence to the brake-shoes. A later and improved form is the Westinghouse automatic air-brake, commonly called simply Westinghouse brake, which is now in universal use. At the present time the Westinghouse brake, unless otherwise specified, is always understood to mean the automatic air-brake. See below.

**Westinghouse brake (more fully, Westinghouse automatic air-brake).** Figs. 1688-1748. The change made from the original form of the Westinghouse air-brake (see above) in order to make it automatic was to carry a full pressure of air at all times in the brake-pipes and cause the brakes to be applied by a reduction of this pressure instead of by the admission of pressure, so that the breaking apart of the train or a reduction of pressure by escape of air at any point on the brake-pipe would apply the brakes to the whole train at once. A further advantage was that the action of the brakes was made quicker by saving the appreciable interval of time required for the compressed air to flow from a single reservoir at one end of the train in sufficient quantities to fill all the brake-cylinders. An auxiliary reservoir is placed under each car, containing air at the same pressure as in the brake-pipes and main reservoir. An ingenious valve called the triple-outlets connects the brake-pipe, auxiliary reservoir and brake-cylinder together in such manner that any reduction of pressure in the brake-pipe opens a passage for the air from the auxiliary reservoir to the brake-cylinder, applying the brakes, and closes the connection between brake-pipe and reservoir. To release the brakes, the pressure in the brake-pipes is restored; when the triple-outlet closes the connection between the auxiliary reservoir and brake-cylinder and opens one between the brake-cylinder and the outer air and between the auxiliary reservoir and the brake-pipe. In order that the train brakes may be applied from any car, each car is fitted with a valve called the conductor's valve, connected to the brake-pipe, so that the compressed air therein can be permitted to escape by opening the valve. Additional parts to perfect the working of the brake-gear in practice (but not required in theory for its complete application) are the pump-governor, fig. 1716, Drain-cap and air-strainers, figs. 1719 and 1746, etc.

**Westinghouse electric-motor (for street-cars).** Fig. 5877.

**Westinghouse freight-brake.** Figs. 1728-9; 1695-8. A device not differing essentially from the Westinghouse passenger brake-gear except that the parts are made lighter and cheaper for use on freight-cars. To this end the triple-valve, reservoir and brake-cylinder are commonly combined in one part, as in fig. 1729-9. The engine, air-pump and main reservoir, on the contrary, are made somewhat larger. Special arrangements for operating extra long trains and on extra heavy gradients have been introduced, as shown in the engravings. See Air-brake and Straight air-brake.

**Westinghouse train-signaling apparatus.** Figs. 5884-5407. A device for utilizing the surplus compressed air required for operating the Westinghouse brakes to transmit signals to the engine instead of using the ordinary bell-cord. See Train-signaling apparatus.

**Wheel.** 1. A circular frame or solid piece of wood or metal which revolves on an axis.

See Brake-wheel.

**Ratchet-wheel.**

**Gear-wheel.**

**Spar-wheel.**

**Hand-wheel.**

**Winding-wheel ratchet-wheel.**

**Westinghouse brake-wheel.**

2. Figs. 5355-5376, and 5620-34. A circular frame or disk, as above defined, serving to support a moving vehicle, as car-wheel (which see), hand-car wheel, street-car wheel, etc. Car-wheels are generally either cast (chilled) or steel-tired. Steel wheels and the Sace & Kear wheel do not require a snare under either of these titles. See words in italic for further details. See also Wheel-tread. Car-wheel. Chill.

The defects of wheels for which cars may be refused under the rules for the interchange of traffic are as follows:

(a) Shelled out; wheels with defective treads on account of pieces shelling out, leaving flat spots deepest at the edge, with a raised center. (See fig. b.) Wheels...
must not be condemned from this cause, unless the spots are over 2 inches, or are so numerous as to endanger the safety of the wheel.

**Fig. a.**

---

(b) Seams 1 inch long or over at a distance of ½ inch or less from the throat of the flange, or seams 3 or more inches long on any other point of the tread.

(c) Worn through chill; when the flat spot caused by wear exceeds 2 inches in length, or if it in inches long on any other point of the tread.

(d) Worn flange; flanges 1 inch thick or less, or having flat, vertical surfaces extending more than 1 inch from tread. (See figs. c and d.)

---

**Fig. b.**

---

(e) Out of gage, or wheels that measure less than 4 feet 8½ inches between flanges or more than 4 feet 6 inches from the back of flange of either wheel to gage line of mate wheel, or less than 4 feet 11 inches from gage line of either wheel to outer edge of tread of mate wheel. (See gage, fig. 5421.) This does not apply to wheels cast after September 1, 1894.

(f) Out of gage, or wheels that measure less than 4 feet 5½ inches between flanges or more than 4 feet 6½ inches from the back of flange of either wheel to gage line of mate wheel, or less than 4 feet 11½ inches from gage line of either wheel to outer edge of tread of mate wheel. (See gage, fig. 5421.) This does not apply to wheels cast prior to September 1, 1894.


---

Wheels, Specifications for cast-iron. (Master Car-Builders' Recommended Practice.)

In 1893 specifications for cast-iron wheels and a form of guarantee by manufacturers, were adopted as Recommended Practice; these had formerly been standards of the Association.

They are as follows:

1. "The chills in which the wheels of any one wheelmaker are cast shall be of equal diameters, and the same chill must not vary at different points more than one-sixteenth of an inch in diameter."

2. "Wheels of the same nominal diameter furnished by any one wheelmaker must not vary more than one-fourth of an inch above or below the mean size measured on the circumference, and the same wheel must not vary more than one-sixteenth of an inch in diameter."

3. "The wheels broken must show clean gray iron in the plates; the depth of pure white iron must not exceed seven-eighths of an inch or be less than three-eighths of an inch in the middle of the tread, and shall not be less than three-sixteenths of an inch in the throat. The depth of the white iron shall not vary more than one-fourth of an inch around the tread on the rail line in the same wheel."

4. "For each hundred wheels which pass inspection and are ready for shipment, one representative wheel shall be taken at random and subjected to the following test:

   "The wheel shall be placed flange downward on an anvil block weighing not less than seventeen hundred (1,700) pounds, set on rubble masonry at least two feet deep, and having three supports not more than five (5) inches wide for the wheel to rest upon. It shall be struck centrally on the hub by a weight of one hundred and forty (140) pounds falling from a height of twelve (12) feet. Should this wheel stand five (5) blows without breaking into two or more pieces, the hundred wheels shall be accepted."

The above tests shall apply to standard weight wheels from twenty-six to forty-two inches in diameter, used on the standard gage roads.

"Or, the wheel shall be placed flange downward on a cast-iron ring weighing one thousand (1,000) pounds, the outside diameter of the ring being thirty-six and one-half (36½) inches, the inside diameter twenty-four (24) inches, and thickness eight (8) inches, supported on rubble masonry at least two feet deep. It shall be struck on the plate, close to the rim, by a weight of one hundred (100) pounds falling from a height of seven (7) feet. When subjected to this test a five hundred and fifty (550) pound wheel shall stand twenty (20) blows: a five hundred and seventy-five (575) pound wheel, twenty-five (25) blows, and a six hundred (600) pound wheel thirty (30) blows without breaking a piece out. This test applies to 33-inch wheels: 26, 28 and 30-inch wheels must stand the twelve-five-blow test, and 26 and 40-inch wheels must stand the thirty-five-blow test."
5. "Should, in either case, the test wheel break in two or more pieces with less than the required number of blows, then a second wheel shall be taken from the same lot and similarly tested. If the second wheel stands the test, it shall be optional with the inspector whether he shall test a third wheel or not. If he does not so select, or if he does and the third wheel stands the test, the hundred wheels shall be accepted."

6. "Wheels shall not vary from the specified weight more than two per cent."

7. "The flange shall not vary in the same wheel more than thirty seconds of an inch from its mean thickness."

8. "All wheels shall be numbered consecutively, and shall have the number, also the day, month, and year when made, plainly formed on the inside plate in casting, and no two wheels shall have the same number."

Wheels guarantee for cast-iron. (M. C. B. Recommended language.)

1. "This indenture, made this day of... 18... and between...party of the first part, and...party of the second part, Witnesseth:

The party of the first part hereby agrees to furnish to the party of the second part, free on board cars at...chilled cast-iron wheels... inches in diameter, for use under...

2. "The party of the second part hereby agrees to pay to the party of the first part...dollars for each wheel furnished, and to keep an accurate account of the mileage made by the wheels placed in service under cars in passenger equipment and under locomotives and tenders, and an accurate record of the number of months of service of the wheels placed in service under cars in freight equipment."

3. "The party of the second part hereby agrees, when any wheel furnished under the contract is scrapped, to furnish to the party of the first part a statement which will show: 1. The wheel number. 2. The service in which the wheel ran. 3. The amount of service in months or miles. 4. The cause of failure. 5. A charge against the party of the first part of fifty-five per cent of the price of the wheel mentioned above. 6. A credit to the party of the first part of...cents per 1,000 miles for 38 in passenger equipment...

Except in case of wheels removed for the following causes:

1. Flat by sliding. 2. Chipped flange. 3. Broken flange, if the breakage is not caused by seams, worn through chill or worn flange. 4. Broken or chipped rim, not caused by rim being hollow. 5. Breakage of any kind caused by wreck or derailment."

4. "The party of the first part hereby agrees, on presentation of the statement above mentioned, to pay the party of the second part any balance due from lack of sufficient service on the part of the wheels (with above exceptions), to balance the charge, and the party of the second part hereby agrees to pay the party of the first part any balance due as shown by the aforesaid statement, settlements to be made quarterly."

5. "The party of the second part hereby agrees to hold, subject to the inspection of the party of the first part, for a period of thirty days after said statement has been rendered, any wheels(with above exceptions) which have not earned for themselves a credit equal to the amount charged against them."

6. "It is understood that the basis of settlement shall be as follows:

- 38-inch passenger wheels: 70,000 miles.
- 38-inch passenger wheels: 60,000 miles.
- 36-inch engine and tender wheels: 60,000 miles.
- 36-inch engine and tender wheels: 45,000 miles.
- 38 and 36-inch engine and tender wheels: 40,000 miles.
- Refrigerator, through line and cattle cars: 60 months.
- All other freight cars: 48 months."

Wheels (distance-gages between flanges). The standard distance between the backs of car wheels, as indicated, fig. 5421, is 4 feet 5½ inches; drawing shows the form of gage for measuring this distance. In 1885 it was decided by letter ballot that in fitting wheels on axles a variation of ½ inch each way from the standard distance of 4 feet 5½ inches between the flanges would be allowed, making the maximum distance 4 feet 6 inches, and the minimum distance 4 feet 5 inches. See Check gage.

Wheel and track (terms and gaging points). Fig. 5468.

3. Gage of track is the shortest distance between the heads of track rails.

4. Inside gage of flanges is the distance between backs of flanges of a pair of mounted wheels measured on a line parallel to the base line, but ½ inch nearer to the axis of the wheels.

5. Gage of wheels is the distance between the outside faces of flanges of a pair of mounted wheels measured on a line parallel to the base line, but ½ inches farther from the axis of the wheels.

6. Thickness of flange is the distance measured parallel to the base line between two lines perpendicular thereto, one drawn through the point of measurement of "gage of wheels," to the outer edge of tread.

7. Width of tread is the distance measured parallel to the base line from a line perpendicular thereto, drawn through the point of measurement of "gage of wheels" on mate wheel.

8. Over all gage is the distance parallel to base line from outer edge of one wheel to the outer edge of mate wheel.

The above mentioned wheel gage distances are either directly or by inference as follows:

- Inside Gage of Flanges:
  - 4 feet 5½ inches.

- Thickness of Flange:
  - 1½ inches.

- Width of Tread:
  - 4½ inches.

- Check Gage Distance:
  - 4 inches.

- Over All Gage:
  - 5½ inches.

Wheel-bar (iron six-wheel truck). A substitute of an iron for a wooden wheel-piece to which the pedestals are attached.

Wheel-box (Englishe). 26, figs. 848-51. American term, hub. The center of the wheel, which is bored out to receive the axle.

Wheel-box (street-car). 21, figs. 565-54, etc. A covering for a wheel which projects through the floor. The sides are usually of wood and the top of sheet-iron, but they are sometimes made entirely of wood or metal.

Wheel-box bolts. A lock of wood attached by a bolt to the top of a wheel-box so that it can be turned, somewhat like a door-button, to hold the wheel-box in its place.
Wheel-center (steel-tired wheels). Figs. 2535, etc. The portion of a wheel inside of the tire, and between it and the hub or boss. The wheel-center is sometimes in one piece, sometimes in two or more pieces. It is made of cast-iron, the hub or boss and the central filling-piece, which see. Face-plates front and back, are also used. The term is seldom applied to chilled or cast wheels.

Wheel-center, or skeleton. 26, 27 and 28, figs. 348-35. The whole of a railroad wheel, except the tire, and the fastenings which connect the tire to the rim.

Wheel check-gage. See Check-gage.

Wheel circumference measure. Figs. 5424-5. By letter ballot in 1893, the wheel circumference measure, shown in fig. 5423, was adopted as a standard of the Association. Prior to that date it had been recommended for use in all car building shops.

Wheel-cover (English). 188, figs. 501-4. See Splasher.

Wheel-plate. 1. (Cast-iron wheels.) 22, fig. 5355-61. Wheel-piecetruss-rod. 13, figs. 4842-4966. See above.

Wheel-piecetie-rod. See above.

Wheel-pieceplate. 11, 12, figs. 4842-4966. See above.

Wheel-piece tie-rod. See above.

Wheel-timber. A wheel-piece, which see.

Wheel-tires, minimum thickness of steel tires (M. C. B. Recommended Practice). Fig. 5429. See Interchange of Traffic. Steel-tire.

Wheel-tread. Fig. 5434. The outer surface or part of a car-wheel which bears on the rails. The standard width of wheel-tread is 5 1/8 in. measured from outside of tread to inside of flange, i.e., including the entire thickness of the flange. See fig. 5457.

Wheel-tread and flange. Fig. 5487. This form of wheel tread and flange was adopted as a standard of the Association by letter ballot in 1888. See Flange thickness.

Wheel-cover. Figs. 278-82. Wickes refrigerator car. Shows the Wickes system of refrigeration, slightly modified. In the Wickes car the refrigerator doors open out and are flush with the outside sheathing. See figs. 1890-2. The usual sliding doors are omitted. There is a cooling compartment at each end, occupying the full width of the car and 2 feet 10 inches of the length and separated from the storage compartment by a wooden partition or jacket, which starts about 2 feet from the floor and extends to within about 16 inches of the ceiling.

Whisk broom or wisp broom, and holder. Figs. 3696-3700. A small broom for brushing wearing apparel, furniture and upholstering.

White-metal band. Figs. 4025-8. More properly seat-back molding, which see.

White's "anti-friction" card-door hanger. Fig. 2830.

Whitney contracting-chill. Figs. 5374-5. See Chill.

Whitworth gages. See Cylindrical gage.

Whitworth system of screw-threads. A system of screw-threads designed by Sir Joseph Whitworth, of England, and which is almost universally used in that country and throughout Europe. It differs from the Sellers system in that the sides of the threads stand at an angle of 55 degrees instead of 60 degrees, and the tops of the threads and the spaces between them at the root are rounded, as shown in fig. 5496, instead of being flat, as in the Sellers system. The number of threads per inch in the two systems is a follows:

<table>
<thead>
<tr>
<th>Diameter of Screw</th>
<th>No. of Threads per Inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/32</td>
<td>37</td>
</tr>
<tr>
<td>7/32</td>
<td>33</td>
</tr>
<tr>
<td>1/4</td>
<td>29</td>
</tr>
<tr>
<td>5/16</td>
<td>24</td>
</tr>
<tr>
<td>3/8</td>
<td>19.7</td>
</tr>
<tr>
<td>1/2</td>
<td>16</td>
</tr>
<tr>
<td>9/16</td>
<td>13.3</td>
</tr>
<tr>
<td>5/8</td>
<td>11.1</td>
</tr>
<tr>
<td>7/8</td>
<td>9.7</td>
</tr>
<tr>
<td>11/16</td>
<td>8.4</td>
</tr>
</tbody>
</table>

The Whitworth pipe-thread differs from the above. See Pipe-thread.

The Whitworth system in this country has practically passed out of use.

Wickes refrigerator car. Figs. 278-82. Shows the Wickes system of refrigeration, slightly modified. In the Wickes car the refrigerator doors open out and are flush with the outside sheathing. See figs. 1890-2. The usual sliding doors are omitted. There is a cooling compartment at each end, occupying the full width of the car and 2 feet 10 inches of the length and separated from the storage compartment by a wooden partition or jacket, which starts about 2 feet from the floor and extends to within about 16 inches of the ceiling.

There are two ice tanks in each cooling compartment. These tanks are constructed of an oak frame work to which are nailed in vertical and horizontal rows, galvanized iron strips 2 inches wide interwoven in the manner of basket-work. Projecting outward from these strips 3 inches are galvanized iron leaves which largely increase the cooling surface. These tanks are separated from one another, from the jacket and from the wheels by wide boards at the end of the car by air spaces of about 4 inches. They are supported by 2 x 4 oak grates 2 feet from the floor. Beneath the bars are many rows of galvanized iron wire, crossing and recross-
ing from side to side of the car. A sloping bottom or apron of galvanized iron at the bottom of the jacket leads the drip water to the wires. There is another apron of galvanized iron in front of the wires extending to within 13 inches of the floor. On the floor, directly under the wires, is the drip-pan with a properly trapped drain at each end. The drip water falls from the ice through the grate bars on to the wires and down into the drip-pan. The warm air enters the cooling compartment through the opening at the top of the jacket and descending as it cools comes in contact with the ice, the metal surface of the tanks, the wires, and the spray of drip water about the wires, and re-enters the car through the opening below the apron in front of the wires, having been cooled, dried and purified. Each tank isiced through an opening in the roof, provided with an inner and outer door, each properly insulated.

This car may be also used for shipment of goods under ventilation. When so used the ice-hatches are left open and protected by iron screens. This gives a thorough circulation of air into the openings on the front end, passing the length of the car and out through the openings at the rear end.

Wicket. See Fare-wicket (street-cars).
Wick-sleeve (of student-lamp, which see). I, fig. 3400.
Widegage. In general usage, the distance between the wick-sleeve (of student-lamp, which see). I, fig. 3400.
Winding-gear (pile-driver-car). 41, 42, figs. 401-4. Consti-
Winding-arbor. See Square-end.
Winding-shaft, See Square-end.
Winding-shaft lever (side-dump ore-car). 131a. A
Winding-shaft ratchet-wheel and pawl. 66, 67, figs.
66-15. A round iron bar supported by the winding-
shaf t plates, to which the drop door-chain or hopp er-
chain is attached. It carries a ratchet-wheel.
Winding-shaft lever (side-dump ore-car). 131a. A lever connected to the winding-shaft by ratchet-wheel, pawl and dog by which a great torsional or winding stress may be applied to close the sides of the car. It is supplemental to a four-arm winch which is con-
ect ed directly to the shaft and which is used to turn the shaft so far as is possible by such means.
Winding-shaft plate (of a hopper-bottom coal-car). Figs. 305-15. The plate attached to the side of the car carrying the ratchet-wheel, pawl, and dog, serving as a bearing for the winding-shaft. See above.
Winding-shaft ratchet-wheel and pawl. 66, 67, figs.
Winding-shaft winch. 134, figs. 305-15. See Winding-
shaf t lever.
Windlass. 1. "(Nautical.) A large horizontal roller jour-
neled in standards (cheeks, windlass-bits), and rotated
by hand-spikes or other means. It differs from the
outrigger principally in the horizontality of its axis.
Ship's hoisting-machines, turned by cranks, are wind-
ches and some are specially adapted to machines which re-
olve on their bases, as cranes, derricks, etc."—Knight.
See Derrick.

Winding-lift. See Square-end.
Winding-shaft lever (side-dump ore-car). 132. A
Winding-shaft ratchet-wheel and pawl. 66, 67, figs.
66-15. A round iron bar supported by the winding-
shaf t plates, to which the drop door-chain or hopp er-
chain is attached. It carries a ratchet-wheel.
Winding-shaft lever (side-dump ore-car). 132. A lever connected to the winding-shaft by ratchet-wheel, pawl and dog by which a great torsional or winding stress may be applied to close the sides of the car. It is supplemental to a four-arm winch which is con-
ect ed directly to the shaft and which is used to turn the shaft so far as is possible by such means.
Winding-shaft plate (of a hopper-bottom coal-car). Figs. 305-15. The plate attached to the side of the car carrying the ratchet-wheel, pawl, and dog, serving as a bearing for the winding-shaft. See above.
Winding-shaft ratchet-wheel and pawl. 66, 67, figs.
Winding-shaft winch. 134, figs. 305-15. See Winding-
shaf t lever.
Windlass. 1. "(Nautical.) A large horizontal roller jour-
neled in standards (cheeks, windlass-bits), and rotated
by hand-spikes or other means. It differs from the
outrigger principally in the horizontality of its axis.
Ship's hoisting-machines, turned by cranks, are wind-
ches and some are specially adapted to machines which re-
olve on their bases, as cranes, derricks, etc."—Knight.
See Derrick.

2. A brake-shaft is sometimes called a brake-windlass,
Window-curtain. C, figs. 4552-3. A cloth or some kind of textile material loosely hung over a window to exclude sunshine, and which can be spread or drawn aside at pleasure. Curtains of this kind are now little used. Window-shades, which see, lie always flat, and are rolled up upon sash-rollers. They are often also called curtains.

Window-curtain bracket. Figs. 4567-9, 4577-5. More commonly, simply curtain-bracket, for supporting window-shade rollers. A more correct term would be shade or window-shade brackets, but in common usage, curtain brackets support shade rollers.

Window-curtain holder or hook. Y, figs. 4582-3; figs. 3568-9. A metal hook fastened at the side of a window for holding a curtain when drawn aside. Knobs are also used.


Window-curtain pulley. Figs. 4589-70. Practically obsolete. See Shade and curtain.

Window-curtain rings. Figs. 3579-82. See Curtain.

Window-curtain rod. Figs. 3584-6. See Curtain.

Window-curtain roller. Figs. 4594-5. More properly, a shade, or window-shade roller, which see.

Window-deflector-ventilator. See Deflector and ventilator.

Window dust-guard or deflector. Figs. 4565-90. That part of a shade-case, which see, that is drawn aside in car-building. It is fastened to the window-caseing by a dust-guard spring-holder, fig. 4588.

Window-furnishings (for deck-sashes). Figs. 4380-4402. (For lower windows.) Figs. 4403-4575.

Window-glass. Panes of glass used for windows. They are either plate or rolled glass, made by pouring the molten glass on to a table having the height of the desired thickness of the plate, and then passing a roller over the top, or blown, or common window-glass, the latter being by far the cheapest and most widely used, but of very much inferior quality. It is made by blowing the glass into a large bulb, which is then slit open while still hot and flattened out.

Window-grating. A wrought or cast iron partition made of bars, or in other form, placed on the outside of the windows of passenger-cars to prevent passengers from putting their heads or arms outside. Now rarely used.

Window-guard or deflector. Figs. 4379-80. A thin narrow-board of the height of the window adjusted perpendicular to the car side at the forward edge of the window, to deflect dust and cinders so they shall not enter the open window. It is fastened to the window-casing by a dust-guard spring-holder, fig. 4588.

Window-faster. Figs. 4453-90. A sash-lock, which see.

Window-furnishings. Figs. 4380-4402. (For lower windows.) Figs. 4403-4575.

Window-glass. Panes of glass used for windows. They are either plate or rolled glass, made by pouring the molten glass on to a table having the height of the desired thickness of the plate, and then passing a roller over the top, or blown, or common window-glass, the latter being by far the cheapest and most widely used, but of very much inferior quality. It is made by blowing the glass into a large bulb, which is then slit open while still hot and flattened out.

Window-grating. A wrought or cast iron partition made of bars, or in other form, placed on the outside of the windows of passenger-cars to prevent passengers from putting their heads or arms outside. Now rarely used.

Window-guard or deflector. Figs. 4379-80. A thin narrow-board of the height of the window adjusted perpendicular to the car side at the forward edge of the window, to deflect dust and cinders so they shall not enter the open window. It is fastened to the window-casing by a dust-guard spring-holder, fig. 4588.

Window-faster. Figs. 4453-90. A sash-lock, which see.

Window-glass. Panes of glass used for windows. They are either plate or rolled glass, made by pouring the molten glass on to a table having the height of the desired thickness of the plate, and then passing a roller over the top, or blown, or common window-glass, the latter being by far the cheapest and most widely used, but of very much inferior quality. It is made by blowing the glass into a large bulb, which is then slit open while still hot and flattened out.

Window-grating. A wrought or cast iron partition made of bars, or in other form, placed on the outside of the windows of passenger-cars to prevent passengers from putting their heads or arms outside. Now rarely used.

Window-guard or deflector. Figs. 4379-80. A thin narrow-board of the height of the window adjusted perpendicular to the car side at the forward edge of the window, to deflect dust and cinders so they shall not enter the open window. It is fastened to the window-casing by a dust-guard spring-holder, fig. 4588.

Window-faster. Figs. 4453-90. A sash-lock, which see.

Window-glass. Panes of glass used for windows. They are either plate or rolled glass, made by pouring the molten glass on to a table having the height of the desired thickness of the plate, and then passing a roller over the top, or blown, or common window-glass, the latter being by far the cheapest and most widely used, but of very much inferior quality. It is made by blowing the glass into a large bulb, which is then slit open while still hot and flattened out.

Window-grating. A wrought or cast iron partition made of bars, or in other form, placed on the outside of the windows of passenger-cars to prevent passengers from putting their heads or arms outside. Now rarely used.

Window-guard or deflector. Figs. 4379-80. A thin narrow-board of the height of the window adjusted perpendicular to the car side at the forward edge of the window, to deflect dust and cinders so they shall not enter the open window. It is fastened to the window-casing by a dust-guard spring-holder, fig. 4588.

Window-faster. Figs. 4453-90. A sash-lock, which see.
draft or the contrary by the current of external air passing over the car. With the Spear heater, figs. 3058-60, a wind scoop is shown.

Wings (pile-driver car). 20, figs. 401-4. See Pile-driver car and swinging-platform.

Winslow car-roof. Figs. 2353-57. A car-roof, patented by A. P. Winslow, which consists of metal roof-sheets laid cross-wise to the car. They are made with corrugations and are let into grooves in the rafters. The latter are covered with strips of sheet-iron and the whole with a fastener of transverse boards, which are fastened to longitudinally purified attached to the rafters or carlines See Car-roof.

Wire. See Seal-wires, figs. 8886-7a, 8800. Woven-wire, figs. 8922-87.

Wire-base (for lantern). Figs. 8333-4, 8386.

Wire-covered bell-cord. See Bell-cord. Little used.

Wire-gauze (for ventilator). A finenetting made of wire-base (for lantern). Figs. 3352-4, 8356.

Wood-center car-wheel. Figs. 5820, 5347. A form of wire shade-tripod. Fig. 8435. See Shade-ring.

Wood screw-thread. A form of screw-thread used for wood-screw. A small cylindrical bar of iron or steel worn flat (car-wheels). Under the rules for the intertwinement openings are covered to prevent the admission of dust.

Wire shade-tripod. Fig. 8435. See Shade-ring.

Wood-center car-wheel. Figs. 5330, 5347. A form of car-wheel used in England almost universally for passenger service, but rarely in this country. The wheel-center is entirely made up of teakwood used as a continuous and solid piece of spokes held in place by side-plates and Mansell retaining rings. Called in England the Mansell wheel. See Steel-tired wheel. Car-wheel. Tire-fastening.

Wooden brake-block (English). 63, figs. 348-41. A piece of soft wood used in England as a brake-block, which see. Wood is being superceded by cast-iron.


Wooden-frame truck. A car-truck, of which the wheel-pieces and end-pieces are made of wood. Figs. 4813-4965 are illustrations. See Truck. Car-truck.

Wooden floor-mat (street-cars). A sort of grating made of strips of wood, with distance-pieces and spaces between.

Wood's platform gate. Figs. 7974-6. A gate, the details of which are shown in the figures, that has found considerable favor on steam and suburban roads. When opened it folds against the end of the car quite out of the way.

Wood-screw. A small cylindrical bar of iron or steel with a wood screw-thread cut on it and a slotted head so that it can be turned with a screw-driver. A lug-screw is a heavy kind of wood-screw, but is not so-called. It has a square instead of slotted head, as fig. 3711. See Screw.

Wood screw-thread. A form of screw-thread used for screws which are intended to screw into wooden objects. It differs from a metal thread in having the spaces between the projections wider.

Wood siderventilator. Fig. 85. See Ventilators.

Worm. A helix like a screw-thread, for winding a rope or a chain upon. See Brake-chain worm. 17, fig. 3441.

Worn flat (car-wheels). Under the rules for the intertwinement openings are covered to prevent the admission of dust.

Wooden brake-block (English). 63, figs. 348-41. A piece of soft wood used in England as a brake-block, which see. Wood is being superceded by cast-iron.


Wooden-frame truck. A car-truck, of which the wheel-pieces and end-pieces are made of wood. Figs. 4813-4965 are illustrations. See Truck. Car-truck.

Wooden floor-mat (street-cars). A sort of grating made of strips of wood, with distance-pieces and spaces between.

Wood's platform gate. Figs. 7974-6. A gate, the details of which are shown in the figures, that has found considerable favor on steam and suburban roads. When opened it folds against the end of the car quite out of the way.

Wood-screw. A small cylindrical bar of iron or steel with a wood screw-thread cut on it and a slotted head so that it can be turned with a screw-driver. A lug-screw is a heavy kind of wood-screw, but is not so-called. It has a square instead of slotted head, as fig. 3711. See Screw.

Wood screw-thread. A form of screw-thread used for screws which are intended to screw into wooden objects. It differs from a metal thread in having the spaces between the projections wider.

Wood siderventilator. Fig. 85. See Ventilators.

Worm. A helix like a screw-thread, for winding a rope or a chain upon. See Brake-chain worm. 17, fig. 3441.

Worn flat (car-wheels). Under the rules for the intertwinement openings are covered to prevent the admission of dust.

Wooden brake-block (English). 63, figs. 348-41. A piece of soft wood used in England as a brake-block, which see. Wood is being superceded by cast-iron.


Wooden-frame truck. A car-truck, of which the wheel-pieces and end-pieces are made of wood. Figs. 4813-4965 are illustrations. See Truck. Car-truck.

Wooden floor-mat (street-cars). A sort of grating made of strips of wood, with distance-pieces and spaces between.

Wood's platform gate. Figs. 7974-6. A gate, the details of which are shown in the figures, that has found considerable favor on steam and suburban roads. When opened it folds against the end of the car quite out of the way.

Wood-screw. A small cylindrical bar of iron or steel with a wood screw-thread cut on it and a slotted head so that it can be turned with a screw-driver. A lug-screw is a heavy kind of wood-screw, but is not so-called. It has a square instead of slotted head, as fig. 3711. See Screw.

Wood screw-thread. A form of screw-thread used for screws which are intended to screw into wooden objects. It differs from a metal thread in having the spaces between the projections wider.

Wood siderventilator. Fig. 85. See Ventilators.

Worm. A helix like a screw-thread, for winding a rope or a chain upon. See Brake-chain worm. 17, fig. 3441.

Worn flat (car-wheels). Under the rules for the intertwinement openings are covered to prevent the admission of dust.

Wooden brake-block (English). 63, figs. 348-41. A piece of soft wood used in England as a brake-block, which see. Wood is being superceded by cast-iron.


Wooden-frame truck. A car-truck, of which the wheel-pieces and end-pieces are made of wood. Figs. 4813-4965 are illustrations. See Truck. Car-truck.

Wooden floor-mat (street-cars). A sort of grating made of strips of wood, with distance-pieces and spaces between.

Wood's platform gate. Figs. 7974-6. A gate, the details of which are shown in the figures, that has found considerable favor on steam and suburban roads. When opened it folds against the end of the car quite out of the way.

Wood-screw. A small cylindrical bar of iron or steel with a wood screw-thread cut on it and a slotted head so that it can be turned with a screw-driver. A lug-screw is a heavy kind of wood-screw, but is not so-called. It has a square instead of slotted head, as fig. 3711. See Screw.

Wood screw-thread. A form of screw-thread used for screws which are intended to screw into wooden objects. It differs from a metal thread in having the spaces between the projections wider.
INDEX TO ENGRAVINGS.

Note.—The following engravings, 5,683 in all, are alphabetically arranged under the following general heads; these nine general heads include the engravings, and they are again sub-classed alphabetically. The page number is put at the bottom of each page.

<table>
<thead>
<tr>
<th>TRUCKS</th>
<th>PAGE</th>
<th>NO.</th>
<th>FIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABS, General Views, Exterior and Interior</td>
<td>(43 pages, 228 cuts)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CABS</td>
<td>(98 “ 390 ”)</td>
<td>46</td>
<td>229</td>
</tr>
<tr>
<td>CAB-BODIES</td>
<td>(98 “ 1,887 ”)</td>
<td>142</td>
<td>617</td>
</tr>
<tr>
<td>CABS-FURNISHINGS</td>
<td>(108 “ 2,131 ”)</td>
<td>221</td>
<td>2,454</td>
</tr>
<tr>
<td>TRUCKS</td>
<td>(21 “ 557 ”)</td>
<td>329</td>
<td>4,578</td>
</tr>
</tbody>
</table>

Total Number of Pages and Cuts

891 pages, 5,683 cuts.

If the above general arrangement be borne in mind, there will be no difficulty in turning at once to any class of engravings desired, all being alphabetically arranged under their title and subtitle, as shown above and more fully in the following detailed index. Under each of the headings and sub-headings of the following list, the engravings are in general arranged alphabetically, according to the names of roads or otherwise, as far as their nature would permit. In a few cases cars have been grouped together on account of their construction features and uses, in preference to the particular kind of freight carried, and by which name they are usually distinguished. This, it is thought, will not lead to confusion, as they are never widely separated, but are nearly in alphabetical order.

<table>
<thead>
<tr>
<th>CAR-BODY DETAILS</th>
<th>PAGE</th>
<th>NO.</th>
<th>FIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passenger, Coaches</td>
<td>94</td>
<td>419</td>
<td></td>
</tr>
<tr>
<td>Combination-cars</td>
<td>108</td>
<td>447</td>
<td></td>
</tr>
<tr>
<td>Diving-cars</td>
<td>110</td>
<td>474</td>
<td></td>
</tr>
<tr>
<td>Business or Pay-cars</td>
<td>113</td>
<td>497</td>
<td></td>
</tr>
<tr>
<td>Special Suburban-car</td>
<td>115</td>
<td>501</td>
<td></td>
</tr>
<tr>
<td>English Carriage</td>
<td>116</td>
<td>501</td>
<td></td>
</tr>
<tr>
<td>Sleeping-cars</td>
<td>118</td>
<td>505</td>
<td></td>
</tr>
<tr>
<td>Sides and Roofs</td>
<td>134</td>
<td>531</td>
<td></td>
</tr>
<tr>
<td>Baggage-cars</td>
<td>137</td>
<td>570</td>
<td></td>
</tr>
<tr>
<td>Baggage and Express</td>
<td>138</td>
<td>584</td>
<td></td>
</tr>
<tr>
<td>Baggage and Mail</td>
<td>138</td>
<td>584</td>
<td></td>
</tr>
<tr>
<td>Post-office Cars</td>
<td>140</td>
<td>605</td>
<td></td>
</tr>
</tbody>
</table>

CAR-BODIES, Continued, General Passenger-car.

For a Box-car.

142 | 617 |

145 | 618 |

146 | 625 |

147 | 618 |

148 | 618 |

153 | 1,428 |

154 | 1,451 |

155 | 1,453 |

160 | 1,544 |

162 | 1,602 |

164 | 1,661 |

167 | 1,688 |

164 | 1,750 |

178 | 1,761 |

177 | 1,785 |

178 | 1,785 |

198 | 2,007 |

204 | 2,325 |

208 | 2,388 |

209 | 2,408 |

212 | 2,419 |

220 | 2,451 |
## INDEX TO ENGRAVINGS

<table>
<thead>
<tr>
<th>CAR-FURNISHINGS</th>
<th>Page</th>
<th>Fig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bell Cord, Bushings</td>
<td>221</td>
<td>2,454</td>
</tr>
<tr>
<td>Couplings and Splices</td>
<td>221</td>
<td>2,464</td>
</tr>
<tr>
<td>Guides</td>
<td>221</td>
<td>2,476</td>
</tr>
<tr>
<td>Hangers</td>
<td>223</td>
<td>2,503</td>
</tr>
<tr>
<td>Hanger Straps</td>
<td>223</td>
<td>2,537</td>
</tr>
<tr>
<td>Door, Bolts, etc.</td>
<td>223</td>
<td>2,551</td>
</tr>
<tr>
<td>Hooks and Catches</td>
<td>223</td>
<td>2,586</td>
</tr>
<tr>
<td>Knobs and Escutcheons</td>
<td>226</td>
<td>2,621</td>
</tr>
<tr>
<td>Locks</td>
<td>227</td>
<td>2,644</td>
</tr>
<tr>
<td>Freight-car Locks</td>
<td>230</td>
<td>2,736</td>
</tr>
<tr>
<td>Notice Plates</td>
<td>232</td>
<td>2,773</td>
</tr>
<tr>
<td>Stops and Weather-strips</td>
<td>233</td>
<td>2,803</td>
</tr>
<tr>
<td>Sliding-door Fixtures</td>
<td>234</td>
<td>2,825</td>
</tr>
<tr>
<td>Floor</td>
<td>235</td>
<td>2,837</td>
</tr>
<tr>
<td>Heating Apparatus, Baker's</td>
<td>236</td>
<td>2,865</td>
</tr>
<tr>
<td>The Consolidated</td>
<td>240</td>
<td>2,879</td>
</tr>
<tr>
<td>Gold's</td>
<td>243</td>
<td>2,996</td>
</tr>
<tr>
<td>Safety's</td>
<td>247</td>
<td>3,023</td>
</tr>
<tr>
<td>Spear's</td>
<td>251</td>
<td>3,058</td>
</tr>
<tr>
<td>Stones and Ranges</td>
<td>251</td>
<td>3,061</td>
</tr>
<tr>
<td>Lamps, Gas, The Frost System</td>
<td>259</td>
<td>3,109</td>
</tr>
<tr>
<td>The Pintsch System</td>
<td>259</td>
<td>3,110</td>
</tr>
<tr>
<td>Lamps, Oil</td>
<td>263</td>
<td>3,233</td>
</tr>
<tr>
<td>Combination, for Street-cars</td>
<td>270</td>
<td>3,308</td>
</tr>
<tr>
<td>Tail and Caboose Lamps</td>
<td>271</td>
<td>3,310</td>
</tr>
<tr>
<td>Lamp Brackets and Lanterns</td>
<td>272</td>
<td>3,333</td>
</tr>
<tr>
<td>Burners</td>
<td>273</td>
<td>3,363</td>
</tr>
<tr>
<td>Chimneys and Shades</td>
<td>275</td>
<td>3,419</td>
</tr>
<tr>
<td>Lavatory, Furnishings</td>
<td>277</td>
<td>3,488</td>
</tr>
<tr>
<td>Pumps and Faucets, etc</td>
<td>278</td>
<td>3,495</td>
</tr>
<tr>
<td>Wash-basins, etc</td>
<td>281</td>
<td>3,525</td>
</tr>
<tr>
<td>Air-pressure System of Water Supply</td>
<td>283</td>
<td>3,534</td>
</tr>
<tr>
<td>Water-coolers</td>
<td>284</td>
<td>3,549</td>
</tr>
<tr>
<td>Towel-rod Brackets, etc</td>
<td>284</td>
<td>3,558</td>
</tr>
<tr>
<td>Miscellaneous Furnishings:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grilles and Panels</td>
<td>286</td>
<td>3,624</td>
</tr>
<tr>
<td>Hat-hooks, etc</td>
<td>287</td>
<td>3,666</td>
</tr>
<tr>
<td>Sandries</td>
<td>288</td>
<td>3,805</td>
</tr>
<tr>
<td>Jacks</td>
<td>289</td>
<td>3,728</td>
</tr>
<tr>
<td>Hooks, Basket</td>
<td>290</td>
<td>3,753</td>
</tr>
<tr>
<td>Platform Furnishings</td>
<td>291</td>
<td>3,771</td>
</tr>
<tr>
<td>Gates</td>
<td>292</td>
<td>3,784</td>
</tr>
<tr>
<td>Postal-car Furnishings</td>
<td>293</td>
<td>3,814</td>
</tr>
<tr>
<td>Saloon Furnishings</td>
<td>294</td>
<td>3,839</td>
</tr>
<tr>
<td>Seals</td>
<td>296</td>
<td>3,877</td>
</tr>
<tr>
<td>Seals, Bushnell's</td>
<td>297</td>
<td>3,901</td>
</tr>
<tr>
<td>Seals, Hale &amp; Kilburn's</td>
<td>299</td>
<td>3,917</td>
</tr>
<tr>
<td>Robert's Woven Wire</td>
<td>300</td>
<td>3,932</td>
</tr>
<tr>
<td>Starritt's</td>
<td>305</td>
<td>3,968</td>
</tr>
<tr>
<td>Wakefield Rattan</td>
<td>307</td>
<td>3,990</td>
</tr>
<tr>
<td>Chairs and Springs</td>
<td>308</td>
<td>3,990</td>
</tr>
<tr>
<td>Hardware</td>
<td>310</td>
<td>4,022</td>
</tr>
<tr>
<td>Sofa and Sleeping-berth</td>
<td>313</td>
<td>4,116</td>
</tr>
<tr>
<td>Smoking-room</td>
<td>318</td>
<td>4,273</td>
</tr>
</tbody>
</table>

## FURNISHINGS, Continued

| Table Plates and Hooks | 319 | 4,286 |
| Ventilators | 319 | 4,290 |
| Windows, Deck | 321 | 4,390 |
| Blinds | 323 | 4,403 |
| Lower, and Door | 324 | 4,450 |
| Shades | 327 | 4,544 |

## TRUCKS, Freight-car, General Views

| Rigid Diamond and Details | 330 | 4,580 |
| Swing-motion | 335 | 4,740 |
| Miscellaneous Types | 336 | 4,747 |
| Passenger, Four-wheeled and Details | 340 | 4,906 |
| Six-wheeled and Details | 347 | 4,962 |

## TRUCK DETAILS (with each style of Truck):

| Journal Boxes and Lids | 350 | 5,130 |
| Bolster Springs | 352 | 5,133 |
| Equalizer and Elliptic | 354 | 5,235 |
| Wheels, Sted-Hired | 357 | 5,235 |
| Wheel Tire Fastenings | 362 | 5,372 |
| Chilled Cast Wheels | 363 | 5,345 |
| Wheels, Contracting Chills | 364 | 5,364 |

## MASTER CAR BUILDERS' STANDARDS:

| Journal Boxes, etc | 365 | 5,370 |
| Bearings and Wedges | 367 | 5,399 |
| Axles and Wheel Gage | 368 | 5,419 |
| Brake-gear | 369 | 5,455 |
| Pedestal | 370 | 5,490 |
| Wheel and Track Gages | 371 | 5,484 |
| Screw Threads | 372 | 5,490 |
| Coupler | 373 | 5,490 |

## MASTER CAR BUILDERS' RECOMMENDED PRACTICE:

| Attachment of Coupler | 373 | 5,506 |
| Marking Freight-cars | 374 | 5,513 |
| Protection of Trainmen | 374 | 5,535 |
| Freight Safety-chains | 375 | 5,533 |
| Bearing and Wedge Gages | 375 | 5,556 |
| Loading Poles and Bark | 375 | 5,572 |
| Defect Card for Air-brake | 376 | 5,577 |
| Dummy Coupling Hook | 376 | 5,579 |

## HAND-CARS, General Views

| Working Drawings | 378 | 5,590 |

## PUSH-CARS, General Views

| 380 | 5,601 |

## VELOCIPede-CARS, General Views

| Mine and Tunnel | 381 | 5,617 |
| Wheels | 383 | 5,620 |

## WAREHOUSE TRUCKS

| 383 | 5,636 |

## STREET-CARS, General Views

| 383 | 5,642 |
| Detail Drawings | 387 | 5,654 |

## STREET-CAR TRUCKS

| 391 | 5,668 |

## STREET-CAR MOTORS

| 392 | 5,674 |
Figs. 1-4. CARS, Freight; General Views.

Fig. 1. Box Car, New York Central & Hudson River Railroad.
Capacity, 60,000 lbs. Weight, 30,650 lbs.
Inside End Sills, Brake Hand Rail, and Equipped with Air Brakes and Fox Trucks.
(Details are shown in Figs. 227-231.)

Fig. 2. Box Car, Pennsylvania Railroad.
Length, 89 ft. Capacity, 60,000 lbs. Weight, 32,350 lbs.
Outside End Sill, Equipped with Air Brakes and Rigid Diamond Trucks.
(Details are shown in Figs. 222-243.)

Fig. 3. Box Car, New York, Lake Erie & Western Railroad.
Length, 60 ft. Capacity, 60,000 lbs. Weight, 31,000 lbs.
Equipped with Air Brakes and Rigid Diamond Trucks.

Fig. 4. Furniture Car, Chicago, Burlington & Quincy Railroad.
Length, 40 ft. Capacity, 50,000 lbs. Weight, 21,550 lbs.
Coupler is placed between Center Sills to get greater height of Car-body.
(Details are shown in Figs. 247-250.)
**Fig. 5. Fruit Car. Norfolk & Western Railroad.**
Length, 34 ft. 8 ins. Capacity, 46,000 lbs. Weight, 41,600 lbs.
Grated Doors and Ventilators. Equipped with Rigid Diamond Trucks.

**Fig. 6. Fruit Car. Denver & Rio Grande Railroad.**
Length, 34 ft. Capacity, 45,000 lbs. Weight, 41,000 lbs.
Equipped with Platforms and Steps, Passenger Trucks, En & Ventilators and Air Brakes.

**Fig. 7. Fruit Car. Northern Pacific Railroad.**
Length, 31 ft. 3 ins. Capacity, 48,000 lbs. Weight, 31,000 lbs.
Ventilated Ends and equipped with Swing Motion Diamond Trucks with Elliptic Springs.

**Fig. 8. Poultry Car.**
Length, 33 ft. 10 ins. Capacity, 18,000 lbs., 5,000 Fowl, 3,000 Geese, or 1,400 Turkeys.
Equipped with Swing Motion Diamond Trucks.
Fig. 9. Refrigerator Car for Dressed Meat.
Length, 36 ft. Capacity, 50,000 lbs. Weight, 43,000 lbs.

Fig. 10. Refrigerator Car. Atchison, Topeka & Santa Fe Railroad.
Length, 36 ft. Capacity, 10,000 lbs. Weight, 41,500 lbs. Hanrahant System of Refrigeration, the details of which are shown in Figs. 274-277.

Fig. 12. Refrigerator Car, Southern Pacific Company.
Length, 36 ft. Capacity, 50,000 lbs. Weight, 43,000 lbs.
Candus System of Refrigeration, details of which are shown in Figs. 283-288.
**Fig. 13. Refrigerator Car. New York, Lake Erie & Western Railroad.**
Length, 34 ft. Capacity, 80,000 lbs. Weight, 39,800 lbs.

**Fig. 14. Refrigerator Car for Dressed Meats. Swift Refrigerator Line.**
Chase System of Refrigeration. Equipped with Swinging Motion Diamond Trucks.

**Fig. 15. Barrel Car. Union Tank Line.**
Length, 51 ft. Capacity, 432 barrels, or 40,000 lbs.

**Fig. 16. Flat Car. Saginaw, Tuscola & Huron Railroad.**
Length, 36 ft. Capacity, 60,000 lbs. Weight, 20,500 lbs.
Equipped with Pull up Brake, Didrich Brake Wheel and Swinging Motion Diamond Trucks.
Figs. 17-21. CARS, Freight; General Views.

Fig. 17. Flat Car, Norfolk & Western Railroad.
Length, 34 ft. Capacity, 60,000 lbs. Weight, 19,000 lbs.
Equipped with Rigid Diamond Trucks.

Fig. 18. Flat Car, Davenport, Iowa & Dakota Railroad.
Length, 34 ft. Capacity, 40,000 lbs. Weight, 17,700 lbs.
Equipped with Rigid Diamond Trucks.

Fig. 19. Flat Car, for Bridge Timbers.
Length, 41 ft. Capacity, 60,000 lbs. Weight, 21,700 lbs.
Equipped with Rigid Diamond Trucks (Details are shown in Figs. 204-207.)

Fig. 20. Ore Car, Chicago & North Western Railway.
Length, 28 ft. Capacity, 60,000 lbs. Weight, 19,000 lbs.
Equipped with Air Brakes and Swing Motion Trucks.

Fig. 21. Gondola Car, with Double Drop Bottom and Rack for Coke, Pittsburgh, Fort Wayne & Chicago Railway.
Inside length, 33 ft. Capacity, 60,000 lbs. Weight, 30,700 lbs.
CARS, Freight; General Views.

Fig. 22. Gondola Car, Single Drop-bottom, for Coal and Lumber.
Lake Shore & Michigan Southern Railway.
Length, 34 ft. Capacity, 90,003 lbs. Weight, 27,153 lbs.
Equipped with Air Brakes and Rigid Diamond Trucks.

Fig. 23. Gondola Car, with Drop-bottom and Drop-ends, for Coal, Ore and Lumber.
Norfolk & Western Railroad.
Length, 36 ft. 1 in. Capacity, 80,000 lbs. Weight, 27,400 lbs.
(Details are shown in Figs. 302-304.)

Fig. 24. Gondola Car, with Hopper-bottom, for Coal.
New York, Ontario & Western Railway.
Length, 29 ft. 1 in. Capacity, 80,000 lbs. Weight, 25,150 lbs.

Fig. 25. Gondola Car, with Pyramidal Hopper-bottom, for Coal.
Length, 26 ft. Capacity, 80,000 lbs. Weight, 23,400 lbs.
Equipped with Air Brake, Side trucking an Rigid Diamond Trucks.

Fig. 26. Gondola Car, with Twin-Hoppers, for Coal.
Baltimore & Ohio Railroad.
Length, 36 ft. 2 ins. Capacity, 80,000 lbs. Weight, 30,800 lbs.
Figs. 27-33. CARS, Freight; General Views.

**Fig. 27. Side-Dump Ore Car. Lake Shore & Michigan Southern Railway.**
Length, 32 ft. Capacity, 80,000 lbs. Weight, 36,500 lbs. (Details are shown in Figs. 332-333.)

**Fig. 28. Side-Dump Car, Thacher.**
Capacity, 40,000 lbs. Weight, 17,200 lbs. Body tilted by Compressed Air. (Details are shown in Figs. 338-342.)

**Fig. 29. Mine Car, Automatic Side Dump, built by C. W. Raymond & Co.**

**Fig. 30. Mine Car, Automatic Side Dump, built by C. W. Raymond & Co.**

**Fig. 31. Cement Car, Drop Bottom, built by Bloomsburg Car Company.**

**Fig. 32. Mine Car, End Dump, built by Bloomsburg Car Company.**

**Fig. 33. Mine Car, Steel, End Dump, built by Bloomsburg Car Company.**
Fig. 31. Logging Car, built by The Russell Wheel & Foundry Company.

Fig. 32. Logging Car Truck, built by The Russell Wheel & Foundry Company.

Truck length, 8 ft. 4 in. Height, 34 in. Capacity, 60,000 lbs. Weight, 9,400 lbs. (Details are shown in Figs. 35-36.)

Fig. 36. Logging Car, built by The Russell Wheel & Foundry Company.

Fig. 37. Stock Car, Double Decked for Sheep and Hogs. Chicago, Burlington & Quincy Railroad.

Capacity, 40,000 lbs. Weight, 31,500 lbs.

Equipped with Air Brakes, Troughs for Feeding and Watering and Swing Motion Trucks.

Fig. 38. Stock Car for Cattle and Horses. Pennsylvania Railroad.

Capacity, 60,000 lbs. Weight, 30,100 lbs.

Equipped with Feed Boxes, Air Brakes and Rigid Diamond Trucks.
Fig. 39. **Stock Car for Cattle and Horses. Chicago & Northwestern Railway.**

Capacity, 50,000 lbs.  Weight, 34,550 lbs.

Arrangements for Feeding and Watering, Rod Doors for Loading Lumber and Rails, and Equipped with Air Brakes and Swing Motion Trucks.

Fig. 40. **Stock Car for Cattle and Horses. Canda Cattle Car Company.**

Length, 36 ft.  Capacity, 60,000 lbs.  Weight, 25,000 lbs.

Arrangements for Feeding and Watering, Rod Doors for Loading Lumber and Rails, and Equipped with Air Brakes and Special Swing Motion Trucks.  (Details are shown in Figs. 339-364.)

Fig. 41. **Stock Car for Cattle and Horses. Atchison, Topeka & Santa Fe Railroad.**

Length, 34 ft.  Capacity, 50,000 lbs.  Weight, 28,000 lbs.

Arrangements for Feeding and Watering, Equipped with Air Brakes and Swing Motion Trucks.  (Interior shown in Fig. 42.)
Fig. 42. Interior of Stock Car for Cattle and Horses. Atchison, Topeka & Santa Fe Railroad. Showing Racks and Troughs for Feeding and Watering.

Fig. 43. Interior of Stock Car for Horses. Keystone Palace Horse Car Company. Capacity, 18 horses.

Fig. 44. Stock Car for Horses and Prize Cattle. Equipped with Air Brakes and Swing Motion Trucks. (Interior shown in Fig. 43.)

Fig. 45. Stock Car for Horses and Prize Cattle. The Burton Stock Car Company. Length, 44 ft. Capacity, 16 horses, or 22,400 lbs. (Interiors shown in Figs. 46 and 47.)

Fig. 46. Interior of Burton Stock Car for Horses. Partitions moved to one side, making a Box Stall or Storage Room for Vehicles.

Fig. 47. Interior of Burton Stock Car for Horses. Partitions arranged longitudinally. Trough when lowered constitutes a Buffer.
Figs. 48-51. CARS, Freight and Caboose; General Views.

**Fig. 48. Tank Car for Oil, Acids, Molasses, Etc. Union Tank Lines.**
Length, 37 ft. Capacity, 8,000 gals. Weight, 28,000 lbs.
(Details are shown in Figs. 373-378.)

**Fig. 49. End View.**
Tank Car for Oil, Acids, Etc. Union Tank Line.

**Fig. 50. Caboose Car. Norfolk & Western Railroad.**
Four-Wheeled. With Lookout and Tool Box.

**Fig. 51. Caboose Car with Equalizing Ram.**
Duluth & Iron Range Railroad.
Four-Wheeled. With Lookout. (Older Pattern.)
Fig. 52. Caboose Car. New York, Chicago & St. Louis Railroad.
With Lookout, Platforms, Steps and Rigid Diamond Trucks.

Fig. 53. Caboose Car. Denver & Rio Grande Railroad.
With Lookout, Side Doors, and Swing Motion Diamond Trucks with Rigid Springs.

Fig. 54. Caboose Car. Chicago, St. Paul, Minneapolis & Omaha Railway.
With Lookout, Tool Box, Platforms and Steps, Side Doors and Passenger Trucks.
Fig. 55. Side Elevation.
Box Car. Pennsylvania Railroad.
(No longer a standard)

Fig. 56. End Elevation.

Fig. 57. Side Elevation.
Box Car. Baltimore & Ohio Railroad.
Inside width, 7 ft. 10 ins. Inside height, 7 ft. 10 ins. Capacity, 50,000 lbs. Weight, 29,500 lbs.

Fig. 58. End Elevation.

Fig. 59. Side Elevation.
Box Car. Pennsylvania Railroad. Capacity, 60,000 lbs. Weight, 31,600 lbs. (Details are shown in Figs. 232-243.)

Fig. 60. End Elevation.

Fig. 61. Side Elevation.
Box Car. Baltimore & Ohio Railroad.

Fig. 62. End Elevation.
CARS, Freight; General Views. Figs. 63-72

Fig. 63. Side Elevation. Low Flat Car. Baltimore & Ohio Railroad. Length over couplers, 38 ft. 1½ ins. Capacity, 60,000 lbs.

Fig. 64. End Elevation.

Fig. 65. Side Elevation. Gondola Car. Baltimore & Ohio Railroad. Length, 38 ft. 5½ ins. Capacity, 60,000 lbs. American Continuous Drawbar.

Fig. 66. End Elevation.

Fig. 67. Side Elevation. Box Hopper Gondola Car. Baltimore & Ohio Railroad. Capacity, 60,000 lbs. Weight, 29,700 lbs. Clear opening of each hopper, 15 × 76 ins.

Fig. 68. End Elevation.

Fig. 69. Side Elevation. Double-Hopper Gondola Car. Baltimore & Ohio Railroad. Length, 38 ft. 5½ ins. over couplers. Capacity, 60,000 lbs.

Fig. 70. End Elevation.

Fig. 71. Side Elevation. Side Dump Car. Baltimore & Ohio Railroad. Length, 31 ft. 9½ ins. over couplers. Capacity, 60,000 lbs. American Continuous Drawbar. Fox Pressed Steel Truck.

Fig. 72. End Elevation.
Figs. 73-80. CARS, Freight; General Views.

Fig. 73. Side Elevation.
HOPPER GONDOLA CAR, RACKED FOR COKE. BALTIMORE & OHIO RAILROAD.
Inside length, 28 ft. 6 ins. Inside width, 7 ft. 6 ins. Capacity, 40,000 lbs. Weight, 22,300 lbs.
Clear Opening of Hopper, 32 1/2 x 57 1/4 ins.

Fig. 74. End Elevation.

Fig. 75. Side Elevation.
STOCK CAR, DOUBLE-DECKED. PENNSYLVANIA RAILROAD.
Capacity, 60,000 lbs.

Fig. 76. End Elevation.

Fig. 77. Side Elevation.
HAND DERRICK CAR. PENNSYLVANIA RAILROAD.
Capacity, 15 tons. Weight, 50,700 lbs.

Fig. 78. End Elevation.

HAND DERRICK CAR. BALTIMORE & OHIO RAILROAD.
Capacity, 15 tons. Weight, 30,375 lbs.
Equipped with Air Brakes. (Details are shown in Figs. 38-39.)
CABS, Caboose; General Views. Figs. 81-88.

Figs. 81-84. Elevation Diagrams of Various Types of Caboose Cars.

Fig. 81. Side Elevation.
Fig. 82. End Elevation.

FOUR-WHEEL CABOOSE CAR WITH LOOKOUT. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Eight-Wheel Caboose, with Side Doors and Lookout.

Fig. 83. Side Elevation.
Fig. 84. End Elevation.

EIGHT-WHEEL CABOOSE, WITH SIDE DOORS AND LOOKOUT.

Fig. 85. Side Elevation.
Fig. 86. End Elevation.

EIGHT-WHEEL CABOOSE, WITH SIDE DOORS AND TOOL BOX.

Fig. 87. Side Elevation.
Fig. 88. End Elevation.

EXPRESS CAR, BALTIMORE & OHIO RAILROAD.
Length, 14 ft. Length over all, 51 ft. 10 in.
Figs. 89-92. CARS, Passenger; General Views.

**Fig. 90.** COACH, FIRST-CLASS, WITH SMOKING COMPARTMENT. ILLINOIS CENTRAL RAILROAD.
Length, 51 ft. 6 ins. Capacity, 50 persons. Weight, 60,000 lbs.

**Fig. 91.** INTERIORS OF FIRST-CLASS COACHES.
Pendulum Light.

**Fig. 92.** COACH, FIRST-CLASS. CHICAGO, BURLINGTON & QUINCY RAILROAD.
(Details of Side and Roof shown in Figs. 557-560.)
Fig. 93. Coach for Local or Suburban Service. Atlantic City Railroad.

Fig. 94. Interior of First-Class Coach. Oil Lamps and Window Blinds.

Fig. 95. Interior of First-Class Coach. Boston & Albany Railroad. Turtle-Back Roof and Bracket Oil Lamps.

Fig. 96. Coach, First-Class. Boston & Albany Railroad. Turtle-Back Roof.
Fig. 101. Dining Car for Summer Service. Delaware & Hudson Canal Company.

Fig. 102. Interior Dining Car, for Summer Service. Delaware & Hudson Canal Company.

Fig. 103. Interior of a Dining Car for Summer Service. Atchison, Topeka & Santa Fe Railroad.

Oil Lamps, Portable Tables and Chairs.

Fig. 104. Combination Café and Baggage Car. Wabash Railroad.
Fig. 105. DINING CAR. NEW YORK, LAKE ERIE & WESTERN RAILROAD.
(Shown on Transfer Table)

Fig. 106. INTERIOR OF DINING CAR.
Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company.
(Exterior shown in Fig. 109. Plan in Fig. 101.)

Fig. 107. INTERIOR OF DINING CAR. LA RABAVIDA.
Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company.

Fig. 108. INTERIOR OF DINING CAR, FEJRIMAND.
Exhibited at World's Columbian Exposition, 1893, by Wagner Palace Car Company.
(Plan shown in Fig. 178.)

Fig. 109. INTERIOR OF DINING CAR, LA RABAVIDA.
Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company.
Fig. 110. Dining Car, La Rabida.
Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company.
(Interiors shown in Figs. 107 and 109. Plan in Fig. 101.)

Fig. 111. Interior of Parlor Car for General Service of Pullman's Palace Car Company.

Fig. 112. Interior of Parlor Car.
Boston & Albany Railroad.
(Turtle-Back Roof)

Fig. 113. Interior of Parlor Car for Summer Service.
Pennsylvania Railroad's Limited Express.
(Exterior view is shown in Fig. 113)

Fig. 114. Interior of Buffet Parlor Car for Summer Service.
Pinched Lights and Wicker Furniture
Figs. 115-118. CARS, Passenger; General Views.

Fig. 115. Parlor Car Maud, for General Service, built by Pullman's Palace Car Company.
(Interior is shown in Fig. 116.)

Fig. 116. Interior of Parlor Car Maud.
Corner Bracketed to Support Bucket Racks, Planchet Light and Bay Windows.
(Exterior is shown in Fig. 115.)

Fig. 117. Interior of Parlor Car Santa Maria.
(Plan is shown in Fig. 119.)

Fig. 118. Private Car Hesperia, The Pikes Valley Railway.
(Shown on Transfer Table.)
CARS, Passenger; General Views. Figs. 119-123

Fig. 119. **INTERIOR OF PRIVATE CAR, DINING ROOM, BUILT BY PULLMAN'S PALACE CAR COMPANY, 1876.**
*Steam Heat, Oil and Electric Lamps.*

Fig. 120. **INTERIOR OF DIRECTORS' CAR, DINING ROOM. NORFOLK & WESTERN RAILROAD, 1880.**

Fig. 121. **OBSERVATION END OF PARLOR CAR FOR PENNSYLVANIA RAILROAD LIMITED EXPRESS.**
*(Interior shown in Fig. 111.)*

**Fig. 122. EXHIBITED AT WORLD'S COLUMBIAN EXPOSITION, 1893, BY PULLMAN'S PALACE CAR COMPANY.**
*Bay Windows, Vaulted Ceiling, Oval Deck Windows and Electric Lights.* *(Plan shown in Fig. 123.)*

Fig. 123. **COMPARTMENT SLEEPING CAR, FERDINAND.**
*(Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company. Plan shown in Fig. 125.)*
Figs. 124-128. CARS, Passenger; General Views.

Fig. 124. SLEEPING CAR, PULLMAN'S PALACE CAR COMPANY.
(A type that is being replaced by those shown in Figs. 123 and 129.)

Fig. 125. Interior of a Sleeping Car, Built by The Baker & Smith Car Company.

Fig. 126. Interior of Sleeping Car America. Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company. Vaulted Ceiling, Oval Deck-Window, Disappearing Curtain Rods and Electric Lights. (Plan is shown in Fig. 128.)

Fig. 127. Interior of Sleeping Car, Isabella, State Room. Exhibited at World's Columbian Exposition by the Wagner Palace Car Company. (Plan shown in Fig. 177.)

Fig. 128. Interior of Buffet Parlor Car, Perion. Exhibited at World's Columbian Exposition by the Wagner Palace Car Company. (Plan shown in Fig. 178.)
Fig. 129. SLEPPING CAR FOR PULLMAN'S PALACE CAR COMPANY'S SERVICE.

(Shown on Transfer Table)

Fig. 130. INTERIOR OF SLEEPING CAR, GLADIOLUS. PENNSYLVANIA RAILROAD'S LIMITED EXPRESS.

Fig. 131. INTERIOR OF SLEEPING CAR, AMERICA, DRAWING ROOM. Exhibited at World's Columbian Exposition, 1893, by Pullman's Palace Car Company. (Plan is shown in Fig. 185. Another interior is shown in Fig. 195.)

Fig. 132. INTERIOR OF COMBINATION CAR, SMOKING COMPARTMENT. Exhibited at World's Columbian Exposition by the Wagner Palace Car Company. (Plan is shown in Fig. 175.)

Fig. 133. INTERIOR OF COMBINATION CAR, SMOKING COMPARTMENT. Exhibited at World's Columbian Exposition by Pullman's Palace Car Company. (Plan is shown in Fig. 181; exterior in Fig. 134.)
Fig. 134. Combination Smoking, Barber Shop, Bath Room and Baggage Car. Exhibited at World’s Columbian Exposition, 1893, by Pullman’s Palace Car Company. (Plan is shown in Fig. 134, Interior in Fig. 133.)

Fig. 135. Combination Passenger and Baggage Car. Baltimore & Ohio Railroad.

Fig. 136. Combination Passenger, Baggage and Mail Car. Chattanooga Southern Railway.

Fig. 137. Combination Baggage and Mail Car. St. Louis & Hannibal Railway.
Fig. 138. Interior of a Combination Passenger and Baggage Car.

Fig. 139. Interior of a Baggage and Express Car.

Fig. 140. Baggage and Express Car. Illinois Central Railroad.
Length, 50 ft. 8 in. Capacity, 40,000 lbs. Weight, 45,400 lbs.

Fig. 141. Baggage Car. Baltimore & Ohio Railroad.
Figs. 142-145. CARS, Postal; General Views.

Fig. 142. Postal Car. Chicago, Burlington & Quincy Railroad.

Fig. 143. Interior of Postal Car.
Fig. 144. Interior Postal Car for Papers.
Fig. 145. Postal Car, with one End Door. Illinois Central Railroad.

Length, 60 ft. 9 ins. Capacity, 40,000 lbs. Weight, 72,100 lbs.
CARS, Postal; General Views.

**Fig. 146.** Postal Car, Chicago & Northwestern Railway.
(Shown on Transfer Table.)

**Fig. 147.** Interior Postal Car, Showing Letter Case End, Lamps and Skylight.

**Fig. 148.** Interior Postal Car, Showing Bag Racks, Reversible Tables and Paper Boxes.

**Fig. 149.** Electric Light Plant.
Chicago, Milwaukee & St. Paul Railway.
(Placed in the end of Baggage Cars.)

**Fig. 150.** Interior Parlor Car.
Chicago, Milwaukee & St. Paul Railway.
(Showing Arrangement of Lamps for Electric Lighting.)
Fig. 151. OPEN EXCURSION CAR FOR SUBURBAN ROADS. SALT LAKE & LOS ANGELES RAILROAD.

Fig. 152. INTERIOR OF TOURIST OR EMIGRANT SLEEPING CAR. SOUTHERN PACIFIC COMPANY. (Details shown in Figs. 105-111.)

Fig. 153. INTERIOR OF SPECIAL TOURIST CAR FOR EXCURSIONISTS AND TROOPS. PENNSYLVANIA COMPANY.

Fig. 154. SPECIAL TOURIST CAR FOR EXCURSIONISTS AND TROOPS. PENNSYLVANIA COMPANY. Designed for World's Fair Service.
Fig. 155. Passenger Coach, Pennsylvania Railroad. Seating capacity, 64 persons. Weight, 65,800 lbs. (Details are shown in Figs. 435-443.)

Fig. 156.

Fig. 157. Passenger Coach, Baltimore & Ohio Railroad. Length, 48 ft. 6 in. Capacity, 56 persons. Weight, 53,300 lbs. (Details are shown in Figs. 433-434.)

Fig. 158.

Fig. 159. Passenger Coach, Baltimore & Ohio Railroad. Length, 60 ft. Capacity, 67 persons. Weight, 70,800 lbs. Lounges and Smoking Room.

Fig. 160.

Fig. 161. Club Car Netherwoods, Central Railroad of New Jersey.

Fig. 162. Club Car Netherwoods, Central Railroad of New Jersey.
Figs. 163-172. CARS, Passenger, Baggage and Postal; General Views.

Fig. 163-164. Passenger Coach. New York Central & Hudson River Railroad.

Fig. 165-166. Boarding Car. Chicago, Burlington & Quincy Railroad.

Fig. 167. Plan of Baggage Car built by Pullman's Palace Car Company.

Fig. 168-170. Refrigeration Express Car. Baltimore & Ohio Railroad.
Inside length, 53 ft. 2 ins. Weight, 63,000 lbs.
(Interior arrangement is shown in Figs. 588-597.)

Figs. 182-187. CARS, Passenger; General Views.

Fig. 182. Side Elevation.
POSTAL CAR.
(Interior view is shown in Fig. 143.)

Fig. 183. Sectional Plan.
POSTAL CAR.
(Interior view is shown in Fig. 143.)

Fig. 184. Sectional Plan.
COMBINATION BAGGAGE, SMOKING, BATH ROOM AND BARBER SHOP CAR, MARCHENA.
(Exterior and Interior views are shown in Figs. 134 and 133.)

Fig. 185. Side Elevation.
SLEEPING CAR, AMERICA.
(Interior views are shown in Figs. 126 and 131.)

Fig. 186. Sectional Plan.
SLEEPING CAR, AMERICA.
(Interiors are shown in Figs. 126 and 131.)

Fig. 187. Plan.
COMPARTMENT SLEEPER, FERDINAND.
(Exterior view is shown in Fig. 123.)

CARS EXHIBITED AT THE WORLD'S COLUMBIAN EXPOSITION, 1893, BY PULLMAN'S PALACE CAR COMPANY.
CARS, Passenger; General Views.

Fig. 189. Sectional Plan.
First Class Coach.

Fig. 190. Sectional Plan.
Parlor Car, Santa Maria.
(Interior view is shown in Fig. 117.)

Fig. 191. Sectional Plan.
Dining Car, La Habida.
(Exterior and interior views are shown in Figs. 107, 109 and 110.)

Fig. 192. Side Elevation.
Combination Library, Sleeping and Observation Car, Isabella.
(Interior view is shown in Fig. 122.)

Fig. 193. Sectional Plan.
Combination Library, Sleeping and Observation Car, Isabella.
(Interior is shown in Fig. 122.)

CARS EXHIBITED AT THE WORLD'S COLUMBIAN EXPOSITION, 1893, BY PULLMAN'S PALACE CAR COMPANY.

Fig. 194. Side Elevation.
PRIVATE CAR, ALEXANDER, BUILT BY PULLMAN'S PALACE CAR COMPANY.

Fig. 195. Sectional Plan.
PRIVATE CAR, BUILT BY PULLMAN'S PALACE CAR COMPANY.

Fig. 196. Sectional Plan.
PRIVATE CAR, BUILT BY PULLMAN'S PALACE CAR COMPANY.

Fig. 197. Sectional Plan.
PRIVATE CAR, BUILT BY PULLMAN'S PALACE CAR COMPANY.

Fig. 198. Sectional Plan.
BUSINESS CAR, NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Fig. 199. Sectional Plan.
BUSINESS CAR, NEW YORK, LAKE ERIE & WESTERN RAILROAD.
CARS, Passenger; General Views. Figs. 200-205

Fig. 200. Sectional Plan.
BUSINESS CAR, NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Fig. 201. Sectional Plan.
PRIVATE CAR, BUILT BY THE HARNEY & SMITH CAR COMPANY.

Fig. 202. Sectional Plan.
PRIVATE CAR, BUILT BY THE BARNEY & SMITH CAR COMPANY.

Fig. 203. Sectional Plan.
CHAPEL CAR, AMERICAN BAPTIST PUBLICATION SOCIETY, BUILT BY THE BARNEY & SMITH CAR COMPANY.

Fig. 204. Sectional Plan.
FIRST CLASS CORRIDOR DINING CAR, LONDON & NORTHWESTERN RAILWAY.

Fig. 205. Sectional Plan.
SLEEPING CAR, MANH BOUDOIR.
Figs. 206-208. CARS, Working; General Views.

**Fig. 206. Wrecking Car, Double-Hand, Union Pacific Railway, built by Industrial Works, Bay City, Michigan.**
Capacity, 15 tons.

Numbers Refer to List of Names with Figs. 388-396.

**Fig. 207. Steam Wrecking Crane, Industrial Works.**
Radius of arm, 22 ft. Capacity, 40 tons.

Numbers Refer to List of Names with Figs. 405-407.

**Fig. 208. Steam Shovel, Industrial Works.**
Fig. 209. **Locomotive Crane**, built by the Industrial Works. Capacity, 12 tons.

Fig. 210. **Locomotive Crane**, Yale & Towne Manufacturing Company. Radius of boom, 16 ft. Capacity, 4,000 lbs.

Fig. 211. **Locomotive Crane**, Yale & Towne Manufacturing Company. Radius of boom, 26 ft. 6 in. Capacity, 10 tons. Weight 56,000 lbs. (Details are shown in Figs. 300-301.)
Fig. 212. **Double Derrick Car, Yale & Towne Manufacturing Company.**
Lifting Capacity, 30,000 lbs.

Fig. 213. **Rodgers Ballast Distributing Car.**
*With Plow Raised for Transportation.*

Fig. 214. **Ballast Plow, Preceded by a Hopper-bottom Ballast Car.**

Fig. 215. **Clearance Car, Pennsylvania Railroad.**
Fig. 216. Clearance Car, Pennsylvania Railroad.

Fig. 217. Railroad Ditching Car, The American.

Fig. 218. Sweeping Car, for Electric Roads.

Fig. 219. Air Brake Instruction Car, Westinghouse Air Brake Company.

Fig. 220. Interior Air Brake Instruction Car, Westinghouse Air Brake Company.
Figs. 221-224. CARS, Working; General Views.

Fig. 221. PILE DRIVER CAR. NEW YORK CENTRAL & HUDSON RIVER RAILROAD.
Built by the Industrial Works, Bay City, Michigan. The framing of Pile Driver Cars is shown in Figs. 397-400.

Fig. 222. THE RUSSELL WING ELEVATOR SNOW PLOW.

Fig. 223. THE RUSSELL SNOW PLOW.

Fig. 224. THE RUSSELL DOUBLE TRACK SNOW PLOW. (The framing is shown in Fig. 409.)
Snow Plows built by The Ensign Manufacturing Company.
Fig. 225. The Russell Wing Snow Plow.
Built by the Ensign Manufacturing Company.

Fig. 228. The Jull Centrifugal Snow Shovel.
Built by The Leslie Brothers, Paterson, N. J.

Fig. 227. The Jull Centrifugal Snow Excavator.
Built by The Jull Manufacturing Company, Brooklyn.

Fig. 226. The Rotary Steam Snow Shovel.
Built by The Leslie Brothers, Paterson, N. J.
CAR-BODIES.

Numbers refer to List of Names with Figs. 265-266.
CAR BODIES, Freight; Box Cars.

Fig. 232-243

Numbers Refer to List of Names of Parts with Figs. 265-266.
Figs. 244-246. CAR-BODIES, Freight; Box Cars.

Numbers Refer to List of Names of Parts with Figs. 265-266.
CAR-BODIES. Freight; Box Cars.

Fig. 254-256

Numbers refer to List of Names of Parts with Figs. 263-266.
Figs. 257-260. CAR-BODIES, Freight; Fruit Cars.

Numbers Refer to List of Names of Parts with Figs. 265-266.
CAR-BODIES, Freight; Fruit Cars.

Fig. 261-262

Numbers Refer to List of Names of Parts with Figs. 265-266.
**CAR-BODIES, Freight; Fruit Cars.**

**Fig. 265. End Elevation of Framing.**

**Fig. 266. Cross Sections through Door and Bolster.**

**VENTILATED FRUIT-CAR BODY. CINCINNATI, NEW ORLEANS & TEXAS PACIFIC RAILWAY.**

**List of Names of Parts of Box-car Bodies.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Side Sill.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>End-Sill.</td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td>Inner Intermediate-sill.</td>
<td></td>
</tr>
<tr>
<td>3b</td>
<td>Outer Intermediate-sill.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Center-Sill.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Short Floor timber.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Brake-hanger Timber.</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Floor-timber Distance-block.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Flange-timber Brace.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Sill Knee iron.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Sill Tie-rod.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Transverse Floor-timber.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Body-bolster.</td>
<td></td>
</tr>
<tr>
<td>12a</td>
<td>Body-bolster Thimble.</td>
<td></td>
</tr>
<tr>
<td>12b</td>
<td>Top Plate of Iron Body-bolster.</td>
<td></td>
</tr>
<tr>
<td>12c</td>
<td>Bottom Plate of Iron Body-bolster.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Body-bolster Truss-rod.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Body-bolster Truss-rod Washer.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Body-bolster Truss-rod.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Body Side-bearing.</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Body Center-plate.</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>King-bolt or Center-pin.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Body Truss-rod.</td>
<td></td>
</tr>
<tr>
<td>19a</td>
<td>Body Truss-rod Washer.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Body Truss-rod Saddle.</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Body Truss-rod Bearing.</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Cross Tie-timber.</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Drawbar.</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Draft-spring.</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Auxiliary Buffer-spring.</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Draft-timber.</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Floor.</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Double-deck.</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Buffer-block (same as 32).</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Sill step.</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Ground.</td>
<td></td>
</tr>
<tr>
<td>32a</td>
<td>Buffer-block (same as 32).</td>
<td></td>
</tr>
<tr>
<td>32b</td>
<td>Buffer-block (same as 32).</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Buffer-beam.</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Door.</td>
<td></td>
</tr>
<tr>
<td>34a</td>
<td>Grain door.</td>
<td></td>
</tr>
<tr>
<td>34b</td>
<td>Grain-door Rod.</td>
<td></td>
</tr>
<tr>
<td>34c</td>
<td>Door-hanger.</td>
<td></td>
</tr>
<tr>
<td>34d</td>
<td>Door-brace.</td>
<td></td>
</tr>
<tr>
<td>34e</td>
<td>Door-shoe.</td>
<td></td>
</tr>
<tr>
<td>34f</td>
<td>Door-stop.</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>End-brace.</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>End-brace Plate.</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Sill-and-plate Rod.</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Counterbrace Rod.</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Brace-rod.</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Brace-rod Washer.</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Brace-pocket.</td>
<td></td>
</tr>
<tr>
<td>42</td>
<td>Post.</td>
<td></td>
</tr>
<tr>
<td>43</td>
<td>Post-pocket.</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Corner-post.</td>
<td></td>
</tr>
<tr>
<td>44a</td>
<td>Corner-post Washer.</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Door-post.</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Window-post.</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Plate-door.</td>
<td></td>
</tr>
<tr>
<td>48</td>
<td>Plate.</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Belt-plate.</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Belt-timber.</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>End Belt-timber Tie-rod.</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>Sheathing or Siding.</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Inside Lining.</td>
<td></td>
</tr>
<tr>
<td>54</td>
<td>Lining-strap.</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Upper Corner-plate.</td>
<td></td>
</tr>
<tr>
<td>56</td>
<td>Middle Corner-plate.</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Lower Corner-plate.</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>Roping-staple.</td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>Ladder-round.</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>Hand-hold.</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>Grated Door.</td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>Door.</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>Grain door.</td>
<td></td>
</tr>
<tr>
<td>64</td>
<td>Grain-door Rod.</td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>Door-sill.</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>Door-track.</td>
<td></td>
</tr>
<tr>
<td>67</td>
<td>Bottom Door-track.</td>
<td></td>
</tr>
<tr>
<td>68</td>
<td>Door-track Bracket.</td>
<td></td>
</tr>
<tr>
<td>69</td>
<td>Door-hanger.</td>
<td></td>
</tr>
<tr>
<td>70</td>
<td>Door-brace.</td>
<td></td>
</tr>
<tr>
<td>71</td>
<td>Door-shoe.</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>Door-stop.</td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>Closed-door Stop.</td>
<td></td>
</tr>
<tr>
<td>74</td>
<td>Door-hasp.</td>
<td></td>
</tr>
<tr>
<td>75</td>
<td>Door-pin.</td>
<td></td>
</tr>
<tr>
<td>76</td>
<td>Door-pin Chain.</td>
<td></td>
</tr>
<tr>
<td>77</td>
<td>Door-handle.</td>
<td></td>
</tr>
<tr>
<td>78</td>
<td>Card-rack.</td>
<td></td>
</tr>
<tr>
<td>79</td>
<td>Cartline.</td>
<td></td>
</tr>
<tr>
<td>80</td>
<td>Cartline (same as 81).</td>
<td></td>
</tr>
<tr>
<td>81</td>
<td>Fustin.</td>
<td></td>
</tr>
<tr>
<td>82</td>
<td>Ridge-pole.</td>
<td></td>
</tr>
<tr>
<td>83</td>
<td>Roof-boards.</td>
<td></td>
</tr>
<tr>
<td>84</td>
<td>Upper-flush Board.</td>
<td></td>
</tr>
<tr>
<td>85</td>
<td>Lower-flush Board.</td>
<td></td>
</tr>
<tr>
<td>86</td>
<td>Roofing-board Bracket.</td>
<td></td>
</tr>
<tr>
<td>87</td>
<td>Facia-board (same as 90).</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>Brake Hand-wheel.</td>
<td></td>
</tr>
<tr>
<td>89</td>
<td>Brake-shaft.</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>Horizontal Brake-shaft.</td>
<td></td>
</tr>
<tr>
<td>91</td>
<td>Upper Brake-shaft Bearing.</td>
<td></td>
</tr>
<tr>
<td>92</td>
<td>Lower Brake-shaft Bearing.</td>
<td></td>
</tr>
<tr>
<td>93</td>
<td>Brake Hand-wheel.</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>Brake-shaft.</td>
<td></td>
</tr>
<tr>
<td>95</td>
<td>Horizontal Brake-shaft.</td>
<td></td>
</tr>
<tr>
<td>96</td>
<td>Upper Brake-shaft Bearing.</td>
<td></td>
</tr>
<tr>
<td>97</td>
<td>Lower Brake-shaft Bearing.</td>
<td></td>
</tr>
<tr>
<td>98</td>
<td>Brake-shaft Step.</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>Brake-shaft Bracket.</td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Brake-step.</td>
<td></td>
</tr>
<tr>
<td>101</td>
<td>Brake-step Bracket.</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Hand-hold.</td>
<td></td>
</tr>
<tr>
<td>103</td>
<td>Brake Ratchet-wheel.</td>
<td></td>
</tr>
<tr>
<td>104</td>
<td>Brake-pawl.</td>
<td></td>
</tr>
<tr>
<td>105</td>
<td>Brake-shaft Chain.</td>
<td></td>
</tr>
</tbody>
</table>
Figs. 267-270. CAR-BODIES, Freight; Milk Cars.

Numbers refer to Lists of Names of Parts on opposite and preceding pages.
CAR-BODIES, Freight; Milk Cars.

Fig. 271. Part Longitudinal Section.

Fig. 272. Transverse Section

Names of Parts Special to Figs. 267-270.

21A. Body Truss-rod Bearing Brace.
28. Turnbuckle Truss Rod.
32. Deflecting Ceiling.
42. Door-post.
53c. Ceiling.
53A. Intermediate Lining.
61. Door.
72. Door-rod or Bar.
90. Eaves Molding.
141B. Signal-lamp Bracket.
146B. Brake-lever Tie-rod.
78A. Door Grab-iron.
pp. Fipe to Conductor's Valve.
BB. Can-rack Bracket.
V. Conductor's Valve.
W. Windows.

Fig. 273. Plan of Floor.
Milk-car Body, for Small Cans, Old Colony Railroad.

Fig. 273a. Sectional Side Elevation.

Fig. 273b. Part Plan Showing Underframe.
Milk-car Body. New York, Ontario & Western Railway.
Length, 45 ft. Capacity, 60,000 lbs. or 280 10-gallon cans. Weight, 31,000 lbs.
Figs. 274-275. CAR-BODIES, Freight; Refrigerator Cars.

Fig. 274. Half Plan of Roof Frame and Underframe,

Fig. 275. Half Side Elevation of Promin and Half longitudinal Section.
CAR-BODIES; Freight; Refrigerator Cars.

Numbers refer to List of Names on Following Page.

Fig. 276. End Elevation.

Fig. 277. Transverse Sections.


Fig. 278. Port Side Elevation.

Fig. 279. Part Longitudinal Section.

Fig. 280. End Elevation.

Refrigerator-car Body.


Fig. 281. Transverse Sections.

Names of Parts of Refrigerator Cars. Figs. 278-286.

2. End-sill.
12a. Top Bolster-plate.
12b. Bottom Bolster-plate.
12c. Bolster Center-casting.
12d. Body-bolster Thimble.
12e. Body-bolster Truss-block.
17. Body Center-plate.
18. King-bolt.
23c. Coupler.
32. Buffer-beam.
33. Brake.
34. Brace-rod.
34'. End Brace-rod.
35. End-brace.
37. Counterbrace.
37. Counterbrace-rod.
42. Post.
43. Brace-rod Washer.
43. Corner-post.
44. Door-post.
46. Plate.
48. End-plate.
48a. Side Bell-rail.
48b. End Bell-rail.
48c. End Bell-rail.
52. Sheathing.
53b. Inside Lining.
53a. Intermediate Lining.
53a. Guard Lining-strips for Ice-box.
53e. Inner Overhead Lining.
53f. Outer Overhead Lining.
53g. Intermediate Overhead Lining.
54. Lining-stud.
55. Upper Corner-plate.
57. Lower Corner-plate.
59. Ladder-round.
60. Hand-holds.
61e. End-door.
61r. Roof-door for Ice.
61a. Door.
68b. Door-hinge.
72. Door-bolt Bracket.
73. Door-hasp.
74b. Door-bolt or Bar.
76. Door-pin Chain.
77. Door-guard.
82. Curtain.
83. Purlin.
84. Ridge-pole.
86. Running-board.
86a. Running-board Blocking.
91. Floor-board.
93. Brake-wheel.
94. Brake-shaft.
97. Lower Brake-shaft Bearing.
100. Brake-step.
102. Hand-hold.
108. Key-blocks.
210. Uncoupling-lever and Rod.
212. Buffing Sub-sill.
Fig. 281. Sectional Plan. Showing Framing. Refrigerator car Body for Fruit. Southern Pacific Company. Length, 37 ft. 3 in. Capacity, 50,000 lbs. Weight, 40,000 lbs. Canada Patents. (General view is shown in Fig. 12.)

Fig. 216. End Elevation.

Names of Parts Special to Figs. 283-286.

27a. Slatted floor.
27b. Floor.
26a. Draft-timbers.
18a. Center-sill.
13b. Side-sill.
61a. Roof-door.
61b. Open door.
61c. Door.
64a. Body-door.
64b. Door Trim.
64c. Door-lintel.
64d. Door Sub-sill.
81a. Carline.
88a. Running-board Extension.
A. Auxiliary Battery.
d. Battery-case.
e. Battery-case.
1. Skeletal Frame to Hold Rail.

CAB-BODIES. Freight: Refrigerator Cars.

Members refer to List of Names of Parts on this and the opposite page.

Fig. 338-386.
Names of Parts of Flat Car. Fig. 57-286.

26. Draft timbers. 27. Floor. 32. Buffer blocks. 30A. Stake pocket.

Fig. 287. Part Plan showing Floor and Underframing.
**Names of Parts of Gondola Cars.**

Figs. 293-315.

1. Side sill.
2. End sill.
3. Inner Intermediate sill.
4. Outer Intermediate sill.
5. Sill Tie-rod.
6. End sill and Bolster Tie-rod.
7. Short Center sill Tie-rod.
14. King bolt or Center pin.
15. Body Truss rod.
16. Body Truss rod Hopper strap.
17. Body Truss rod Saddle.
18. Body Truss rod Bearing.
22. Draft spring.
23. Draft timbers.
24. Floor.
25. Hopper floor.
27. Buffer blocks.
29. Side Body truss rod.
30. Side Body truss rod Bearing.
31. Side Body truss rod Block.
32. Side-plank Tie rod.
33. Side-plank Tie strap.
34. Stake pocket.
35. Coke rack Stake pocket.
36. Stake.
37. Side plank.
38. Upper Corner plates (Inner and Outer).
39. Intermediate Corner plate.
40. Lower Corner plate.
41. Roping staple.

(Continued.)
Names of Parts. Figs. 298-315.

(Continued.)

61. Drop-door.
62. Drop-door Hinge.
63. Drop-door Eye-bolt.
64. Drop-door Chain.
65. Drop-door-chain Ring.
66. Winding-shaft Ratchet-wheel.
68. Bracket for Pawl.
69. Dog for Pawl of Winding-shaft Ratchet-wheel.
70. Winding-shaft.
71. Hopper Stay-rods (11a).
72. Hopper Supporting-strap.
73. Hopper Supporting-strap.
74. Door-pin.
75. Door-pin Chain.
76. Brake-wheel.
77. Brake-wheel.
78. Upper Brake-wheel Bearing.
81. Hand-hold.
82. Brake Ratchet-wheel.
83. Push-pole Corner-iron.
84. Uncoupling-lever and Rod.
85. Sill Strap-bolt.
A. Auxiliary Reservoir.
B. Air-brake Cylinder.
C. Lever Connecting-rod.
FL. Floating-lever.
Fig. 305-309. CAR-BODIES, Freight; Gondola Cars.

Numbers Refer to List of Names with Figs. 298-304.
CAR-BODIES, Freight; Gondola Cars.

Fig. 310-315

Numbers Refer to List of Names of Parts with Figs. 308-304.
Figs. 325-331. CAR-BODIES, Freight; Gondola and Side dump Cars.

Letters Refer to List of Names with Figs. 310-315.

Fig. 325. Plan of Framing and Hopper.
One-car Body. Duluth & Iron Range Railroad.
Length, 23 ft. Capacity, 50,000 lbs.

Numbers Refer to List of Names on Preceding Page.

Fig. 326. Half Side Elevation.
Half Longitudinal Section.

Fig. 327. Half Plan of Car and Half Plan of Underframe.

Fig. 328. Transverse Sections.
Numbers Refer to List of Names on Following Page.
Fig. 334-335. CAR-BODIES, Freight; Side-dump Cars.

Figs. 336-342. CAR-BODIES, Freight; Side-dump Cars.

**Names of Parts of Side-dump Car.**

<table>
<thead>
<tr>
<th>Part</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Side-sill.</td>
</tr>
<tr>
<td>2.</td>
<td>Outside End-sill.</td>
</tr>
<tr>
<td>4.</td>
<td>Center-sill.</td>
</tr>
<tr>
<td>22.</td>
<td>Cross Tie-rod.</td>
</tr>
<tr>
<td>29.</td>
<td>Cross-tie Timbers.</td>
</tr>
<tr>
<td>32.</td>
<td>Buffer-block.</td>
</tr>
<tr>
<td>42.</td>
<td>Post.</td>
</tr>
<tr>
<td>43.</td>
<td>Corner-post.</td>
</tr>
<tr>
<td>44.</td>
<td>Door-post.</td>
</tr>
<tr>
<td>46.</td>
<td>Plate.</td>
</tr>
<tr>
<td>47.</td>
<td>Plate-rod.</td>
</tr>
<tr>
<td>55.</td>
<td>Upper Corner-plate.</td>
</tr>
<tr>
<td>93.</td>
<td>Brake-wheel.</td>
</tr>
<tr>
<td>96.</td>
<td>Upper Brake-shaft Bearing.</td>
</tr>
<tr>
<td>97.</td>
<td>Lower Brake-shaft Bearing.</td>
</tr>
<tr>
<td>98.</td>
<td>Brake-shaft Step.</td>
</tr>
<tr>
<td>102.</td>
<td>Corner Grab-iron.</td>
</tr>
<tr>
<td>110.</td>
<td>Ridge Timber.</td>
</tr>
<tr>
<td>111.</td>
<td>Center-post.</td>
</tr>
<tr>
<td>112.</td>
<td>Transverse Filling-piece.</td>
</tr>
<tr>
<td>42x.</td>
<td>Transverse Tie-rod.</td>
</tr>
<tr>
<td>48.</td>
<td>Top Door-rail.</td>
</tr>
<tr>
<td>49.</td>
<td>Under-door Hinge-bolt.</td>
</tr>
<tr>
<td>52.</td>
<td>End Planking.</td>
</tr>
<tr>
<td>55.</td>
<td>Upper Corner-plate.</td>
</tr>
<tr>
<td>57.</td>
<td>Lower Corner-plate.</td>
</tr>
<tr>
<td>60.</td>
<td>Hand-hold.</td>
</tr>
<tr>
<td>62.</td>
<td>Side Door-rail.</td>
</tr>
<tr>
<td>68.</td>
<td>Same as 47.</td>
</tr>
<tr>
<td>70.</td>
<td>Side-door Hinge-plate.</td>
</tr>
<tr>
<td>72.</td>
<td>Side-door Stop.</td>
</tr>
<tr>
<td>73.</td>
<td>Side-door Locking-bar.</td>
</tr>
<tr>
<td>74.</td>
<td>Door-latch Lever and Hook.</td>
</tr>
<tr>
<td>93.</td>
<td>Brake-hand-wheel.</td>
</tr>
<tr>
<td>94.</td>
<td>Brake-shaft.</td>
</tr>
<tr>
<td>103.</td>
<td>Brake Ratchet-wheel.</td>
</tr>
<tr>
<td>142.</td>
<td>Brake-head.</td>
</tr>
<tr>
<td>143.</td>
<td>Brake-beam.</td>
</tr>
<tr>
<td>144.</td>
<td>Brake-hanger.</td>
</tr>
<tr>
<td>145.</td>
<td>Brake-lever.</td>
</tr>
<tr>
<td>150.</td>
<td>Brake-chain.</td>
</tr>
<tr>
<td>121.</td>
<td>Center-truck Roller Pedestal.</td>
</tr>
<tr>
<td>122.</td>
<td>Center-truck Roller.</td>
</tr>
<tr>
<td>123.</td>
<td>Side-door.</td>
</tr>
<tr>
<td>124.</td>
<td>Winding-shaft Chain.</td>
</tr>
<tr>
<td>125.</td>
<td>Side-door Hinge.</td>
</tr>
<tr>
<td>127.</td>
<td>Strap of Hinge to Side-door.</td>
</tr>
<tr>
<td>128.</td>
<td>Winding-shaft Chain-guide.</td>
</tr>
<tr>
<td>129.</td>
<td>Winding-shaft.</td>
</tr>
<tr>
<td>130.</td>
<td>Winding-shaft Ratchet-wheel.</td>
</tr>
<tr>
<td>131a.</td>
<td>Winding-shaft Lever.</td>
</tr>
<tr>
<td>131b.</td>
<td>Winding-shaft Lever.</td>
</tr>
<tr>
<td>132.</td>
<td>Dog for Pawl.</td>
</tr>
<tr>
<td>133.</td>
<td>Plate for Winding-shaft Ratchet-wheel.</td>
</tr>
<tr>
<td>134.</td>
<td>Winding-shaft Winch.</td>
</tr>
<tr>
<td>135.</td>
<td>Inclined Floor (same as 27).</td>
</tr>
<tr>
<td>136.</td>
<td>Top Side-rail (same as 46).</td>
</tr>
<tr>
<td>140.</td>
<td>Deck Strap-bolt.</td>
</tr>
<tr>
<td>141.</td>
<td>Same as 122.</td>
</tr>
<tr>
<td>142.</td>
<td>Brake-leader.</td>
</tr>
<tr>
<td>143.</td>
<td>Brake-beam.</td>
</tr>
<tr>
<td>144.</td>
<td>Brake hanger.</td>
</tr>
<tr>
<td>145.</td>
<td>Brake-lever.</td>
</tr>
<tr>
<td>150.</td>
<td>Brake-chain.</td>
</tr>
<tr>
<td>152.</td>
<td>Brake Connecting-rod.</td>
</tr>
<tr>
<td>200.</td>
<td>Worm-wheel for Turning Winding-Shaft.</td>
</tr>
<tr>
<td>201.</td>
<td>Winding-shaft.</td>
</tr>
<tr>
<td>203.</td>
<td>Winding-shaft Chain.</td>
</tr>
<tr>
<td>204.</td>
<td>Clutch Connecting-rod.</td>
</tr>
<tr>
<td>205.</td>
<td>Lever for Moving Clutch.</td>
</tr>
<tr>
<td>206.</td>
<td>Wheel for Winding-shaft.</td>
</tr>
<tr>
<td>207.</td>
<td>Winding-shaft.</td>
</tr>
<tr>
<td>208.</td>
<td>Winding-shaft.</td>
</tr>
<tr>
<td>209.</td>
<td>Chain for Dumping Car-body.</td>
</tr>
<tr>
<td>211.</td>
<td>Sheave for Dumping-chain.</td>
</tr>
<tr>
<td>212.</td>
<td>Sheave-bracket.</td>
</tr>
<tr>
<td>213.</td>
<td>A. Side-bar of Truck-frame.</td>
</tr>
<tr>
<td>214.</td>
<td>B. Inverted Arch-bar.</td>
</tr>
<tr>
<td>215.</td>
<td>C. Center Arch-bar.</td>
</tr>
<tr>
<td>216.</td>
<td>Frame Tie-bar.</td>
</tr>
<tr>
<td>218.</td>
<td>Same as H.</td>
</tr>
<tr>
<td>219.</td>
<td>Truck Bolster-bearing Casting.</td>
</tr>
<tr>
<td>220.</td>
<td>H. End-bar of Truck-frame.</td>
</tr>
<tr>
<td>221.</td>
<td>Latching-bar.</td>
</tr>
<tr>
<td>222.</td>
<td>J. Truss-tie Channel-bar.</td>
</tr>
<tr>
<td>223.</td>
<td>Truck-bolster Truss-rod.</td>
</tr>
<tr>
<td>224.</td>
<td>L. Truck-bolster Raising-block.</td>
</tr>
<tr>
<td>226.</td>
<td>O. Cylinder Connecting-pipes.</td>
</tr>
<tr>
<td>227.</td>
<td>P. Train-pipe.</td>
</tr>
<tr>
<td>228.</td>
<td>W. Gravity-latch and Weight.</td>
</tr>
<tr>
<td>229.</td>
<td>X. Latch and Operating-cylinder.</td>
</tr>
<tr>
<td>230.</td>
<td>Y. Dumping-cylinder.</td>
</tr>
<tr>
<td>231.</td>
<td>Z. Piston-rod.</td>
</tr>
</tbody>
</table>
CAR-BODIES, Freight; Side Dump.

Numbers Refer to List of Names on Preceding Page.

Fig. 336. Side Elevation.

Fig. 337. Plan showing Floor and Underframe.

Fig. 338. End Elevation.

SIDE-DUMP CAR, BOSTON & ALBANY RAILROAD.
(Damped by Chains wound around a Shaft by Worm and Wheel.)
Figs. 339-342. CAR-BODIES, Freight; Side-dump Cars.

Numbers refer to Names of Parts with Figs. 334-335.

Fig. 339. Side Elevation.

Fig. 340. Sectional Plan, showing Dumping Cylinder.

Fig. 341. Transverse Section with Body Tipped.

Fig. 342. Half Cross Section and Half End Elevation.

SIDE-DUMP CAR. TEACHER CAR & CONSTRUCTION COMPANY.
Dumped by Compressed Air. (General view shown in Fig. 28.)
Fig. 343. Side Elevation.

Fig. 344. Sectional Plan.
MINE CAR. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Fig. 344a. Sectional End Elevation.

Fig. 345. End Elevation.

Fig. 346. Sectional Side Elevation.

Names of Parts Special to Figs. 343-344a.
23. Draft-hook.
23a. Coupling Chain.
23b. Continuous Draft-bar.
27. Floor.
32. Buffer-blocks.
41. Rail-and Post Strap Plate.
42a. End-post.
46. Top-rail.
46a. Coping-iron.
46b. End-rail.
52. Side-planks.
57. Lower Corner-plate.
62. End Door-bar.
63. End-door.
65. End-door Hinge.
A. Axle.
B. Journal-box.
W. Wheel.

Names of Parts of Mine Cars, Figs. 345-347.
1. Side-sill.
2. End-sill.
5. Transverse Floor-timbers.
33. Brace.
36. Sill-and-plate Rod.
37. Brace.
42. Post.
43. Corner-post.
52, 53. Side Plank.
55. Upper Corner-plate.
A. End-door Plate-hinge.
B. End-door Rod.
C. Safety-hook.
D. Body Hinge-plates.
E. End-door Strap-hinge.
F. Dump-rod Strap-hinge.
T. Wheel-piece.
U. Truck End-piece.
V. End sill Filling Piece.
W. Wheel.

SIDES DUMP CAR FOR COAL. PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS RAILWAY.
Fig. 348-351. CAR-BODIES, Freight; English Wagon.

Names in Use in England for Parts of Goods Wagon. Figs. 348-351.

5. Middle Longitudinal. 11. Strap-bolt.

(Continued.)

22. Axle-guard Wingwasher.

26. Boss, or Naw.
27. Spoke.
28. Rim.
29. Tire.
33. Wheel-wheel.
34. Grease Axle-box.
35. Grease-chamber.
36. Axle-box Cover, or Lid.
37. Axle-box Keep.
38. Axle-box Bearing, or Brass.
39. Drawbar.
40. Draw-hook.
41. Coupling-shackle.
42. Coupling-link.
43. and 44. Wagon-coupling, or Draw-chain, consisting of Shackle, Shackle-pin and Links. (49 and 50 are also termed Brake-lever Rock.)
47. Buffer-head.

50. Buffer-rod Shoe.
51. Plate or Laminated Buffer and Draw-spring.
52. Auxiliary Draw-spring (Rubber).
53. Brake-shaft, or Weighbar.
54. Brake-shaft Hanger (V-Pattern).
55. Brake-shaft Arm, or Brake Double-lever.
56. Brake rod, or Brake Push-rod.
57. Brake-lever, or Long Brake-lever.
58. Brake-lever Guard.
59. Brake-lever Ratchet.
60. Brake-lever Handle.
61. Brake-hanger, or Brake-Block Hanger.
63. Brake-block (Wood).
64. Crib-rail, Rocker-rail, or Side-rail.
65. End-stanchion, or End-muntin.
66. Floor-board, or Floor-batten.
67. Side-board, or Side-sheeting.
68. End board, or End-sheeting.
69. Continuous Topside.
70. Falling Door, or Flap Door.
71. Strap-hinge, or Door-hinge Joint.
72. Hinge-plate, or Door-hinge.
73. Hinge-plate Washer, or Door-hinge Washer-plate.
74. Coping or Capping-iron.
75. Through Body-bolt.
76. Inside Body Corner-knee.
77. Outside Corner-plate.
78. Strap-washer, or Washer-plate.
79. Falling-door Latch, consisting of Door Fastening, Staple, Cotter and Chain.
80. Sheet-ring and Staple.
81. Horse-hook, or Towing-hook.
82. Body-knee.
83. Door-hook Washer, or Drawbar Front-plate.
84. Draw-spring Cradle-plate.

Names of Parts of Logging Car. Figs. 352-354.

1. Sill.
2. Bolster.
4. Center-plate.
5. King-post.
6. Drawbar.
7. Drawbar Fastening, Staple, Cotter and Chain.
8. Horse-hook.
13. Drawbar Front-plate.

Names of Parts of Logging Car. Figs. 352-354.

24. Draft-spring.
25. Brake-shaft Handle.
27. Brake-shaft Step.
29. Brake Ratchet-wheel.
32. Brake-rod Block Hanger.
34. Crib-rail, Rocker-rail, or Side-rail.
35. End-stanchion, or End-muntin.
36. Floor-board, or Floor-batten.
37. Side-board, or Side-sheeting.
38. End board, or End-sheeting.
40. Falling Door, or Flap Door.
41. Strap-hinge, or Door-hinge Joint.
42. Hinge-plate, or Door-hinge.
43. Hinge-plate Washer, or Door-hinge Washer-plate.
44. Brake-head.
45. Brake-beam.
46. Brake-hanger.
47. Brake-rod Hanger.
49. Brake-block (Wood).
51. End-stanchion, or End-muntin.
52. Floor-board, or Floor-batten.
53. Side-board, or Side-sheeting.
54. End board, or End-sheeting.
55. Continuous Topside.
56. Falling Door, or Flap Door.
57. Strap-hinge, or Door-hinge Joint.
58. Hinge-plate, or Door-hinge.
59. Hinge-plate Washer, or Door-hinge Washer-plate.
60. Brake-head.
61. Brake-beam.
63. Brake-rod Hanger.
64. Brake-rod Hanger Bracket.
65. Brake-block (Wood).
67. End-stanchion, or End-muntin.
68. Floor-board, or Floor-batten.
69. Side-board, or Side-sheeting.
70. End board, or End-sheeting.
71. Continuous Topside.
72. Falling Door, or Flap Door.
73. Strap-hinge, or Door-hinge Joint.
74. Hinge-plate, or Door-hinge.
75. Hinge-plate Washer, or Door-hinge Washer-plate.
76. Brake-head.
77. Brake-beam.
78. Brake-hanger.
79. Brake-rod Hanger Bracket.
80. Brake-block (Wood).
82. End-stanchion, or End-muntin.
83. Floor-board, or Floor-batten.
84. Side-board, or Side-sheeting.
85. End board, or End-sheeting.
86. Continuous Topside.
87. Falling Door, or Flap Door.
88. Strap-hinge, or Door-hinge Joint.
89. Hinge-plate, or Door-hinge.
90. Hinge-plate Washer, or Door-hinge Washer-plate.
91. Brake-head.
92. Brake-beam.
93. Brake-hanger.
94. Brake-rod Hanger Bracket.
95. Brake-block (Wood).
96. Crib-rail, Rocker-rail, or Side-rail.
97. End-stanchion, or End-muntin.
98. Floor-board, or Floor-batten.
99. Side-board, or Side-sheeting.
100. End board, or End-sheeting.
101. Continuous Topside.
102. Falling Door, or Flap Door.
103. Strap-hinge, or Door-hinge Joint.
104. Hinge-plate, or Door-hinge.
105. Hinge-plate Washer, or Door-hinge Washer-plate.
106. Brake-head.
107. Brake-beam.
110. Brake-block (Wood).
111. Crib-rail, Rocker-rail, or Side-rail.
112. End-stanchion, or End-muntin.
113. Floor-board, or Floor-batten.
114. Side-board, or Side-sheeting.
115. End board, or End-sheeting.
117. Falling Door, or Flap Door.
118. Strap-hinge, or Door-hinge Joint.
119. Hinge-plate, or Door-hinge.
120. Hinge-plate Washer, or Door-hinge Washer-plate.
Figs. 355-358. CAR-BODIES, Freight; Stock Cars.

Numbers Refer to List of Names with Figs. 367-368.
CAR-BODIES, Freight; Stock Cars.

Figs. 359-364

Numbers Refer to List of Names with Figs. 307-308.
Figs. 365-366. CAR-BODIES, Freight; Stock Cars.

Numbers Refer to List of Names on Opposite Page.
Fig. 367. End Elevation.

Fig. 368. Transverse Half Sections.

**STOCK-CAR BODY**. **CHICAGO, BURLINGTON & QUINCY RAILROAD.**

**NAMES OF PARTS OF STOCK-CAR BODIES**, Figs. 355-372.

Fig. 369-373. CAR-BODIES, Freight; Stock Cars.

Numbers Refer to List of Names on Preceding Page.

Fig. 371. Part Longitudinal Section. Fig. 372. Transverse Section.


Names of Parts of Tank Car. Figs. 373-379.

7. Floor-timber Distance-block. 111. Man-hole Cover.
32. Dead-blocks. 119. Running-board.
96. Upper Brake-shaft Bearing. 102. Grab-iron or Hand-hold.
98. Brake-shaft Step. 106. Tank, for Tank-car.
114. Tank-valve.. 115. Tank-valve Seat or Tank-nuzzle.
117c. Tank-valve Rod Bracket.
118. Tank-nuzzle Cap. 119. Running-board.

Fig. 373. Sectional Elevation of Tank, Dome and Valve.
CAR-BODIES, Freight; Tank Cars.

Numbers Refer to List of Names on Opposite Page.
Fig. 380-384. CAB-BODIES, Caboose Cars.

Names of Parts. Figs. 380-384.

1. Side-sill.
2. Intermediate-sill.
3. Center-sill.
7. Floor.
11. Corner Post.
12. Plate.
13. Sheathing.
14. Lining.
15. Door-sill.
17. Roof.
20. Lookout.

Fig. 385. Half Longitudinal Section and Half Side Elevation.

Fig. 386. Half Plan of Underframe and Half Plan of Floor.
FOUR-WHEELED CABOOSE. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Names of Parts. Figs. 385-386.

1. Side-sill.
2. End-sill.
4. Center-sill.
10. Sill Tie-rod.
22. Floor-timber.
27. Floor.
30. Platform-steps.
32. Buffer-beam.
37. Brace.
37. Counter-brace.
42. Posts.
43. Corner-post.
46. Plate.
52. Sheathing or Siding.
53. Inside-lining.
64. Door-sill.
81. Carline.
86. Roof-board.
90. Eaves Facia-board.
93. Brake-wheel.
96. Upper Brake-shaft Bearing.
102. Corner Grab-iron.
103. Brake Ratchet-wheel.
141. Lookout Signal-lamp.
143. Brake-beam.
145. Brake-lever.
152. Lower Brake-strut.
165. Journal-box.
167. Pedestal Stay-rod.
168. Pedestal Tie-bar.
170. Spring-hanger.
171. Spring-hanger Iron.
172. Pedestal.
174. Lookout.
Figs. 387-391. CAR-BODIES, WORKING: Caboose Cars and Locomotive Cranes.

Numbers Refer to List of Names on Preceding Page.

Fig. 387. Transverse Section.

Fig. 388. Half End Elevation and Half Cross Section.

FOUR-WHEELED CABOOSE. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Fig. 389. Plan.

Fig. 390. End Elevation.

LOCOMOTIVE Crane. BUILT BY YALE & TOWNE MANUFACTURING COMPANY.
Length, 22 ft. Capacity, 10 tons. Weight, 56,000 lbs.
Numbers refer to List of Names of Parts of Cranes and Derricks, Figs. 389, 396, and 207.

1. Steel Jib or Boom.
2. Sheave or Pully-blocks.
3. End of Jib.
4. Mast or Crane-post.
5. Hoisting-rope or Chain.
6. End of Boom or Jib.
7. Catenary, auxiliary or Windlass.
8. End of Boom or Jib.
9. End of Boom or Jib.
10. End of Boom or Jib.
11. End of Boom or Jib.
12. End of Boom or Jib.
13. End of Boom or Jib.
14. End of Boom or Jib.
15. End of Boom or Jib.
16. End of Boom or Jib.
17. End of Boom or Jib.
18. End of Boom or Jib.
19. End of Boom or Jib.
20. End of Boom or Jib.
21. End of Boom or Jib.
22. End of Boom or Jib.
23. End of Boom or Jib.
24. End of Boom or Jib.
25. End of Boom or Jib.
26. End of Boom or Jib.
27. End of Boom or Jib.
28. End of Boom or Jib.
29. End of Boom or Jib.
30. End of Boom or Jib.
31. End of Boom or Jib.
32. End of Boom or Jib.
33. End of Boom or Jib.
34. End of Boom or Jib.
35. End of Boom or Jib.
36. End of Boom or Jib.
37. End of Boom or Jib.
38. End of Boom or Jib.
39. End of Boom or Jib.
40. End of Boom or Jib.
41. End of Boom or Jib.
42. End of Boom or Jib.
43. End of Boom or Jib.
44. End of Boom or Jib.
45. End of Boom or Jib.
46. End of Boom or Jib.
47. End of Boom or Jib.
48. End of Boom or Jib.
49. End of Boom or Jib.
50. End of Boom or Jib.
51. End of Boom or Jib.
52. End of Boom or Jib.
53. End of Boom or Jib.
54. End of Boom or Jib.
55. End of Boom or Jib.
56. End of Boom or Jib.
57. End of Boom or Jib.
58. End of Boom or Jib.
59. End of Boom or Jib.
60. End of Boom or Jib.
61. End of Boom or Jib.
62. End of Boom or Jib.
63. End of Boom or Jib.
64. End of Boom or Jib.
65. End of Boom or Jib.
66. End of Boom or Jib.
67. End of Boom or Jib.
68. End of Boom or Jib.
69. End of Boom or Jib.
70. End of Boom or Jib.
71. End of Boom or Jib.
72. End of Boom or Jib.
73. End of Boom or Jib.
74. End of Boom or Jib.
75. End of Boom or Jib.
76. End of Boom or Jib.
77. End of Boom or Jib.
78. End of Boom or Jib.
79. End of Boom or Jib.
80. End of Boom or Jib.
81. End of Boom or Jib.
82. End of Boom or Jib.
83. End of Boom or Jib.
84. End of Boom or Jib.
85. End of Boom or Jib.
86. End of Boom or Jib.
87. End of Boom or Jib.
88. End of Boom or Jib.
89. End of Boom or Jib.
90. End of Boom or Jib.
91. End of Boom or Jib.
92. End of Boom or Jib.
93. End of Boom or Jib.
94. End of Boom or Jib.
95. End of Boom or Jib.
96. End of Boom or Jib.
97. End of Boom or Jib.
98. End of Boom or Jib.
99. End of Boom or Jib.
100. End of Boom or Jib.
101. End of Boom or Jib.
102. End of Boom or Jib.
103. End of Boom or Jib.
104. End of Boom or Jib.
105. End of Boom or Jib.
106. End of Boom or Jib.
107. End of Boom or Jib.
108. End of Boom or Jib.
109. End of Boom or Jib.
110. End of Boom or Jib.
111. End of Boom or Jib.
112. End of Boom or Jib.
113. End of Boom or Jib.
114. End of Boom or Jib.
115. End of Boom or Jib.
116. End of Boom or Jib.
117. End of Boom or Jib.
118. End of Boom or Jib.
119. End of Boom or Jib.
120. End of Boom or Jib.
121. End of Boom or Jib.
122. End of Boom or Jib.
123. End of Boom or Jib.
124. End of Boom or Jib.
125. End of Boom or Jib.
126. End of Boom or Jib.
127. End of Boom or Jib.
128. End of Boom or Jib.
129. End of Boom or Jib.
130. End of Boom or Jib.
131. End of Boom or Jib.
132. End of Boom or Jib.
133. End of Boom or Jib.
134. End of Boom or Jib.
135. End of Boom or Jib.
136. End of Boom or Jib.
137. End of Boom or Jib.
138. End of Boom or Jib.
139. End of Boom or Jib.
140. End of Boom or Jib.
141. End of Boom or Jib.
142. End of Boom or Jib.
143. End of Boom or Jib.
144. End of Boom or Jib.
145. End of Boom or Jib.
146. End of Boom or Jib.
147. End of Boom or Jib.
148. End of Boom or Jib.
149. End of Boom or Jib.
150. End of Boom or Jib.
151. End of Boom or Jib.
152. End of Boom or Jib.
153. End of Boom or Jib.
154. End of Boom or Jib.
155. End of Boom or Jib.
156. End of Boom or Jib.
157. End of Boom or Jib.
158. End of Boom or Jib.
159. End of Boom or Jib.
160. End of Boom or Jib.
161. End of Boom or Jib.
162. End of Boom or Jib.
163. End of Boom or Jib.
164. End of Boom or Jib.
165. End of Boom or Jib.
166. End of Boom or Jib.
167. End of Boom or Jib.
168. End of Boom or Jib.
169. End of Boom or Jib.
170. End of Boom or Jib.
171. End of Boom or Jib.
172. End of Boom or Jib.
173. End of Boom or Jib.
174. End of Boom or Jib.
175. End of Boom or Jib.
176. End of Boom or Jib.
177. End of Boom or Jib.
178. End of Boom or Jib.
179. End of Boom or Jib.
180. End of Boom or Jib.
181. End of Boom or Jib.
182. End of Boom or Jib.
183. End of Boom or Jib.
184. End of Boom or Jib.
185. End of Boom or Jib.
186. End of Boom or Jib.
187. End of Boom or Jib.
188. End of Boom or Jib.
189. End of Boom or Jib.
190. End of Boom or Jib.
191. End of Boom or Jib.
192. End of Boom or Jib.
193. End of Boom or Jib.
194. End of Boom or Jib.
195. End of Boom or Jib.
196. End of Boom or Jib.
197. End of Boom or Jib.
198. End of Boom or Jib.
199. End of Boom or Jib.
200. End of Boom or Jib.
201. End of Boom or Jib.
202. End of Boom or Jib.
203. End of Boom or Jib.
204. End of Boom or Jib.
205. End of Boom or Jib.
Names of Parts of Pile Driver.

Figs. 401-404.

2. Hammer-eye, or Clevis.
3. Leaders.
4. Stringer Sway- braces (and Main Ladder 32).
5. Pilasters.
6. Top-stringers.
7. Leader-brace.
8. Cabin Ladder.
9. Leader Cap.
10. Main Sheave.
11. File-holding Sheave.
12. Sheathing, of Cabin.
15. Leader-trunnion Pedestal.
17. Leader Brace-pocket.
19. Swinging-platform Sill.
20. Top-stringers.
22. Tongs, or Crabs.
23. Leader Cross-piece.
24. End-sill.
25. Outside Sills (Channel Bars).
26. Main Posts.
27. Swinging-platform, or Upper Platform.
29. Body Counter-brace.
30. Cabin Studding.
31. Carline.
32. Main Ladder, swinging on Leader-trunnions.
33. Lower Ladder.
34. Crane.
35. Gny-ropes.
37. Tuss Rod.
38. Counterbrace Rod.
40. Hammer- rope Fulley.
41. Spools controlled by Strap-brake and Treadle.
42. Driving Chain, Pitch.
43. Connecting Chain.
44. Pitch-gear.
45. Swinging-platform Center-plate (upper and lower).
46. Swinging-platform.
47. Truck.
49. Spur-wheel.
50. Swinging- rack.
51. Leader Trunnion.
52. Leader-trunnion Pedestal.

Leaders, to take in 40-ft. pile. Hammer, 4,500 lbs. Motive power sufficient to propel car and two loaded cars attached.
Fig. 405. Sectional Side Elevation showing Dipper just before filling.

Fig. 406. Plan.

Fig. 407. End Elevation showing Dipper just after dumping.

Steam Shovel, Boom Pattern. Buchanan Steam Shovel & Dredge Company.

Engine cylinders, 8 x 12 in. Boom, 21 ft. Dipper, 8 cu. yds. Car, 10 ft. x 30 ft. Fox Trucks, 80,000 lbs. capacity.

Names of Parts of Steam Shovel. Figs. 405-407 and 208.

1. Dipper.
2. Teeth.
3. Bail.
4. Block.
5. Handle.
6. Dipper-cylinder or Ratchet-beam.
7. Transmission-bearings with Cap.
8. Valve Hand-wheel and Spindle.
10. Slip-joint.
11. Mast-wheel or Boom-wheel.
12. Chain-spool.
13. Friction-brake Wheel.
15. Spur-wheel.
20. Mast Base-casting.
22. Swing-cylinder Valve.
24. Boom Tie-rod.
27. Operating Levers.
29. Dipper-bottom.
Fig. 408-413. CAR-BODIES, Working; Snow Plow Framing.

Fig. 408. Side Elevation of Framing.

Fig. 409. Plan of Framing.

DOUBLE-TRACK SNOW PLow (RUSSELL'S). ENSIGN MANUFACTURING COMPANY.

(A general view is shown in Fig. 23.]

Numbers Refer to List of Names on Opposite Page.

Fig. 410. Side Elevation of Framing.

Fig. 411. Half Plan and Half Horizontal Section.

SNOW PLow, BUILT BY THE PORTLAND COMPANY, PORTLAND, MAINE.

Fig. 412. Half Rear End Elevation.

Fig. 413. Half Front End Elevation.
CAR-BODIES, Working; Snow Plow and Flanger. Figs. 414-418

Fig. 415. Side Elevation.

Fig. 416. Longitudinal Section.

Fig. 417. Horizontal Section.

Fig. 418. Half End Elevation and Cross Section.

SNOW PLOW AND FLANGER. MICHIGAN CENTRAL RAILROAD.
(To be Attached to a Flat Car.)

Names of Parts of Snow Plow or Flanger. Figs. 414-418.

1. Side-sill.
2. End-sill.
4. Center-sill.

1. Side-sill.
2. Bottom-sill.
2a. Side-plate.
3a. Intermediate-sill.
4. Center-sill.
5. End-girt.
6. Top-girts or Cross-tie timber.
7. Bunter Beam.
8. Bottom-girt or Cross-tie-timber.
10. Furring-piece.
11. Front Body-bolster.
13. Buffer-beam (Same as 32).
15. Shear-beams.
16. Stem.
17. Center Throat-piece.
21 and 22. Furring-pieces.
23. Oak-knee.
25. Front End-sill.
26 and 27. Frame for Door in Bulkhead.
28. Frame for Door in Bulkhead.
29 and 30. Bulkhead and Deck-timber.
Figs. 419-421. CAB-BODIES, Passenger; Coach.

Fig. 419. Half Side Elevation of Exterior.

Fig. 420. Part Plan of Underframing and Floor.

Fig. 421. Side Elevation of Framing.

FIRST-CLASS PASSENGER COACH. NORFOLK & WESTERN RAILROAD.
Fig. 422. Half Side Elevation of Interior.

Fig. 423. Half Plan of Interior and Section of Sides.

Fig. 424. Side Elevation of Framing.

FIRST-CLASS PASSENGER COACH. NORFOLK & WESTERN RAILROAD.
Fig. 425-429. CAR-BODIES, Passenger; Couches.

Fig. 425. End Elevation.

Fig. 426. Transverse Section.

Fig. 427. End Elevation of Framing.

FIRST-CLASS PASSENGER-COACH BODY, NORFOLK & WESTERN RAILROAD.

Fig. 428. Half Plan Showing Underframing.

FIRST-CLASS PASSENGER COACH EXHIBITED AT WORLD'S COLUMBIAN EXPOSITION BY THE NEW YORK CENTRAL & HUDSON RIVER RAILROAD.
**CAR-BODIES, Passenger; Coach and Combination Cars.**

**Figs. 430-434**

**Fig. 430. Half Side Elevation Showing Framing.**

**Fig. 431. Half Plan Showing Underframe and Roof. Baggage, Buffet and Smoking Car Exhibited at World's Columbian Exposition, 1893, by the New York Central & Hudson River Railroad.**

**Fig. 432. End Elevation.**

**Fig. 433. Half Transverse Section and Half End Elevation of Framing.**

**Fig. 434. Half Side Elevation of Passenger Coach. First-Class Passenger Coach Exhibited at World's Columbian Exposition by the New York Central & Hudson River Railroad. (97)**
Fig. 435. Part Longitudinal Section and Sectional View of Interior.

Fig. 436. Half Plan of Underframing and Floor.

Fig. 437. Side Elevation showing Framing.

FIRST-CLASS PASSENGER COACH. PENNSYLVANIA RAILROAD.
Fig. 436. Side Elevation of Exterior.

Fig. 438. Part Plan of Underframing.

Fig. 440. Side Elevation showing Framing.

FIRST-CLASS PASSENGER COACH. PENNSYLVANIA RAILROAD.
Names of Parts of Passenger Car-bodies. Figs. 435-473.

1. Side-sill.
2. End-sill.
4. Center-sill.
5. Floor-timber Distance-block.
6. Bridging.
7. Floor-timber Brace.
8. Still Knee-iron.
15. Body Centre-plate.
16. King-bolt.
17. King-bolt Plate.
18. Check-chain.
22. Body Queen-post.
23. Turnbuckle.
24. Truss-rod Anchor-iron.
27. Floor.
29. Draught Ceiling.
30. Draughtbar.
31. Draft-spring.
32. Center-draft Draughtbar.
33. Platform-floor.
34. Platform sill.
35. Platform Short-sill.
36. Platform End-sill.
37. Platform Railing-post.
38. Base Washer for Platform Railing-post.
40. Same as 41 in Fig. 435.
41. Platform Hand-rail Chain.
42a. Buffer-plate (Fig. 436).
42b. Foot-plate (Fig. 436).
44. Bridge.
45. Platform-step.
46. Tread-board.
47. Step-iron.
48. Step-hanger.
49. Step-hanger Brace.
50. Splash-board.
51. Brace.
52. Brace-rod.
53. Brace-rod Straining-rod.
54. Sill-end-plate Rod.
55. Counterbrace.
56. Counterbrace Rod.
57. Brace-rod Washer.
58. Window-post.
59. Sheathing-Furring.
60. Stud.
61. Corner-post.
62. Door-post.
63. Truss-plank.
64. Truss-plank Cap.
65. Belt-rod.
66. Sheathing-rail.
67. Outside Panel or Sheathing.

(Continued.)
### Names of Parts of Passenger Car-bodies. Figs. 435-478.

**Continued**

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>Window Sash</td>
</tr>
<tr>
<td>86</td>
<td>Window Blind-sash</td>
</tr>
<tr>
<td>86'</td>
<td>Inside Window-stop or Window-casing</td>
</tr>
<tr>
<td>87</td>
<td>Window Cove-moulding</td>
</tr>
<tr>
<td>88</td>
<td>Window-moulding</td>
</tr>
<tr>
<td>89</td>
<td>Inside Window-panel</td>
</tr>
<tr>
<td>90</td>
<td>Window-lintel</td>
</tr>
<tr>
<td>91</td>
<td>Letter-board</td>
</tr>
<tr>
<td>92</td>
<td>Fascia-board</td>
</tr>
<tr>
<td>93</td>
<td>Eaves-moulding</td>
</tr>
<tr>
<td>94</td>
<td>Inside Cornice</td>
</tr>
<tr>
<td>95</td>
<td>Inside Cornice Fascia-board</td>
</tr>
<tr>
<td>96</td>
<td>Inside Cornice Sub-fascia-board</td>
</tr>
<tr>
<td>97</td>
<td>Inside Lining</td>
</tr>
<tr>
<td>98</td>
<td>Plate</td>
</tr>
<tr>
<td>99</td>
<td>Door-lintel</td>
</tr>
<tr>
<td>100</td>
<td>Carline or Compound Carline</td>
</tr>
<tr>
<td>101</td>
<td>Rafter</td>
</tr>
<tr>
<td>102</td>
<td>Roof-boards</td>
</tr>
<tr>
<td>102a</td>
<td>Sash-balanced (Fig. 447).</td>
</tr>
<tr>
<td>103</td>
<td>Platform Roof</td>
</tr>
<tr>
<td>104</td>
<td>Platform-roof Carline</td>
</tr>
<tr>
<td>105</td>
<td>Platform-roof End Carline</td>
</tr>
<tr>
<td>106</td>
<td>Roof-apron</td>
</tr>
<tr>
<td>107</td>
<td>Platform Hood</td>
</tr>
<tr>
<td>108</td>
<td>Platform-hood Bcur</td>
</tr>
<tr>
<td>109</td>
<td>Platform-hood Post</td>
</tr>
<tr>
<td>110</td>
<td>Clear-story or Upper-deck</td>
</tr>
<tr>
<td>111</td>
<td>Deck-sill</td>
</tr>
<tr>
<td>112</td>
<td>Same as 111 in Fig. 462</td>
</tr>
<tr>
<td>113</td>
<td>Deck Bottom-rail</td>
</tr>
<tr>
<td>114</td>
<td>Deck End-sill</td>
</tr>
<tr>
<td>115</td>
<td>Deck-sill Fencing</td>
</tr>
<tr>
<td>116</td>
<td>Deck Post</td>
</tr>
<tr>
<td>117</td>
<td>Deck End-panel or Ventilator</td>
</tr>
<tr>
<td>118</td>
<td>Deck-plate</td>
</tr>
<tr>
<td>119</td>
<td>Upper-deck Carline</td>
</tr>
<tr>
<td>120</td>
<td>Upper-deck Eaves-moulding</td>
</tr>
<tr>
<td>121</td>
<td>Inside Deck-corncie</td>
</tr>
<tr>
<td>122</td>
<td>Deck Sofft-board</td>
</tr>
<tr>
<td>123</td>
<td>Car Seat</td>
</tr>
<tr>
<td>124</td>
<td>Seat-end or Aisle Seat-end</td>
</tr>
<tr>
<td>125</td>
<td>Seat-back</td>
</tr>
<tr>
<td>126</td>
<td>Foot-rest</td>
</tr>
<tr>
<td>128</td>
<td>Stone or Hinter</td>
</tr>
<tr>
<td>129</td>
<td>Smoke-pipe Jack</td>
</tr>
<tr>
<td>130</td>
<td>Saloon</td>
</tr>
<tr>
<td>130a</td>
<td>Saloon Ventilator-pipe</td>
</tr>
<tr>
<td>131</td>
<td>Closet Hopper</td>
</tr>
<tr>
<td>132</td>
<td>Urinal</td>
</tr>
<tr>
<td>133</td>
<td>Water-sooder</td>
</tr>
<tr>
<td>134</td>
<td>Water-alone</td>
</tr>
<tr>
<td>135</td>
<td>Center-lamp</td>
</tr>
<tr>
<td>136</td>
<td>Lamp-jack</td>
</tr>
<tr>
<td>136a</td>
<td>Fro Carburetter</td>
</tr>
<tr>
<td>137</td>
<td>Window</td>
</tr>
<tr>
<td>138</td>
<td>Windo-blind</td>
</tr>
<tr>
<td>139</td>
<td>Window-shade</td>
</tr>
<tr>
<td>140</td>
<td>Friexe Ventilator</td>
</tr>
<tr>
<td>141</td>
<td>End-ventilator</td>
</tr>
<tr>
<td>143</td>
<td>Side Deck-ventilator</td>
</tr>
<tr>
<td>145</td>
<td>Basket-rack</td>
</tr>
<tr>
<td>147</td>
<td>Door-mullion</td>
</tr>
<tr>
<td>148</td>
<td>Bottom Door-rod</td>
</tr>
<tr>
<td>149</td>
<td>Middle Door-rod</td>
</tr>
<tr>
<td>150</td>
<td>Top Door-rod</td>
</tr>
<tr>
<td>151</td>
<td>Door-panel</td>
</tr>
<tr>
<td>152</td>
<td>Brake-shaft</td>
</tr>
<tr>
<td>153a</td>
<td>Hand Brake-shaft Bred Gear-wheel</td>
</tr>
<tr>
<td>154</td>
<td>Uncoiling-staff</td>
</tr>
<tr>
<td>155</td>
<td>Brake-shaft Step</td>
</tr>
<tr>
<td>156</td>
<td>Lower Brake-shaft Bearing</td>
</tr>
<tr>
<td>157</td>
<td>Brake Hound-wheel</td>
</tr>
<tr>
<td>158</td>
<td>Brake Ratchet-wheel</td>
</tr>
<tr>
<td>159</td>
<td>Brake-panel</td>
</tr>
<tr>
<td>160</td>
<td>Brake-chain Worm</td>
</tr>
<tr>
<td>160a</td>
<td>Brake-chain Sheave</td>
</tr>
<tr>
<td>160b</td>
<td>Horizontal Brake-chain-shaft Bred Gear-wheel</td>
</tr>
<tr>
<td>170</td>
<td>Brake-chain Worm</td>
</tr>
<tr>
<td>170a</td>
<td>Brake-chain Sheave</td>
</tr>
<tr>
<td>171</td>
<td>Flag-holder Socket-plate</td>
</tr>
<tr>
<td>172</td>
<td>Platform Tie-rod</td>
</tr>
<tr>
<td>173</td>
<td>Compression-beam</td>
</tr>
<tr>
<td>174</td>
<td>Compression-beam Brace</td>
</tr>
<tr>
<td>175</td>
<td>Body Counterbrace</td>
</tr>
<tr>
<td>176</td>
<td>Counterbrace</td>
</tr>
<tr>
<td>177</td>
<td>Overhang Brake-rod</td>
</tr>
<tr>
<td>178</td>
<td>Same as 187</td>
</tr>
<tr>
<td>179</td>
<td>Uncoiling-rod</td>
</tr>
<tr>
<td>180</td>
<td>Uncoiling-shaft</td>
</tr>
<tr>
<td>210</td>
<td>Uncoiling-rod</td>
</tr>
<tr>
<td>221</td>
<td>Overhang Brake-rod Strut</td>
</tr>
</tbody>
</table>

**Fig. 444. End Elevation.**

**Fig. 445. Transverse Section.**

**Combination Passenger and Baggage-Car Body.** Norfolk & Western Railroad.
Fig. 447. Sectional Side Elevation.

Fig. 448. Sectional Plan of Floor and Underframing.

Fig. 449. Side Elevation of Framing.

COMBINATION-CAR BODY, SMOKING AND BAGGAGE COMPARTMENTS. NORFOLK & WESTERN RAILROAD.
Fig. 450. Sectional Side Elevation, Baggage Compartment.

Fig. 451. Sectional Plan of Floor and Underframing.

Fig. 452. Side Elevation of Framing.

COMBINATION-CAR BODY, SMOKING AND BAGGAGE COMPARTMENTS, NORFOLK & WESTERN RAILROAD.
Fig. 461-463. CAR-BODIES, Passenger Suburban Coach.

Numbers refer to List of Names with Figs. 441-446.

Fig. 461. Half Side Elevation.

Fig. 462. Half Side Elevation of Framing.

Fig. 463. Half Plan of Underframing and Roof Framing.

SUBURBAN PASSENGER CAR. MANHATTAN RAILWAY, NEW YORK CITY.
CAR-BODIES, Passenger; Suburban Coach.

Fig. 461. Half Longitudinal Section, Showing Interior.

Fig. 465. End Elevation, Framing.

Fig. 467. Sectional Half Plan, Showing Seats and Platform.

Suburban Passenger Car. Manhattan Railway, New York City.
Fig. 468-470. CAR-BODIES, Combination; Passenger, Baggage and Mail Cars.

Numbers Refer to List of Names with Figs. 441-446.
CAB-BODIES, Combination; Passenger, Baggage and Mail Cars. Figs. 471-473

Numbers Refer to List of Names with Figs. 441-446.
Dining car body and details. Chicago, Burlington & Quincy Railroad
Figs. 479-486

CAB-BODIES, Passenger; Dining Cars.

Fig. 479. Front Side Elevation. Fig. 480. Transverse Section showing Kitchen. Fig. 481. Transverse Section showing Bulkheads.

Fig. 482. Plan of Dining Room and Conductor's Quarters.

Figs. 483 and 484. Wine Closet.

Fig. 485. Side Elevation of Conductor's Quarters.

Fig. 486. Side Elevation of Conductor's Quarters.

DINING-CAR BODY AND DETAILS. CHICAGO, BURLINGTON & QCINTY RAILROAD.
Figs. 487-490. CAR-BODIES, Passenger; Pay Car.

Fig. 487. Port Longitudinal Section and Port Side Elevation

Fig. 488. Sectional Plan of Floor.

Fig. 489. End Elevation.

Business on Pay Car, Norfolk & Western Railroad.

Fig. 490. Transverse Section.
1. Solebar.
2. Headstock, or Buffer beam.
3. Cross-bearer, Crossbar, or Transom.
4. Diagonal.
5. Middle longitudinal.
6. End half-longitudinal.
7. Brake-shaft Cross-bearer, or Center Crossbar.
8. Buffer spring Bed, or Back Check.
9. Longitudinal Tie rod.
10. Transverse Tie-rod.
11. Strap Bolt.
13. Headstock Cap (cast iron).
14. Axle-guard (plate pattern), or Hornplate.
15. Axle guard Stay-rod, or Axle-guard Stretcher.
16. Spider Plate (plain), or Underframe Plate.
17. Axle-guard Keep, Hornstay, or Brelide.
18. Bearing spring Buckle, or Hoop.
21. Wheel-seat.
22. Grease Axle-box.
23. Grease Chamber.
24. Axle-box Cover, or Lid.
25. Axle-box Keep.
26. Axle-box Bearings, or Brass.
27. Druebar.
29. Coupling Shackle.
30. Coupling Screw.
31. Screw-coupling, Nut and Gudgeons.
32. Screw-coupling Weighted Lever.
33. Screw coupling, consisting of Shank, Screw, Nuts and Weighted Lever.
34. Safety Chain, or Side Chain, consisting of Eye-bolt and Hook.
35. Buffer-head.
36. Buffer-rod.
37. Buffer-rod Guide, or Buffer Block.
38. Plate, or Laminated Buffering and Draw-spring.
40. Floor Board, or Floor Batten.
41. Headstock and Diagonal Spring-link, or Spring Shackle.
42. Spring-link Adjusting-screw, or Tee-bolt.
43. Spring-link Adjusting-screw (special parts).
44. Auxiliary Rubber Bearing-spring.
45. Scroll-iron, or Spring Hanger.
46. End Scroll iron.
47. Scroll-iron (special pattern).
49. Bottom End-piece, or Bottom End-ber.
50. Bottom Cross-piece, or Bottom Crossbar.
51. Corner-piller.
52. Standing, Intermediate, or Partition Pillar.
53. Doorway Pillar.
54. End Pillar.
55. Cant-rail.
56. End Arch-rail.
57. Waist-rail.
58. Eye-rail.
59. Top Light-rail.
60. Bottom Light-rail.
61. Top Light-rail.
63. Bottom Panel-batten.
64. End-rail.
65. Top Panel-batten.
66. Elbow-rail.
67. Door-panel batten.
68. Quarterlight Pillar.
69. Door Garnish-rail.
70. Door Bottom Ventilator-rail.
71. Door Top-rail.
72. Door Bottom-rail.
73. Door Glass-frame Stop-rail.
74. Full-under, or Turn-under.
75. Side Top-panel Rail.
76. Door Fence-rail.
77. Seat-rail Support.
78. Roof-stick, or Hoop-stick.
79. Plated Moulding, or Fascia Moulding.
80. Waist-panel.
81. Quarter-panel.
82. Quarterlight-panel.
83. End-panel.
84. Door Bottom-panel.
85. Inside Casing, or Inside Linings.
86. Partition.
87. Roof-board.
88. Side-gutter, or Outside Cornice.
89. Side-gutter, or Outside Cornice Moulding.
90. Ventilator Hoist, or Cowl.
91. Ventilator Sliding-panel.
92. Ventilator Fixed-panel.
93. Quarterlight, or Side-light (fixed).
94. Door-light (falling).
95. Door Pillar or Door Stile.
96. Door-light Bottom Stash-rod, or Glass-frame Bottom Stash-rod.
97. Door-light Stile, or Glass-frame Stile.
98. Quarterlight Moulding, or Glass-frame Stile.
Figs. 505-507. CAR-BODIES, Passenger; Sleeping Cars.

Fig. 505. Half Longitudinal Section Showing Framing and Interior.

Fig. 506. Half Plan Showing Seats and Roof Framing.

Fig. 507. End Elevation of Framing.

Names of Parts, Figs. 505-511.

1. Side-sill.
2. End-sill.
4. Center-sill.
5. Bridging.
6. Upper Berth.
7. Sill Tie-rod.
8. Body Center-plate.
9. King-bolt.
10. Head Board.
11. Drawbar.
13. Platform Short-sills.
15. Base-washer for Platform Railing-post.
20. T. Table.
21. Tread-board.
22. Brace.
23. Counter-brace.
24. Sheathing Furring.
25. Truss-plank.
27. Plate.
28. Ceiling.
29. Roof-boards.
30. Clear-story or Upper-deck.
32. Deck-post.
33. Deck End-panel or Ventilator.
34. Deck plate.
35. Upper-deck Carline.
36. Overhang Truss-rod.
37. Overhang Truss-rod Strut.

EMIGRANT OR TOURIST’S SLEEPING CAR. SOUTHERN PACIFIC COMPANY.
CAR-BODIES, Passenger; Sleeping Cars. Figs. 510-511

Fig. 508. Half Side Elevation.

Fig. 509. Half Plan of Underframe.

Fig. 510. Transverse Section Showing Seats and Berths.

Emigrant or Tourist’s Sleeping Car. SOUTHERN PACIFIC COMPANY.
CAB-BODIES, Passenger; End Framing for Sleeping Car. Figs. 514-522

Names of Parts, Figs. 512-518.

1. Side-sill.
2. End-sill.
4. Center-sill.
5. Sill Knee-iron.
10. Sill-and-plate Rod.
11. Counterbrace.
12. Window-post.
15. Corner-post.
16. Truss-plank.
17. Plate.
18. Rafter.
22. Roof-apron.
23. Deck-sill.
25. Upper-deck Carline.

Fig. 517. Sectional Plan. Fig. 518. Corner.

Standard End Framing for Parlor, Private and Sleeping Car.
Pullman's Palace Car Company.
(Shoewing Anti-Telescoping Device.)

Names of Parts, Figs. 514-518.

A. End-sill Stiffening-plate.
B. End-sill Stiffening-angle.
C. Iron Carline Knee-iron.
D. Truss-rod Washer-plate.
E. Corner-post Knee-iron.
F. Corner Angle-post.
G. Iron-carline or Rafter.
H. End-plate Strengthening-angle.
I. Body End-plate.
J. Deck End-plate.
K. Corner-plate.
L. Deck End-plate Strap-bolt.
M. Platform-roof Carline.
N. Ceiling-furring.
O. Ceiling-furring.
P. Inside Upper Deck-corner.
Q. Berth-front, Upper-part.
R. End Sill-and-plate Tie-rod.
S. Side Cantilever-truss for Overhang.

Fig. 516. Transverse Sections.
CAR-BODIES, Passenger; End Framing for Sleeping Cars.

Fig. 527. Half Cross Section and Half End Elevation.

Fig. 528. Section of Vestible.

Fig. 529-530. Plan and Side Elevation of Platform and Car End.

STANDARD COMPOSITE END FRAMING FOR PARLOR, PRIVATE AND SLEEPING CARS.

WAGNER PALACE CAR COMPANY.

Names of Parts. Figs. 523-530.

1. Side-sill.
2. End-sill.
4. Center-sill.
5. Bridging.
8. Truss-rod Anchor-strap.
11. Short-sill.
17. Window-post.
18. Window Sheathing.
19. Furring.
20. Upper-deck Carlines.
22. sill-and-belt-rail Tie-rod.
23. sill-and-plate Tie-rod.
24. Counterbrace.
25. Window-post.
27. Furring.
29. sill-and-plate Tie-rod.
30. Counterbrace.
31. Window-post.
32. sill-and-belt-rail Tie-rod.
33. sill-and-plate Tie-rod.
34. Platform.
35. Short-sill.
36. Platform End-sill.
37. Roof Boards.
40. Counterbrace.
41. Window-post.
42. sill-and-belt-rail Tie-rod.
43. sill-and-plate Tie-rod.
44. Counterbrace.
45. Window-post.
46. sill-and-belt-rail Tie-rod.
47. sill-and-plate Tie-rod.
48. Counterbrace.
49. Window-post.
50. sill-and-belt-rail Tie-rod.
51. sill-and-plate Tie-rod.
52. Counterbrace.
53. Window-post.
54. sill-and-belt-rail Tie-rod.
55. sill-and-plate Tie-rod.
56. Platform.
57. Short-sill.
58. Platform End-sill.
59. sill-and-belt-rail Tie-rod.
60. sill-and-plate Tie-rod.
61. Platform.
62. Short-sill.
63. Platform End-sill.
64. sill-and-belt-rail Tie-rod.
65. sill-and-plate Tie-rod.
66. Platform.
67. Short-sill.
68. Platform End-sill.
69. sill-and-belt-rail Tie-rod.
70. sill-and-plate Tie-rod.
71. Platform.
72. Short-sill.
73. Platform End-sill.
74. sill-and-belt-rail Tie-rod.
75. sill-and-plate Tie-rod.
76. Platform.
77. Short-sill.
78. Platform End-sill.
79. sill-and-belt-rail Tie-rod.
80. sill-and-plate Tie-rod.
81. Platform.
82. Short-sill.
83. Platform End-sill.
84. sill-and-belt-rail Tie-rod.
85. sill-and-plate Tie-rod.
86. Platform.
87. Short-sill.
88. Platform End-sill.
89. sill-and-belt-rail Tie-rod.
90. sill-and-plate Tie-rod.
91. Platform.
92. Short-sill.
93. Platform End-sill.
94. sill-and-belt-rail Tie-rod.
95. sill-and-plate Tie-rod.
96. Platform.
97. Short-sill.
98. Platform End-sill.
100. sill-and-plate Tie-rod.
101. Rafter.
102. Roof Boards.
103. Platform-roof End-carline.
104. Platform-roof Apron.
105. Deck-sill.
106. Deck-plate.
107. End-sill Flitch-plank.
108. Side-sill Flitch-plank.
110. Foot of Iron Bar of Vestible End-post.
111. Platform End-sill.
113. Vestible Body-corner-posts.
Passenger Car Framing adopted by Pullman's Palace Car Company.
Names of Parts; Figs. 531-538.

22. Body Queen-post.
26t. Cross-tie-timber Truss-rod Bearing.
51. Brace.
58. Window-post.
59. Sheathing Furring.
59b. Furring-blocks.
59e. End-sheathing or End Panel-furring.
60. Stud.
60e. End-studs.
61. Corner-post.
62. Door-post.
63. Truss-plank.
65. Belt-rail.
65a. Auxiliary Belt-rail.
66. Sheathing-rail.
68. Belt-rail Cap.
90. Window-lintel.
92. Boxes-molding.
98. Plate.

99. Door-lintel.
100. Compound Carline.
101. Rafter.
102. Roof Boards.
108. Platform-hood Bow.
111. Deck-sill.
115. Deck-post.
117. Deck-plate.
118. Upper-deck Carline.
127. Window.
163. Compression-beam.
164. Compression-beam Brace.
164b. Auxiliary Compression-beam Brace.
165. Counterbrace.
260. Deck End-sill.

Fig. 536. Port Side Elevation.

Fig. 537. Interior View.

Fig. 538. Interior View.

Passenger Car Framing, Adopted by Pullman's Palace Car Company.
Baltimore & Ohio, Wabash and Other Railroads.
Figs. 539-539a. CAR-BODIES, Passenger; Coach Details.

Fig. 539. End Elevation.
Fig. 539a. End Elevation of Framing. FIRST-CLASS PASSENGER COACH.

Names of Parts, Figs. 539-541.

2. End-sill. 51. End-brace.
23. Turnbuckle. 70. Sheathing.
27. Floor. 72. Wainscot-panel.
29. Drawer or Coupler. 74. Inside Window-sill.
35. Platform-sill. 76. Wainscot-panel.
37. Platform Short-sill. 77. Outside Window-sill.
40. Base-washer for Platform-railing Post. 80. Upper Belt-rail.
44. Body Hand-rail. 82. Window Blind-sash.
45. Platform-step.

88. Window Moulding.
89. Inside Window-panel.
90. Window-lintel.
91. Letter-board.
92. Fascia-board.
93. Eaves-moulding.
94. Inside Cornice.
95. Inside Cornice Fascia-board.
97. Inside Lining.
98. Plate.
99. Door-lintel.
100. Compound Cornice.
101. Rafter.
102. Roof Boards.
104. Platform-roof Cornice.
105. Platform-roof End-cornice.
106. Roof-apron.
110. Clear-story or Upper Deck.
111. Deck-sill.
112. Deck Bottom-rail.
113. Deck End-sill.
114. Deck-sill Fascia.
114a. Deck-sill Sub-facing.
115. Deck-post.
116. Deck End-panel or Ventilator.
118. Upper-deck Cornice.
120. Inside Deck-cornice.
121. Deck-plate (117).
121a. Deck Sub-board.
122. Car Seat.
123. Seat-end or Aisle Seat-end.
124. Seat-stand.
125. Seat-back.
127. Window.
140. Window-blind.
140a. Window-shade.

(Continued)
Fig. 540. Transverse Section Showing Interior.
FIRST-CLASS PASSENGER COACH.

Names of Parts, Figs. 389-541.

(Continued.)
144. Deck-sash or Deck-window.
144p. Deck-screen Post.
145 or A. Continuous Basket-rack.
147. Bottom Door-rail.
148. Middle Door-rail.
149. Top Door-rail.
150. Door stile.
151. Door panel.
152. Brake-shaft.
156. Upper Brake-shaft Bearing.
190. Brake-chain Worm.
190a. Brake-chain Sheave.
190b. Brake-shaft Bevel Gear wheel.
172. Uncoupling-shaft.
172a. Uncoupling-rod.
173. Uncoupling-lever.
190. Ceiling.

Fig. 541. Sectional Side Elevation, Showing Exterior and Interior
FIRST-CLASS PASSENGER COACH.
(Full elevation and plan are shown in Figs. 419-427.)
Names of Parts. Figs. 542-547.

1. Side-sill.
1a. Side-sill Flitch-plank.
1b. Sill Flitch-plate.
3a. Outer Intermediate-sill.
4. Center-sill.
27. Car Floor.
27b. Sub-car-floor.
54. Sill and plate Rod.
58. Window-post.
59. Window-panel or Sheathing Furring.
63. Truss-plank.
64. Truss-plank Cap or Moulding.
65. Belt-rail.
66. Sheathing-rail.
67. Sheathing.
67b. Inside Lining.
67f. Inside Lining over Window.
74. Lower Wainscot-rail.
75. Upper Wainscot-rail or Panel.
77. Outside Window-sill.
78. Inside Window-sill.
81. Belt-rail Cap.
82. Upper Belt-rail.
83. Stash Furring-strip.
85. Outside Window-sash.
85a. Upper Outside Window-sash.
86. Inner Window-sash.
86a. Upper Inner Window-sash.
86s. Window-blind.
90. Window-lintel.
91. Letter-board.
92. Eaves Sub-fascia-board.
93. Eaves Fascia-board.
94. Inside Cornice.
94b. Plate Facing, or Inside Cornice Fascia-board.
95. Inside Cornice Fascia-board, same as 94b.
96. Plate.
96a. Auxiliary Plate.
99. Door Lintel.
99b. Door Lintel Top-rail.
100. Compound Carline.
101. Rafter.
102. Roof-boards.
111. Deck-sill.
111b. Deck-sill Top-moulding.
111c. Same as 112.
112. Deck Bottom-rail.
113. Deck End-sill.
74. Lower Wainscot-rail.
75. Upper Wainscot-rail or Panel.
77. Outside Window-sill.
78. Inside Window-sill.
81. Belt-rail Cap.
82. Upper Belt-rail.
83. Stash Furring-strip.
85. Outside Window-sash.
85a. Upper Outside Window-sash.
86. Inner Window-sash.
86a. Upper Inner Window-sash.

Names of Parts (Continued). Figs. 542-547.

114. Deck-sill Facing.
114a. Deck-sill Bottom-moulding.
115. Deck-post.
117. Deck-plate. (Marked 121 in Figs. 549, 550 and 554).
118. Upper-deck Carline.
119. Deck Eaves-fascia-board.
119a. Deck Eaves-sub-fascia-board.
120. Deck Inside Cornice.
121. Deck-plate in Figs. 543, 550 and 554.
121a. Deck Soffit-board.
144. Deck-sash or Window.
144a. Outer Deck-sash for Screen.
144b. Deck-screen.
146. Door-mullion.
147. Bottom Door-rail.

Fig. 54a. Section through A B.

Fig. 54b. Cross Section of Part of a Roof.

BAGGAGE CAR.
NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

Fig. 542. Transverse Section of Side and Lower Deck.
COACH. BALTIMORE & OHIO RAILROAD.

TRANVERSE SECTIONS OF SIDES AND ROOFS OF PASSENGER CARS.
CAR-BODIES, Passenger; Sides and Roofs. Figs. 545-550

Fig. 555. Transverse Section of Roof.


Numbers Refer to List of Names with Figs. 542-544.

Fig. 548. Cross Section of Side.

Fig. 549. Sectional Plan of Brg.

Fig. 550. Cross Section of Side and Roof of a Coach.

Parlor Car, with Bay Windows. Pullman's Palace Car Company.

New York Central & Hudson River Railroad.
Figs. 551-554. CAR-BODIES, Passenger and Sleeping; Sides and Roofs.

Fig. 551. Cross Section of Side and Roof.

Fig. 552. Part Elevation of Interior.

Coach. Wabash Railroad.

Fig. 553. Part Side Elevation of Framing of Roof.

Coach. Wabash Railroad.

Fig. 554. Cross Section of Side and Roof and Upper Berth of a Sleeping Car.

Pullman's Palace Car Company.

Names of Parts (Continued). Figs. 542-567.

148. Middle Door-rail.
149. Upper Door-rail.
150. Door-stile.
151. Door-panel.
152. Door-cap Rail.
153. End-ventilator.
155. Fascia-board.
156. Sub-fascia-board.
157. Inside-lining.
158. Threshold-plate.
159. Door-sill Plate.

(Continued on Page 121.)

SCALE OF FEET

Fig. 564. Cross Section of Side and Roof and Upper Berth of a Sleeping Car.

For other Sections of Sleeping Car See Figs. 514 and 527.)
CAR-BODIES, Passenger and Baggage; Sides and Roofs. Figs. 555-569

Fig. 555. Side Door, Side and Roof. Cross Sections of Baggage Car.

Fig. 556. End Door. Cross Sections of Passenger Car.

Side, End and Roof Framing of Baggage and Passenger Car.

CHICAGO, BURLINGTON & QUINCY RAILROAD.
Names of Parts. Figs. 542-557 (Concluded).

188. Upper End-door Sash.
189. Lower End-door Sash.
190. Deck Ceiling Veneered.
190a. Ceiling of Baggage Car.
191. Veneering of Lower Deck Ceiling.
191a. Lower Deck Veneered Ceiling.
200a. Rail between Windows.
201. Moulding for Shade-roller Box.
203. Shade.
205. Furring Brace-blocks.
206. Base-board Corner Moulding.
208. Filling-board (Fig. 560).
209. Filling-board.
211. Inside Sub-lining.
220. Ceiling Strips or Furring (Fig. 534).
220b. Ceiling-furring.
221. Ceiling Furring-brace.
222. Berth Front, Upper Part.
223. Berth-front Panel.
224. Berth Front, Lower Part.
225. Top-rail of Pipe-box.
235. Overhang-truss.
236. Overhang-True Tie-rod.

Fig. 570. Side Elevation of Framing.

Fig. 571. Plan of Underframing.

Baggage and Express Car. Baltimore & Ohio Railroad.

Fig. 571a. Half Cross Section and Half End Elevation, showing Framing.

Baggage and Express Car.
Baltimore & Ohio Railroad.
CAR-BODIES, Baggage. Figs. 572-574

SCALE OF FEET.

Fig. 574. Half Side Elevation of Exterior.

Fig. 573. Half Plan and Horizontal Section of Sides.
BAGGAGE AND EXPRESS CAR. BALTIMORE & OHIO RAILROAD.

Names of Parts of Baggage Cars. Figs. 570-583.

1. Side-sills.
   1a. Side-sill Flitch-plate.
   1b. Side-sill Flitch-plank.
2. End-sill.
   2a. End-sill Flitch-plate.
   2b. End-sill Flitch-plank.
   3a. Outer Intermediate-sill.
   3b. Center-sill.
4. Center-sill.
5. Skirting.
7. Sill Tie-rod.
10. King-bolt.
14. Turnbuckle.
16. Floor.
17. Platform Cross-timber.
18. Platform Tie-rod.
20. Platform Timbers.
22. Platform End-sill.
25. Platform Rail.
27. Body Braces.
28. Counter Brace-rod.
29. Composite End-posts.
30. Sill-and-plate Rod.
31. Counterbrace.
32. Window-posts.
33. Stud.
34. Corner-post.
35. Door-post.
36. Outside Window-sill.
37. Window-lintel.

(Continued.)
Figs. 574-578. CAR-BODIES, Baggage.

Fig. 574. Half Side Elevation of Framing.

Fig. 575. Section at Door

Fig. 576. Section at Letter Case

Fig. 577. Part Side Elevation of Interior.

Fig. 578. Part Plan of Underframing.

BAGGAGE CAR. NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

(Details are shown in Figs. 1176-1363.)

Names of Parts of Baggage Cars. Figs. 570-583. (Concluded.)

<table>
<thead>
<tr>
<th>No.</th>
<th>Part</th>
</tr>
</thead>
<tbody>
<tr>
<td>91</td>
<td>Letter-board.</td>
</tr>
<tr>
<td>98</td>
<td>Plate.</td>
</tr>
<tr>
<td>99</td>
<td>Door-lintel.</td>
</tr>
<tr>
<td>100</td>
<td>Compound-cantilever.</td>
</tr>
<tr>
<td>101</td>
<td>Rafter.</td>
</tr>
<tr>
<td>103</td>
<td>Platform Roof.</td>
</tr>
<tr>
<td>106</td>
<td>Roof-apron.</td>
</tr>
<tr>
<td>111</td>
<td>Deck-sill.</td>
</tr>
<tr>
<td>113</td>
<td>Deck End-sill.</td>
</tr>
<tr>
<td>113a</td>
<td>End-sill Stiffening-plate.</td>
</tr>
<tr>
<td>115</td>
<td>Deck-post.</td>
</tr>
<tr>
<td>117</td>
<td>Deck-plate.</td>
</tr>
<tr>
<td>118</td>
<td>Upper-deck Cantilever.</td>
</tr>
<tr>
<td>146</td>
<td>Door-mullion.</td>
</tr>
<tr>
<td>148</td>
<td>Door Middle-rail.</td>
</tr>
<tr>
<td>149</td>
<td>Door Upper-rail.</td>
</tr>
<tr>
<td>150</td>
<td>Door-stile.</td>
</tr>
<tr>
<td>151</td>
<td>Door-panels.</td>
</tr>
<tr>
<td>152</td>
<td>Brake-shaft.</td>
</tr>
<tr>
<td>157</td>
<td>Hand Brake-wheel.</td>
</tr>
<tr>
<td>175</td>
<td>Door Guards.</td>
</tr>
<tr>
<td>177</td>
<td>Door-threshold.</td>
</tr>
<tr>
<td>179</td>
<td>Guard for Heater.</td>
</tr>
<tr>
<td>181</td>
<td>Window.</td>
</tr>
<tr>
<td>190</td>
<td>End-sill Stiffening-plate.</td>
</tr>
<tr>
<td>191</td>
<td>End-sill Stiffening-angle.</td>
</tr>
<tr>
<td>192</td>
<td>Platform Short-sill Tie-rod.</td>
</tr>
<tr>
<td>193</td>
<td>Platform End-sill Tie-rod.</td>
</tr>
<tr>
<td>194</td>
<td>Platform Truss-rod.</td>
</tr>
<tr>
<td>195</td>
<td>End-plate-and-bolster Tie-rod.</td>
</tr>
</tbody>
</table>
CAR-BODIES, Baggage. Figs. 579-583

Fig. 579. Half Side Elevation of Exterior.

Fig. 580. Half Side Elevation of Interior.

Fig. 581. Half Plan of Floor and Roof.

Fig. 582. Half End Elevation of Framing and Cross Section.

Baggage Car. New York Central & Hudson River Railroad.
(Details are shown in Figs. 1178-1363.)
Figs. 584-595. CAR-BODIES; Baggage and Express Cars.

Fig. 586. Half Plan of Underframe.
Express Car without Platforms. Louisville & Nashville Railroad.

Figs. 587-592. Cross Sections Showing Framing.

Note.—A system of electric lighting adopted by the Chicago, Milwaukee & St. Paul Railway, and differing but slightly from that employed by the Pennsylvania Railroad and the Pullman's Palace Car Company. A general view of the interior of car is shown in Fig. 119.
CAR-BODIES, Combination; Baggage and Mail. Figs. 600-615

Numbers Refer to List of Names with Figs. 605-608.

Fig. 611. Transverse Section.

Fig. 612. Plan.

Twenty-five-foot Mail Compartment of a Combination Baggage and Mail Car. Pennsylvania Railroad.

Approved by U. S. Railway Mail Service, Second Division.

Fig. 613. Sectional Elevation of Interior.

Fig. 614. Transverse Section.

Fig. 615. Sectional Plan.

Twenty-foot Mail Compartment of a Combination Baggage and Mail Car. Old Colony Railroad.
CAR-BODY DETAILS.

Separate Parts of Cars, their Forms and Dimensions.

Figs. 617-695. CAR-BODY DETAILS, Box Cars; Wood.
DETAILS OF CAST AND WROUGHT IRON PARTS OF 90,000-IB. BOX-CAR BODY. NEW YORK CENTRAL & HUDSON RIVER RAILROAD.
Wrought-Iron Details for Box-car Body. New York Central & Hudson River Railroad.

Working Drawings are shown in Figs. 229-231.

Fig. 873. Corner-plate.
Fig. 904. Push-pole Corner-plate.
Fig. 996. Stake-pocket.
Fig. 996. Stake-pocket.

Fig. 874-875. Stake-pocket.
Fig. 911-912. Center-plate.
Fig. 913. Center-plate.
Fig. 914-915. Stake-pocket.

Details of Pressed Steel Detail Parts of Freight Cars.

(144)
Fig. 993-1071. CAR-BODY DETAILS, Flat and Gondola Cars; Wrought and Cast Iron.


Details of Wood and Wrought-iron Parts of 60,000 lb. Flat Car. New York, Lake Erie & Western Railroad.

(Car Body is shown in Figs. 287-290.)
CAR-BODY DETAILS, Gondola and Caboose; Wrought and Cast Iron. Figs. 1072-1175


Details of Cast-Iron Parts of Four-Wheel Caboose. New York, Lake Erie & Western Railroad.
CAR-BODY DETAILS, Baggage Car; Wood and Wrought Iron.  Figs. 1228-1297

Fig. 1228-1229.  Intermediate Platform-timber (4).
Fig. 1229-1230.  Canopy Return-ends.
Fig. 1230-1231.  Step Timbers, 2 rights and 2 lefts.
Fig. 1231-1232.  Buffer block (2).
Fig. 1232-1233.  Hanger block (2).
Fig. 1234-1238.  Side-doors (2).
Fig. 1239-1240.  Canopy Return-ends.
Fig. 1240-1241.  Application of Steps and Platform.
Fig. 1241-1242.  Application of Safety chains.

Fig. 1243-1244.  End-sill Flitch-plate 2.
Fig. 1244-1245.  Curtain-plate (10).
Fig. 1245-1246.  End-plate Stiffener (2).
Fig. 1246-1247.  Truss-rod Anchor-irons (4).
Fig. 1247-1248.  Side-sill Flitch-plate (4).
Fig. 1248-1249.  Platform Hand-rail (4).
Fig. 1249-1250.  Side-door Threshold (4).
Fig. 1250-1251.  End-stiffener (8).
Fig. 1251-1252.  End-stiffener (4).
Fig. 1252-1253.  Side-door Threshold (4).
Fig. 1253-1254.  Platform Post and Brake-shaft (8 of each).
Fig. 1254-1255.  Platform-post (8 of each).
Fig. 1255-1256.  Chafing-plate (8).
Fig. 1256-1257.  Platform Ties and Tie-rod (8).
Fig. 1257-1258.  Canopy Return-ends.

Fig. 1259-1260.  Canopy Return-ends.
Fig. 1260-1261.  Canopy Return-ends.
Fig. 1261-1262.  Canopy Return-ends.
Fig. 1262-1263.  Canopy Return-ends.
Fig. 1263-1264.  Canopy Return-ends.
Fig. 1264-1265.  Canopy Return-ends.
Fig. 1265-1266.  Canopy Return-ends.
Fig. 1266-1267.  Canopy Return-ends.
Fig. 1267-1268.  Canopy Return-ends.
Fig. 1268-1269.  Canopy Return-ends.
Fig. 1269-1270.  Canopy Return-ends.
Fig. 1270-1271.  Canopy Return-ends.
Fig. 1271-1272.  Canopy Return-ends.
Fig. 1272-1273.  Canopy Return-ends.
Fig. 1273-1274.  Canopy Return-ends.
Fig. 1274-1275.  Canopy Return-ends.

Fig. 1276-1277.  Decking (4).  Center Standards.
Fig. 1277-1278.  Decking (4).  Center Standards.
Fig. 1278-1279.  Decking (4).  Center Standards.
Fig. 1279-1280.  Decking (4).  Center Standards.
Fig. 1280-1281.  Decking (4).  Center Standards.
Fig. 1281-1282.  Decking (4).  Center Standards.
Fig. 1282-1283.  Decking (4).  Center Standards.
Fig. 1283-1284.  Decking (4).  Center Standards.
Fig. 1284-1285.  Decking (4).  Center Standards.
Fig. 1285-1286.  Decking (4).  Center Standards.
Fig. 1286-1287.  Decking (4).  Center Standards.
Fig. 1287-1288.  Decking (4).  Center Standards.
Fig. 1288-1289.  Decking (4).  Center Standards.
Fig. 1289-1290.  Decking (4).  Center Standards.
Fig. 1290-1291.  Decking (4).  Center Standards.
Fig. 1291-1292.  Decking (4).  Center Standards.
Fig. 1292-1293.  Decking (4).  Center Standards.
Fig. 1293-1294.  Decking (4).  Center Standards.
Fig. 1294-1295.  Decking (4).  Center Standards.
Fig. 1295-1296.  Decking (4).  Center Standards.
Fig. 1296-1297.  Decking (4).  Center Standards.
Fig. 1297-1298.  Decking (4).  Center Standards.
Fig. 1298-1299.  Decking (4).  Center Standards.
Fig. 1299-1300.  Decking (4).  Center Standards.
Fig. 1300-1301.  Decking (4).  Center Standards.

DETAILS OF WOOD AND WROUGHT-IRON PARTS OF BAGGAGE-CAR BODY. NEW YORK CENTRAL & HUDSON RIVER RAILROAD.
Details of Wrought-Iron Parts of Baggage-car Body.

New York Central & Hudson River Railroad.
CAR-BODY DETAILS, Baggage; Wrought and Cast Iron.

Figs. 1364-1427

Details of Wrought and Cast Iron Parts of Brake-gear and Draft-gear of Baggage-car Body.

New York Central & Hudson River Railroad

(Gould Draft-gear.)
Fig. 1428. Transverse Section of Underframe and Side Elevation of Bolster.

Fig. 1429. Cross Section.

Fig. 1430. Plan.


Fig. 1431. Transverse Section of Underframe, showing Method of Attaching Body-bolster of a Derrick Car.

Iron Body-bolster for a Derrick-car, Baltimore & Ohio Railroad. Car is shown in Figs. 392-393.

Fig. 1432. Transverse Section of Underframe of a Refrigerator Car and Half Elevation and Half Longitudinal Section of Bolster.


Fig. 1433. Part Transverse Section of Underframe of a Box Car, showing Body bolster, Truck-bolster and Roller Side-bearing.

Fig. 1434. End Elevation.

Fig. 1435. Half Plans of Truck-bolster and Body bolster.

CAR-BODY DETAILS, Freight; Iron and Steel Bolsters.

Numbers Refer to List of Names on Following Page.

Fig. 1137. Cross Section of Underframe of a Box car, and Plan and Elevation of Body-bolster. IRON BODY-BOLSTER. CHICAGO, BURLINGTON & QUINCY RAILROAD.

Drawing shows construction adopted to lower the car floor and to allow the drawbar to be placed between the center sills.

Fig. 1140-1141. Body Center-plate Coasting. DETAILS OF IRON BODY-BOLSTER, FOR 50,000-LB. FURNITURE CAR. CHICAGO, BURLINGTON & QUINCY RAILROAD.

Fig. 1142-1144. Body-bolster Thimble. Body Side-bearing.

Fig. 1148. Side Elevation of Bolster.

Fig. 1119. Cross Section.

Fig. 1150. Plan of Bolster and Sills.

DOUBLE IRON BODY-BOLSTER, FOR 60,000-LB. BOX-CAR. MICHIGAN CENTRAL RAILROAD.

Other Body-bolsters are shown as follows: Composite Wood and I-Beam (Sterlingworth; Fig. 371; Composite Wood and Iron Flitch Plates, Figs. 395, 396 and 318. Truck Bolsters are shown with Trucks.

(153)
Fig. 1451. Half Side Elevation and Cross Section of Platform, showing Truss to strengthen Platform.

Body bolster and Platform Truss. Pennsylvania Railroad.

Fig. 1452. Cross Section of Underframe. Draft-timbers and Platform-sills are Plated to strengthen Platform.

Fig. 1453. Cross Section of Bolster.

Fig. 1454. Plan of Bolster and Sills.

Double Body-bolster, Passenger. Norfolk & Western Railroad.

Fig. 1455. Cross Section of Bolsters, Half Elevation of Center-plate Truss and Full Elevation of Side-bearing Truss.

Fig. 1456. Elevation of Bolster.

Fig. 1457. Plan of Bolster and Connecting Trusses.

Double Body bolster and Longitudinal Trusses between, for Center-plate and Side-bearing.

New York Central & Hudson River Railroad.

Names of Parts of Body-bolsters, Freight. Figs. 1428-1434.

1. Top-plate.
2. Bottom-plate.
3. Thimble.
4. Outer-thimble, or Wedge.
5. Thimble-bolt.
6. Outer Thimble-bolt.
7. End-bolt.
8. Side-sill Bolt.
10. Truck Side-bearing.
12. Truck Center-plate.
13. King-bolt.
16. Truck-bolster.
18. Center-sill Bolt.
4a. Intermediate Thimble.
**List of Names of Parts of Brakes.**

Figs. 1458-1463.

1. Brake-beam.
2. Brake-lever (Dead-lever and Live-lever).
5. Lower Brake-rod.
7. Floating-lever.
8. Floating Connecting-rod.
9. Center Brake-lever.
10. Center Brake-lever Chain.
11. Center Brake-lever Sheaves.
12. Dead-lever Brake-rod.
Figs. 1464-1513. CAR-BODY DETAILS, Brake-gear; Freight.

Fig. 1464. Side Elevation of Brake Gear.

Figs. 1464 and 1465. Side Elevation and Plan of Brake Gear.

Fig. 1466. End Elevation of Brake Gear.

FREIGHT BRAKE GEAR FOR OUTSIDE HUNG BRAKES. CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.
(Plan of arrangement for inside hung brakes is shown in Figs. 1505-1508.)

Figs. 1467-1469. Figs. 1470-1472. Figs. 1473-1474. Figs. 1475-1476.


Figs. 1485-1486. Figs. 1487-1489.

Figs. 1490-1491. Figs. 1492-1493. Figs. 1494-1495. Figs. 1496-1497.

Figs. 1498-1501. Figs. 1502-1503.

Figs. 1504-1505. Figs. 1506-1507. Figs. 1508-1509.

Details of Foundation Brake Gear adopted by the Master Car Builders' Association, 1889, 1890 and 1891, except the Westinghouse Brake Beam, which was dropped in 1893.
CAB-BODY DETAILS, Brake-gear; Freight. Figs. 1514-1529

Details of Foundation Freight Brake Gear adopted by the Master Car Builders' Association 1889, 1890 and 1891.

Names of Parts of Freight Brake Gear. Figs. 1528-1529.

2. Brake-shoe.
3. Brake-shoe Key.
4. Trussed Brake-beam.
5. Brake-beam Truss rod.
9. Brake Safety-chain or Link.
17. Brake-beam Adjusting-hanger Eye.
Brake-gear, Freight, for Diamond Truck.
Inside-hung from Channel-beam Transoms.
Brake Hand-rails, for use on top of Box Cars, are shown in Figs. 229-231, 244-246, and 878-879. Application of Air-brake to Gondola Cars is shown in Figs. 23, 310-311, 316-319. Other inside-hung Brakes are shown under Trucks.

Names of Parts. Figs. 1535-1537.
1. Upper Brake-lever Connecting-rod.
2. Upper Brake-lever Connecting-rod Clevis.
3. Live Truck-lever.
5. Truck Brake-lever.
7. Dead Truck-lever.
8. Brake-beam.
17. Brake-hanger Bracket.

Names of Parts. Figs. 1540-1542.
1. Upper Brake-lever Connecting-rod.
2. Upper Brake-lever Connecting-rod Clevis.
3. Live Truck-lever.
5. Brake-lever Hanger.
8. Lower Brake Connecting-rod.
15. Brake-lever Hanger-bridge.
CAR-BODY DETAILS, Brake-gear; Passenger.

Fig. 1535. Half Side Elevation.
Fig. 1536. Plan.
Fig. 1537. Half Plan.

Brake-gear, Passenger, as Applied to Four-wheeled Trucks.
Brakes on Both Sides of Wheels.

Fig. 1539. Sectional Side Elevation.

Recommended by the Westinghouse Air Brake Company. Showing Arrangement of Body Gear and the Connections Between it and a Six-Wheeled Truck Brake Gear.

Fig. 1540. Sectional Side Elevation.
Fig. 1541. Half End Elevation and Half Cross Section.
Fig. 1542. Transverse Section.

Brake-gear, Passenger, for Six-Wheeled Trucks.
Recommended by the Westinghouse Air Brake Company.
Figs. 1543-1574. CAR-BODY DETAILS, Brake-gear; Trucks and Beams.

Fig. 1543. Sectional Side Elevation.

Fig. 1544. End Elevation.  

Brake Gear, Passenger, for Six-Wheeled Truck.  
An alternative design offered by the National Hollow Brake Beam Company.

Figs. 1545-1547. Standard Inside Hung Freight Beam with Clips.

Figs. 1548-1549. Standard Inside Hung Freight Beam with Finger-Guards.

Figs. 1550-1552. Standard Outside Hung Freight Beam with Finger-Guards.

Figs. 1553-1555. Standard Rigid Head Beam for Passenger Cars and Locomotive Tenders.

Figs. 1556-1558. Self-Adjusting Spring Head Beam for Passenger Cars and Locomotive Tenders.

Brake Beams Made by National Hollow Brake Beam Company.

Figs. 1561-1564. Freight Brake Beam, Westinghouse.

Figs. 1565-1567. Passenger Brake Beam, Westinghouse.

Figs. 1568-1571. Brake Beam Struts.

Figs. 1572-1574. Brake Head and Shoe.
CAR-BODY DETAILS, Brake-gear; Beams.

**Figs. 1580-1601**

**The Kewanee Steel Brake-beam and Brake-head.**
For Passenger Cars and with Christie Heads.

**Figs. 1581-1582.**

**Wheel-guard for Kewanee Steel Brake-beam.**

**Figs. 1575-1590. Elevation and Plan.**
The Schoen Pressed Steel Brake-beam.

**Figs. 1584-1586. Perspective View.**

**Figs. 1587-1588.**
The Detroit Steel Brake-beam.

**Fig. 1599.**
The Universal Steel Brake-beam.
*Figs. 1581-1590 are made and sold by the American Brake Beam Company.*

**Fig. 1600.**
The Marden Brake-beam, Weight 87 lbs., made by Marden Car Brake Company.

**Fig. 1601.**
Beamless Brake Rigging, Beamless Brake Company.
*Showing Application of Brakes to a Truck Without the Use of a Brake-beam.*

---

**The Detroit Steel Brake-beam.**
*Made by Marden Car Brake Company.*

---

**Wheel-guard for Kewanee Steel Brake-beam.**

---

**The Universal Steel Brake-beam.**
*Made and Sold by the American Brake Beam Company.*

---

**Beamless Brake Rigging, Beamless Brake Company.**
*Showing Application of Brakes to a Truck Without the Use of a Brake-beam.*
Figs. 1602-1632. CAR-BODY DETAILS, Brake-gear; Brake Heads, Clips and Struts.

Fig. 1602-1603. Christie Head for Loop-hanger.
Fig. 1604-1605. Special Christie Head for Six axled Truck.
Fig. 1606. Christie Head for Freight Service.
Fig. 1607-1608. Christie Head for Passenger and Tender Brake-beams.

Fig. 1609-1611. Self-adjusting Springhead.
Fig. 1612-1613. P. & R. Railroad Freight Brake-head.
Fig. 1614-1615. Hooked Brake-head.
Fig. 1616. Collins Brake-head.

Fig. 1616a-d. Self-adjusting Spring Brake-head for Link Hanger.
Fig. 1616e. Ratchet Sleeve and Ratchet Pawl.
Fig. 1616f. Self-adjusting Spring-head for Loop Hanger.

Fig. 1617-1619. For brake-head to take Christie Head designed for Wooden Beams.
Fig. 1620-1621. Sleeve for Adjustable-head, for Figs. 1604-1605.

Fig. 1622. Passenger Brake-beam Strut. Angle of Lever, 45°.

Fig. 1623-1624. Passenger Brake-beam Strut. Angle of Lever, 45°.

Fig. 1625-1626. Fig. 1627. Spring Cheek Clip for 2-in. Beam.
Fig. 1628-1629. Cheek Clip Safety-hanger for 2-in. Beam. Clip.
Fig. 1630-1631. Finger-guard Casting.
Fig. 1632. Finger-guard.

BRAKE HEADS, CLIPS, GUARDS AND STRUTS. NATIONAL HOLLOW BRAKE BEAM COMPANY.

Other types of Heads and Shoes are shown with Truck Details, with M. C. B. Standards and with Brake-beams.
CAR-BODY DETAILS, Brake-gear; Brake Shoes.

Figs. 1633-1660

Figs. 1633-1634. Plain Car Shoe.
Figs. 1635-1639. Special New Freight Shoe.
Fig. 1636. Flange Car Shoe.
Figs. 1637. Lappin Brake-shoe for Christie Head.
Figs. 1638-1640. Lappin Brake-shoes.

LAPPIN BRAKE-SHOES, AS MADE BY THE LAPPIN BRAKE SHOE COMPANY.

Figs. 1640-1650.

Figs. 1641. Ross Shoe applied to a sharp flanged wheel.

Figs. 1650-1656.

Figs. 1650. Meehan-Shepard Brake-shoe for Blind Drivers.
Fig. 1669. CAB-BODY DETAILS, Brake-gear, Air; Eames Vacuum.

Fig. 1670. NAMES OF PARTS OF DIAPHRAGM AND BRAKE-HOSE.

1. Diaphragm-shell
2. Diaphragm-rubber
3. Diaphragm-ring
4. Diaphragm-rubbers
5. Diaphragm-Eye-bolt
6. Diaphragm Cap Screws
7. Diaphragm Plug
8. Double-thread Nipple (1/4 x 1/4 in.)
9. Elbow (1/4 in.)
10. Hose-nipple (1/4 x 1/4 in.)
11. Tie (1/4 x 1/4 in.)
12. Hose-clip, Plain (1/4 in.)
13. Diaphragm-hose (1/4 x 1/4 in.)

Fig. 1671. NAMES OF PARTS OF DIVIDING ATTACHMENT FOR ENGINES FITTED WITH DRUM BRAKES.

1. Body
2. Valve
3. Union-nut (1/4 in.)
4. Cap
5. Valve-seat
6. Union-part (1/4 in.)
7. Valve-stem
8. Union-nut (1/4 in.)

Fig. 1672. NAMES OF PARTS OF COUPLING.

1. Coupling-valve
2. Coupling-valve Lever
3. Coupling-point
4. Coupling-ears
5. Coupling-gasket
6. Coupling-spring

Fig. 1673. NAMES OF PARTS OF EJECTOR.

1. Steam-body
2. Air-body
3. Upper Body
4. Release-valve Body
5. Main Air-tube
6. Upper Air-tube
7. Air Check-valve Sent.
8. Release-valve
9. Release-valve Seat
10. Steam Spanner-nut
11. Union-nut
12. Release-lever Fulcrum
13. Release-valve Body
14. Release-valve Stud
15. Release-valve Nut
16. Fulcrum-pin
17. Handle Nut
18. Handle
19. Base-cap Screw
20. Steam-valve Nut
21. Valve-stem Nut
22. Valve-stem Nut
23. Valve-stem Nut
24. Valve-stem Nut
25. Valve-stem Nut
26. Valve-stem Nut
27. Valve-stem Nut
28. Valve-stem Nut
29. Steam-valve Nut
30. Ball Joint
31. Steam-valve Stem
32. Exhaust-pipe
33. Nipple
34. Union-part
35. Drip-valve Body
36. Drip-valve Cap
37. Drip-valve Ball
Fig. 1688-1689. CAR-BODY DETAILS, Brake-gear, Air; Westinghouse.

Fig. 1688. Sectional View, showing general arrangement of apparatus. WESTINGHOUSE QUICK-ACTION AUTOMATIC AIR-BRAKE.

Fig. 1689. Longitudinal Section. EIGHT-INCH AIR PUMP. WESTINGHOUSE AIR BRAKE COMPANY

NAMES OF PARTS OF PUMP.

Fig. 1689.  
2. Top-head (complete).  
3. Steam Cylinder (complete).  
4. Center-piece (complete).  
5. Air-cylinder (complete).  
6. Air-cylinder Head.  
7. Main-valve (complete).  
8. Upper Main-valve Packing-ring.  
10. Steam-piston and Rod.  
11. Air-piston (complete).  
14. Steam-pipe Union-nut (½-in.).  
15. Exhaust-pipe Union-nut (1-in.).  
17. Reversing-valve Stem.  
18. Reversing-valve Plate.  
20. Reversing-valve Chamber-cap.  
22. Reversing-cylinder.  
23. Reversing-piston (complete).  

37. Lower Steam-cylinder Gasket.  
38. Upper Air-cylinder Gasket.  
40. Air-cylinder Oil-cup.  
41. Drain-cock.  
42. Cylinder-head Bolt (½ X 24).  
43. Valve-chamber Bush.  
44. Discharge-valve Stop.  
45. Valve-stop Set-screw.  
46. Chamber-bush Set-screw.  
47. Reservoir Union-stud (1-in.).  
48. Exhaust-pipe Union-stud (1-in.).  
49. Steam-pipe Union-stud (1-in.).  
50. Main-valve Stop.  
51. Reversing-valve Plate-bolt.  
52. Pump-head Bolt (½ X 1½ in.).  
53. Union-swivel.  
54. Governor Union-nut.  
55. Governor Union-stud.  
56. Piston Stuffing-box.  
57. Union-swivel.  
58. Piston-rod Nut.  

(169)
CAR-BODY DETAILS; Brake-gear, Air; Westinghouse.

Figs. 1690-1692

Fig. 1690. Sectional View showing general Arrangement of Apparatus.
WESTINGHOUSE QUICK-ACTION AUTOMATIC AIR-BRAKE.

Fig. 1691. Longitudinal Section.
Fig. 1692. Cross Section.
NINE-AND-ONE-HALF-INCH AIR-PUMP.
WESTINGHOUSE AIR BRAKE COMPANY.

NAMES OF PARTS OF PUMPS. Figs. 1691-1692.

60. Top Head (Complete).
61. Steam Cylinder (Complete).
62. Center-piece (Complete).
63. Air-cylinder (Complete).
64. Lower Head.
65. Steam-piston and Rod.
66. Air-piston (Complete).
67. Piston Packing-ring.
68. Piston-rod Nut.
69. Reversing-valve Plate.
70. Reversing-valve Plate Bolt.
71. Reversing-valve Rod.
72. Reversing-valve.
73. Reversing-valve Chamber-bush.
74. Reversing-valve Chamber-cap.
75. Main-valve Bush.
76. Main Piston valve (Complete).
77. Large Main-valve Piston-head.
78. Large Main-valve Piston Packing-ring.
79. Small Main-valve Piston-head.
80. Small Main-valve Piston Packing-ring.
81. Main Valve-stem.
82. Main Valve-stem Nut.
83. Main Slide-valve.
84. Right Main-valve Cylinder-head.
85. Left Main-valve Cylinder-head.
86. Air-valve.
87. Air-valve Seat.
88. Air-valve Cage.
89. Valve-chamber Cap.
90. Union-stud (1/1 in.).
91. Union-nut (1/1 in.).
92. Union-screw (1/1 in.).
93. Steam-pipe Stud (1 in.).
94. Governor Union-nut.
95. Stuffing-box.
96. Stuffing-box Nut.
98. Air-cylinder Oil-cap.
99. Short Cup-screw (4 X 1/16).
100. Long Cup-screw (4 X 4/11).
101. Upper Steam-cylinder Gasket.
102. Lower Steam-cylinder Gasket.
103. Upper Air-cylinder Gasket.
104. Lower Air-cylinder Gasket.
105. Drain-cock.
106. Air-strainer.
107. Steam-pipe Sleeve (1 in.).
108. Left Main-valve Head-gasket.
109. Right Main-valve Head-gasket.
110. Main-valve Head-bolt.
111. Cup-screw.

(167)
Fig. 1693-1698. CAR-BODY DETAILS, Brake-gear, Air; Westinghouse.

Fig. 1693. Sectional Side Elevation and Plan of a Passenger Car.
APPLICATION OF WESTINGHOUSE AIR-BRAKE TO A PASSENGER CAR.

Fig. 1697. Sectional Plan of Freight Car.
APPLICATION OF WESTINGHOUSE AIR-BRAKE TO A FREIGHT CAR.

Names of Parts of Passenger and Freight Brake-gear. Figs. 1693-1698.


Names of Parts of Brake Gear of Locomotive and Tender. Figs. 1699-1707.

1. Main-reservoir. 9. Pipe from Main-reservoir to Engineer’s Brake-valve.

(169)
CAR-BODY DETAILS, Brake-gear, Air; Westinghouse. Figs. 1699-1707

Fig. 1701. Part End Elevation.

Fig. 1702-1704. Part End Elevation and Cross Sections.

Fig. 1705. Sectional End Elevation of Locomotive.

APPLICATION OF WESTINGHOUSE AIR-BRAKE TO A LOCOMOTIVE, TENDER, AND PASSENGER CAR.

Fig. 1706. Sectional View of Quick Acting Passenger Triple-valve.

NAMES OF PARTS OF TRIPLE VALVES. Figs. 1706-1707.

2. Triple-valve Body.
4. Piston.
5. Piston Packing-ring.
12. Check-valve Spring.
13. Check-valve Case.
15. Check-valve.
17. Union-nut.
18. Union-wedged.
19. Drain-cup.
22. Graduating Spring.
23. Leather Gasket.
25. Half-inch Cup-Screw.
27. Union Gasket.

(169)
**Names of Parts of Triple Valve.** Figs. 1706-1709.

2. Triple-valve Case.
3. Lower Cap.
4. Upper Cap.
5. Piston.
8. Graduating-stem.
11. Leather Gasket.
13. Four-way Cock Key.
15. Handle.
16. Key-spring.
17. Key-cap.

**Names of Parts of Engineer's Valve.** Figs. 1710-1715.

(Continued.)

58. Half-inch Bolt.
59. Feed-valve Stud.
60. Upper-gasket.
61. Lower-gasket.
62. Feed-valve Body.
63. Supply-valve.
64. Feed-valve Spring.
65. Feed-valve Cap-nut.
66. Feed-valve Piston-rod.
67. Friction-ring.
68. Piston-spring.
69. Spring-box.
70. Adjusting-nut.
71. Check-nut.
72. Diaphragm.
73. Feed-valve Piston-nut.
74. Feed-valve Piston-head.
75. Diaphragm-ring.
76. Cock-body.
77. Cock-key.
78. Cap-nut.
79. Key-spring.
80. Handle.
Details of Westinghouse Air-brake Apparatus.

Names of Parts of Freight Cylinders. Figs. 1728-1729.
1. Cylinder-body.
2. Piston-head and Rod.
4. Follower-stud and Nut.
5. Follower.
7. Packing-expander.
10. Reservoir.
11. Drain-plug.
12. Reservoir-stud and Nut.
15. Triple-valve Gasket.

Names of Parts of Steam Valve. Fig. 1720.
1. Hand-wheel.
2. Valve-stem.
3. Packing-nut.
6. Valve-body.
7. Union-nut.
8. Union-swivel.
10. Steam-pipe Swivel-ring.

Names of Parts. Fig. 1726.
1. Cylinder-body.
2. Piston-head and Rod.
3. Back Head.
4. Front Head.
5. Follower.
6. Packing Leather.
7. Packing-expander.
9. Reservoir.
10. Drain-plug.
11. Reservoir-stud and Nut.

Names of Parts of Governor. Figs. 1716.
1. Cylinder-body.
2. Governor Piston.
3. Governor Piston-spring.
4. Governor Piston-nut.
5. Steam-valve Cylinder.
6. One-inch Union-nut.
7. One-inch Union-swivel.
10. Diaphragm-body.
11. Spring-box.
13. Regulating-nut.
14. Regulating-spring.
15. Diaphragm (complete).
17. Union-nut.
18. Union-swivel.
**Names of Parts of Freight Brake Cylinder.**

Figs. 1730-1731.

2. Cylinder Body.
3. Piston-head and Rod, Follower-studs and Nut.
5. Follower-stud and Nut.
6. Follower.
7. Piston-packing Leather.
8. Packing Expander.
10. Gasket.
12. Front-head.
13. Special Auxiliary Reservoir.
15. Triple-valve Gasket.

---

**Fig. 1731. Sectional Side Elevation.**

Standard Special Freight Brake-cylinder with Detached Auxiliary Reservoir and Triple Valve.

---

**Fig. 1732. Main Reservoir for Locomotive.**

22 in X 34 in.

to 26 1/2 X 41 in.

Capacity 11200 cu. in.
to 20000 cu in.

---

**Fig. 1733. Reservoir Drain Cock.**

12 in. X 33 in.

---

**Fig. 1735. Auxiliary Reservoir for 10-in. Cylinder.**

16 in. X 33 in.

---

**Fig. 1734. Auxiliary Reservoir for Locomotive Driver Brake and Tenders.**

10 in. X 24 in.

---

**Fig. 1736. Hose and Coupling, Passenger.**

**Fig. 1741. Hose and Coupling, Freight.**

---

**Fig. 1737. Hose Nipple.**

---

**Fig. 1742. Hose Clamp.**

---

**Fig. 1738. Hose Coupling, Freight.**

---

**Fig. 1743. Conductor's Valve.**

**Fig. 1744. Angle Cock.**

---

**Fig. 1745. Air Strainer.**

---

**Fig. 1746. Coupling Hook.**

---

**Names of Parts.**

Fig. 1743.

2. Valve-body.
3. Valve-key.
4. Valve-cap.
5. Key-spring.
6. Key-stop.
7. Key Escutcheon.
8. Valve-handle.
10. Key-washer.

---

**Names of Parts.**

Fig. 1744.

13. Cock-body.
15. Cock-cap.
16. Key-spring.
17. Handle.

---

**Names of Parts.**

Fig. 1745.

1. Angle-cock Body.
2. Angle-cock Key.
3. Angle-cock Cap.
4. Angle-cock Key-spring.
5. Angle-cock Handle.
6. 11-in. to 1-in. Reducer.

---

**Names of Parts.**

Fig. 1746.

2. Drain-cup Body.
3. 1-in. Union-screw.
4. Union-nut.
5. Union-gasket.
CAR-BODY DETAILS, Brake-gear, Air; Westinghouse. Figs. 1747-1749

Names of Parts Driver-brake Cylinder. Fig. 1748.

- Cylinder-body
- Piston-head and Rod
- Lower-head
- Upper-head
- Release-spring
- Cylinder-head Bolt and Nut
- Gasket
- Cross-head
- Follower
- Piston Packing-leather
- Packing-expander
- Follower-stud and Nut

Names of Parts of Driver Brake. Fig. 1747.

- Cylinder Body
- Lower Cylinder-head
- Upper Cylinder-head
- Cross-head
- Adjusting Nut
- Cam
- Brake-shoe
- Brake-shoe Holder or Brake-head
- Nut
- Cam-screw
- Brake-shoe Hanger
- Brake-block Safety-hanger
- Brake-block Suspending Plate
- Brake-block Suspending Stud
- Brake-block Pin
- Brake-block Pin-rod
- Eccentric-lever Links

Names of Parts of Driver Brake. Fig. 1749.

- Driver-brake Cylinder
- Piston-rod
- Lower Cylinder-head
- Upper Cylinder-head
- Bell Crank
- Fulcrum-bracket
- Driver-brake Shoe
- Driver-brake Head or Shoe-holder
- Driver-brake Hanger
- Hanger Bracket
Fig. 1750-1752. CAR-BODY DETAILS, Brake-gear, Air; New York.

**NAMEs OF PARTS OF PLAIN TRIPLE VALVE. Fig. 1750.**

- 29. Plug.
- 38. Slide-valve.
- 40. Piston.
- 49. Graduating-valve Spring.

**NAMEs OF PARTS OF TTRIPLE VALVE. Fig. 1751.**

- 23. Check-valve Spring.
- 25. Cap-gasket.
- 29. Union-nut.
- 30. Union-wrench.
- 31. Union-gasket.
- 32. Drain-plug.
- 38. Slide-valve.
- 40. Main-piston.
- 41. Triple-valve Body.
- 42. Emergency-valve Case.
- 43. Emergency-valve Case-gasket.
- 49. Graduating-valve Spring.

**NAMEs OF PARTS OF PUMP. Fig. 1752.**

- 1-2. Combined Steam Cylinders.
- 3-4. Combined Air Cylinders.
- 5-6. Slide valves.
- 7-8. Valve-stems.
- 11, 12, 13, 14. Discharge Air-valves.
- 16-17. Steam-chest Bushings.
- 19. Lower Steam-cylinder Head, with Valves and Bushings.
- 21-22. Five-inch Steam-pistons.
- 23. Five-inch Air-piston.
- 25. Five-inch Piston Packing-rings.
- 34. Seven-inch Piston Packing-rings.
- 35. Center-piece.
- 42. Upper Intermediate-valve Seat.
- 44. Upper Discharge-valve Cap.
- 46. Lower Discharge-valve Seat.
- 47. Top-head.
- 49. Lower Air-cylinder Gasket.
- 51. Lower Steam-cylinder Gasket.
- 52. Cylinder-head Bolts.
- 54. Drain-cock.
- 55. Piston-plate Bolt.
- 56. Steam Union stud for Governor.
- 57. Steam Union-nut for Governor.
- 60. Exhaust-pipe Union-swivel.
- 61. Quarter-inch Nipple.
- 62. Quarter-inch Union.
- 63. Air Union-stud.
- 64. Air Union-nut.
- 65. Air Union-swivel.
CAR-BODY DETAILS, Brake-gear, Air; New York. Figs. 1753-1760

Fig. 1753. Side Elevation. Fig. 1754. Section.
ENGINEER'S BRAKE-VALVE.

AIR BRAKE EQUIPMENT OF NEW YORK AIR BRAKE COMPANY.

Fig. 1755. Section. AIR-PUMP GOVERNOR.

Names of Parts of Engineer's Valve. Figs. 1753-1754.

34. Bell-crank.
35. Spring-lever. 58. Head-screws.
40. Lower-head. 61. Gage-pipe Union-swivel.
41. Upper-head.
44. Spindle and Eccentric-pin. 63. Cap.
45. Piston Packing-ring. 64. Feed-valve.
46. Bell-crank Fulcrum-pin. 65. Feed-valve Lever.
47. Feed-valve Lever-pin. 66. Feed-valve Lever-connection.
50. Handle.
51. Quadrant. 67. Main-lever.
52. Quadrant-latch. 68. Excess Pressure Valve.
53. Quadrant Latch-spring. 69. Excess-pressure Valve.
54. Quadrant Latch-pin. 70. Excess-pressure Check-valve.
55. Eccentric-spindle Packing-nut.

Names of Parts of Governor. Fig. 1755.

10. Regulating-spring.
11. Upper-spring Washer.

Note.—Other parts of New York Air-brake Equipment, not shown, are practically the same as those made by the Westinghouse Air Brake Company, shown in Figs. 1758-1746.
CAR-BODY DETAILS, Passenger and Baggage: Doors. Figs. 1783-1793

Fig. 1783. END DOOR OF COACH. PENNSYLVANIA RAILROAD.

Fig. 1784-1786. END DOOR OF COACH. NORFOLK & WESTERN RAILROAD.

Fig. 1787. END DOOR OF PRIVATE CAR. PULLMAN PALACE CAR COMPANY.

Fig. 1788. CAR DOOR AND DOOR CASING. (An older pattern.)

Fig. 1789. DOOR FOR PULLMAN EXTENDED VESTIBULE.

Fig. 1790. DOOR FOR PULLMAN VESTIBULE.

Fig. 1791. DOOR FOR Gould VESTIBULE.

Fig. 1792. BAGGAGE-CAR SIDE-DOOR. NORFOLK & WESTERN RAILROAD.

Fig. 1793. BAGGAGE-CAR SIDE-DOOR. NEW YORK CENTRAL & HUDSON RIVER RAILROAD.

Fig. 1794. Door-post or Jamb.
Fig. 1795. Door-mullion.
Fig. 1796. Door Name-plate.
Fig. 1797. Top Door-rail.
Fig. 1798. Bottom Door-rail.
Fig. 1799. Middle or Lock Door-rail.
Fig. 1800. Parting Door-rail.
Fig. 1801. Door-stile.
Fig. 1802. Lower or Twin Door-panels.
Fig. 1803. Middle Door panel.
Fig. 1804. Upper Door-sash.
Fig. 1805. Lower Door-sash.
Fig. 1806. Door-sash Bolt.
Fig. 1807. Door-sash Plate.
Fig. 1808. Door-hinge.
Fig. 1809. Door-knob.
Fig. 1810. Door-lintel.
Fig. 1811. Door-lock.
Fig. 1812. Door-lock Keeper.
Fig. 1813. Door-hanger.
Fig. 1814. Door-hook.
Fig. 1815. Door Guards.
Figs. 1794-1822. CAR-BODY DETAILS, Freight; Box-car Doors.

Figs. 1795-1810. Sectional Plans, showing Door partly closed and securely closed flush with side of car.

THE WAGNER CAR DOOR. THE WAGNER CAR DOOR COMPANY.

Dunham Storm-proof Car Door. THE Q. & C. COMPANY.

Figs. 1807-1809. Elevation and Sectional Plan. Fig. 1809a. Cross Section.

Fig. 1810. Track.

Figs. 1811-1812. Door Handle. DETAILS OF AMERICAN FLUSH CAR DOOR.
**Figs. 1853-1862. CAR-BODY DETAILS, Freight; Refrigerator Car Doors.**

**Door is forced in against rubber packing by a cam, operated by a lever.**
CAR-BODY DETAILS, Freight; Box Car and Grain Doors.

Fig. 1863. Moore Car Door.
Cross Sections showing Door in place and Door raised preparatory to moving it.

Fig. 1865. Side Elevation.
Moore Car Door.
Dotted lines show positions of levers and rods when door is raised to open or close it. When not raised by lever its weight wedges it against side of car.

Fig. 1866-1869. Names of Parts of Van Lierw's Grain Door.

1. Lug.

2. Stanchion-socket.

3. Stanchion.
B. Door.

4. Lift.
C. Grain-door Stile.

5. Grain-door Latch.
e. Hand-hold.

F. Stanchion Guide-rod.
G. Grain-door Floor-stop.

H. Grain-door Side-stop.
I. Chafing-strip.

J. Grain-door Stile.
K. Grain-door Floor-stop.

L. Grain-door Corner-plate.
M. Grain-door Lock, 6, and Latch, 5.

N. Grain-door Rail.
S. Door-sill.

X. Grain-door Corner-plate.
Figs. 1870-1895. CAR-BODY DETAILS, Freight ; Grain Doors.

The Chicago Grain Door, made by The Chicago Grain Door Company.

Names of Parts of McGuire Door. Figs. 1876-1895.

A. Door-post Angle-iron.
C. Overhead Door-catch or Hook.
D. Grain-door.
G. Door-keeper or Dog.
H. Double-door Hinge.
J. Door-fuierum.
K. Grain-door Rod.
L. Door-keeper or Dog.
N. Door-shoe.
P. Door-shoulder.

Names of Parts. Figs. 1896-1925.

A. Plate.
B. Carline.
C. Overhead-catch.
D. Grain-door.
E. Door-guide.
F. Inside Door-stop.
G. Post Angle-iron.
H. Door Rubbing-plate.
J. Door-post Angle-iron.
K. Dog to block door sidewise.
L. Operating Lever.
P. Door-post.
1. Side-sill.
3a. Outer Intermediate-sill.
4. Center-sill.
CAR-BODY DETAILS, Freight: Grain Doors. Figs. 1896-1935

**Fig. 1896. Side Elevation.**

**Fig. 1897. End View of Door in use and hung up out of the way.**


**THE DECatur GRAIN DOOR AND PARTS.**

**Fig. 1927. Side Elevation.**

**Fig. 1928. Cross Section.**

GRAIN DOOR, CHICAGO & NORTH WESTERN RAILWAY.

**Fig. 1930-1935. Details of Door and Fastenings.**

(183) THE CORRUGATED STEEL GRAIN DOOR, MICHIGAN RAILWAY SUPPLY COMPANY.

**Fig. 1931-1932. Operating Application to Lever (L).**

**THE DECatur GRAIN DOOR.**

**Names of Parts.** Figs. 1927-1928.

B. Roof-earline.
C. Overhead Door-catch.
D. Grain-door.
E. Auxiliary Grain-door.
F. Door button-head.
G. Door-chain.
H. Chain-casting.
J. Corner-plates.
K. Door-stop.
M. Door-catch.

1. Side-sill.
2. Intermediate-sill.
3. Center-sill.

Figs. 1918-1919. Figs. 1920-1928.

Operating Application to Lever (L).
Names of Parts of Draft-gear.

Figs 1936-2033.

1. Draw-head.
2. Knuckle.
4. Shank.
5. Strap-bolts (Tail-bolt, Fig. 2031).
6. Pocket-strap or Yoke.
7. Front-thimble.
8a. Follower-plates.
11. Key-block.
13. Draft-spring Case, or Housing for Spring.
14. Tail-bolt.
15. Tail-bolt Key.
17. Spring.
18. Unlocking-lever.
19. Carry-iron (Thurmond).
20. Carry-iron Spring.
21. Uncoupling Chain.
Figs. 2037-2020. CAR-BODY DETAILS, Draft-gear, Freight; Draw-bar Attachments.

Numbers Refer to List of Names with Figs. 1936-1958.

Fig. 2037. Sectional Elevation.

Fig. 2038. Inverted Plan.

Note - The distance from face of buffer plate to end of case must be 2/32 for any size case.

Fig. 2039. Plan.

Fig. 2040. End Elevation and Cross Section of Refrigerator Car.

THE BUTLER DRAW-BAR ATTACHMENT.

THE CANDA DRAW-BAR ATTACHMENT.
CAR-BODY DETAILS, Draft-gear, Freight; Draw-bar Attachments. Figs. 2021-2033

Numbers Refer to List of Names with Figs. 1936-1958.

Fig. 2021. Housing and Follower-plate.

Fig. 2022-2023. Follower-plates.

Fig. 2024. Stop-plate.

Fig. 2025. Side-plates (J).

Fig. 2026. Housing and its Parts for Canda Draw-bar Attachment.

Figs. 2027-2028. Housing and Follower-plate.

Fig. 2029. End Elevation.

Fig. 2030. Sectional Elevation.

DRAW-BAR ATTACHMENT. BALTIMORE & OHIO RAILROAD.

Fig. 2031. Plan.

Fig. 2032. End Elevation.

Fig. 2033. Sectional Side Elevation

DRAFT GREY, UNION TANK LINE,
Sterlingworth Body- bolster.
Fig. 2034-2072. CAR-BODY DETAILS, Draft-gear; Freight Draw-bar Attachments.

Attachments are Described on Opposite Page.
DRAW-BARS AND COUPLERS.

Names of Railroads using Attachments shown on the opposite page and the Date.

Fig. 2034-2035. Norfolk & Western Railroad, 1892.
Fig. 2036-2037. Chicago, Rock Island & Pacific Railway, 1891.
Fig. 2038-2039. Canadian Pacific Railway, 1892.
Fig. 2040-2041. Michigan Central Railroad, 1892.
Fig. 2042-2043. East Tennessee, Virginia & Georgia Railroad, 1891.
Fig. 2044-2046. New York Central & Hudson River Railroad, 1892.
Fig. 2047-2048. Michigan Central Railroad, 1893.
Fig. 2049-2050. Union Pacific Railway, 1890.
Fig. 2051-2052. Chesapeake & Ohio Railway, 1891.
Fig. 2053-2054. Pennsylvania Railroad, 1892.
Fig. 2055-2056. Chicago & North Western Railway, 1890.
Fig. 2057-2058. Northern Pacific Railroad, 1892.
Fig. 2059-2060. Lake Shore & Michigan Southern Railway, 1892.
Fig. 2061-2062. Kansas City, Ft. Scott & Memphis Railroad, 1892.
Fig. 2063-2064. Central Railroad of Georgia, 1892.
Fig. 2065-2066. Chicago, Burlington & Quincy Railroad, 1892.
Fig. 2067-2068. Michigan Central Railroad, 1892.
Fig. 2069-2070. Denver & Rio Grande Railroad, 1889.
Fig. 2071-2072. Wabash Railroad, 1893.

Fig. 2073. Link and Pin Coupler. Wrought iron, forged.

The Link and Pin types of Couplers are now nearly obsolete on Steam Railroads.

Fig. 2074. Plan. Fig. 2075. Side Elevation.

Compressor-knuckle.

Figs. 2076-2078. The Lock.

Fig. 2077. End Elevation of Draw-head.

BROWN'S EMERGENCY LINK COUPLER.
FIGS. 2088-2111d. CAR-BODY DETAILS, Draft-gear; Freight Couplers.

Numbers Refer to List of Names with Figs. 2177-2178.

THE BUCKEYE LITTLE GIANT COUPLER.

THE CALIFORNIA COUPLER.

Fig. 2101. Continuous Draw-bar Attachment.
COMMON TYPES OF DRAW-BAR ATTACHMENTS.
CAR-BODY DETAILS, Draft-gear; Freight Couplers. Figs. 2112-2140

Numbers Refer to List of Names with Figs. 2177-2178

The Elliott Freight Coupler.
Figs. 2141-2160. CAR-BODY DETAILS, Draft-gear; Freight Couplers.

The Gould Automatic Freight Coupler.

Hinson Freight Coupler.

Perspective Views of the Hinson Freight Coupler and Its Parts.
CAR-BODY DETAILS, Draft-gear; Freight Couplers. Figs. 2161-2190

Fig. 2161. The Janney Freight Draw-bar and Attachments.

No. 86. Fig. 2162. No. 205. No. 85a. Figs. 2163-2165.

No. 113. No. 111. No. 113a. No. 80a. Figs. 2166-2173.

No. 110. Fig. 2174.
No. 2a. Figs. 2175.
No. 95. Fig. 2176.

Names of Parts of Janney Freight Coupler. Figs. 2161-2182.

2a. Wrought-knuckle.
86. Coupler.
86a. Coupler Solid Liner-blocks.
86a1. Coupler Solid Liner-blocks and Slotted-tail.
88. Knuckle-pin.
90. Clevis.
91. Clevis-pin.
95. Draft-spring.
96. Locking-spring.
111. Uncoupling-lock.
112. Keeper.
113. Angle-clips.

Fig. 2183. Plan of Johnston Coupler.

Names of Parts of Gould Tender Hook. Figs. 2145-2149.

4. Knuckle-pin.
5. Lock-pin.
17. Unlocking-lever Chain.
61. Knuckle.
71. Lock.
78. Coupler-head.
79. Side-link.
81. Side-link Pin.
83. Spring-cap.
88. Spring.

Johnston Freight Coupler and Parts.

Fig. 2184. Uncoupling Lever.
Fig. 2191-2212. CAR-BODY DETAILS, Draft-gear; Freight Couplers.

Fig. 2191. The Coupler Open.  
Fig. 2192. Sectional View of Head and Lock  
Fig. 2193. Knuckle  
Fig. 2194. Keeper  
Fig. 2195. Lock  

THE POOLEY FREIGHT COUPLER AND PARTS.

Fig. 2196. Knuckle Pin.

Fig. 2197-2198. Proof Bolts.

Fig. 2199. Uncoupling lever Chain.

Fig. 2200. Sectional Side Elevation.

Fig. 2201. Plan.

Fig. 2202. Side Elevation.

Fig. 2203. Front Elevation.

Fig. 2204. Plan of Couplers Locked.

THE SMILLIE FREIGHT COUPLER.

Fig. 2205-2206. Sections.

Fig. 2207-2208. Lock.

Fig. 2209.  
Fig. 2210.  
Fig. 2211.  
Fig. 2212.

THE IMPROVED STANDARD FREIGHT COUPLER.

Fig. 2204. Plan of Couplers Locked.

THE IMPROVED STANDARD FREIGHT COUPLER.

Fig. 2209.  
Fig. 2210.  
Fig. 2211.  
Fig. 2212.

Thurmond-McKeen Freight Coupler and Parts.

Names of Parts of Couplers. Figs. 2073-2144.

1. Draw-head.  
2. Knuckle.  
3. Pin.  
4. Shank.  
5. Strap or Yoke-bolts.  
CAR-BODY DETAILS, Draft-gear; Freight Couplers. Figs. 2213-2239

Fig. 2213. Plan and Elevation of Draw-bar.

Figs. 2214-2216. Sections.

Thurmond-McKeen Freight Coupler.

Fig. 2217. Uncoupling Rod Brackets. Perspective View, showing application of Coupler.

Thurmond-McKeen Freight Coupler and its Fittings.

Fig. 2218. Freight Carry-iron.

Fig. 2219-2220. Longitudinal Section.

Fig. 2221. Perspective View of Draw-head.

Fig. 2222. Cross Section.

Fig. 2223. Perspective View of Coupler, Hand-rod and Bracket.

Fig. 2224. Longitudinal Section.

Fig. 2225. Plan.

Thurmond-McKeen Locomotive Tender-hook.

Fig. 2226. Plan of Draw-head.

Fig. 2227. Perspective View of Draw-head.

Fig. 2228. Bracket for Face of End-sill, Corner of Sill.

Fig. 2229. Coupler, Hand Rod and Bracket.

Fig. 2230. Hand Rod.

Figs. 2231-2232. Bracket for Face of Sill. Under-side of Sill.

The Trojan Freight Coupler.

Fig. 2233. Knuckle Lock.

Fig. 2234. Knuckle Pin.

Fig. 2235. Operating Rod.

Fig. 2236. Finger.

The Trojan Freight Coupler and Parts.
PASSENGER COUPLERS.

THE VAN DORSEN FREIGHT COUPLER.

THE DREXEL PASSENGER COUPLER.

THE GOULD PASSENGER DRAW-BAR AND COUPLER.
Fig. 2252. Perspective View.

Fig. 2253. Plan.

Fig. 2254. Elevation.

Fig. 2255. Side Elevation.

Fig. 2256. Section.

Fig. 2257. Plan.

Fig. 2258. End Elevation

THE JANNEY PASSENGER COUPLER.

NAMES OF PARTS.

Fig. 2257.

2. Knuckle.
6. Knuckle-pin.
44. Lock-spring and Bolt.
45. Knuckle-lock.
46. Lock-lever.
47. Lock-lever Bolt.

THE IMPROVED STANDARD PASSENGER COUPLER AND PARTS.

Fig. 2257. Perspective View of Underside.

Fig. 2259. Knuckle Pin.

Fig. 2258. Knuckle.

Fig. 2260. Knuckle Pin.

Fig. 2261. Lever Bolt.

THE TROJAN PASSENGER COUPLER AND PARTS.

Fig. 2271. Lock Spring and Bolt.

Fig. 2272. Passenger Operating rod.

Fig. 2273. Lever.

Fig. 2274. Passenger Knuckle Lock.
Fig. 2276. Sectional Side Elevation.

Fig. 2277. End Elevation.

The Van Dorsten Passenger Coupler and Draw-bar Attachment.

Fig. 2279. Sectional Side Elevation.

The Thurmond-McKeen Platform and Coupler.

Fig. 2281. Carry-iron.
CAR-BODY DETAILS, Draft-gear, Passenger; Center-draft Draw-bars. Figs. 2282-2289a

Names of Parts of Thurmond-McKeen Passenger Platform and Coupler. Figs. 2277-2281.

1. Draw-head.
2. Knuckle.
5. Buffer-stem Pivot-pin.
7. Buffer-spring.
10. Buffer-spencer Box.
11. Lock-lever.
12. McKeen Carry-iron.

Names of Parts of Center-draft Draw-bar. Figs. 2288-2289a.

2. End-sill.
3. Center-sill.
4. Platform End-sill or Buffer-beam.
6. King-bolt.
7. Draft-spring.
8. Front Follower-plate.
10. Draft-spring Case or Housing.
11. Draft-spring Bolt.
12. Draft-spring Tail-bolt.
13. Draft-spring Tail-bolt Key.
15. Draw-bar Bearer.
17. Draw-bar Sector.
18. Draw-bar Sector.
20. McKeen Carry-iron.
27. Platform-plate.
32. Platform-plate.
33. Platform-plate.
34. Platform-plate.
35. Platform-plate.
37. Platform-plate.
38. Platform-plate.
40. Platform-plate.
41. Platform-plate.
42. Platform-plate.
43. Platform-plate.
44. Platform-plate.
45. Platform-plate.
46. Platform-plate.
47. Platform-plate.
49. Platform-plate.
50. Platform-plate.
51. Platform-plate.
52. Platform-plate.
53. Platform-plate.
54. Platform-plate.
55. Platform-plate.
56. Platform-plate.
57. Platform-plate.
58. Platform-plate.
59. Platform-plate.
60. Platform-plate.
61. Platform-plate.
63. Platform-plate.
64. Platform-plate.
65. Platform-plate.
68. Platform-plate.
69. Platform-plate.
70. Platform-plate.
71. Platform-plate.
72. Platform-plate.
73. Platform-plate.
74. Platform-plate.
75. Platform-plate.
76. Platform-plate.
77. Platform-plate.
78. Platform-plate.
79. Platform-plate.
80. Platform-plate.
81. Platform-plate.
82. Platform-plate.
83. Platform-plate.
84. Platform-plate.
85. Platform-plate.
86. Platform-plate.
87. Platform-plate.
88. Platform-plate.
89. Platform-plate.
90. Platform-plate.
91. Platform-plate.
92. Platform-plate.
93. Platform-plate.
94. Platform-plate.
95. Platform-plate.
96. Platform-plate.
97. Platform-plate.
98. Platform-plate.
100. Platform-plate.

Numbers refer to List of Names on Opposite Page.

The Gould Platform, Buffer and Coupler, as adopted by the Lake Shore & Michigan Southern Railroad.
Fig. 2301. Perspective View.

The Janney-Buhoup Platform Equipment.

Names of Parts of Janney-Buhoup Equipment. Figs. 2301-2347.

1. Passenger Coupler.
2. Knuckle.
12. Fulcrum-bolt.
15. Catch-spring Bolt.
25. Catch-spring.
28P. Main Draft-spring.
35. Fulcrum-ferrule.
65. Trap-door Spring.
68JB. Trap-door, Janney-Buhoup.
68t. Trap-door Frame.

133. Buffer-stem.
134v. Equalizer.
135v. Yoke-lever.
136. Catch-lever.
137. Catch-lever Thimble.
138. Catch.
139. Foot-plate Housing.
140. Buffer-spring.
141. Pull-red.
142. Tail-pin.
143. Yoke Connecting-bolt.
144OP. U-bolt, Old Pattern.
144NP. U-bolt, New Pattern.

145. Spring-pocket.
146. Pull-rod Carrier-iron.
147. Face-plate.
148. Lever-hinge Bracket.
149. Thrust, Top.
150. Thrust, Bottom.
152. Lever-handle.
153. Uncoiling-lever Collar.

158. Draft-spring Ferrule.
159. Connected Buffer-plate.
160. Sliding Foot-plate.
170. Foot-plate Stop.
174. Thrust-bolt.
183. Uncoupling-lever Collar.
186. Buffer-guide.
188. Collar-stop Socket.
212. Coupling-pin.
CAR-BODY DETAILS, Draft-gear, Passenger; Janney and Leonard. Figs. 2348-2354

Fig. 2348. End Elevation.

Fig. 2349. Inverted Plan. The Janney-Buhoup Platform Equipment Giving Dimensions and Sizes of Parts.

Fig. 2350. Longitudinal Section. (Concluded.)

Fig. 2351. Cross Section on CC. (Continued.)

Fig. 2352. Plan.

Fig. 2353. Section of Center Buffer, Side Buffer.

Fig. 2354. Section of Center Buffer, Side Buffer.

THE LEONARD HYDRAULIC BUFFER.
Used on the Empire State Express, New York Central & Hudson River Railroad. Folding-steps.

CAR-FRAMING—NOTE: Details of Car Framing are shown as follows: Box Cars, Figs. 617-623; Flat Cars, Figs. 865-869; Caboose, Fig. 1182; Baggage Cars, Figs. 1171-1180; Passenger Cars, Sidings and Roof, Figs. 339-346; Private and Sleeping Cars, Figs. 500-505.

Names of Parts. Figs. 2351-2354.
AA. Center Buffer-stem.
BB. Side Buffer-stem.
C. Tee Connection with Pump.
D. Side Buffer-stem Cylinder.
E. Center Buffer-stem Cylinder.
F. Pressure-bar Cylinder.
G. Side Buffer-stem Piston.
H. Center Buffer-stem Piston.

J. Pressure-bar Piston.
K. Pressure-bar.
L. Folding-steps.
M. Lever for Operating Folding-steps.
N. Lever-bar.
O. Water-pipe Connections.
P. Buffer-plate.
Q. Center Buffering-spring.
R. Side Buffering-spring.
S. Draft-spring.
Figs. 2335-2367. CAR-BODY DETAILS, Freight-car Roofs; The Winslow Roof.

Numbers refer to List of Names on opposite page.

**Fig. 2335. Transverse Section.**

**Fig. 2336. Plan.**

*The Winslow Car-roof.*

**Fig. 2337. Longitudinal Section.**

**Fig. 2338. Longitudinal Section.**

**Fig. 2339. Transverse Section.**

**Fig. 2340. Plan.**

*The Winslow Car-roof. (With curved roof sheets.)*

**Fig. 2341. Section of Joint Strip.**

**Fig. 2342. Half Cross Section and Half Elevation.**

**Figs. 2343-2344. Strap Bolts for Ridge-hole.**

**Fig. 2345. Cross Section of Plate and Beams.**

**Fig. 2346. Joint Strip and Section of Metallic Lining.**

*Winslow Metallic Car-roof, as built by the Paris Car Wheel Company.*
CAB-BODY DETAILS, Freight-car Roofs; The Chicago Roof. Figs. 2368-2379

**Fig. 2168. Part Sectional Elevation of Roof.**

**Fig. 2369. Part Sectional Plan of Roof.**

**Fig. 2370.**

**Fig. 2371. Part Section at Door.**

**Fig. 2372.** Section through End-plate.

**Fig. 2373. Cross Section of Ridge-pole.**

**Fig. 2374.** Part Side Elevation of Ridge-pole, showing Mortise.

**Fig. 2375.** Cross Section through Plate and Eaves.

**Fig. 2376. Section through Cover-strips.**

**Fig. 2377. Stop-block.**

**Fig. 2378. Double-board Car-roof.**

**Names of Parts of Winslow Roof.** Figs. 2355-2361.

2. Corrugations.
3. Cover-strip.
4. Roof-strips.
5. Ridge-pole.
6. Purlins.
7. Roof-boards.
8. Eaves Fascia-board.

**Names of Parts of the Excelsior Roof.** Figs. 2380-2384.

A. Lower Ridge-pole.
B. Upper Ridge-pole.
C. Carline.
D. Running-boards.
E. Roof-strips.
F. Eaves Fascia-board.
G. Sub-fascia-board.
H. Galvanized Iron Lining.
I. Purlins.
J. Plate.
K. Roof-board.
L. Sub-rafter.
M. Cover strip for Sub-rafter.

Sectional Corrugated Roof as Made by The Chicago Car Roofing Company.
Fig. 2380-2388. CAR-BODY DETAILS, Freight-car Roofs; The Excelsior.

Fig. 2380. Part Transverse Section.

Fig. 2381. Part Transverse Section.

Fig. 2382. Cross Section of Ridge-pole.

Fig. 2383. Longitudinal Section of Ridge-pole.

Fig. 2384. Cross Sections of Roofing Strips.

THE EXCELSIOR CAR ROOF, AN INSIDE METALLIC CAR ROOF.

Fig. 2385. Exterior View.

Fig. 2386. Transverse Section.

THE EXCELSIOR GALVANIZED CAR ROOF, AN OUTSIDE METALLIC CAR ROOF.

MANUFACTURED BY THE EXCELSIOR CAR ROOF COMPANY, ST. LOUIS.
**Names of Parts of Car Roof**

2. Lower Course of Roof-boards.
3. Purlins.
4. Sub-rafter, fluted.
5. Roof-boards.
6. Running-board.
7. Carline.
8. Roof-lining.
10. Sub-fascia board.

**CAR ROOF. THE DRAKE & WEIR COMPANY.**

**Fig. 2389.** Sectional Isometric View.

**Fig. 2390.** Section through Ridge.

**Fig. 2391.** Form of Joint.

**Excelsior Outside Metallic Car Roof.**

**Fig. 2392.** Sectional Isometric View.

**Fig. 2393.** Sectional Isometric View.

**Fig. 2394.** Cross Section of Rafter.

**NEPONSET RED ROPE CAR ROOFING. F. W. BIRD, WALPOLE, MASS.**
Figs. 2395-2407. CAR-BODY DETAILS, Freight Roofs; Asphalt. | Train Signaling; Westinghouse.

**Names of Parts.**

**Method of Applying Carey's Asbestos-Asphalt.**


**Method of Applying Hutchins' Car-Roof.**

An asphalt car roofing material showing how it is made up of several sheets.

**Train Air-signaling Apparatus. Westinghouse Air Brake Company.**

**Names of Parts.**

1. Cock-body. 2. Cock-key. 3. Cock-cap. 4. Key-spring. 5. Cock-handle. **Strainer-body.**

**Discharge-valve.**


**Improved Reducing-valve.**

CAR-BODY DETAILS, Sleeping-cars; Berths.
Figs. 2408-2409

Names of Parts of Sleeping-car Berths.

Fig. 2408.

A. Lower-berth.
B. Bunk-apron.
C. Head-room of Lower-berth.
D. Head-room of Upper-berth.
E. Decorations of Bunk-apron.
F. Width of Lower Deck.
G. Inside Fascia-board.
H. Bunk Window-panel.
I. Mirror.
J. Inside Window-panel.
K. Wainscot.
L. Truss-plank.
M. Bunk-end.
N. Head-board.
O. Bunk-partition.
P. Deck-window Panel.
Q. Deck-ceiling.
R. Decorated Deck Window-panel.
S. Lower Deck-ceiling.
T. Berth-curtain.
U. Berth-mattress.
V. Window.
W. Seat-end.
X. Seat-cushion and Berth-mattress.
a. Upholstering of Window Seat-end.
b. Bed-clothing.
c. Seat-end Arm.
d. Curtain-rod.
e. Curtain-rod Bracket.
f. Register.
g. Hammock for Clothing.
h. Pillows.
i. Berth Chain-pulley.
j. Berth-chain.
k. Berth-spring.

Names of Parts of Sleeping-car Sections.

Figs. 2409-2413.

1. Lower-berth.
2. Upper-berth.
3. Upper-berth (folded up).
5. Berth-front, Lower Part.
7. Bunk-apron, or Deck-sill Facing.
9. Head-board.
10. Inside Window-panel.
12. Wainscot.
15. Curtain-rod Folding-bracket.
16. Berth Curtain-rod or Pole.
17. Berth-curtain.
19. Pillow-box.
20. Bunk-end.
22. Lower-deck Ceiling.
27. Card or Writing-table.
28. Table-leg.

(Continued.)
30. Seat-back.
31. Seat-arm, Upholstered.
32. Head-rest and Head-board Pocket. (The upholstered head-rest lifts up about its hinged top and forms a pocket for day wearing-apparel.)
33. Upholstered Inner Seat-end.
34. Pillow.
35. Blankets.
36. Deck-window Screen.
37. Vaulted Compound-car-line Decorations.
(Continued.)

Names of Parts.
Figs. 2409-2412.
(Concluded.)
38. Vaulted Deck-ceiling.
39. Lamp-dome.
40. Center-lamp.
41. Vaulted Deck-window.
42. Cross-Section of Car-side.
43. Window Sash-lift.
44. Window-stop.
45. Table-hook.
46. Table-hook Plate.
47. Berth-catch Handle.
49. Lower-berth Stop-bar.
50. Window-shade.
51. Window-shade Thumb-latch.
52. Hammock.
53. Seat-back Paneling.
54. Head-board Bolt and Lock.
55. Hat-posts.
CAR-BODY DETAILS, Sleeping-cars; Berths. Figs. 2413-2418

Fig. 2413. End Elevation.

Fig. 2414. Side Elevation.

Fig. 2415. Section of Seat.

BERTH OF AN EMIGRANT OR TOURIST SLEEPING-CAR.

Fig. 2416. Side Elevation.

Fig. 2417. Plans.

Fig. 2418. Sectional View of a Four-place Boudoir, in process of conversion into a Sleeping-car.

MANN BOUDOIR SLEEPING-CAR.

Fig. 2419. Plans.

Names of Parts of Mann Boudoir Sleeping-Berth. Fig. 2418.

A. Sofa.
B. Sofa-back and Upper-berth.
C. Bolsters.
D. Lower-berth Mattress.
E. Upper-berth Mattress.
F. Upper Berth-hinge.
G. Pillow-box.
H. Step-ladder Box.
J. Mattress-box.
3. Mirror-panel.
5. Seat-cord.

7. Basket-rack, with Exhaust Ventilators at each end.
11. Upper Berth-rest Plate.
23. Window-shade.
27. Window-curtains (Side and Center).
28. Window-shade Leathers.
Names of Parts of Barr Vestibules.

Fig. 3419. Perspective View.

1. Diaphragm Face-plate.
2. Diaphragm or Outer Wing.
3. Inner Wing.
4. End Plate.
5. Vestibule Door.
6. Face-plate Buffers.
7. Fairing Center Board.
8. Hand Brake Lever.
10. Vestibule Hood.
12. Letter Board.
15. Hand-brake Mast and Wheel.
17. Platform Rod End-
18. Draw-bar End-
19. Vestibule End-
20. Platform End-
21. Platform Rod.
22. Platform Board.
23. Platform End-sill.
24. Platform Rod End-
25. Platform End-
26. Platform Rod.
27. Platform Board.
29. Platform Rod End-
30. Platform End-
31. Platform Rod.
32. Platform Board.
33. Platform End-sill.
34. Platform Rod End-
35. Platform End-
36. Platform Rod.
37. Platform Board.
38. Platform End-sill.
39. Platform Rod End-
40. Platform End-
41. Platform Rod.
42. Platform Board.
43. Platform End-sill.
44. Platform Rod End-
45. Platform End-
46. Platform Rod.
47. Platform Board.
49. Platform Rod End-
50. Platform End-
51. Platform Rod.
52. Platform Board.
53. Platform End-sill.
54. Platform Rod End-
55. Platform End-
56. Platform Rod.
57. Platform Board.
58. Platform End-sill.
59. Platform Rod End-
60. Platform End-
61. Platform Rod.
62. Platform Board.
63. Platform End-sill.
64. Platform Rod End-
65. Platform End-
66. Platform Rod.
67. Platform Board.
68. Platform End-sill.
69. Platform Rod End-
70. Platform End-
71. Platform Rod.
72. Platform Board.
73. Platform End-sill.
74. Platform Rod End-
75. Platform End-
76. Platform Rod.
77. Platform Board.
78. Platform End-sill.
79. Platform Rod End-
80. Platform End-
81. Platform Rod.
82. Platform Board.
83. Platform End-sill.
84. Platform Rod End-
85. Platform End-
86. Platform Rod.
87. Platform Board.
88. Platform End-sill.
89. Platform Rod End-
90. Platform End-
91. Platform Rod.
92. Platform Board.
93. Platform End-sill.
94. Platform Rod End-
95. Platform End-
96. Platform Rod.
97. Platform Board.
98. Platform End-sill.
99. Platform Rod End-
100. Platform End-
101. Platform Rod.
102. Platform Board.
103. Platform End-sill.
104. Platform Rod End-
105. Platform End-
106. Platform Rod.
107. Platform Board.
108. Platform End-sill.
109. Platform Rod End-
110. Platform End-
111. Platform Rod.
112. Platform Board.
113. Platform End-sill.
114. Platform Rod End-
115. Platform End-
116. Platform Rod.
117. Platform Board.
118. Platform End-sill.
119. Platform Rod End-
120. Platform End-
121. Platform Rod.
122. Platform Board.
123. Platform End-sill.
124. Platform Rod End-
125. Platform End-
126. Platform Rod.
127. Platform Board.
128. Platform End-sill.
129. Platform Rod End-
130. Platform End-
131. Platform Rod.
132. Platform Board.
133. Platform End-sill.
134. Platform Rod End-
135. Platform End-
136. Platform Rod.
137. Platform Board.
139. Platform Rod End-
140. Platform End-
141. Platform Rod.
142. Platform Board.
143. Platform End-sill.
144. Platform Rod End-
145. Platform End-
146. Platform Rod.
147. Platform Board.
149. Platform Rod End-
150. Platform End-
151. Platform Rod.
152. Platform Board.
154. Platform Rod End-
155. Platform End-
156. Platform Rod.
157. Platform Board.
158. Platform End-sill.
159. Platform Rod End-
160. Platform End-
161. Platform Rod.
162. Platform Board.
163. Platform End-sill.
164. Platform Rod End-
165. Platform End-
166. Platform Rod.
167. Platform Board.
168. Platform End-sill.
169. Platform Rod End-
170. Platform End-
171. Platform Rod.
172. Platform Board.
173. Platform End-sill.
174. Platform Rod End-
175. Platform End-
176. Platform Rod.
177. Platform Board.
178. Platform End-sill.
179. Platform Rod End-
180. Platform End-
181. Platform Rod.
182. Platform Board.
183. Platform End-sill.
184. Platform Rod End-
185. Platform End-
186. Platform Rod.
187. Platform Board.
188. Platform End-sill.
189. Platform Rod End-
190. Platform End-
191. Platform Rod.
192. Platform Board.
194. Platform Rod End-
195. Platform End-
196. Platform Rod.
197. Platform Board.
198. Platform End-sill.
199. Platform Rod End-
200. Platform End-
201. Platform Rod.
202. Platform Board.
203. Platform End-sill.
204. Platform Rod End-
205. Platform End-
206. Platform Rod.
207. Platform Board.
208. Platform End-sill.
209. Platform Rod End-
210. Platform End-
211. Platform Rod.
212. Platform Board.
213. Platform End-sill.
214. Platform Rod End-
215. Platform End-
216. Platform Rod.
217. Platform Board.
218. Platform End-sill.
219. Platform Rod End-
220. Platform End-
221. Platform Rod.
222. Platform Board.
223. Platform End-sill.
224. Platform Rod End-
225. Platform End-
226. Platform Rod.
227. Platform Board.
228. Platform End-sill.
229. Platform Rod End-
230. Platform End-
231. Platform Rod.
232. Platform Board.
233. Platform End-sill.
234. Platform Rod End-
235. Platform End-
236. Platform Rod.
237. Platform Board.
238. Platform End-sill.
239. Platform Rod End-
240. Platform End-
241. Platform Rod.
242. Platform Board.
244. Platform Rod End-
245. Platform End-
246. Platform Rod.
247. Platform Board.
248. Platform End-sill.
249. Platform Rod End-
250. Platform End-
251. Platform Rod.
252. Platform Board.
254. Platform Rod End-
255. Platform End-
256. Platform Rod.
257. Platform Board.
258. Platform End-sill.
259. Platform Rod End-
260. Platform End-
261. Platform Rod.
262. Platform Board.
263. Platform End-sill.
264. Platform Rod End-
265. Platform End-
266. Platform Rod.
267. Platform Board.
268. Platform End-sill.
269. Platform Rod End-
270. Platform End-
271. Platform Rod.
272. Platform Board.
274. Platform Rod End-
275. Platform End-
276. Platform Rod.
277. Platform Board.
278. Platform End-sill.
279. Platform Rod End-
280. Platform End-
281. Platform Rod.
282. Platform Board.
283. Platform End-sill.
284. Platform Rod End-
285. Platform End-
286. Platform Rod.
287. Platform Board.
289. Platform Rod End-
290. Platform End-
291. Platform Rod.
292. Platform Board.
293. Platform End-sill.
294. Platform Rod End-
295. Platform End-
296. Platform Rod.
297. Platform Board.
298. Platform End-sill.
299. Platform Rod End-
300. Platform End-
301. Platform Rod.
302. Platform Board.
303. Platform End-sill.
304. Platform Rod End-
305. Platform End-
306. Platform Rod.
307. Platform Board.
308. Platform End-sill.
309. Platform Rod End-
310. Platform End-
311. Platform Rod.
312. Platform Board.
313. Platform End-sill.
314. Platform Rod End-
315. Platform End-
316. Platform Rod.
317. Platform Board.
318. Platform End-sill.
319. Platform Rod End-
320. Platform End-
321. Platform Rod.
322. Platform Board.
323. Platform End-sill.
324. Platform Rod End-
325. Platform End-
326. Platform Rod.
327. Platform Board.
328. Platform End-sill.
329. Platform Rod End-
330. Platform End-
331. Platform Rod.
332. Platform Board.
Fig. 2423-2424. CAR-BODY DETAILS, Vestibules; General Views.

Fig. 2424. THE PULLMAN IMPROVED EXTENDED VESTIBULE, AS APPLIED TO PARlor, PRIVATE AND SLEEPING CARS.

The platform is entirely enclosed, the area over the steps being closed by a trap door.

Fig. 2423. Side View. THE PULLMAN VESTIBULE FOR A LOCOMOTIVE TENDER. ( Exhibited at the World's Columbian Exposition, 1893, but not in general use.)

Names of Parts of Vestibules. Figs. 2423-2446.

1. Diaphragm Face-plate.
2. Diaphragm, or Outer-plate (Barr). 14. Uncoupling-lever, or Mason.
4. Inner Face-plate, or Middle-post for Vestibule. 16. Brake-mast Gear-wheels or Sheave (Gould).
8. Face Plate-plates, or Vestibule-buffer (Pullman).
9. Platform-buffer, or Main Center-buffer (Barr).
11. Vestibule End-windows.
12. Door Guard-rod.
13. Angle-plate (Barr).
20. Platform-hood.
23. Overhead Equalizer-spring.
24. Face-plate Piston.
26. Equalizer Connecting-chain (Pullman) or Face-plate Retaining-chain (Gould).
27. Horizontal Equalizing-lever.
29. Face-plate Piston-guide.
30. Toggle-joint and Bar (Barr).
32. Platform End-all (55 in Gould).
34. Buhup Vestibule-equalizer.
35. Vestibule-end Carline.
36. Chain-sheave Bracket (Gould).
37. Chain-sheave (Gould).
38. Top Face-plate Guide.
40. Gravity-bar Fulcrum-bolt (Gould).
41. Front Face-plate Gravity-bar.
42. Roller for Top of Front Gravity-bar.
43. Bottom Face-plate Guide.
45. Drawbar and Coupler (Pullman) or Threshold-plate (Gould).
46. Drawbar-spring (Pullman).
47. Drawbar-stirrup (Pullman).
48. Combination Yoke (Pullman).
49. Drawbar-shunt (Pullman).
50. Buffer-springs (Pullman).
51. Equalizer.
52. Buffer stem.
53. Bracket for Brake-gear.
CAR-BODY DETAILS, Vestibules: The Barr.

The longitudinal and lateral motions of the face-plate are permitted by hinged wings or partitions. Gravity keeps the face-plates together.

The Barr Improved Wing Vestibule.

The Barr Toggle-Vestibule.

The Face-plate is kept forced out against its opposing plate by a toggle-joint, between it and the End-post.

The Barr Vestibules, manufactured by The Drexel Railway Supply Company.
Fig. 2431-2436. CAR-BODY DETAILS, Vestibules; The Gould.

Numbers refer to List of Names with Figs. 2423-2424.

The Gould Pendulum Vestibule.

The face-plates are kept together by their own weight acting upon the Gravity-bar No. Fig. 2431.
CAR-BODY DETAILS, Vestibules; The Pullman Extended. Figs. 2437-2441

Numbers Refer to List of Names on Following Page.
Fig. 2442. Side Elevation and Longitudinal Section, showing Equalizers and Springs for the Adjustment of Face-plates, and Hand-brake Gear.

NAMES OF PARTS OF VESTIBULES.

1. Diaphragm Face-plate.
2. Diaphragm.
3. Inner Face-plate.
4. End-post.
5. Corner-post.
8. Platform Foot-plate or Threshold-plate.
10. Door Guard-rod.
11. Diaphragm Face-plate.
12. Diaphragm.
13. Inner Face-plate.
17. Vestibule-door.
22. Vestibule-end.
23. Platform-end-plate.
24. Combination yoke.
27. Combination yoke.
29. Buffer-springs.
30. Equalizer.
31. Buffer-stem.
32. Bracket for Brake gear.

Fig. 2443. Section Plan, showing Equalizers and Springs for the Adjustment of Face-plates.

NAMES OF PARTS OF COACH WINDOW.

1. Truss-plank.
2. Lower Wainscot-rail.
4. Window-panel.
5. Inside Window-sill.
6. Window, or Window-glass.
7. Window-casing, or Inside Window-stop.
8. Window-pilaster.
12. Window-rail, or Sash.
13. Shade.
15. Window-blind Mullion.
16. Shade Thumb-latch or Lift.
17. Continuous Basket-rack.
20. Window-casing or Cup-molding.
22. Window-latch.
23. Pilaster-cap Bracket.
24. Window Cove-molding.
26. Inside Cornice.
27. Inside-cornice Sub-facett-board, or Paneling.
CAB-BODY DETAILS, Vestibules; The Pullman.

Names of Parts of Windows, Etc.

B. Window-balances.
C. Drapery-curtain.
D. Lower Wainscot-rail.
E. Upper Wainscot-rail.
F. Wainscot-panel.
G. Wood Orille.
H. Inside Window-cornice.
I. Inside Window-sill.
J. Pilaster.
K. Mullion of Upper-sash.
L. Molding of Window-post.
M. Window Sash-stile.
N. Window-sash Rail.
O. Hot-water Pipes.
P. Hot-water-pipe Guard-rail.
Q. Basket or Bundle-rack.
R. Lower-sash.
S. Upper-sash, Leaded Glass.
T. Window-lift.
U. Window-stop.
V. Electric Push-button.
W. Inside-cornice Sub-fascia-board.
X. Inside-cornice Plate.
Y. Curtain-hook.
Z. Inside-cornice Sub-fascia-board.
1. Bracketed Window-cornice.
2. Corbeled Shelf.
3. Hat-posts.
4. Ornamental-cornice.
5. Table.
7. Seat-back.
10. Candelabrum.
11. Mirror.
Figs. 2451-2453. CAR-BODY DETAILS, Windows; Coach, Parlor-car and Dining-car.

Numbers refer to Lists of Names of Parts with Figs. 2442-2445 and Figs. 2446-2450.

**Fig. 2451.**
**Perspective View of a Coach Window.**

A Window of a Coach is shown in Fig. 2451. Other views of Windows are shown under General Views of Passenger Car Interiors, Figs. 2450-2453, and also in Figs. 2454, 2455, 2456, 2457 and Fig. 2458. Sleeping-car Window is shown in Figs. 2458-2461.

**Fig. 2452.**
**Perspective View of Parlor-car Window.**

**Fig. 2453.**
**Perspective View of Dining-car Windows, Seats and Table.**

**Fig. 2460.**
**Perspective View of Dining-car Windows and Seats.**
CAR FURNISHINGS.
Including those Parts of a Car that are Applied after the Car has Left the Paint Shop.

CAR-FURNISHINGS, Bell-cords; Bushings, Couplings and Guides. Figs. 2454-2490
Figs. 2191-2515. CAR-FURNISHINGS, Bell-cords; Guides and Hangers.

Fig. 2191. Pulley-guides with Flanges.
Fig. 2192. Side Pulley-guides with Flanges.
Fig. 2193. Pulley-guides with Flanges.
Fig. 2194. Overhead Guide with Pulley, Flange and Stem.
Fig. 2195. Corner Guide with Pulley.
Fig. 2196. Swing Guides with Pulleys.
Fig. 2197. Angle Guides with Flanges and Pulleys.

BELL-CORD PULLEY GUIDERS. (ADAMS & WESTLAKE AND DAYTON MANUFACTURING COMPANIES)

BELL-CORD STRAP HANGERS.

BELL-CORD STRAP HANGERS, WITH DECORATED BRACKETS.
CAR-FURNISHINGS, Bell-cords; Hangers. Doors; Bolts.  Figs. 2516-2539b

Bell-cord Band, Chain and Rod Hangers.

Fig. 2516.  Fig. 2517.  Fig. 2518.  Fig. 2519.  Fig. 2520.  Fig. 2521.  Fig. 2522.  Bell-cord Band, Chain and Rod Hangers.

Fig. 2523.  Fig. 2524.  Fig. 2525.  Fig. 2526.  Fig. 2527.  Fig. 2528.  Fig. 2529.  Fig. 2530.  Bell-cord Band, Chain and Rod Hangers.

Fig. 2531.  Fig. 2532.  Fig. 2533.  Fig. 2534.  Bell-cord Hanger Straps.

Fig. 2535.  Fig. 2536.  Fig. 2537.  Fig. 2538.  Fig. 2539.  Fig. 2540.  Fig. 2541.  Fig. 2542-2543.  Bell-cord Hanger Straps.

Fig. 2544.  Fig. 2545.  Fig. 2546.  Fig. 2547.  Fig. 2548.  Fig. 2549.  Fig. 2550.  Fig. 2551.  Bell-cord Hanger Straps.

DOORS, HARDWARE AND TRIMMINGS; Bolts.

Barrel Door-bolt with Bent Staple-Plate.

Fig. 2552.  Fig. 2553.  Fig. 2554.  Fig. 2555.  Fig. 2556.  Fig. 2557.  Fig. 2558.  Fig. 2559.  Barrel Door-bolt with Bent Staple-Plate.

Fig. 2560.  Fig. 2561.  Fig. 2562.  Fig. 2563.  Fig. 2564.  Fig. 2565.  Fig. 2566.  Fig. 2567.  Barrel Door-bolt with Bent Staple-Plate.

Barrel Door-bolt and Keeper or Staple.

Fig. 2568.  Fig. 2569.  Fig. 2570.  Fig. 2571.  Fig. 2572.  Fig. 2573.  Fig. 2574.  Fig. 2575.  Barrel Door-bolt and Keeper or Staple.

Fig. 2576.  Fig. 2577.  Fig. 2578.  Fig. 2579.  Fig. 2580.  Fig. 2581.  Fig. 2582.  Fig. 2583.  Barrel Door-bolt and Keeper or Staple.

Barrel Door-bolt with Round Neck Door-bolt Plate.

Fig. 2584.  Fig. 2585.  Fig. 2586.  Fig. 2587.  Fig. 2588.  Fig. 2589.  Fig. 2590.  Fig. 2591.  Barrel Door-bolt with Round Neck Plate.

Fig. 2592.  Fig. 2593.  Fig. 2594.  Fig. 2595.  Fig. 2596.  Fig. 2597.  Fig. 2598.  Fig. 2599.  Barrel Door-bolt with Round Neck Plate.

Square Door-bolt and Keeper.

Fig. 2600.  Fig. 2601.  Fig. 2602.  Fig. 2603.  Fig. 2604.  Fig. 2605.  Fig. 2606.  Fig. 2607.  Square Door-bolt and Keeper.

Fig. 2608.  Fig. 2609.  Fig. 2610.  Fig. 2611.  Fig. 2612.  Fig. 2613.  Fig. 2614.  Fig. 2615.  Square Door-bolt and Keeper.

Square Door-bolt with Round Neck Plate.

Fig. 2616.  Fig. 2617.  Fig. 2618.  Fig. 2619.  Fig. 2620.  Fig. 2621.  Fig. 2622.  Fig. 2623.  Square Door-bolt with Round Neck Plate.

Fig. 2624.  Fig. 2625.  Fig. 2626.  Fig. 2627.  Fig. 2628.  Fig. 2629.  Fig. 2630.  Fig. 2631.  Square Door-bolt with Round Neck Plate.

Flush Door-bolt with Knob.

Fig. 2632.  Fig. 2633.  Fig. 2634.  Fig. 2635.  Fig. 2636.  Fig. 2637.  Fig. 2638.  Fig. 2639.  Flush Door-bolt with Knob.

Fig. 2640.  Fig. 2641.  Fig. 2642.  Fig. 2643.  Fig. 2644.  Fig. 2645.  Fig. 2646.  Fig. 2647.  Flush Door-bolt with Knob.

Boston-finish Flush Door-bolt.

Fig. 2648.  Fig. 2649.  Fig. 2650.  Fig. 2651.  Fig. 2652.  Fig. 2653.  Fig. 2654.  Fig. 2655.  Boston-finish Flush Door-bolt.

Fig. 2656.  Fig. 2657.  Fig. 2658.  Fig. 2659.  Fig. 2660.  Fig. 2661.  Fig. 2662.  Fig. 2663.  Boston-finish Flush Door-bolt.

Cupboard Catches and Bolts.

Fig. 2664.  Fig. 2665.  Fig. 2666.  Fig. 2667.  Fig. 2668.  Fig. 2669.  Fig. 2670.  Fig. 2671.  Cupboard Catches and Bolts.

Fig. 2672.  Fig. 2673.  Fig. 2674.  Fig. 2675.  Fig. 2676.  Fig. 2677.  Fig. 2678.  Fig. 2679.  Cupboard Catches and Bolts.

Cupboard Catches or Flush-bolts.

Fig. 2680.  Fig. 2681.  Fig. 2682.  Fig. 2683.  Fig. 2684.  Fig. 2685.  Fig. 2686.  Fig. 2687.  Cupboard Catches or Flush-bolts.

Fig. 2688.  Fig. 2689.  Fig. 2690.  Fig. 2691.  Fig. 2692.  Fig. 2693.  Fig. 2694.  Fig. 2695.  Cupboard Catches or Flush-bolts.

Fig. 2696.  Fig. 2697.  Fig. 2698.  Fig. 2699.  Fig. 2700.  Fig. 2701.  Fig. 2702.  Fig. 2703.  Cupboard Catches or Flush-bolts.

Fig. 2704.  Fig. 2705.  Fig. 2706.  Fig. 2707.  Fig. 2708.  Fig. 2709.  Fig. 2710.  Fig. 2711.  Cupboard Catches or Flush-bolts.

Fig. 2712.  Fig. 2713.  Fig. 2714.  Fig. 2715.  Fig. 2716.  Fig. 2717.  Fig. 2718.  Fig. 2719.  Cupboard Catches or Flush-bolts.

Fig. 2720.  Fig. 2721.  Fig. 2722.  Fig. 2723.  Fig. 2724.  Fig. 2725.  Fig. 2726.  Fig. 2727.  Cupboard Catches or Flush-bolts.

Fig. 2728.  Fig. 2729.  Fig. 2730.  Fig. 2731.  Fig. 2732.  Fig. 2733.  Fig. 2734.  Fig. 2735.  Cupboard Catches or Flush-bolts.

Fig. 2736.  Fig. 2737.  Fig. 2738.  Fig. 2739.  Fig. 2740.  Fig. 2741.  Fig. 2742.  Fig. 2743.  Cupboard Catches or Flush-bolts.
Figs. 2554-2585. CAR-FURNISHINGS, Doors; Catches, Locks and Handles.

Fig. 2554-2555. Sliding-door Hasp and Stapl for Mail-car.

Fig. 2556, 2557. Sliding-door Hook and Button for Baggage-car.

Fig. 2558-2559. Spring Latch and Keeper for Baggage-car Sliding-door.

Fig. 2560. Sliding-door Flush Latch.

Fig. 2561-2563. Sliding-door Latch.

Fig. 2564-2567. Sliding-door Mortise-latch.

Fig. 2565. Spring Latch.

Fig. 2566-2567. Sliding-door Mortise-latch and Keeper for Round-edge Door.

Fig. 2568-2569. Flush Sliding-door Mortise-latch and Keeper for Round-edge Door.

Fig. 2570-2573. Baggage-car Door Lock, Keeper, Key and Escutcheon.

Fig. 2574-2575. Sliding-door Flush-lock.

Fig. 2576-2577. Sliding-door Flush-handle Lock and Keeper.

Fig. 2578. Door Chain-bolt.

Fig. 2579. Door Chain-bolt.

Fig. 2580-2581. Door-handles.

Fig. 2582. Door-handles for Sliding-doors.

Fig. 2583. Flush Door-handle.

Fig. 2584-2585. Door-handles for Sliding-doors.

LATCHES, LOCKS AND HANDLES FOR BAGGAGE AND MAIL-CAR DOORS.
CAR-FURNISHINGS, Doors; Hinges.

Fig. 2586. Acorn Butt-hinge. Loose-pin Reversible Butt-hinge. Knuckle broken open to show washer-bearing.

Fig. 2587-2589. Loose-pin Butt-hinge, with Knuckle broken open to show washer-bearing.

Fig. 2589. Loose-pin Butt-hinge, with Ball-bearing Washers.

Fig. 2590. Parliament Hinge.

Fig. 2591. Loose-joint Acorn Butt-hinge, with Washer.

Fig. 2592. Hopper Butt-hinge.

Fig. 2593. Table Hinge.

Fig. 2594. Washer-cap.

Fig. 2595. Washer Complete.

Fig. 2596. Washer-base.

Fig. 2597. Ball-guide.

Fig. 2598-2600. Loose-pin Butt-hinge.

Fig. 2601. Hopper Butt-hinge.

Fig. 2602. Table Hinge.

Fig. 2603. Vestibule-door Hinges, Covered with Brass.

Fig. 2604. T-Hinge.

Fig. 2605. Butt-hinge, Riveted Joint.

Fig. 2606. Offset Butt-hinge, Riveted Joint.

Fig. 2607. Pocket-hinge.

Fig. 2608. Vestibule Hinge for Rabbeded Door.

Fig. 2610. Distributing-table Hinge for Postal-cars.

Fig. 2611-2612. Lamp-house Hinges.

Fig. 2613. Refrigerator-door Hinges.

Fig. 2614. Lamp-house Hinge.

Fig. 2615. Step-ladder Hinge.

Fig. 2616. Hopper Butt-hinge.
Figs. 2621-2643. CAR-FURNISHINGS, Doors; Escutcheons and Knobs.

**Names of Parts.**

**Fig. 2621.**

A. Inside Door-knob.
B. Shank.
C. Spindle.
D. Outside Sleeve-collar.

**Fig. 2622.**

E. Door-latch Rose.
F. Lock-nut.
G. Inside-shell.
H. Back-plate.
I. Latch-pull.
J. Flange-collar.
K. Lock-bolt.
L. Outside-knob.
M. Coupling-sleeve.
N. Shank-facing.

**Fig. 2627.**

O. Screwless Knob and Spindle.

**Fig. 2628-2629.**

**Kirby’s Car-door Lock.**

A. Inside Door-knob.
B. Shank.
C. Spindle.
D. Outside Sleeve-collar.

**Fig. 2630.**

A. Spindle.
B. Door-knob.
C. Flange-collar.
D. Sleeve.
E. Yoke.
F. Stop-bolt.

**Fig. 2631.**

Door-knobs, Spindle and Rose.

**Fig. 2632.**

Screwless Knob-shank and Knob.

**Fig. 2633.**

Flush Door-handle and Escutcheon.

**Fig. 2634-2635.**

Door-knobs and Rosettes.

**Fig. 2636.**

Spring Door-latch or Night-latch.

**Fig. 2637-2638.**

Platform Vestibule Door-latch.

**Fig. 2639.**

Door-knob and Spindle.

**Fig. 2640.**

Door-knobs, Spindles and Rosettes.

**Fig. 2641.**

Door-knobs, Spindles and Plates.

**Fig. 2642.**

Door-knob and Escutcheon-plates.

**Fig. 2643.**

Door-handles, Escutcheon-plates and Rosettes.
CAR-FURNISHINGS, Doors: Locks.

End-door Lock, Keeper, Rose and Escutcheon.

End-door Lock, Keeper.

Linen-closet Lock and Keeper.

Mortise Door Lock and Escutcheons.

End-door Lock and Keeper.

End-door Lock, Keeper, Rose and Escutcheon.

End-door Lock, Keeper, Escutcheon and Rose.

End-door Lock, Keeper, Knob, Escutcheon and Rose.

Combined End-door Lock and Night-latch, Keeper and Escutcheon-plate.

End-door Lock, Keeper, Escutcheon-plate and Thumb-latch.

Combined End-door Lock and Night-latch, Keeper and Escutcheon-plate.
Figs. 2682-2706. CAR-FURNISHINGS, Doors; Locks.

Figs. 2682-2684.
Saloon-door Lock, Keeper and Flush Handle.

Figs. 2685-2688.
Saloon-door Lock, Knobs and Escutcheons.

Figs. 2695-2696.
Saloon-door Lock, Extra Bolt and Keeper.

Figs. 2705-2706.
Saloon-door Lock, Keeper and Flush Handle.

Figs. 2707-2708.
Saloon-door Lock and Keeper.

Extra Long Saloon-door Lock and Keeper.

Vestibule-door Mortise-latch.
CAR-FURNISHINGS, Doors; Locks. Figs. 2707-2735

**Fig. 2707-2710.**
Double Flush-handle Saloon-door Lock and Keeper.

**Fig. 2711-2717.**
End-door Lock, Keeper and Escutcheon.

**Fig. 2718-2721.**
Night-latch, Keeper, Key and Escutcheon.

**Fig. 2722-2723.**
Night-latch and Keeper.

**Fig. 2724-2725.**
Night-latch and Keeper.

**Fig. 2726-2727.**
Combination End-door Lock and Night-latch.

**Fig. 2728-2730.**
Double Flush-handle Saloon-door Lock.

**Fig. 2731-2733.**
Saloon-door Latch, Keeper, Knob and Rose.

**Fig. 2734-2735.**
Dead-lock, with Keeper.
Fig. 2736. **Lock closed ready for Pin or Seal.**

**Freight-car Door-lock, Malleable Iron.**

Fig. 2737. **Lock in position to release Hasp.**

Figs. 2738-2739. **Freight-car Door-lock.**

Opened and Closed.

Fig. 2740. **Hasp.**

Parts of Freight-car Door-lock.

Fig. 2741. **Stationary Seal-holder.**

Freight-car Door-locks.

Fig. 2742. **Howard Lock.**

Figs. 2743-2745. Howard Lock Parts.

Locks Made by the Q. & C. Company.

(For other Freight-car Fastenings, see Car-doors.)

Fig. 2746. **Stationary Seal-holder.**

Freight-car Door-locks.

Fig. 2747. **Double-Hasp.**

Fig. 2748. **Best Hasp.**

Fig. 2749. **Hasp-staple.**

Fig. 2750. **Stationary Seal-holder.**

Freight-car Door-locks.

Fig. 2751. **Catch for E Lock.**

Fig. 2752. **Simms Lock.**

(For other Freight-car Fastenings, see Car-doors.)
CAR-FURNISHINGS, Padlocks.

**Figs. 2760-2772**

**Railroad Padlock, Malleable Iron.**

**Fig. 2761.** Railroad Padlock, Cheap grade with external ears for shackle.

**Fig. 2762.** Railroad Padlock, Cheap grade with external ears for shackle.

**Fig. 2763.** (5/4 full size.) Railroad Padlock, Bar Shackle.

**Fig. 2764.** Closed. Showing manner in which escutcheon drops into place.

**Fig. 2766-2767.** Rack-tumbler Spring Padlock.

**Names of Parts.** Figs. 2766-2767.

1. Shackle.
2. Tumbler.
4. Tumbler.
5. Ward.
6. Pivot.
7. Clevis.
8. Case.

**Names of Parts.** Figs. 2768-2770.

A. Tumbler.
B. Shackle.
C. Tumbler-dog.
D. Shackle-spring.
E. Tumbler.
F. Tumbler-spring.
G. Key-hole.
H. Shackle-stop.

**Names of Parts.** Figs. 2771-2772.

A. Shackle.
B. Sliding Bolt.
C. Tumbler.
D. Heel, of Shackle.
E. Bit, of Sliding Bolt.
F. Shackle-guard.
G. Shackle-spring.
H. Sliding-bolt Spring.
I. Shackle-springs.
J. Tumbler.
K. Tumbler.
L. Key Pin.
Figs. 2773-2793. CAR-FURNISHINGS, Doors; Notice Plates.

Passengers are not allowed to stand on the Platform.
Fig. 2773. Size, 5¼ × 10¾ ins.

Passengers not allowed to stand on the Platform.
Fig. 2774. Size, 4½ × 13½ ins.

PASSENGERS MUST KEEP OFF THE PLATFORM UNTIL THE TRAIN STOPS.
Fig. 2775. Size, 5¼ × 11¾ ins.

PASSENGERS ARE NOT ALLOWED TO STAND ON THE PLATFORM.
Fig. 2776. Size, 5¼ × 11¾ ins.

PASSENGERS ARE NOT ALLOWED TO STAND ON THE PLATFORM.
Fig. 2777. Size, 5¼ × 11¾ ins.

PASSENGERS ARE NOT ALLOWED TO STAND ON THE PLATFORM.
Fig. 2778. Size, 5¼ × 13½ ins.

LADIES VESTIBULE.
Fig. 2783. Size, 2½ × 7¼ ins.

SMOKING ROOM.
Fig. 2784. Size, 2½ × 7¾ ins.

SALOON.
Fig. 2785. Size, 3¼ × 9½ ins.

DRINKING WATER.
Fig. 2786. Size, 2½ × 7¼ ins.

TOILET.
Fig. 2793. Size, 3 × 14¼ ins.

LADIES TOILET.
Fig. 2794. Size, 3 × 14¼ ins.

Any size desired.
Figs. 2790-2791. NOTICE FRAMES.
CAR-FURNISHINGS, Door; Notice Plates, Stops, Springs and Weather Strips. Figs. 2794-2824

Door Holders and Stops.

Fig. 2805-2806. The Excelsior Door Holder for the Partition.

Fig. 2807-2808. Door Holder.

Fig. 2809-2810. Door Holder.

Fig. 2811-12. Door Holder for Sliding Door.

Fig. 2813-2814. Door Holder.

Figs. 2825-2842. CAR-FURNISHINGS, Sliding-door Fixtures.

Fig. 2825. Corner Door-roller.
Fig. 2826. Door Sheave, improved Noiseless.
Fig. 2827. Door Guide.
Fig. 2828. Door Sheave, improved Noiseless.
Fig. 2829. Hatfield Hanging-door Sheave.
(Used for both passenger and freight cars.)
Fig. 2830. White's "Anti-friction" Car-door Hanger.
Fig. 2831. "Differential" Car-door Hanger.
Fig. 2832. Side Elevation, with one Side-plate removed.
"Anti-friction" Car-door Sheave.
Fig. 2833. Side Elevation, with one Side-plate removed.
Fig. 2834. Baggage and End-door Car-sheaves.

Fig. 2835. Fig. 2836. Fig. 2837. Fig. 2838. Fig. 2839. Fig. 2840. Fig. 2841. Fig. 2842.
CAR-FURNISHINGS, Sliding-door Fixtures. Floor-furnishings. Figs. 2843-2864

Fig. 2843. Double Sliding Door Fixture. J. L. Howard & Co., Hartford, Conn.

Figs. 2843-2834
Fig. 2847. Corner Door-roller.
Fig. 2844. Side Elevation. Fig. 2845. Cross Section Details of Double Sliding-door Fixture.

Fig. 2849. Corner Door-roller.
Fig. 2850. Bottom Door-roller. Fig. 2861. Bottom Door-roller.

Fig. 2853-2854. Upper and Lower Gromets for Carpet Eyelets.

Fig. 2855. Wire Eyelet-nail.

Fig. 2858. Cast Spittoon, Larsen's Removable Top.

Fig. 2856. Corrugated-rubber Floor-mat.

Fig. 2857. Perforated-rubber Floor-mat.

Fig. 2860. Cast Spittoon. Larsen's Removable Top.

Fig. 2861. "Protection" Cuspidor, with Umbrella-rests.

Fig. 2862. "Protection" Cuspidor, with Mat.
CAR-FURNISHINGS, Heating Apparatus; Baker's.

Fig. 2885-2900

Fig. 2885. Sectional View.

Fig. 2886. Exterior View.

Improved Two-coil Fire-proof Heater.

Baker's Two-coil Fire-proof Car-heater, and Parts specially Belonging to it.
Figs. 2901-2923. CAR-FURNISHINGS, Heating Apparatus; Baker's.

Fig. 2902a. Ring for Russia Iron Top.

Fig. 2903. Circulating Drum, or Water Reservoir and Expansion Chamber.

Fig. 2904. Base of Smoke-Flue.

Fig. 2905. Upright Circulating Drum to go inside of Car.

Fig. 2906. Expanding Generator Coil.

Fig. 2907. Governor Coil.

Fig. 2908. Outside casing, removable.

Fig. 2909. High Fire-pot, Cast Whole.

Fig. 2910. Ash-pit.

Fig. 2911. Ash-pit Top (No. 30), Grate (No. 30) and Door (No. 31).

Fig. 2912. Top of Heater and part of Gas Preventor.

Fig. 2913. Ash-pit Bottom and Baffle Heaters.

Fig. 2914. Filling Funnel and Combination Cock with Drip.

Fig. 2915. Grate-support.

Fig. 2916. Inside casing removable.

Fig. 2917. Safety Plate and Gas Preventor combined.

Fig. 2918. Grate Shaker.

Fig. 2919. Bask of Smoke-flue.

Fig. 2919a. Ash-pit Door-guides.

Fig. 2919b. Cross Section of Cast-iron Safety-vent and Bushing. May be used on all Heaters.

Fig. 2920. Coil.

Fig. 2921. Top of Heater.

Fig. 2922. Door of Ash-pit.

Fig. 2923. Grate-support.

The "Perfected" Heater.
**Fig. 2959. CAR-FURNISHINGS, Steam and Hot-water Heating Apparatus; The Consolidated.**

**Fig. 2960. DIRECT STEAM-STORAGE SYSTEM.**

**Names of Parts of Direct Steam System No. 2. Figs. 2959-2960.**

- **26C. Tee with Drip-connection.**
- **26G. Floor-plate for 26F.**
- **54. Coupling, R. & L.**
- **54W. Return-bend.**
- **54X. Return-bend.**
- **68C. K. & L.**
- **68F. Coupling.**
- **74V. Tee.**
- **86H. Graduating Steam Angle-valve.**

**Fig. 2960. Direct Steam System No. 2, with Special Tee and Cock.**

**Names of Parts of Drums. Figs. 2961-2967.**

- **5C. Cap for Boiler Tube.**
- **5N. Drum.**
- **5T. Cap with 1 in. Outlet.**
- **5U. Cap with 1 in. Outlet.**

**Fig. 2961-2967. Details of Drums for Combination Cars, Direct Storage System.**

**Names of Parts of Multiple Circuit Drum System with Fire-proof Heater. Fig. 2968.**

- **26. Asbestos-packed Cock.**
- **26F. Large Round Spindle.**
- **26G. Floor-plate for 26F.**
- **36. Multiple-circuit drum.**
- **36X. Special Center-tee.**
- **58. Fire-proof Heater.**
- **59. Expansion Drum with End Connection.**
- **59B. Combination Cock with Handle and Funnel.**

**Fig. 2968. MULTIPLE CIRCUIT DRUM SYSTEM WITH FIREPROOF HEATER. Expansion Drum Direct Connected.**

**Systems of Car Heating. Consolidated Car Heating Company.**
Fig. 2969. The McElroy Comminoler System of Car Heating

Fig. 2970. Tub McElroy

Fig. 2971. Special Asbestos-Cock

Fig. 2972. Main Steam-Casting.

Fig. 2973. The Comminoler Storage System.


Names of Parts. Fig. 2974.

A. Coil. B. McElroy Comminoler.
C. Dial Cock for admitting Steam to Comminoler B.
D. Trap for opening Overflow-pipe H.
E. Water Line in Expansion-drain.
F. McElroy Steam-gauge to show pressure on train-pipe.
G. Swing Check-valve.
H. Overflow-pipe to remove Water of Condensation.

Fig. 2974. Perspective View.
Figs. 2975-2995. CAR-FURNISHINGS, Steam Heating Apparatus; The Consolidated.

Fig. 2975. Dial-cock.

Fig. 2976. Elevation. Trap-cock.

Fig. 2977-2978. Graduating Valve. Trap Valve.

Fig. 2979. The McElroy Steam-hose Coupling.

Fig. 2989. The McElroy Steam-hose Coupling.

Fig. 2992. (Coupled.) Fig. 2993. (Uncoupled.)

Fig. 2991. (Coupling.) Fig. 2992. (Coupled.)

Fig. 2995. Top View.

The Sewall Steam-hose Coupling.
CAR-FURNISHINGS, Steam Heating Apparatus; Gold's.

Fig. 2996-3001

Fig. 2997. Plan of Car, showing System of Pipes.

Gold's Double-coil Hot-water Circulating System of Car Heating.

Fig. 2998. Sectional Elevation.

Fig. 2999. Plan of Car, showing System of Piping.

Gold's Plain Pipe System of Car Heating.

Fig. 3000. Sectional Elevation.

Fig. 3001. Plan of Car, showing System of Piping.

Gold's Steam Heat Storage System of Car Heating.

Names of Parts of Gold Heating Systems. Figs. 2996-3001.

A. Heater-pipes.
B. Steam Connection.
C. Return-bend.
D. Gold's Vertical Steam-traps.
E. Angle-valve for Steam Supply.
F. Expansion-loops.
G. Train-pipe Valve.
H. Thermostatic-trap on Train-pipe Valve.

J. Train-pipe.
K. Covering on Train-pipe.
L. Shields.
M. Couplings.
N. Steam-hose.
O. Tee.
P. Cross-over Steam Supply-pipe.
Q. Heater-stands.
T. Supports for Pipes, Traps, etc.
U. Cast-iron Heater-stops.
V. Branch-connections to Heater.
W. Wheel and Rod connecting with Sediment-well.
X. Hot-water Stove.
Y. Hot-water Coil.
Z. Steam-coil.
a. Hot-water Column to Drum.
b. Hot-water Column to Radiator.
c. Asbestos-cock.
d. Overflow-pipe.
e. Steam-supply.
f. Check-valve.
g. Steam-supply to Jet.
h. Hot-water Return.
i. Steam-jet.
j. Improved Trap and Blow-off.
Figs 3002-3005. CAR-FURNISHINGS, Steam and Hot-water Heating Apparatus; Gold's.

**Names of Parts**

**Figs. 3002 and 3006.**

A. Hot-water Coil.
B. Steam-coil.
C. Inner Wrought-iron Casing.
D. Outside Russian-iron Casing.
E. Cast-iron Fire-pot.
F. Stove-grate.
G. Grate-bar.
H. Feed-door.
J. Hot-water Column to Drum.
K. Hot-water Return column.
L. Asbestos-cock.
M. Steam jets.
N. Steam Supply.
O. Angle-valve.
P. Overflow to Trap.
Q. Safety-valve.
R. Expansion-drum.
S. Horizontal Check-valve.
T. Hot-water Radiator.
U. Self-closing Air Relief-cock.
V. Return to Trap
W. Twin-valve (to close and open supply to and from drum).
X. Air-relief Pipe.
Y. Steam-pipe and Siphon.
Z. Smoke-pipe.

**Fig. 3002. Sectional View of Heater and Pipe Connections.**

DUPLEX DOUBLE-COIL OVERFLOW SYSTEM.

**Fig. 3003. Sectional View of Heater and Pipe Connections.**

DOUBLE-COIL JET SYSTEM.

**Fig. 3004. Section through Center.**

IMPROVED VERTICAL STEAM-TRAP AND BLOW-OFF.

**Fig. 3005. Section through Center.**

TRAIN-PIPE VALVE WITH THERMOSTATIC STEAM-TRAP.

CAR-HEATING APPARATUS. GOLD CAR HEATING COMPANY.
Names of Parts. Fig. 3005.

A. Main-body of Train-pipe Valve.
B. Piston-valve with Composition Seats.
C. Eccentric-wheel.
D. Pin to Hold Eccentric-wheel in Position.
E. Bolts to Hold Bottom.
F. Bottom-plate.
G. Spindle.
H. Floor-plate.
J. Strainer.
K. Post to Hold Spring.
L. Handle to Operate Train-pipe Valve under Car.
M. Cast-iron Body.
N. Composition-seat.
O. Diaphragm Filled with Expansion Fluid.
P. Cover of Trap.
Q. Brass Set-screw.
R. Lock-nut.
S. Spring.
T. Ventilator.

Fig. 3006. Sectional View of Heater and Pipe Connections.
Duple Double-coil Jet System with Sediment Well and Special Blow-off.

Fig. 3007. Excelsior Steam Trap with Sediment Well, Gravity Relief Trap and Special Blow-off Valve.

Fig. 3008. Section through Center. Gold's Steam-jet.

Fig. 3009. Sectional Elevation. Gold's Storage Heater (Iron).

Fig. 3010. Gold's Terra-cotta Storage Heater.

Names of Parts. Fig. 3010.

A. Supply-pipe.
B. Outside-tube.
C. Section of Terra-cotta.
D. Ports or Passages for Steam and Condensation.
E. Heater Support.
F. Plug for 1 in. Supply Pipe.
G. Lock Nut and Plate.
H. Steam Pipe to Pipe "A."
J. Supply-pipe.
K. Return.
L. Heater-cap.
Fig. 3011. Longitudinal Section.

Fig. 3012. Plan.
GOLD'S PRESSURE REGULATOR.

Fig. 3013. Coupled.

Fig. 3014. Uncoupled.

Fig. 3015. Act of Coupling.
The Universal Straight Port Coupling.

Fig. 3016. GOLD'S COMPRESSİON COUPLING.

Fig. 3017. GOLD'S INTERCHANGEABLE COUPLİNG.

Fig. 3018. THE Universal STRAIGHT PORT COUPLİNG.

GOLD'S GRAVITY RELIEF TRAP.
CAR-FURNISHINGS, Steam and Hot-water Heating Apparatus; The Safety's. Figs. 3023-3027

Fig. 3023. General View of Heater and Connections.

STANDARD SYSTEM OF STEAM HEATING BY SINGLE WATER CIRCULATION (L-50).

The Safety Car Heating and Lighting Company.

NAMES OF PARTS Constituting One Equipment. Figs. 3023.

603. Steam Valve (Special) (2).
604. Floor-plate (2).
605. Socket (2).
606. Wrench (1).
609. Train-pipe Cock (2).
611. Ell, 1½ in. (2).
612. Tee, 1½ x 1½ in. (2).
616. Ells, 1 in. R. x L. (6).
629. Extra Heavy Nipple (2).

Fig. 3024-3027.

STANDARD (COIL JACKET) HEATING SYSTEM (L-143).

The Safety Car Heating and Lighting Company.

NAMES OF PARTS Constituting One Equipment. Figs. 3024-3027.

603. 1 in. Angle-valve (Special) (1).
603b. 1 in. Angle Drip-valve (1).
604. Floor-plate for Train-pipe cocks (2).
605. Socket for Train-pipe Cocks (2).
606. Wrench for Train-pipe Cocks (1).
608. Asbestos Packed Train-pipe cock with Drip, 1½ in. (2).
616. Ells, 1 in. (4).
617. Tee, 1½ x 1 in. (1).
621. Tees, 1 in. (2).
622. ⅝ in. Extra Heavy Cock (2).
624c. One-pipe Jacket (1).
625. Standard Pipe, 1 in. (40 ft.).
626. Extra Strong Pipe, 1½ in. (20 ft.).
628. Standard Pipe, 1½ in. (60 ft.).
629. Extra Heavy Nipple, ½ in. (2).
639. Directions (frame) (1).
642. Plugs, 1 in. (2).
677. Covering for 1½ in. Pipe (60 ft.).
679. Covering for 1½ in. Tees (8).
680. Covering for 1 in. Pipe (18 ft.).
681. Covering for 1 in. Ell (2).
698. Nipples, ½ x 3 in. (3).
699. Street Ells, 1 in. (2).
787. ⅝ x 1½ in. Tee (1).
788. ½ x 1½ in. Tee (1).
789. ½ x 1 in. Ell (1).
770. Expansion drum, 3 ft. (1).
801. Coil-jacket (1 Pr.).
Figs. 3029-3034. CAB-FURNISHINGS, Steam Heating Apparatus; The Safety's.

Fig. 3029. Plan.

Fig. 3030. Plan. STANDARD (RETURN) HEATING SYSTEM (L-168).

Names of Parts, constituting One Equipment. Figs. 3029-3030.

603. Angle Valve, 1 in. (1).
604. Floor-plates for Train-pipe Cock (3).
605. Wrench for Train-pipe Cock (1).
611. Car Ell, 1½ in. (6).
612. Tee, 1½ x 1½ x 1½ in. (6).
616. Elks, 1 in. (6).
621. Tee, 1 in. (2).
622. Extra Heavy Cocks, ½ in. (6).
624a. Double Jacket (3).
625. Standard Pipe, 1 in. (100 ft.).
629. Extra Strong Pipe, 1½ in. (30 ft.).
630. Extra Strong Pipe, 1½ in. (20 ft.).
632. Plug, 1 in. (6).
637. Covering for 1½ in. Pipe (120 ft.).
638. Standard Pipe, 1¼ in. (100 ft.).
639. Extra Heavy Nipple, 6 in. (6).
631a. Plug, 1 in. (6).
638a. Standard Pipe, 1¼ in. (100 ft.).
638b. Standard Pipe, 1½ in. (80 ft.).
639. Three-way Train-pipe Cocks (1).
179. Lag Screws, 2 in. x \( \frac{1}{4} \) in. (34).

603a. Angle Inlet-valves (regulating), 1 in. (2).

603b. Angle Drip-valves, 1 in. (2).

604. Floor-plates for Train-pipe Cocks (3).

605. Sockets for Train-pipe Cocks (2).

606. Wrench for Train-pipe Cocks (1).

609. asbestos-packed Train-pipe Cocks with Drips, 1\( \frac{1}{4} \) in. (2).


610b. Couplings, R. & L. 1\( \frac{1}{4} \) in. (2).

612. Standard Pipe, 1 in. (15 ft.).

613. Standard Pipe, 1\( \frac{1}{4} \) in. (80 ft.).

615. Cross, 1 in. x 1 in. (1).


619. Covering for 1\( \frac{1}{4} \) in. Pipe (3).

620. Covering for 1 in. Pipe (9 ft.).

621. Covering for 1 in. Els (2).

622. Covering for 14 in. Cross (1).

623. Standard Pipe, 2 in. (200 ft.).

625. Nipples, 1\( \frac{1}{4} \) in. x 3 in. long (2).

626. Tees, Eccentric, 2 in. x 1 in. (3).

627. O. P. Return Bends, 3 in. (4).

628. Tees, 3 in. x 1 in. x 3 in. (3).

629. Els, 2 in. (6).

630. R. & L. Couplings, 3 in. (4).

631. Directions (framed) (1).

632. Pipe Straps (34).

Names of Parts Constituting One Equipment. Figs. 3035-3039.

Fig. 3036. Elevation. Direct Steam System (L-III).

Names of Parts. Gibbs Steam Coupler (Not Illustrated).

651. Large Ring above Diaphragm. 667. Ring to Hold No. 666.

654. Steam Hose, 24 in. long, 14 in. 68. Blank and Chain.


656. Hose Band. 670. Ell, \( 1\frac{1}{2} \) in., 45°.

674. Bolt for No. 674, \( 1\frac{1}{4} \) in. x 1\( \frac{1}{2} \) in. 671. Diaphragm.

665. Pair Couplers, without Hose, Hose-bands or Nipples. 672. Spring.


A steam jacket surrounds water pipe, and heats water of circulating system.
Steam Heating Apparatus; The Safety's.

**Names of Parts of Steam Hose Couplings.**

- 654. Steam Hose, 24 in. long, by 1½ in.
- 656. Hose Band.
- 657. Diaphragm. (Complete).
- 659. 1 in. x 1½ in. Bolt for No. 674.
- 660. Pair Couplers. (Without hose, hose-bands, or nipples.)
- 661. Gasket.
- 662. Ring to hold No. 666.
- 663. Blank and Chain. (See Fig. 3033.)
- 664. 45° Ell, 1¼ in.
- 665. Link to Hose Band.

**Double Steam Jacket 624 B, to heat water in pipes by steam from locomotive.**

Fig. 3057. Plan of Heater, Pipes and Connections for Direct Steam-heating. System of Car-heating. Chicago, Milwaukee & St. Paul Railway.

Fig. 3066. Sectional View.
SPEAR CAR-HEATER. Hot-air System.

Fig. 3065. Exterior View.
SPEAR CAR-HEATER. Hot-air System.

Figs. 3061-3062. Fire-grate.
Figs. 3063-3064. Oven or Kettle.
Fig. 3065ab. Door.
Fig. 3067ab. Grate Support.

Details of Caboose Stove. New York, Lake Erie & Western Railroad.
Figs. 3068a-3108. CAR-FURNISHINGS, Heating; Stoves and Ranges.

Caboose Stove and Parts. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Fig. 3068a. Elevation. Fig. 3068b. Plan. Fig. 3068c. Section. Fig. 3070. Ash-pit. Fig. 3070a. Section of Ash-pit. Fig. 3071. Plan of Ash-pit. Fig. 3072a. Door-latch.

Fig. 3073-3074. The Spear Caboose Stove. Figs. 3075-3105. Names and Numbers of Parts of the Spear Caboose Stove.

Figs. 3076-3077. HOTEL-CAR RANGE, with broiler and hot-water tank. Size, 3 ft. 4 in. X 2 ft. 1 in. X 6 ft. 8 in. Weight, 735 lbs.

Figs. 3078-3079. DINING-CAR RANGE, with broiler, hot-water tank and fuel closet. Size, 6 ft. 8 in. X 2 ft. 10 in. X 5 ft. 6 in. Weight, 1,200 lbs.

Figs. 3080-3081. DIRECTORS'-CAR RANGE, with hot-water tank. Size, 2 ft. 8 in. X 1 ft. 10 in. X 5 ft. 0 in. Weight, 490 lbs.
### Names of Parts of Regulator. Figs. 3117-3118.

1. Regulator-body.
2. Top-plate.
4. Adjusting-nut.
5. Lock-nut.
7. Diaphragm.
8. Diaphragm-flange.
10. Diaphragm Flange-nut.
11. Valve.
15. Valve-cap Washer.

### Names of Parts of Mercurial Check Valve. Figs. 3119-3120.

1. Valve-bowl.
2. Valve-chamber.
5. Set-screw.

### Names of Parts of Mercurial Safety Valve. Fig. 3124.

1. Pressure-chamber.
2. Relief-chamber.
3. Cap.
5. Pressure-pipe.
6. Relief-pipe.
7. Return-bend.
8. Set-screw.
10. Deflector.
Pigs. 8112-3124. CAR-FURNISHINGS, Gas Lamps and Lighting; Frost System.

Numbers refer to Lists of Names of Parts on the Preceding and Following Pages.

Fig. 3119-3120. Elevation and Section. MERCUlAL CHECK-VALVE.

Fig. 3121-3123. Plan and Sections. FROST DRY CARBURATOR.

Fig. 3124. Sectional Elevation. MERCUlAL SAFETY-VALVE.

Fig. 3112-3113. Plan and Sections, FROST DRY CARBURATOR.

Fig. 3115. Section. TANK-VALVE.

Fig. 3116. Section. CLOSET-VALVE. THE FROST DRY CARBURATOR SYSTEM OF CAR LIGHTING.

Fig. 3117. Elevation. REGULATOR.

Fig. 3118. Section. TANK-VALVE.

Fig. 3119. General, Plan. TANK.
 NAMES OF PARTS OF FILLING VALVE.  
Figs. 3125-3126.  
1. Valve-body.  
2. Valve-needle.  
3. Packing-washer.  
5. Packing-nut.  
7. Lead Washer.  
8. Cap.  
(Not shown.)

 NAMES OF PARTS OF BLEED VALVE.  
Figs. 3127-3128.  
1. Valve-body.  
2. Valve-needle.  
3. Packing-washer.  
5. Packing-nut.  
7. Lead washer.  

 NAMES OF PARTS OF CARBURETOR.  
Figs. 3121-3128.  
1. Ventilator.  
2. Cowl.  
7. Carburetor Valve-box.  
8. Carburetor Valve-box Cover.  
9. Tee.  
10. Air-pipe.  
11. Copper-coil.  
12. Air-inlet.

 NAMES OF PARTS OF DUST-GUARD AND CHECK-VALVE.  
Figs. 3112-3118.  
1. Valve-body.  
2. Dust-cup.  
3. Retaining-bolt.  
5. Air Inlet-pipe.  
6. Felt Dust-screen.  
8. Leather Valve-seat.  
10. Valve-spring.  

 NAMES OF PARTS OF TANK VALVE.  
Fig. 3115.  
1. Valve-body.  
2. Valve-needle.  
3. Packing-washer.  
5. Packing-nut.  

 NAMES OF PARTS OF CLOSET VALVE.  
Fig. 3116.  
1. Valve-body.  
2. Valve-needle.  
3. Packing-washer.  
5. Packing-nut.  

 NAMES OF PARTS.  
Fig. 3183.  
2. Bracket-lamp Smoke-bell.  
5. Deck-lamp Smoke-bell.
Figs. 3133-3137. CAR-FURNISHINGS, Gas Lamps and Lighting; Frost System.

Fig. 3133. General View. No. 3 Front Deck-lamp.

Fig. 3134. General View. No. 2 Front Bracket-lamp.

Fig. 3135. General View. No. 1 Front Vestible-lamp.

Fig. 3136. General View. No. 3 Front Deck-lamp.

Fig. 3137. General View. No. 2 Front Bracket-lamp.

Names of Parts of No. 3 Deck Lamp. Figs. 3133 and 3136.

1. Gas-body.
2. Gas-arm.
3. Plain-arm, long.
4. Plain-arm, short.
5. Wind-cap.
7. Retaining-nuts.
8. Ejector-ring.
10. Top-flue.
11. Cone-top.
15. Openwork-body.
17. Tube-spring.
18. Shade-holder Clamp.
19. Shade-holder Clamp-spring.
20. Glass-globe or Bowl.
22. Gas-nipple.
25. Porcelain-cylinder.
27. Injector.
29. Injector-latch Spring.
30. Gas-arm Foot.
32. Valve-body.
33. Valve-needle.
34. Valve-spring.
35. Valve-stem.
36. Valve-cap.
37. Valve-wheel.
38. Valve-wheel Nut.
40. Gas-arm-union Washer.

Names of Parts of No. 2 Bracket Lamp. Figs. 3134 and 3137.

1. Lamp-bracket, with Lamp-body and Globe-supports, complete.
3. Top-cap and Ventilating-chimney.
5. Glass Globe.
8. Shutter.
9. Shutter-knob. (Not shown.)
10. Valve body.
11. Valve-stem.
15. Valve-key.
16. 1/4-in. Union.
17. Washer.
Fig. 3138. General View.

No. 2 FRONT DECK LAMP.

Fig. 3139. Section.

Names of Parts of No. 2 Deck Lamp. Figs. 3138-3139.

1. Regenerator Casting.
2. Top-plate or Deflector Casting.
5. Globe Retaining-ring.
7. Star Burner.
10. Lamp-arm Nipples.
11. Center-rod for Chimney-flue.
13. Cone-cap.
15. Cone-top.
16. Cone-cap Casing.
17. Chimney-casing.
20. Screws for Beaded Ring and Filigree Cresting.
22. Chimney-cap.
23. Tripod.
25. Spacing-sleeve.
27. Deflector-cap.
30. Needle.
31. Valve-stem.
32. Spring.
33. Cap.
34. Hand-wheel.
35. Nut.
36. Cap-screw.
37. Ceiling-plate.

Names of Parts of No. 1 Vestibule Lamp. Figs. 3135 and 3140.

1. Lamp Body with Arms.
2. Gas-arm.
5. Globe-ring.
8. Glass Bowl.
9. Glass Chimney. (Not shown.)
10. Top-shell and Reflector.
11. Top-shell Retaining-screw.
12. Top-cap with Ventilating Chimney.
15. Valve-needle.
16. Valve-spring.
17. Valve-stem.
18. Valve-cap.
22. Latch.
23. Latch-spring.
24. Latch-cap.
25. Latch Finger-knob.
27. Dome.
28. Smoke-bell.
29. Gas-arm Union-washer.
Fig. 3141. AIR-TANK.
Fig. 3142. Sectional Side View. FILLING CAN.
Fig. 3143. Sectional Front View. Section of Transfer-plug.
Fig. 3144. Top View.
Fig. 3145. Section of Transfer-plug.

Fig. 3146. AIR PRESSURE-gage.
Fig. 3147. Indicator Dial.
Fig. 3148. Test-gage PET-cock.
Fig. 3149. INSPECTION CARD CASE.

Fig. 3150. OPERATING STICK.

Fig. 3151. STORAGE-TANK.

Fig. 3152. NIPPLE-UNION.
Fig. 3153. SOCKET-UNION.

Fig. 3154. CARBURATOR UNION-TEE.
Fig. 3155. CARBURATOR UNION-TEE.

Fig. 3156. CARBURATOR UNION-TEE.

Fig. 3157. BURNER for No. 1 Ventilule Lamp.
Fig. 3158. BURNER for No. 2 Bracket Lamp.
Fig. 3159. BURNER for No. 3 Deck Lamp.

**Names of Parts.** Fig. 3142.
1. Filling valve.
2. Filling valve Flange with Trap.
5. Filling-plug.

**Names of Parts.** Fig. 3145.
1. Body.
2. Discharge-pipe.
4. Packing-nut.
5. ½-inch Union with Hose Nipple.

**Names of Parts.** Figs. 3143-3144.
1. Storage-tank.
2. Tank-flange.
3. Tank-cove.
5. Discharge-valve.
7. Check-valve.
8. Air-gage.
Names of Parts of Vestibule Lamp. (Fig. 3228-3241)

100. Glass-bowl.
115. Reflector.
143. Check-screws for Cluster.
155. Screws to fasten Hinge.
166. Screws for Cluster-stem.
157. Screws for Reflector.
204. Ventilator.
222. Burner-tips.
236a. Cluster.
305. Cluster-stem.
307. Bezel, or Ring for Bowl, with Hinge.
308. Clips for Bowl.

(Continued.)

Names of Parts of Vestibule Lamp. (Fig. 3228-3241)

316. Spring-catch (complete).
318. Plug for Cluster.
319. Locknut for Check-screws.
320. Body-casting.
321. Flue.
322. Top-piece for Flues.
323. Diaphragm.
324. Ventilating-chimney.
325. Center-post for Flues.
326. Cock (complete).
327. Gas-way.
328. Spin Globe-holder Ring.

Fig. 3233. No. 192. CENTER-SUSPENSION GAS-LAMP. (Pullman Pattern.)

Fig. 3235. No. 196. FOUR-ARM LAMP.

Fig. 3237. No. 193. CENTER-SUSPENSION GAS-LAMP. (Pullman Pattern.)

Fig. 3238. No. 197 and 193. SECTION CENTER-SUSPENSION LAMP. (361)

Fig. 3239. SECTION VESTIBULE LAMP.

Fig. 3240. METHOD OF HANGING FOUR-ARM LAMPS.
Fig. 3242. STANDARD LAMP-BODY.

Fig. 3243. FOUR-ARM GAS-LAMP WITH MAIL-CAR REFLECTOR, No. 115.

Fig. 3247. SALOON OR EXPRESS WALL LAMP.

Fig. 3250. STREET-CAR LAMP.

Fig. 3251. STREET-CAR LAMP.

Names of Parts of Center-Suspension Lamps.

Fig. 3238.

28. Flange Union.
28A. Ell. \( \frac{3}{4} \times \frac{1}{2} \) in.
50. Locknut, \( \frac{1}{4} \) in.
326. Chimney.
326. Gas-vent.
320. Top-ring for Flues.
321. Greater Frame-casting.
322. Spider.
323. Flue.
324. Upper Frame-casting.
325. Thimble and Flange.
326. Top-flue.
327. Roof-casting.
328. Clock.
329. Thumb-piece, Socket and Plate.

Names of Parts of Center-Lamps.

Fig. 3242.

11. Cup-reflector.
15. Screens for Reflector.
17. No. 40 Burner.
18. Two-flame Cluster for Center-lamp.
19. Four-flame Cluster for Center-lamp.
20. Five-flame Cluster.
22. Ring (cast iron).
23. Spider.
25. Lock.
27. Locknut for Cluster-stem.
28. Bezels, or Ring for Bowl, with Hinge.
29. Clips for Bowl.
30. Clips for Flue.
31. Post.
32. Top-piece for Flues.
33. Flue.
34. Chimney.
35. Ring for Fastening Crown.
36. Diaphragm.
37. Spring-catch (complete).
38. Hinge-cover.
40. Locknut for Check-screws.
41. Flue.
42. Chimney.
43. Ring for Fastening Crown.
44. Diaphragm.
45. Spring-catch (complete).
46. Hinge-cover.
47. Plug for Cluster.
48. Locknut for Check-screws.
49. Flue.
50. Chimney.
51. Ring for Fastening Crown.
52. Diaphragm.
53. Spring-catch (complete).
54. Hinge-cover.
55. Plug for Cluster.
56. Locknut for Check-screws.
CAR-FURNISHINGS, Oil Lamps and Chandeliers; Single Center. Figs. 3252-3260

Fig. 3252. Drop over-all, 26 ins. Acme Burner.

Fig. 3253. Dual Burner. Drop, 26 ins. PILLAR-SUPPORTED OR SINGLE CENTER-LAMPS.

Fig. 3254. Drop over-all, 23 ins. Acme Burner.

Fig. 3255. Curtained Lamp for Compartment Cars. Acme Burner. Drop over-all, 25½ ins.

Fig. 3256. Single or PILLAR-SUPPORTED CENTER-LAMPS.

Fig. 3257. Tornado Lamp. Drop over-all, 24 ins. Tubular Construction.

Fig. 3258. Candle Lamp, and Candle Socket detached. Drop, 25 ins. FOUR-ARM SUPPORT CENTER-LAMPS.

Fig. 3259. Drop over-all, 24 ins. Moehring's Center-draft Burner.
Figs. 3261-3266. CAR-FURNISHINGS, Oil Lamps and Chandeliers; Two-light Center.

Fig. 3261. Sectional View of Improved Hurricane Chandelier, One Fount, Dual Burners. TWO-LIGHT OIL CHANDELIERS.

Fig. 3262. Hurricane Chandelier, Student-lamp Principle, Dual Burners; Drop, 26 ins.

Fig. 3263. One-font Dual Burner; Drop, 2 ins. TWO-LIGHT OIL CHANDELIERS.

Fig. 3264. Two-font Mosquito Center-draft Dual Burner; Drop, 28 ins.

Fig. 3265. A Decorate Lamp for Dining, Parlor, Sleeping, and First-class Coaches. TWO-LIGHT OIL CHANDELIERS.

Fig. 3266. A Plain Lamp for Postal, Baggage, and Suburban Cars. Student-lamp Frames, Drop 26 ins., Acme Burners.
CAR-FURNISHINGS, Combination Oil and Electric Chandeliers: Two-light Center. Figs. 3267-3272

Fig. 3267. Maple-fount, Drop, 26 in. Acme Burners.

TWO-LIGHT OIL CHANDELIER.

Fig. 3268. Two-founts, Drop, 294 ins. Student-lamp Principle

Fig. 3269. Two-light Oil Chandelier, Student-lamp Burners.

Fig. 3270. Two-light Oil and Two-light Electric Chandelier. (Pullman Pattern 1001.)

Fig. 3271. Acme-Burners, Drop, 26 in.

TWO-LIGHT OIL AND TWO-LIGHT ELECTRIC CHANDELIER.

Fig. 3272. Dual-burners, Drop, 26 ins.
Figs. 3273-3279. CAR-FURNISHINGS, Oil Lamps and Chandeliers; Four-light Center and Vestibule.

Fig. 3273. For Postal Cars. One Oil Point. Markling's Center-draft Burner. Drop, 30 ins.

Fig. 3274. Four Oil Fountains. Markling Burners. Drop, 20½ ins.

Fig. 3275. Four-light Chandelier for Private, Dining and Parlor Cars. Drop, 26 ins. With Acme Burner, Glass Drip-cups, and Patent Combination Smoke-bell and Ventilator.

Fig. 3276. Four-light Chandelier. Drop, 20½ ins. One Oil-fount and Dual Burners.

Fig. 3277. Improved Combination Smoke-bell and Ventilator.

CAR-FURNISHINGS, Oil and Combination Lamps: Center and Bracket. Figs. 3280-3287

Names of Parts of Lamps, Etc. Figs. 3281-3317.

1. Lamp-stay.
2. Lamp-shade.
3. Lamp-globe.
4. Lamp-arms.
5. Lamp-holder.
7. Glob-holder.
8. Lamp-burner.
10. Lamp-chimney holder.
11. Lamp-chimney reflector.
12. Lamp-chimney 2.
15. Lamp-reflector.
16. Lamp-chimney reflector.
17. Side-lamp holder.
20. Lamp-bottom.
22. Lamp-chimney holder.
23. Lamp-chimney reflector.
24. Lamp-chimney cap.
25. Lamp-globe.
26. Lamp-reflector.
27. Side-lamp holder.
28. Feed-tube.
29. Shade cap.
30. Center-stay.
31. Maching Center-draft burner.
32. Acme burners and glass drip-cups.
Figs. 3286-3297. CAR-FURNISHINGS, Oil and Candle Lamps; Bracket.

Fig. 3288. SIDE-LAMP. With Acme Burner.

Fig. 3289. MAIL-CAR LAMP. With Shade and Acme Burner.

Fig. 3290. MAIL-CAR LAMP. With Reflector and Acme Burner.

Fig. 3291. SIDE-LAMP. With Acme Burner.

Fig. 3292. SIDE-LAMP. With Mochring Center-draft Burner, Adjustable Canopy.

Fig. 3293. SIDE-LAMP. With Mochring Center-draft Burner, Adjustable Canopy.

Fig. 3294. SIDE CANDLE-LAMP.

Fig. 3295. EMERGENCY SIDE CANDLE-LAMP.

Car Side or Bracket-Lamps.

Fig. 3296. BRACKET ELECTRIC LAMP.
CAR-FURNISHINGS, Oil Lamps and Electroliers. Figs. 3298-3307

Fig. 3298. SIDE-LAMP.
To match Figs. 3293, 3295 and 3306.
Acme-burner.

Fig. 3299. SIDE-DECK-LAMP.
Moehring Center-draft Burner.

Fig. 3300. ADJUSTABLE BRACKET-LAMP.
Student-lamp Fount.

Fig. 3301. TORNADO SIDE-LAMP.
Plain cast fittings.

Fig. 3302. TORNADO SIDE-DECK-LAMP.
Tubular construction.

Fig. 3303. TORNADO SIDE-LAMP.
Tubular construction.

Fig. 3304. ADJUSTABLE BRACKET-LAMP.

Fig. 3305. ONE-LIGHT CENTER ELECTROLIER.

Fig. 3306. TWO-LIGHT CENTER ELECTROLIER.

Fig. 3307. THREE-LIGHT CENTER ELECTROLIER.

Names of Parts of Lamps, Etc. Figs. 3291-3217.

1. Lamp-stay.
2. Lamp-shade.
3. Lamp-globe Chimney.
4. Lamp-arms.
5. Lamp-ring.
8. Lamp-burner.
10. Lamp-chimney Holder.
11. Lamp-chimney Bracket.
13. Lamp-reflector.
15. Side-lamp Holder.
17. Side-lamp Braces.
18. Lamp-bottom.
20. Candle-holder Cup.
22. Center-stay.
23. Feed-tube.
Figs. 3308-3317. CAR-FURNISHINGS, Oil and Combination Lamps; Street-car Center.

Fig. 3308. Sectional View.
STREET-CAR CENTER-LAMP.

Fig. 3309. STREET-CAR CENTER-LAMP.
Spread of arms, 25 ins. Drop, 12½ ins.

Fig. 3310. CANDLE CENTER-LAMP AND ELECTROLIER.
Drop, 14¼ ins.

Fig. 3311. VESTIBULE OR PLATFORM LAMP.
Drop, 16 ins. Enamelled reflector.

Fig. 3312. OIL CENTER-LAMP AND ELECTROLIER.
Three hangers. Nickeline reflector.

Fig. 3313. TWO-LIGHT CHANDELIER FOR STREET-CARS.
Spread of burners, 19¾ ins.

Fig. 3314. TWO-LIGHT CHANDELIER.

Fig. 3315. TWO-LIGHT CHANDELIER FOR CABLE-CARS.
Drop, 15 ins.

Fig. 3316. CENTER-LAMP.
2½-arm Drop.

Fig. 3317. CENTER-LAMP.
Drop, 15 ins.
Two-spring or Dual Burner.

CENTER-LAMPS AND CHANDELIERs FOR STREET, CABLE AND TROLLEY CARS.
CAR-FURNISHINGS, Oil Lamps and Lanterns; Tail and Caboose. Figs. 3318-3332

Fig. 3318. ENGINE-LAMP WITH TWO LENSES.

Fig. 3319. WATT'S UPPER-DRAFT VENTILATED TAIL-LAMP.

Fig. 3320. COACH TAIL-LAMP WITH THREE OR FOUR LENSES.

Fig. 3321. PASSENGER AND CABOOSE TAIL-LAMP.

Fig. 3322. THE BLIZZARD LAMP. COACH AND CABOOSE TAIL-LAMPS. THE RAILROAD SIGNAL LAMP AND LANTERN COMPANY.

Fig. 3323. LAMP DETACHED.

Fig. 3324. LAMP IN DETACHED.

Fig. 3325. PLATFORM TAIL-LAMP.

Fig. 3326. PLATFORM TAIL-LAMP.

Fig. 3327. PLATFORM TAIL-LAMP.

Fig. 3328. PLATFORM TAIL-LAMP.

Fig. 3329. PLATFORM TAIL-LAMP.

Fig. 3330. PLATFORM TAIL-LAMP.

Fig. 3331. PLATFORM TAIL-LAMP.

Fig. 3332. PLATFORM TAIL-LAMP.

Attachment to caboose.

Lamp detached.

Lamp interior.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Platform tail-lamp.

Names of Parts of Lamps, Etc. Figs. 3326-3317.

1. Lamp-stay.
2. Lamp-shade.
3. Lamp-globe Chimney.
4. Lamp-arms.
5. Lamp ring.
8. Lamp-burner.
10. Lamp-chimney Holder.
11. Lamp-chimney Holder.
12. Lamp-chimney Bracket.
14. Lamp-reflector.
15. Lamp-chimney Reflector.
17. Side-lamp Bracket.
19. Lamp-bottom.
20. Candle-holder Cup.
21. Candle-holder Cup.
22. Lamp-globe.
23. Crude-stay.
24. Feed-Tube.
25. Shade-cap.
Figs. 3333-3362. CAR-FURNISHINGS, Lamp Brackets and Lanterns.

Fig. 3333. Hinged Bracket. Fig. 3334. Hinged Bracket. Fig. 3335. Lamp Socket. Fig. 3336. Parted Bracket.

Fig. 3337. Lamp-bracket, Adjustable. Fig. 3338. Solid Bracket. Top-support Bracket. Set-screw Bracket. Corner Socket. Lamp and Flag Holders, Brackets and Sockets.

Fig. 3339. Lampbracket, Adjustable. Fig. 3340. Solid Bracket. Top-support Bracket. Set-screw Bracket. Corner Socket. Lamp and Flag Holder.

Fig. 3341. Corner Socket. Fig. 3342. Flat Lamp Socket. Fig. 3343. Flag-holder. Fig. 3344. Projecting Socket Holder.

Fig. 3345. Bracket for Tail-lamp.

Fig. 3346-3351. Manner of Taking A. & W. Lantern Apart.

Fig. 3352. The Adams Lantern. Fig. 3353. The Giant Lantern. Fig. 3354. The "Pullman" Pattern. Fig. 3355. The "Quincy" Pattern.

Fig. 3356. Twisted Steel Ears. The Oriental Lantern. The "Pullman" Pattern. The "Quincy" Pattern.

Fig. 3357. "Pennsylvania" Pattern. Fig. 3358. "Rock Island" Pattern. Railroad Lanterns.

Fig. 3359. Steamboat Lantern guarded with Heavy Wire. Fig. 3360. Steamboat Lantern.
CAB-FURNISHINGS, Lamps; Burners.

Figs. 3363-3375

Sectional Piece. Improved Dual Burners, with Skirt.

Fig. 3365. Amazon Burner.

Fig. 3366. Fireside Burner.

Fig. 3367. Dual Burner. (1/2 full size.)

Fig. 3371. Morning Argand Burner. (1/2 full size.)

Fig. 3372. Astral Argand Burner.

Fig. 3373. Sun-hinge Burner. (Sun-hinge Chimney, Nos. 14 and 17.)
CAR-FURNISHINGS, Lamps; Burners.

Figs. 3363-3375

Figs. 3363-3364. Sectional Views.
Improved Dual Burners, with Skirt.

Fig. 3365. Amazon Burner.

Fig. 3366. Fireside Burner.

Fig. 3367. Dual Burner. ½ full size.

Fig. 3368. Section of Dual Burner.

Fig. 3370. Two-spring Slip Burner, for Street-Car Lamps.

Fig. 3371. Moehring Argand Burner. ½ full size.

Fig. 3372. Astral Argand Burner.

Fig. 3373. "Sun-Hinge" Burner. (Sun-hinge Chimney, Nos. 14 and 17.)

Fig. 3374. Sun-Hinge Burner. (Original Form.)

Fig. 3375. "Brillianl" Argand Burner. ½ full size.
Figs. 3376-3397. CAR-FURNISHINGS, Lamps; Burners.

Fig. 3376. "Monarch" Burner (to full size). (Nos. 2, 3 and 18 Chimneys.)

Fig. 3377. "Unique" Sun-hinge Burner. (Sun-hinge Chimney, Nos. 11 and 17.)

Fig. 3378. "Aladdin," Long Body.

Fig. 3379. "Savage." Signal-Lamp Burners, no Chimney Required.

Fig. 3380. "Champion." Signal-Lamp Burners, no Chimney Required.

Fig. 3381. "Calendar." Signal-Lamp Burners.

Fig. 3382. "Aladdin." Short Body.

Fig. 3383. "Aladdin." Candle-Lamp Burners.

Fig. 3384. "Candle." Short Body.

Fig. 3385. Oil-screws, Tubed, with Heater-plate.

Fig. 3386. Lard-lamp Screw.

Fig. 3387. Lard-oil Hatchet Burner.

Fig. 3388. Reducing-collar.

Fig. 3389. Lamp-collar.

Fig. 3390. Solid Lamp-Hoop.

Fig. 3391. Feeder-cup and Collar.

Fig. 3392. Minot Heating Burner.
Figs. 3426-3453. CAR-FURNISHINGS, Lamps; Globes, Lenses and Canopies.

Standard Styles of Lamp-shades: Special Forms for Student and other Lamps.
(The use of these Standards in the trade is general, but not universal.)

Fig. 3426. "Dome" Lamp-shade.
Fig. 3427. "Viennese" Lamp-shade.
Fig. 3428. "Crowned" Lamp-shade.
Fig. 3429. "Globe" Lamp-shade or Lamp-globe.

Fig. 3430. Round Lamp-globe.
Fig. 3431. Melon-shaped Lamp-globe.
Fig. 3432. Kug-shaped Lamp-globe.
Fig. 3433. Pear-shaped Lamp-globe.
Fig. 3434. Double Cone-shaped Lamp-globe.

Fig. 3435. Adjustable Wire-shade Tripod.

Fig. 3436. Combined Reflector and Chimney-holder.

Fig. 3437. "Universal" Adjustable Shade-ring. Bell, 7½ ins. diameter.

Fig. 3438. Smoke-bell and Smoke-bell Bracket. 7½ ins. diameter.

Names of Parts. Fig. 3468.

1. Tank.
2. Wash-basin.
3. Slab.
6. Soap Dish.
7. Mirror.
15. Towel-box.
16. Comb and Brush-rack.
17. Tumbler Holder.
18. Cuspidore.

Fig. 3441. Section. Fresnel Lens. (A modified form of the Fresnel Lens.)

Fig. 3442-3443. Front View. Semaphore Lens.
CAR-FURNISHINGS, Lavatory; General View and Fittings. Figs. 3468-3480

Fig. 3468. General Interior View.
Lavatory of a Sleeping-car for Men.
(A prevailing system that is being replaced by that shown in Figs. 3623-3640.)

Fig. 3469. Basin-bushing and Plug for Overflow-bowl.
Fig. 3470. Basin-bushing and Plug.
Fig. 3471. Tail-coupling for Alcove-faucet.
Fig. 3472. Tumbler-holder and Drip.
Fig. 3473. Stop-cocks.
Fig. 3474. Spud.
Fig. 3475. Spud and Coupling.
Fig. 3476. Combination Cock for Baker Heaters.

Numbers refer to List of Names on Preceding Page.
Fig. 3481-3494. **CAR-FURNISHINGS, Lavatory; Pumps and Faucets.**

Fig. 3481. *Wash-room Pumps.*

Numbers refer to Names of Parts with Figs. 3486-3488.

Fig. 3483. *Chain-post or Stay.*

Fig. 3485. *Compression Faucet.*

Fig. 3486. *Tank Waste-cup.*

Fig. 3487. *Spider.*

Fig. 3488. *Wrench.*

Fig. 3489. *Telegraph Faucet.*

Fig. 3490. *Bibb-cock.*

Fig. 3491. *Stop-cock.*

Fig. 3492. *Tank's self-closing Bibb-cock.*

Fig. 3494. *Hitchcock's combination hot-and-cold water faucets.*
CAR-FURNISHINGS, Lavatory; Tumbler-holders and Soap-dishes. Figs. 3495-3510

Fig. 3495. Tumbler-holder.
Fig. 3496. Double Tumbler-holder.
Fig. 3497. Tumbler-holder.
Fig. 3498.
Fig. 3499. Tumbler-holders.
Fig. 3500.
Fig. 3501.
Fig. 3502. Top View of Fig. 3501. Size, 3¾ × 3¾ ins.
Fig. 3503. 4½ ins. in diameter.
Fig. 3504. Side View of Fig 3501. Size, 3¾ × 3¾ ins.
Fig. 3505. Soap-dishes. Center to Center of Bolts, 5 ins.
Fig. 3506.
Fig. 3507.
Fig. 3508. Closed. Folding Lavatory or Wash-basin.
Fig. 3509. Open.
Fig. 3510. Comb and Brush Rack.
Figs. 3511-3524. CAR-FURNISHINGS, Lavatory; Cases and Racks.

Fig. 3511. Towel, Comb and Brush Rack.

Fig. 3512. Comb and Brush Case.

Fig. 3513. Comb and Brush Rack.

Fig. 3514. Comb and Brush Rack.

Fig. 3515. Cuff Rack.

Figs. 3517-3518. Towel, Comb and Brush Rack.

Fig. 3519. Cuff Rack.

Fig. 3520. Comb and Brush Case.

Fig. 3521. Towel Rack.

Fig. 3522. Comb and Brush Case, Metallic.

Fig. 3523. Comb and Brush Case, Wood.

Fig. 3524. Comb and Brush Case, Metallic, decorated.

Toilet Racks and Cases.
Fig. 3527. Double Wash-bowl, Fittings and Water-cooler. Made of White Metal.

Fig. 3528. General View.

Fig. 3529. Sectional Plan. Folding Wash Stand for State-rooms.
Fig. 3534. Part Sectional Plan, showing Piping and Connections between Air-tank and Water-tank.

Fig. 3535. Part Sectional Elevation, showing Piping and Connections between Air-tank and Water-tank.

Fig. 3536. End Elevation.

Fig. 3538. Part Sectional Plan, showing Piping and Connection between Air-tank, Heater, Storage Tank and Lavatories.

Fig. 3539. Sectional View of Heater and Pipes.

Fig. 3540. Sectional Elevation of Piping and Connections between Heater, Lavatory and Closet.

**Names of Parts of Pullman Water-supply.**

*Figs. 3534-3541.*

A. Shut-off Cock in Supply-pipe.

AA. Shut-off Cock to Hand pump.

B. Stop and Waste Cock for Hoppers.

BB. Air-strainer and Drip cup.

C. Stop Cock to Wash-bowls.

D. Stop Cock to Faucets.

E. Stop Cock to Fire-hose.

F. Shut-off Valve to Hot-water Coil.

G. Stop Cock to Wash-bowls.

H. Shut-off Valve to Hot-water Coil.

I. Check-Valve in Supply-pipe.

J. Globe-Valve in Hot-water Supply-pipe.

K. Drip Stop Cock.

L. Safety Plug.

M. Hot-water Boiler.

N. Main Shut-off Cock.

O. Three-way Valve.

P. Air-pressure Valve or Governor.

Q. Reducing-Valve.

R. Check-Valve in Hand pump Pipe.

S. Water Strainer or Screen.

T. Waste-pipe and Valve.

U. Air-vent from Water-tank.

V. Stem of Valve P.

W. Check-Valve in Air-pressure Pipe.

X. Tank filler.

YY. Blow-off Valve, to clean Strainer T.

Pullman System of Water Supply for Lavatories and Closets.

Hot and Cold Waters are under Pressure of Compressed Air.
CAR-FURNISHINGS, Lavatory; Pullman Water Supply. Figs. 3541-3548

Names of Parts. Figs. 3542-3547.

1. Reservoir.
2. Feed Water-pipe for Hot Water.
3. Feed-pipe for Cold Water.
5. Hot-water Jacket.
6. Hot-water Pipe.
7. Cold-water Connections.
8. Water-cask Bracket.
9. Hot-water Connections.
11. Hot and Cold-water Cock.
13. Cold-water Connections.
15. Cold-water Connections.

Pullman's System of Water Supply for Lavatories and Closets.

Hot and Cold Waters are Under Pressure of Compressed Air.

Fig. 3518.
Swing-nozzle Faucet.
Figs. 3549-3577. CAR-FURNISHINGS, Lavatory; Water-coolers and Towel-rod Brackets.

Fig. 3549. WATER-COOLERS AND STANDS.

Fig. 3550-3551. WATER-COOLERS AND STANDS.

Fig. 3552. TOWEL-ROD BRACKET.

Fig. 3553. CURTAIN-ROD BRACKET.

Fig. 3554. CURTAIN-ROD BRACKET.

Fig. 3555. TOWEL-ROD BRACKET.

Fig. 3556. TOWEL-ROD BRACKET.

Fig. 3557. TOWEL-ROD BRACKET.

Fig. 3558. TOWEL-ROD BRACKET.

Fig. 3559. TOWEL-ROD BRACKET.

Fig. 3560. TOWEL-ROD BRACKET.

Fig. 3561. TOWEL-ROD BRACKET.

Fig. 3562. TOWEL-ROLLERS.

Fig. 3563. TOWEL-ROLLERS.

Fig. 3564. TOWEL-ROLLERS.

Fig. 3565. TOWEL-ROLLERS.

Fig. 3566. TOWEL-ROLLERS.

Fig. 3567. TOWEL-ROLLERS.

Fig. 3568. TOWEL-ROLLERS.

Fig. 3569. TOWEL-ROLLERS.

Fig. 3570. TOWEL-ROLLERS.

Fig. 3571. TOWEL-ROLLERS.

Fig. 3572. TOWEL-ROLLERS.

Fig. 3573. TOWEL-ROLLERS.

Fig. 3574. TOWEL-ROLLERS.

Fig. 3575. TOWEL-ROLLERS.

Fig. 3576. TOWEL-ROLLERS.

Fig. 3577. TOWEL-ROLLERS.
Figs. 3624-3665. CAR-FURNISHINGS, Miscellaneous; Brackets, Grilles, Panels, Etc.

Figs. 3624-3625. Hand-rail Brackets
Figs. 3626-3627. Pole-bracket for Street-cars.

Figs. 3628-3629. Pole-bracket for Street-cars.

Figs. 3630-3633. Pole or Hand-straps.

Figs. 3634. Hand-rod Bracket.

Fig. 3635. Transom Grille. One-half.

Figs. 3636-3646. Upholsterers' Nails and Buttons.

Fig. 3637. Pole or Hand-straps.

Figs. 3638-3639. Ornamental Cast Work, Grilles, etc.

Fig. 3639. Mirror Frame.

Fig. 3640. For Vestibule and King-pin Plate.

Fig. 3641. For Door.

Fig. 3642. Grille for Vestibule Door.

Fig. 3643. Grille for Vestibule Door. To cover heater pipes.

Figs. 3647-3648. Ornamental Cast Work, Grilles, etc.

Fig. 3649. Grille for Vestibule Door. To cover heater pipes.

Fig. 3650. Grille for Vestibule Door. To cover heater pipes.

Fig. 3651. For Door.

Fig. 3652. Deck Window Panel.

Figs. 3653-3661. Partition or Window Panels.

Panel Decorations in Relief. They are veneered with natural wood.

Fig. 3654. For Bulkheads.

Fig. 3655. Cast Grilles.

Fig. 3656. Berth-front Border.

Fig. 3657. Mirror Frame.

Fig. 3658. Mirror Frame. Ornamental Cast Work.

Fig. 3659. Berth Corners.
Figs. 3695-3727. CAR-FURNISHINGS, Miscellaneous; Sundries.

Fig. 3708. MACHINE-BOLT. Square-head.

Fig. 3709. MACHINE-BOLT. Hexagon-head.

Fig. 3710. CARROUSELBOLT.

Fig. 3713. U-Bolt.

Fig. 3714. KEY-BOLT.

Fig. 3715. EYE-BOLT.

Fig. 3712. STRAP-BOLT.

Fig. 3711. LAG SCREW.

Fig. 3716. WASHER, OR PLATE-WASHER.

Fig. 3717-3718. BEVELED-WASHER.

Fig. 3719. DOUBLE-WASHER.

Fig. 3720. TRAPEZOIDAL-WASHER.

Fig. 3721. PULLEY BLOCK.

Fig. 3722. PULLEY BLOCK.

Fig. 3723. SINGLE-SREW TURNBUCKLE.

Fig. 3724. RIGHT-AND-LEFT SCREW TURNBUCKLE.

Fig. 3725. SLIDE TURNBUCKLE.

Fig. 3726. PATENT TURNBUCKLE, R. AND L.
Numbers refer to List of Names of Parts on Opposite Page.

Fig. 3728. Broad-base Jack.
Fig. 3729. Claw Type of Jack.
Fig. 3730. Low Jack.
Fig. 3731. Journal-box Jack.
Fig. 3732. Double-piston Outside-pump Jack.
Fig. 3733. Bellbase Ratchet Screw Jack.
Fig. 3734. Sectional View of Low-type Hydraulic Jack.
W. & S. Hydraulic Jacks.
Fig. 3735. Sectional View of Claw-type Hydraulic Jack.
Fig. 3736-3739. Differential Screw Jack.
Fig. 3742. Traversing Hydraulic Jack.

Figs. 3743-3744. Chapman's Screw-Jack.
Fig. 3745. Broad-base Jack.
Fig. 3746. Journal-box Jack.
Juddron's Hydraulic Jack.
Fig. 3753. **LONG CAST BASKET-RACK.**

Fig. 3754. **CAST BASKET-RACKS.**

Fig. 3755. **CAST BASKET-RACK.**

Fig. 3756. **CONTINUOUS BASKET-RACK.**

Any length. Distance between brackets, 24 ins. Width, 12 ins.

Fig. 3757. **CAST BASKET-RACK.**

Length, 24-30 ins. Depth, 3 ins. Width, 8 ins.

Fig. 3758. **CONTINUOUS BASKET-RACK.**

Any length. Distance between Brackets, 24 ins. Width, 12 ins.

Fig. 3759. **CAST BASKET-RACK.**

Length, 24 ins. Depth, 3 in. Width, 8 ins.

Fig. 3760. **CAST BASKET-RACK.**

Any length. Depth, 1¾ ins. Width, 6¾ ins.

Fig. 3761. **CAST BASKET-RACK.**

Any length. Depth, 3½ ins. Width, 8½ ins.

Fig. 3762. **CAST BASKET-RACK.**

Length, 36 ins. Depth, 3 in. Width, 8½ ins.

Fig. 3763. **CAST BASKET-RACK.**

Length, 30 ins. Depth, 3 ins. Width, 8½ ins.

Fig. 3764. **WIRE BASKET-RACK, WITH CAST BRACKETS.**

Any length. Distance between Brackets, 24 ins. Width, 8 ins.

Fig. 3765. **CAST BASKET-RACK.**

Length, 35-40 ins. Depth, 3 in. Width, 8½ ins.

Fig. 3766. **CAST BASKET-RACK.**

Length, 36 ins. Depth, 3 ins. Width, 8½ ins.

Fig. 3767. **WIRE BASKET-RACK, WITH CAST BRACKETS.**

Any length. Depth, 3½ ins. Width, 10½ ins.

Fig. 3768. **CAST BRACKET-ENDS FOR BASKET-RACKS.**

(290)
CAR-FURNISHINGS, Platform; Railings and Guards. Figs. 3771-3793

Names of Parts. Fig. 3772.
B. Ornamental Casting. I. Brake-wheel.
D. Flush Handle. K. Door-frame.
E. Brake-staff Holder. L. Ornamental Casting.
G. Platform End-rail.

Names of Parts. Fig. 3771.
A. Connecting strip. L. Rail-bolt.
B. Ornamental Casting. M. Brake-staff Holder.
C. Post-rail Ornament. N. Brake-wheel.
F. Grab-rail. Q. Grab-rail Bushing.
G. Post. R. Step-fender.
H. Rail-base. S. Step-molding.
I. Rail-panel. T. Step-molding.
J. Rail-post strip. U. Door Drop-handle.
K. Bottom-rail.

Fig. 3771. Sectional View. Vestibule Platform and its trimmings.

Fig. 3772. Sectional View. Window guard-rods.

Fig. 3773-3774. Door-guard drop-rod catch and pocket.

Fig. 3775. Platform gate panel.

Fig. 3776. Platform swing-bail.

Fig. 3777-3779. Platform hand-rail nuts.

Fig. 3780-3782. Platform end hand-rails, panel and bracket.

Fig. 3783-3789. Step-facing, right and left.

Fig. 3791. Window-guard brackets and rods. Fig. 3793.
Figs. 3794-3806. CAR-FURNISHINGS, Platform; Gates.

Fig. 3794. Elevation or Open Gate. Wood's Platform Gate.

Fig. 3795. Perspective View. Wood's Platform Gate, Decorated.


Fig. 3801-3803. Elevations and Plan. Gate for Special Suburban Cars. Illinois Central Railroad.

Figs. 3804-3806. Open, Closed. Folding Platform Tail-Gate.
Figs. 3838-3849. CAR-FURNISHINGS, Saloon; Closets and Hoppers.

Fig. 3838. Seat Closed. Fig. 3839. Seat Open. Sectional Views.

WATER-CLOSET FOR COACHES AND PALACE CARS.

Bell's Exhaust Hopper-Ventilator.


Fig. 3840. Section through Closet-hopper.

Fig. 3841. Enlarged Section.

Fig. 3842. Enlarged Section.

Fig. 3843. Closet-hopper and Wind-scoop.
CAR-FURNISHINGS, Saloon; Closets, Hoppers and Urinals.

Fig. 3850-3851. Paper Holders and Roll.  
Fig. 3852-3853. Paper-hooks.  
Fig. 3854. Water-closet Hopper Seat and Tank.  
Henry C. Hart Manufacturing Company.

Fig. 3855-3856. Tub "Standard" Dry-closet Hopper and Seat.  

Fig. 3859. Cross Section of Hopper, showing dumping device of Fig. 3854. When cover is raised the seat accompanies it.  

Fig. 3860-3861. Enamel Drift Tray for Oval-seat.  
Fig. 3862. Oblique Closet-hopper.  
Fig. 3863. Oblique Closet-tub.  
Fig. 3864. Oblique Cone-shaped Closet-hopper.  
Fig. 3865. Earthen Cone-shaped Iron Hopper.  
Fig. 3866. Earthen Hopper with Square Vent.  
Fig. 3867. Porcelain Wash-bowl.  
Fig. 3868. Plain Enamelled Iron Urinal.  

Fig. 3870. Philadelphia Water-closet.  
Fig. 3871. Plain Side-urinal.  
Fig. 3872. Urinal Drip-pan.  
Fig. 3873. With Hood, Tabs, Lip and Ventilator.  
Fig. 3874. Plain Enamelled Iron Urinal.
Figs. 3877-3900. CAR-FURNISHINGS, Seals; Freight-car Door, Etc.

C. & N.

RETURN THIS TAG TO GEN'L CLAIM AC'T CHICAGO

Not pressed. Pressed.

Figs. 3877-3878. Fig. 3879. Fig. 3880. Fig. 3881. Fig. 3882. Fig. 3883. Brooks's Cast-in Horse-shoe Shackle Lead Seal.

Fig. 3885. Double Eyelit Printed Metal Strip.

Fig. 3886. Central Cast-in Crosswise Lead Seal with Detective Wire.

Fig. 3887a. Brooks's Corded Lead-seal.

Fig. 3884. Seal Press.

Fig. 3885a. Keystone Car-seal.

Fig. 3883a. Clay-car seal.

Fig. 3885b. Double-lever Seal-press.

Fig. 3886. Small Hammer Seal-press.

Brooks's Combination Glass and Paper Seal.

Fig. 3887. Six-ply Wire Shackle and Lead Car-seal.
CAR-FURNISHINGS, Seats; Bushnell's.

Fig. 3901. Plush Seat with High Back and Head-Roll.

Fig. 3902. Rayon Seat with Oak Arm-Rest.

Fig. 3903. Leather Seat with Metallic Arm-Rest.

Fig. 3904. Sectional View. Upholstered Back-springs.

Fig. 3905. Spring Edge Cushion Springs.

Fig. 3906. Sectional View. Upholstered Cushion-springs.

Fig. 3907. Plain Springs for Cushion.

Fig. 3908. Reversible Double-Border Spring for Beds.

CAR SEATS AND SPRINGS. BUSHNELL MANUFACTURING COMPANY, EASTON, PA.
Figs. 3809-3816. CAR-FURNISHINGS, Seats; Hale and Kilburn's.


Figs. 3912-3914. Seats for Suburban and Narrow-gauge Cars.

Fig. 3917. Sectional View.

**IMPROVED SWING-BACK OR "WALK-OVER" CAR SEAT.**

The back does not reverse, but swings over the cushion, both sides of back being upholstered.

Fig. 3918. Perspective View.

Names of Parts of Seats.

Figs. 3917-3925.

1. Cushion.
2. Back.
4. Arm-rest.
5. Seat-end Rest.
7. Cricket or Base-casting.
8. Wall Socket-casting.
13. Spiral Springs.
15. Flexible Spring-edge.
16. Leg-rest.
18. Leg-rest Ratchet-casting.
20. Leg-rest Ratchet-case.
22. Parallel-rod or Axle of Gear-wheel.
23. Rocker or Tilting-casting.
25. Frame Cross-bar and Lever-fulcrum.
27. Connecting-rail.
28. Foot-rest Casting.
29. Rocker-casting.
30. Flexible Steel Casting.
31. Leg-rest Pivot-casting.
32. Leg-rest Ratchet-case.
33. Seat-tilting Lever.
34. Parallel-rod or Axle of Gear-wheel.
35. Rocker or Tilting-casting.
36. Seat-end Casting.
37. Frame Cross-bar and Lever-fulcrum.
40. Foot-rest Casting.
41. Rocker-casting.
42. Flexible Steel Casting.
43. Cup Casting.
44. Division-arm.
45. Push-down.
46. Seat-lock.

Fig. 3920. Sectional View.

No. 73. HIGH-BACK TILTING CAR SEAT.

Fig. 3921. Revolving Parlor-car Chair.

With detachable cushion.
Figs. 3923-3928. CAR-FURNISHINGS, Seats; Hale and Kilburn's.

- Fig. 3922. No. 61. Reclining Car-seat. High-back, Twin Tilting Seat, Without Leg-rest.
- Fig. 3923. No. 73. Car Seat in Process of Construction With Steel Top Spring-edge Cushion and Back.
- Fig. 3924. No. 64. Reclining and Tilting Twin Car-seat, With Division-arm.
- Fig. 3925. Perspective View. Detachable Cushion and Back. Patent Parlor Car-Chair.
- Fig. 3926. Sleeping-car Berth-seat. Dotted Lines show position of cushions when drawn out to make the bed.
CAR-FURNISHINGS, Seats; Hale and Kilburn's.

**Fig. 3929.** Improved Sectional-spring Back. One Section is detached.

**Fig. 3930-3931.** Improved Sectional-spring Cushion. With one Section detached.

**Fig. 3932.** Spring-edge Back.

**Figs. 3933-3934.** Reversible spring-back Ready for Upholstering. Sectional views showing construction of Spring-edge Back.

**Fig. 3935.** Sectional Views, showing the use of Slat and Webbing and the Elastic Slat Edge.

**Figs. 3936-3937.** Reverse Side of Single and Double Rattan Spring Seats. Showing Construction.

**Fig. 3938.** Sleeping-car Berth Spring for Upper Berth.

**Figs. 3939-3940.** Leather Seat, Plush Bands and Nails.
Fig. 3941. Spring-bed Sections for Private and Sleeping Cars.

Fig. 3942. Patent Rattan Covering, Canvas-lined.

Fig. 3943. Rattan Cross-seat Spring-back with Head-bent

Fig. 3944. Single Side-seat.

Fig. 3945. Double Rattan Spring Cross-seat.

Fig. 3946. Detached Section of the Cobb Patent Elliptic-spring.

Fig. 3947. Broad-band Elliptic Seat-spring.

Fig. 3948. Sitral Elliptic Seat-spring.

Fig. 3951. Cushion with Narrow-band Elliptic Springs. "Cobb Patent."

Fig. 3947. Interior View of Street Car.
Method of Upholstering Side-seats of Suburban and Street Cars.
Fig. 3952. HIGH-BACK TILTING CAR-SEAT. With Spring-edge.

Fig. 3953. Sectional View. Showing Construction and Mechanism. HIGH-BACK TILTING CAR-SEAT.

Fig. 3954. PATENT SWING-BACK CAR-SEAT. Seat Cushion and Back are of Woven wire Fabric covered with Batton.

Fig. 3955. Sectional View. DOUBLE OR TWIN CAR-SEAT. WITH DIVISION-ARM.

Fig. 3956. SEAT CUSHION AND DETACHED SECTIONS. Showing Construction. ROBERTS' PATENT WOVEN-WIRE CAR SEATS.
Figs. 3957-3967. CAR-FURNISHINGS, Seats; Roberts’ Woven-wire.

Fig. 3937. No. 2. Fig. 3953. No. 1. Fig. 3969. No. 3.

Woven Wire Fabric used on Roberts’ Wire Seats.

Fig. 3941. No. 4. Bottom View.
Spring-edge Cushion.

Fig. 3960. No. 7. Woven Wire Seat-back.

Fig. 3963. No. 27. All-wire Spring-edge Cushion.

Fig. 3964. No. 28. Wire Seat.
For use without covering.

Fig. 3965. No. 18. Sleeping-car Berth Bottom-spring.

Fig. 3966. No. 19. Sleeping-car Seat-cushion and Seat-back.
Covering removed to show construction.

Fig. 3972. Extra-high and curved-back rattan seat.

Fig. 3973. Standard plush car-seat.

Fig. 3974. Extra-high back seat. Cushion removed and seat tilted to show mechanical construction.

Fig. 3975. Extra-high back seat. With head-roll and adjustable foot-rest.

Fig. 3976. Extra-high back seat. Tilted to show mechanical parts.
Fig. 3974-3979. CAB-FURNISHINGS, Seats; Scarritt's.

Names of Parts.

Figs. 3967-3976.

1. Seat-cushion.
2. Seat-back Cushion.
4. Arm-rest.
5. Seat-end Rest.
7. Seat-stand.
8. Wall Pivot-plate.
15. Seat-back.

Fig. 3975. No. 59. Scarritt-Forney Reclining Twin-seats.

17. Seat-back Springs.
18. Foot-rest Stand.
19. Foot-rest Arm.
20. Foot-rest Pawl.
22. Foot-rest Pawl-stop.
23. Foot-rest Stop.
27. Friction-plate.
28. Friction-plate Strip.
29. Leg-rest.
30. Leg-rest Slide.
31. Leg-rest Casing.
33. Spring for Retaining-jaw.
34. Retaining-jaw.

Fig. 3976. No. 62. Scarritt-Forney Twin-seat, without Leg-rest.

Figs. 3977-3979. Scarritt's Drawing-room-car Chairs.
CAR-FURNISHINGS. Seats; Wakefield Rattan Company's. Figs. 3980-3986

**Fig. 3980. Revolving and Folding Seat.**

**Fig. 3981. Twin-seat with Division Arm.**

**Fig. 3982. Swing-back Slat-seat.**

**Fig. 3983. Swing-back Rattan-seat.**

**Figs. 3984-3986. Revolving and Folding Seats.**

Car Seats, Wakefield Rattan Company.
Names of Parts of Seats. Figs. 3980-3989.

1. Cushion.
2. Back.
3. Arm.
5. Arm-post.
6. Arm-rail.
7. Seat-stand.
12. Seat-support extension.
13. Spring-lock.
15. Arm-crank.
16. Wall-end slide.

Fig. 3990. Parlor-car Chair. With "Spring-edge" Cane Seat.

Fig. 3991. Parlor-car Smoking-chair. With Rattan or Cane Seat.

Fig. 3992. Parlor-car Chair. (Detachable Back and Seat.)

Fig. 3993. Perforated-veneer Car-seat.

Fig. 3994. Perforated-veneer Car-seat.

Fig. 3995. Emigrant Car-seat. With Gardner's Geared Seat-arm.
CAR-FURNISHINGS, Seats and Chairs.

Figs. 3966-4008.

The Hitchcock Reclining and Revolving Chair.

Fig. 3996.

The Hartley Reclining-chair, Rattan Upholstering.

Fig. 4000.

Jürgens Spiral-elliptic Seat-springs.

Fig. 4001.

Z. Corb's Narrow-band Elliptic Seat-springs.

Fig. 4002.

H. B. Corb's Broad-band Elliptic.

Arrangement of Springs.

Fig. 4003.

Patent Flexible-top Sectional Seat-spring, with Curved Slats.

Fig. 4004.

Detached Section of Springs and Webbing.
Figs. 4009-4050. CAR-FURNISHINGS, Seats; Springs and Hardware.

Fig. 4009. Spiral Seat Spring.

Fig. 4010. Knotted Spiral Seat Spring.

Figs. 4011-4017. Spiral Seat and Back Springs.

Fig. 4018. "Eureka" Spiral Seat Spring.

Figs. 4023-4028. Seat-back Moldings. White metal from 1⁄4 in. flat to 3⁄4 in. half-round.

Fig. 4022. Kirby's Seat-lock for Wood Seat-ends.

Figs. 4014-4016. Seat-arm Rest Brackets.

Figs. 4029-4030. Seat-back Arm-lock, Bolt and Spring.

Figs. 4031-4033. Seat-back Arm-locks with Escutcheons.

Figs. 4034-4039. Seat-arm Rivets.

Figs. 4040-4041. Seat-arm Thimbles.

Fig. 4042. Joint-bolt and Washer.

Fig. 4043. Seat-arm Pivot-bolt.

Figs. 4044-4046. Seat-arm Washers.

Figs. 4047-4050. Seat-arm Washers and Machine Bolts for Forney-skats.
The thicker ones are for the end of seat next to side of car and prevent the arm from striking the woodwork when the back is being turned.
Figs. 4081-4084. **Seat-arm Pivot-plate.**

Fig. 4085. **Seat-arm Pivot-plate.** With solid nipple.

Fig. 4087-4090. With lock. Without lock. **Seat-arm stops.**

Fig. 4091. **Curved seat-arm stop.** With lock.

Fig. 4092. **Pivoted seat-back arm.**

Fig. 4093. **Cobb's pivoted seat-arm.** Other seat-arms are shown in Figs. 4094-4097.

Fig. 4094-4096. **Seat-nail brackets or sockets.**

Fig. 4098-4099. **Seat-back arms for Forney seats.**

Fig. 4100. **Seat-corner.** Sheet Brass.

Fig. 4101. **Seat corner.**

Fig. 4102-4104. **Seat-back corners.**

Fig. 4105. **Iron seat-end with wood arm-rest.** (For Forney seats.)

Fig. 4106. **Seat-stand.**

Fig. 4107. **Revolving chair pedestal.**

Fig. 4108. **Seat-stand.**

Fig. 4109. **Revolving chair pedestal.**

Fig. 4110. **Seat-pull.**

Fig. 4111. **Seat-hinge.**

Figs. 4112-4115. **Chair and sofa castors.**
CAB-FURNISHINGS, Sleeping-cars; Sofas and Berths.

Figs. 4116-4152

Sofa Arm-rest Fixtures.

Fig. 4116. Sofa Arm-rest Fixture.

Fig. 4117. Fig. 4118. Fig. 4119. Spring-catch. Sofa Arm-rest Fixtures.

Fig. 4118. Pin Bushing.

Fig. 4119. Pin Plate. Catch Plate. Sofa Arm-rest Fixtures.

Fig. 4120. Pin Plate. Catch Plate. Sofa Arm-rest Fixtures.

Fig. 4121. Pin Plate. Catch Plate. Sofa Arm-rest Fixtures.

Fig. 4122. Pin Plate. Catch Plate. Sofa Arm-rest Fixtures.

Fig. 4123. Pin.

Fig. 4124. Pin Plate. Catch Plate. Sofa Arm-rest Fixtures.

Fig. 4125-4126. sofa back pivot hinge and plate.

Fig. 4127-4128. sofa rail-end and socket.

Fig. 4129. sofa arm-rest in position.

Fig. 4130. sofa bed hinge and socket.

Fig. 4131-4135. sofa bed hinge and socket.

Fig. 4132. sofa bed hinge and socket.

Fig. 4133. sofa bed hinge and socket.

Fig. 4134. sofa bed hinge and socket.

Fig. 4135. sofa bed hinge and socket.

Fig. 4136. sofa bed hinge and socket.

Fig. 4137. strike-plate.

Fig. 4138. sofa bed hinge and socket.

Fig. 4139. sofa bed hinge and socket.

Fig. 4140. sofa bed hinge and socket.

Fig. 4141. seat pull.

Fig. 4142. seat pull.

Fig. 4143-4144. upper-birth pivot and plate.

Fig. 4145-4146. berth-hattle stops.

Fig. 4147-4148. berth hinge and plate.

Fig. 4149-4150. upper-birth pivot sockets.

Fig. 4151-4152. head-board pivot and socket.
Figs. 4153-4182. CAR-FURNISHINGS, Sleeping-cars; Berths.

Fig. 4153. Berth Pivot. Figs. 4154-4156. Berth Head-rest Pivot and Plate.

Fig. 4156. Upper-berth Rest.

Fig. 4157. Head-board Coupling.

Fig. 4158. Head-board Coupling Keeper.

Fig. 4159. Head-board Bolt. Outside View.

Fig. 4160. Head-board Bolt and Bushing.
1. Upper Face-plate.
2. Knob-latch.
3. Lower or Fixed Bolt.
5. Lower Face-plate.
7. Upper or Spring-bolt.

Fig. 4161. Head-board Bolt.

Fig. 4162. For Bevel-rail Head.

Fig. 4163. For Flat-rail Bushings.

Fig. 4164. Head-board Bolt.

Fig. 4165. Head-board Rack-catch and Keeper Strike-plate.

Fig. 4166. Head-board Lugs.

Figs. 4170-4171. Head-board Bushings.

Fig. 4172-4173. Berth Lock-plate and Bolt.

Fig. 4174-4175. Head-board Fastener.

Fig. 4178-4179. Seat-rack Pocket-catch. Head-board Fastener.

Fig. 4180. Head-board Bolt.
Figs. 4209-4232. CAR-FURNISHINGS, Sleeping-cars; Berths.

Fig. 4210. Fig. 4211. Fig. 4212. Fig. 4213. BERTH CURTAIN-ROD BRACKETS.

Fig. 4214. Fig. 4215. Fig. 4216. Fig. 4217. BERTH CURTAIN-ROD BRACKETS.

Fig. 4218. BERTH-LATCH HANDLE.

Figs. 4219-4220. BERTH-LATCH HANDLES.

Fig. 4221. SECTION OF LOCK-HANDLE.

Fig. 4222. BERTH-LATCH HANDLE.

Fig. 4223. UPPER-BERTH SAFETY-STRAP AND HOOK.

Fig. 4224. UPPER-BERTH SAFETY-HOPE HANGER.

Fig. 4225. BERTH CURTAIN-HOOK.

Fig. 4226. BERTH CURTAIN-HOOK. BERTH SAFETY HOOK-HOOK.

Figs. 4228-4229. BERTH NUMBERS.
CAR-FURNISHINGS, Sleeping-cars; Berths.

Names of Parts. Figs. 4194-4199.

B. Curtain-rod Bracket.
C. Chain.
H. Coat-hook.
L. Chain-pulley.
M. Chain End-plate.
N. Chain-pulley Bracket (same as B).
P. Curtain-pole.
Q. Berth-spring.
R. Berth-spring Frame.
S. Berth-latch Face-plate.
U. Berth-latch Connecting-rod.
V. Berth-latch Turn-buckle.
W. Berth-latch Bolt, Bolt-plate and Bolt-spring.
X. Berth-latch Rocker-arm.
Y. Berth-latch Safety-spring.

Names of Parts. Figs. 4200-4205.

A. Turn-buckle.
A'. Keeper.
B. Bolt.
C. Berth-latch Plate.
D. Berth-latch Rocker-plate.
E. Berth-latch Connecting-rod (e).
F. Berth-lock Keeper.
G. Hole for Bolt.
H. Berth-latch Connecting-rod Bracket.
S. Berth-rattle Stop.

The Pullman Detachable Berth-Lamp.

Stop-bar Quids.

Stop-bar Hinge.

Berth-stop.

Furnishings for a Berth of an Emigrant Sleeping-car.
Figs. 4259-4285. CAR-FURNISHINGS, Sleeping-car; Berths and Smoking Compartment.

Figs. 4250-4259. Upper-Berth Rest. For leaving upper berth partially open.


Figs. 4263. End Berth-rest. Fig. 4264. Section. End Berth-rest.

Figs. 4270. Stop-bar Plate. To support Stop-bar.


Figs. 4278. Telegraph-blank Rack. Pen-rack.


Fig. 4284. Match-striker and Cigar-holder. Ash-receiver.
CAR-FURNISHINGS, Table; Plates and Hooks. Ventilators.

Figs. 4286-4310

Fig. 4286. Table-hook Plates.
Fig. 4288. Table-hook.
Fig. 4290. Table-hook.
Fig. 4292-4293. Table-hook.

Fig. 4296. Table-painters.

Fig. 4300-4301. The Globe Ventilator.

The Globe Ventilator.

Fig. 4304. The Canopy.

The Tornado Ventilator.

Fig. 4305. The Tornado Canopy.

The Cone Cap.

Fig. 4303. The Cone and Apron.

The Cone Cap.

Fig. 4306. The Dished Cap.

The Dished Cap.

Fig. 4307. The Moor.

The Moor.

Fig. 4308. The Duplex.

The Duplex.

Fig. 4309. The Rose.

The Rose.

Fig. 4310. The Stanch.

Types of Ventilators.
Fig. 4311-4329a. CAR-FURNISHINGS, Ventilators; Passenger-car.

Fig. 4315. The World.
Fig. 4316. The Torpedo.
Fig. 4317. The Globe Horizontal.
Fig. 4318. The Globe Vertical.
Fig. 4319. The Cramer Horseshoe.
Fig. 4320. The Cramer Vertical.

Fig. 4321. The Star.
Fig. 4322. The Globe Erect.
Fig. 4323. The Deflector.
Fig. 4324. The Cramer Automatic.

Fig. 4325-6. Ventilator for Saloons.

Fig. 4335-6. Ventilator for Saloons.

Names of Parts. Figs. 4327-29a.
B. Pillow-box.
D. Cold-air Duct.
E. Seat-end.
F. Wind-scoop or Funnel.
L. Car Window.
B. Hot-air Register.
S. Seat-cushion.
W. Hot-water Pipes.

System of Ventilation for Private and Sleeping Cars. Pullman's Palace Car Company.
CAR-FURNISHINGS, Windows; Deck-sash.

Figs. 4330-4368.

Fig. 4330. Windows Closed.

Fig. 4331. One Window Open. MANSFIELD DECK-SASH OPENER.

Fig. 4332. Opener Complete.

Figs. 4333-4334. DECK-SASH TRANSOM OPENER.

Fig. 4335. Launder Monitor.

Fig. 4336. Single, Decorated.

Fig. 4337. Single, with Handle. DECK-SASH OPENER.

Fig. 4338. Manfield's Improved.

Fig. 4339. Single, Plain.

Fig. 4340-41. Single Key.

Figs. 4342-4344. DECK-SASH PULLS.

With Flanges.

Figs. 4344-4345. DECK-SASH PULLS.

With Screws.

Figs. 4351-4352. DECK-SASH PIVOTS.

Figs. 4353-1355. DECK-SASH PIVOTS.

Fig. 4356. Continuous With Screw.

DECK-SASH OPENER.

Figs. 4357-4358. DECK-SASH PIVOTS AND PLATE.

Figs. 4360-4362. DECK-SASH PIVOTS.

(321) Figs. 4363-4364. DECK-SASH PIVOTS.

Figs. 4365-4366. DECK-SASH AND TRANSOM CATCHES.
Figs. 4380-4402. CAR-FURNISHINGS, Windows; Deck-sash.

Fig. 4373.
DECK-SASH CATCHES.

Fig. 4374.
DECK-SASH CATCHES.

Fig. 4375.
DECK-SASH CATCHES.

Fig. 4381.
DECK-SASH CATCH-PLATES OR STRIKE-PLATES.

Fig. 4382.
DECK-SASH CATCH-PLATES OR STRIKE-PLATES.

Fig. 4383.
DECK-SASH CATCH-PLATES OR STRIKE-PLATES.

Fig. 4384.
DECK-SASH CATCH-PLATES OR STRIKE-PLATES.

Fig. 4385.
DECK-SASH LOWER RATCHET-CLAMP AND PIVOT.

Fig. 4386.
DECK-SASH UPPER RATCHET-CLAMP AND PIVOT.

Fig. 4387.
DECK-SASH LOWER RATCHET-CLAMP AND PIVOT.

Fig. 4388.
DECK-SASH UPPER RATCHET-CLAMP AND PIVOT.

Fig. 4389.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4390.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4391.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4392.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4393.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4394.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4395.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4396.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4397.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4398.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4399.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4400.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4401.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4402.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4403.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4404.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4405.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4406.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4407.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4408.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4409.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4410.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4411.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4412.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4413.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4414.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.

Fig. 4415.
DECK-SASH HOOK AND SPINDLE, AND RATCHET-CLAMP AND PIVOT.
CAR-FURNISHINGS, Window-blinds; Bolts, Springs and Pulls

Figs. 4408-4449

Fig. 4100. Blind Bolt.
Fig. 4101. Blind-bolt Bushing.
Fig. 4102. Blind Bolt.

Fig. 4130. Lower Window-blind Pull or Lift.
Fig. 4131. Upper Window-blind Pull or Lift.

Figs. 4113-4114. Sash and Blind Springs

Figs. 4115-4116. Window-blind Pulls or Lifts.

Fig. 4117. Window-blind Bolts or Fasteners.

Figs. 4122-4123. Window-blind Pulls or Lifts.

Figs. 4132-4141. Upper and Lower Window-blind Pulls or Lifts.

Fig. 4145-4149. Upper and Lower Window-blind Pulls or Lifts.
A Lower Window-blind Pull has a projecting Flange to support the Upper-blind.
Figs. 4450-4490. CAR-FURNISHINGS, Windows, Blinds and Sash; Stops and Bolts.
CAR-FURNISHINGS, Window-sash ; Sash Lifts.

Fig. 4491-4496. Window-sash Lifts, Cone Top.

Fig. 4497-4501. Window-sash Lifts, Cone and Straight Top.

Fig. 4502-4505. Window-sash Lifts, Straight Top.

Fig. 4506-4508. Window-sash Lifts, Straight Top.

Fig. 4509-4511. Window-sash Lifts, Mortise.

Fig. 4512-4514. Window-sash Lifts, Mortise.

Fig. 4515-4517. Window-sash Lifts, Straight Top.

Fig. 4518-4520. Window-sash Lifts, Bar Pattern.
Figs. 4521-4523. CAB-FURNISHINGS, Windows; Sash-lifts, Balances, Etc.

Figs. 1521-4522. Window-sash Lifts, Bar Pattern.

Figs. 4523-4524. Window-sash Lifts, Bar Pattern.

Figs. 4525-4526. Window-sash Lifts, Bar Pattern.

Figs. 4531-4532. STORM-SASH FASTENER.

Figs. 4527-4530. ELEVATIONS AND PLANS. Window Dust-guard or Deflector.

Figs. 4531-4532. STORM-SASH FASTENER.

Fig. 4533. DUST-GUARD SPINDLE HOLDER.

Fig. 4534. For the Upper Sash of Windows.

Fig. 4535. For the Lower Sash of Windows.

Fig. 4536. For the Center of Windows.

Fig. 4537. Rubber Weatherstrip. Boseley's Excelsior Weather Strip.


Figs. 4540-4541. For Windows and Sides of Doors. Cooper's Metallic Weather Strips.
Names of Parts. Figs. 4544-4545.

A. Steel Tube, Oval Cross-section.
B. Cams or Eccentric.
C. Corrugated End.
D. Brake.
E. Brass-tip to carry rubber wheel.
F. Thumb-latch.
G. Rod-bearing for spring.
H. Steel axle.
I. Steel rod.
J. Spring.

Fig. 4551. Lambrquin and Shades for Parlour-car.
Hale & Kilburn Mfg. Co.

Names of Parts. Figs. 4544-4545.

A. Steel Tube, Oval Cross-section.
B. Cams or Eccentric.
C. Corrugated End.
D. Brake.
E. Brass-tip to carry rubber wheel.
F. Thumb-latch.
G. Rod-bearing for spring.
H. Steel axle.
I. Steel rod.
J. Spring.

Fig. 4550. Acme Automatic Window-shade.
(One Guide Returns) Adams & Westlake Co.

Acme Automatic Window-shade.
(One Guide Returns) Adams & Westlake Co.

Fig. 4552. Leather and Fringe Shade Bottoms.
In all Colors and Designs to match Tapestry.

Fig. 4550. Acme Automatic Window-shade.
(One Guide Returns) Adams & Westlake Co.

Acme Automatic Window-shade.
(One Guide Returns) Adams & Westlake Co.

Fig. 4552. Leather and Fringe Shade Bottoms.
In all Colors and Designs to match Tapestry.
CAR TRUCKS.

COMPLETE LIST OF NAMES OF THE PARTS OF FREIGHT-CAR TRUCKS. Figs. 4576-4605.

Names of parts in Roman type are special to the miscellaneous and exceptional types of freight-car trucks shown on the following pages. Those in italics only are parts belonging to the Diamond type of truck, which is now the almost universal standard.

Numbers which are omitted from this list are for parts special to passenger-car trucks. Figs. 4606-4608.

1. Wheel.
2. Axle.
5. Pedestal.
7. Continuous Truck-frame.
8. Wheel-piece.
10. Inverted Arch-bar.
11. Auxiliary Arch-bar.
12. End-piece.
13. Transom.
15. Transom Truss-block.
17. Transom Fishing-plate.
18. Transom-casting.
20. Truck-bolster.
23. Truck-bolster Truss-rod Bearing.
24. Truck-bolster Truss-rod Washer.
25. Truck-bolster Fishing-plate.
28. Spring-plank.
29. Spring-plank Bearing.
30. Swing-hangers.
32. Lower Swing-hanger Pivot.
33. Swing-hanger Pivot-bearing.
34. Safety-beam.
35. Axle Safety-spar.
36. Safety-beam Truss-rod.
37. Safety-beam Truss-rod Bearing.
38. Truck Side-bearing.
39. Truck Center-plate.
40. Center-plate Block.
41. Bolster Spring-seat.
42. Bolster Spring-cap.
43. Journal-box Spring.
44. Bolster-spring.
45. Brake-block.
46. Brake-block Washer.
47. Brake-block Frame.
49. Brake-beam Guide.
50. Brake-beam Stop.
51. Brake-beam Cap.
52. Brake-beam Sheave.
53. Lower Brake-rod.
54. Brake-shoe.
55. Body Center-plate.
56. Journal-box Bolts.
57. Column-bolt.
58. Journal.
60. Stop-plate.
61. Dust-guard.
63. Brake-beam Adjusting-hanger Clip.
TRUCKS, Freight Car; General Views.

Fig. 4576. Side View.
Freight-car Truck. Harvey Steel Car & Repair Works.

Fig. 4577. End View.
Freight-car Truck. Harvey Steel Car & Repair Works, Harvey, Ill.

Fig. 4578. Perspective View.
The Fox Solid-pressed-steel Truck.
80,000 lb. M. C. B. Wheels, Axles and Bearings.

Fig. 4579. Perspective View.
Diamond Truck for Russell Snow Flow.
Journals and Arch Bars on Inside and Outside. Solid Wood Bolder with Flitch Plates.
Figs. 4580-4597. TRUCKS, Freight-car; Rigid Diamond and Details.

Fig. 4580. Sectional Side Elevation.

Fig. 4581. Part Plan.

Fig. 4582. Part End Elevation.

RIGID DIAMOND FREIGHT-CAR TRUCK. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Half Elevations and Half Plans.
TRUCK-BOLSTER AND TRUCK-BOLSTER FLITCH-PLATES.

Fig. 4587-4588.

Fig. 4585-4587. SPRING-PLANK.
(Steel channel with wood filler.)

Figs. 4581-4582. BRAKE-LEVER STOP AND GUIDE.
Figs. 4593-4594. BRAKE-LEVER STRUT.

WROUGHT IRON AND STEEL DETAILS OF RIGID DIAMOND FREIGHT-CAR TRUCK. NEW YORK, LAKE ERIE & WESTERN RAILROAD.
Details not given above are Master Car Builders' Standard, which are shown hereinafter. They include Journal Box, Journal-box Lid, Wedge, Brass, and 33-in. Chilled Wheels.

Cast-iron Details of a 40,000-lb. Rigid Diamond Freight-car Truck. NEW YORK, LAKE ERIE & WESTERN RAILROAD.
TRUCKS, Freight-car; Details of Rigid Diamond. Figs. 4667-4728

Fig. 4667. Column-bolt (2).
Fig. 4668. Bolster-plane bolt (2).
Fig. 4669. Journals-box bolt (2).
Fig. 4670. Brake-hanger pin (2).
Fig. 4671. Plate brake-hanger pin (2 of each).
Fig. 4672-73. Intermediate bolster beam separator castings.

Fig. 4674-5. Live-lever guide (1).
Fig. 4675-6. Brake-beam adjusting-hanger carrier (2).
Fig. 4677-8. Dead brake-lever (1).
Fig. 4679-80. Dead brake-lever guide (1). Pins (2 of each).
Fig. 4681-2. Adjusting-hanger carrier (2).
Fig. 4683-4. Interlocking plate (2).

Fig. 4685-7. Intermediate (1).
Fig. 4686-8. Encl. (1).
Bolster beam separator castings.

Fig. 4689-90. Brake-hanger (4).
Fig. 4691-2. Adjusting-hanger carrier (2).
Fig. 4693-4. Adjusting-hanger carrier (2).
Fig. 4695-7. Washer (1).

Fig. 4701-2. Brake-hanger bracket (4).
Fig. 4703-4. Washer (4).
Fig. 4705-6. Washer (6).
Fig. 4707-8. Washer (8).

Fig. 4710-15. Steel or malleable-iron spring-plates and caps, for cars of 40,000, 50,000 and 60,000 lbs. capacity respectively.

Fig. 4720-21. Cast-iron truck center-plate.

Details of Rigid Diamond Freight-car Truck. Norfolk & Western Railroad.
TRUCKS, Freight-car; Swing-motion.

Swing-motion Diamond Freight-car Truck. Chicago & North Western Railway.

TRUCKS, Freight-car: The Fox Pressed-steel.

Numbers refer to Names of Parts on Following Page.

Fig. 4755. Side Elevation.

Fig. 4754. Part Plan.

Fig. 4756. Cross Section and Half End Elevation.

THE FOX SOLID Pressed-steel TRUCK.

Figs. 4761-4764. Tie-pieces (1).

Figs. 4778-4779. Live Lever (1) and Dead Lever (1).

Figs. 4780-4781. Lever-lower Guide (1).

Figs. 4782-4783. Lever-lower Stop (1).

Figs. 4784-4785. Safety Chains and Hasps (1).

Figs. 4786-4787. Brake-lead Hangers (1).

Figs. 4770-4771. King Side-bearings (0).

Figs. 4772-4773. Lever Connection (1).

Figs. 4774-4775. Safety-chain Loop.

Figs. 4776-4777. Brake-lead Hanger Castings (4).

Details of Fox Solid Pressed-steel Truck, Adopted by the New York Central & Hudson River Railroad.
Figs. 4786-4791. TRUCKS, Freight-car; Special Truck and Bolster.

Fig. 4786. Sectional Side Elevation.

Fig. 4787. Plan.
SIX-WHEEL TRUCK FOR 30-TON FLAT-CAR. CHICAGO & NORTH WESTERN RAILWAY.
The car is shown in Figs. 290-293.

Fig. 4788. End-piece.

Fig. 4789. Sectional End Elevation.
TRUCK FOR 50-TON FLAT-CAR.

Fig. 4790-91. THE AMERICAN STEEL TRUCK-BOLSTER.

THE AMERICAN STEEL CASTING COMPANY.

Fig. 4753-4757.

1. Wheel.
2. Wheel-axle.
5. Pedestal-brace.
15. Side-plate.
20. Transom.
63. Bottom Center-plate.
64. Base-plate.
64a. Side-bearing Strut.
64b. Transom (same as 20.)
78. Journal-spring.
87. Brake-hanger Bracket.
107. Body Center-plate.
A special swing-motion truck, the frame of which is carried in stirrups bearing upon the journal-boxes, which leaves each pair of wheels free to move laterally.
List of Names of Parts of Passenger-car Trucks. Figs. 4806-4966.

Names of parts in Roman type are special to six-wheeled car-trucks. Numbers which are omitted from this list are for parts special to freight-car trucks, shown on the pages immediately preceding.

| 1. | Wheel. |
| 2. | Axle. |
| 5. | Pedestal. |
| 7. | Pedestal Stay-rod. |
| 10. | Outside Wheel-piece Plate. |
| 11. | Inside Wheel-piece Plate. |
| 20. | Transom. |
| 22. | Outside Transom for Six-wheeled Truck. |
| 23. | Transom Tie-bar. |
| 24. | Transom Truss-rod. |
| 25. | Transom Truss-block. |
| 27. | Transom Chafing-plate. |
| 29. | Transom-piller. |
| 30. | Truck-sill. |
| 31. | Truck-brasting. |
| 32. | Lateral-motion Spring. |
| 33. | Lateral-motion Spring-pin. |
| 34. | Spring-beam. |
| 35. | Spring-plank. |
| 37. | Swing-hangers. |
| 38. | Upper Swing-hanger Pivot. |
| 39. | Lower Swing-hanger Pivot. |
| 40. | Swing-hanger Pivot-bearing. |
| 41. | Swing-hanger Friction-block. |
| 42. | Safety-beam. |
| 43. | Middle Safety-beam. |
| 44. | Safety-beam Block. |
| 45. | Axle Safety-bearing. |
| 46. | Axle Safety-strap. |
| 47. | Axle Safety-bearing Thimbles. |
| 48. | Safety-beam Tie-rod. |
| 49. | Safety-beam Iron. |
| 50. | Truck Side-bearing. |
| 51. | Side-bearing Bridge. |
| 52. | Truck Center-plate. |
| 53. | Center plate Block. |
| 54. | Center-bearing Beams. |
| 55. | Center-bearing Arch-bar. |
| 56. | Center-bearing Inverted Arch-bar. |
| 57. | Center-chain. |
| 58. | Truck Check-chain Hook. |
| 59. | Truck Check-chain Eye. |
| 60. | Equalizing-bar. |
| 61. | Equalizing-bar Spring-cap. |
| 62. | Equalizing-bar Spring-seat. |
| 63. | Brake-beam Spring-seat. |
| 64. | Brake-beam Spring-cap. |
| 65. | Spring-block. |
| 66. | Equalizing-bar Spring. |
| 68. | Spring-seat. |
| 69. | Brake-hanger. |
| 70. | Brake-shoe. |
| 71. | Brake-shoe. |
| 72. | Kingbolt or Center-pin. |
| 73. | Journal-bearing. |
| 74. | Stop-plate. |
| 75. | Dust-guard. |
| 76. | Brake-beam Adjusting-hanger Carrier. |
| 77. | Brake-beam Adjusting-hanger. |
| 78. | Brake-beam Adjusting-hanger Clip. |
| 79. | Brake-beam Adjusting-hanger Plate. |
| 80. | End-sill Corner-plate. |
| 81. | Transom Corner-plate. |

Fig. 4806. Half Side Elevation and Half Cross Section.

Fig. 4807. Part Plan.

Fig. 4808. Half Longitudinal Section and Half Side Elevation.

FOUR-WHEELED PASSENGER-CAR TRUCK. BALTIMORE & OHIO RAILROAD.
TRUCKS, Passenger-car; Four-wheeled.

Fig. 4809-4812

Fig. 4809. Sectional Side Elevation.

Fig. 4810. Longitudinal Section.

Fig. 4811. Half Transverse Sections.

Fig. 4812. End Elevation.

FOUR-WHEELED PASSENGER-CAR TRUCK, MANHATTAN RAILWAY.
Fig. 4813-4851. TRUCKS, Passenger-car; Four-wheeled and Details.

Fig. 4813. Half Side Elevation and Half Longitudinal Section.

Fig. 4814. Half Plan.

Fig. 4815. Half Cross Section and Half End Elevation.

PASSenger-car TRUCK, FOUR-WHEELED. NEW YORK, LAKE ERIE & WESTERN RAILROAD.

Fig. 4816-4818. TRANsOM.

Fig. 4819-4821. AXLE-GUARD, BACK.

Fig. 4822-4824. AXLE-GUARD, FRONT.

Fig. 4825-4826. SPRING-PLANK FLITCH-PLATE.

Fig. 4827-4829. WHEEL-PIECE.

Fig. 4830-4832. WHEEL-PIECE PLATE.

Fig. 4833-4835. FRONT END-PIECE.

Fig. 4836-4840. BACK END-PIECE.

Fig. 4841-4842. BRAKE-MYER BOLT.

Fig. 4843-4844. SWING-HANGER BOLT.

Fig. 4845-4846. PIN FOR BRAKE-HANGER.

Fig. 4847-4848. PIN FOR BRAKE-HANGER STOP.

Fig. 4849. PIN FOR AXLE-GUARD TIE-Rod.

Fig. 4850. ADJUSTING-ROD.

Fig. 4851. BRAKE-MEY GUIDE.

DETAILS OF FOUR-WHEELED PASSENGER-CAR TRUCK. NEW YORK, LAKE ERIE & WESTERN RAILROAD.
Details of Four-wheeled Passenger-car Truck. New York, Lake Erie & Western Railroad.
Fig. 4919-4920. TRUCKS, Passenger-car; Four wheeled and Details.

- Figs. 4919-4920. Brake-hanger.
- Figs. 4921-4922. Spring-plank Safety-strap.
- Figs. 4923-4924. Spring-plank Hanger-carrier.
- Figs. 4925-4927. Brake-beam Adjusting-hanger Carrier.
- Figs. 4928-4929. Brake-rod.
- Figs. 4932-4933. Pedestal Tie-bar.
- Figs. 4934-4937. Rad-sill Plate.
- Figs. 4938-4939. Truck Check-chain.
- Figs. 4940-4941. Live Brake-lever.

Fig. 4942. Half Side Elevation and Half Longitudinal Section.
FOUR-WHEELED PASSENGER-CAR TRUCK. LAKE SHORE & MICHIGAN SOUTHERN RAILWAY.

FOUR-WHEELED PASSENGER-CAR TRUCK. CHICAGO, BURLINGTON & QUINCY RAILROAD.
Fig. 495. A PERSPECTIVE VIEW OF A FOUR-WHEELED TRUCK.

An Old Pattern, Given for reference to Names of Parts, which are essentially the Same as in the More Modern Trucks.
CAR-TRUCKS, Passenger-car; Six-wheeled.

**Fig. 4962. Perspective View.**

**SIX-WHEELED PASSENGER-CAR TRUCK.**

**Fig. 4963. Half Side Elevation.**

**Half Longitudinal Section**

**Fig. 4964. Plan.**

**Fig. 4965. Transverse Sections.**

**Fig. 4966. Half End Elevation.**

**SIX-WHEELED PASSENGER-CAR TRUCK.**

PULLMAN'S PALACE CAR COMPANY.

Standard for Parlor, Private and Sleeping Cars, and adopted with slight modifications by numerous Railroads.
Fig. 5154. DUST-GUARD.

Figs. 5152-5153. Fletcher Journal-box Lid.

Figs. 5153-5154. TRUCK DETAILS; Journal-boxes.

Fig. 5155. DUST-GUARD.

Figs. 5150-5151. FLETCHER JOURNAL-BOX LTD.

Names of Parts. Figs. 5146-5151.

1. Journal-box.
2. Journal.
4. Stop-wedge.
5. Stop-wedge Axle-bearing.
10. Dust-guard Felt.
11. Oil-retaining Lip.
12. Dust-guard Bearing.
15. Journal-box-cover Spring.

Fig. 5156. Stop-wedge.


Names of Parts. Figs. 5133-5137.

C. Wheel-seat.
D. Dust-guard Bearing.
E. Journal.
10. Journal box.
15. Dust-guard.
27. Journal-bearing Stop-key.

Fig. 5157. Applied to a Collared Journal.

Boston & Albany Railroad.
TRUCK DETAILS; Journal Boxes and Lids. Figs. 5155-5175

The Stick Dust-guard. Figs. 5155-5158.
Sectional Plan and Elevation.


The American Dust-guard. Figs. 5159-5160.

The Raoul Journal-box. Figs. 5165-5166.

The Raoul Journal-box. Fig. 5165.

Morris Box-lids. Figs. 5167-5170.

The Hewitt Box-lid. Made of Pressed Steel. Figs. 5170-5171.

The Drexel Box-lid. Figs. 5172-5175.
**Figs. 5178-5204. TRUCK DETAILS: Center-plates, Side-bearings and Bolster-springs.**

- **Fig. 5182. Pressed-steel Journal-box.**
- **Fig. 5184-5185. Pressed-steel Bolster-column and Guide-plate.**
- **Fig. 5187-5188. Hubbard Anti-friction Side-bearing.**
- **Fig. 5181-5182. Schoen Pressed-steel Center-plates.**
- **Fig. 5181-5185. Holster-column and Guide-plate.**
- **Fig. 5187-5189. Hubbard Anti-friction Side-bearing.**
- **Fig. 5181-5182. Schoen Pressed-steel Center-plates.**
- **Fig. 5181-5185. Holster-column and Guide-plate.**
- **Fig. 5187-5189. Hubbard Anti-friction Side-bearing.**

---

**Press the spring, seat and case. Norfolk & Western Railroad.**

The number of springs depends on capacity of car, each spring being capable of carrying about 10,000 lbs.

**Figs. 5190-5191. King's Yielding Side-bearing.**

---

**Figs. 5192-5193. Schoen Pressed-steel Brake-shoe.**

---

**Figs. 5199-5200. Freight bolster spring and case.**

**L. S. & M. S. Railway.**

---

**Figs. 5200-5204. Freight bolster spring and case.**

**L. S. & M. S. Railway.**

---

**Figs. 5203-5204. Holster-spring.**

Four springs in groups of 3 coils or less, as required.

Width of Case, 11 ins. Capacity, 5 to 8 tons.

**Figs. 5203-5204. Holster-spring.**

Four single-coil springs.

Diameter of Case, 11 ins. Height, 7 ins. Capacity, 6 to 8 tons.
TRUCK DETAILS, Springs; Bolster.

Fig. 5205. Bolster-spring. Four single-coil springs. Diameter of case, 11 ins. Height, 6 ins. Capacity, 6 to 8 tons.

Fig. 5206. Three double-coil springs. Diameter of case, 13 ins. Capacity, 5 to 6 tons.

Fig. 5207. Bolster-spring. Seven coil, Round bar. Capacity, 5 to 6 tons.

Fig. 5208. Three single-coil springs. Diameter of case, 11 ins. Capacity, 5 to 6 tons.

Fig. 5209. Spring-plate. Bolster-springs and Case.

Fig. 5210. Triple Graduated Bolster-spring. The large spring carries empty car-body; the smaller springs assist in carrying the load.

Fig. 5211. Narrow-gage Bolster-spring. Width of case, 7 ins. Four two-coil springs. Capacity, 2 tons.

Fig. 5212. Narrow-gage Bolster-spring. Diameter of case, 7 ins. Capacity, 2 1/4 tons.

Fig. 5213. Graduated Two-group Bolster-spring.

Fig. 5214. Caboose Bolster-spring. Three coil. Diameter of case, 9 1/4 ins.
Figs. 5219-5228. TRUCK DETAILS, Bolster and Equalizer Springs.

Fig. 5219. Triple-coil Graduated Bolster-spring.

Fig. 5220. Double-coil Graduated Bolster-spring.

Fig. 5221. Bolster-spring of 8 Single Coils. Width of Case, 71/4 ins. Capacity, 5 to 6 tons.

Fig. 5222.

Fig. 5223. Double-coil Equalizer-spring.

Fig. 5224. Double-coil Equalizer-spring.

Fig. 5225. Triple-coil Equalizer-spring.

Fig. 5226. Single-coil Equalizer-spring.

Fig. 5227. Double-coil Equalizer-spring.

Fig. 5228. Triple-coil Equalizer-spring.
In making Elliptic Springs for freight or passenger cars, the following information is required:

- Length between centers of scrolls, light...Overall, loaded...
- Thickness of plates
- Total weight of body
- Number of springs in bundle
- Overall, lightweight
- Size of bands
- Number of plates
- Seating capacity

Elliptic-springs are designed as Duplicate, Triplet, Quadruple, Quintuple, Sextuple, which include two, three, four, five and six full elliptic-springs bolted together.

**Fig. 5229.** Douche Elliptic-spring, for freight service.

**Fig. 5230.** Concave Elliptic-spring. (36 in. X 12 1/4 in. high; 8 leaves; main, 3 x 1 1/4 in.; others, 3 x 3 1/4 in. Weight, 183 lbs. Capacity, 6,000 lbs. half exhausted.)

**Fig. 5231.** Triple Elliptic-spring, for passenger service.

**Fig. 5232.** Draft and Journal-spring.

**Fig. 5233.** Draft-springs, 2-coil.

**Fig. 5234.** Machinery-springs.

**Fig. 5235-5239.** Figs. 5229-5240a.
Figs. 5241-5254. TRUCK DETAILS; Sundry Spiral-springs.

Fig. 5241. SQUARE-BAR SINGLE-COIL Spring.

Fig. 5242. KEG-SHAPED Spiral-spring.

Fig. 5243. SPOOL-SHAPED Spiral-spring.

Fig. 5244. Volute-spring.

Fig. 5245. OVAL-BAR DOUBLE-COIL Buffer-spring.

Fig. 5246. ROUND-BAR TRIPLE-COIL GRADUATED-spring.

Fig. 5247. ROUND-BAR DOUBLE-COIL Buffer-spring.
   (Capacity, 16,000 to 18,000 lbs.)

Fig. 5248. ROUND-BAR SINGLE-COIL Spiral-spring.

Fig. 5249. ROUND-BAR DOUBLE-COIL Spiral-spring or Nest-spring.

Fig. 5250. ROUND-BAR TRIPLE-COIL Spiral-spring or Nest-spring.

Fig. 5251. SQUARE-BAR TRIPLE-COIL Nest-spring.

Fig. 5252. EDGE-ROLLED Spiral-spring.

Fig. 5253. FLAT-BAR OR EQUAL-BAR TRIPLE-COIL Spiral-spring or Nest-spring.

Fig. 5254. "Hibbard" OR FLAT-BAR QUADRUPLE-COIL Nest-spring.
TRUCK DETAILS, Wheels; Allen Paper Car Wheel Company. Figs. 5233-5273

Figs. 5234-5252. No. 1. Wheel with Paper Center. Tire secured by Plates and Bolts.

Figs. 5253-5273. Cast-iron Spoke-center. Tire is Pasted on with One Retaining-ring.

Figs. 5255-5253. No. 11. Wheel with Cast-iron Double-plate Center. Tire secured by One Retaining-ring.


Mansell Retaining-rings. Shrunk on Center.

Figs. 5267. No. 5. Cross Section of Wrought-iron Pressed-plate Wheel.

Figs. 5268. No. 8. Cross Section of Cast-iron Pressed-plate Wheel.

Fig. 5269. No. 11. Cross Section of Cast-iron Double-plate Wheel.

STEEL-TIRED CAR-WHEELS. ALLEN PAPER CAR WHEEL COMPANY.

Tires are shrunk on. Diameters are 26, 28, 30, 32, and 36 ins.

WHEELS FOR ELECTRIC AND CABLE CARS. ALLEN PAPER CAR WHEEL COMPANY.

Steel Tired Wheels. Diameters, 28-33 ins.
Figs. 5274-5291. TRUCK DETAILS, Steel-tired Wheels; Arbel and Boies.

WROUGHT-IRON SPOKE-CENTER.

Figs. 5271-75.

WROUGHT-IRON SINGLE-PLATE CENTER.
Tires are fastened by Gibson Fastening.

THE COCKAREL-ARBE T WHEELS. CHAS. G. EKSTIN & Co., NEW YORK.

Figs. 5276-77.

WROUGHT-IRON SPOKE-CENTER.

Figs. 5278-79.

TIRE is fastened by Mansell-rings.

THE COCKAREL-ARBE T WHEEL.

Figs. 5280-81.

WROUGHT-IRON DOUBLE-SPOKE CENTER.

Figs. 5282-83.

THE BOIES DOUBLE-PLATE STEEL-TIERED WHEEL. NO. 1.

TIRE is fastened with Integral-lock.
Wrought-iron Center.

Figs. 5284-88.

Boies Steel-tired Car-wheel, No. 2.

Boies INTEGRAL TIRE-LOCK AND TOOL FOR ROLLING THE SAME.

Showing the manner in which the lip is rolled into the circumferential recess.

Fig. 5286. Cross Section of Tire, with Dimensions.

Fig. 5288. Cross Section of Tire, showing Limits of Wear for First Tire and for Renewals.

TRUCK DETAILS, Steel-tired Wheels; Brunswick, Krupp and McKee, Fuller. Figs. 5292-5207a


Wheels Made by Page, Newell & Company, Boston.

Figs. 5298-5299. No. 11 Wheel. Wrought-iron Coil-disc Center. Tire Secured with Bute Fastening.


Figs. 5302-5303. No. 1 Wheel. Wrought-iron Coil-disc Center. Tire Secured by Wrought-iron Retaining-rings.


Figs. 5306-5306a. Cast-iron Double-plate Center Wheel. Center to cast into heated tire.

Figs. 5307-5307a. Cast-iron Spoke Center-wheel. Center to cast into heated tire.
Figs. 5308-5320. **TRUCK DETAILS, Steel-tired Wheels; Paige, Vauclain and Taylor.**

Figs. 5308-5309. Plate-wheel with Cast-iron Hub. Tire is secured by two side-plates of \( \frac{3}{4} \) in. Steel, and bolted with Turned Steel Bolts.

Wheels made by the Paige Car Wheel Company.


Figs. 5316-5317. Taylor's Interlocked and Welded Steel-tired Wheel. The Steel Tire and Iron Center are Welded Together.


Fig. 5320. Teak-wood-center Wheel. Tire fastened with Mansell Rings. Largely in use in England.
TRUCK DETAILS, Wheels: Snow's, Washburn's and Griffin's.

Fig. 5321. Snow's Boltless Steel-Tired Double-Plate Wheel. Tire is fastened to center by retaining-ring.

Fig. 5326. Snow's Bootless Steel-Tired Spoke Wheel. Tire is fastened to center by retaining-ring.

Fig. 5329. Section of Bootless Fastening.

Fig. 5330-5331. Cast-Iron Double-Plate Center.

Fig. 5332. Cross Section of Tread and Flange, Chilled Wheel.

Fig. 5333. Chilled Cast Wheel. Center is cast into heated tire.
Figs. 5337-5347. TRUCK DETAILS, Steel-tired Wheels; Fastenings.

**Fig. 5337.**
The Gibson Tire Fastening.

**Fig. 5338.**
The Krupp Safety-Lock.

**Fig. 5339.**
The Mansell Tire Fastening.

**Fig. 5340.**
The Mansell Tire Fastening.

Fastenings for Steel-tired Wheels in General Use.

**Fig. 5341.**
The Gibson Fastening.

**Fig. 5342.**
Carleton and Stoughton.

Fastenings that have been in use in Europe.

**Fig. 5343.**
Drummond Fastening.

**Fig. 5344.**
Rivet Fastening.

**Fig. 5345.**
Set-screw or Stud Fastening.

Fastenings that have been in use in Europe.

**Fig. 5346.**
Set-screw Fastening (Plain End.)

**Fig. 5347.**
English Mansell Wheel.

Teakwood Center. Tire secured by Mansell Retaining-rings.
TRUCK DETAILS, Cast Wheels; Types.

Figs. 5348-50.
DOUBLE-PLATE CHILLED CAR-WHEELS.

Figs. 5351-52.
Section and Front View.
HOLLOW-SPOKE WHEEL.

Figs. 5353-54.
CAST-CENTERS FOR STEEL TIRES.

Figs. 5360-61.
Back View.
Front View.
SINGLE-PLATE WHEEL.

Fig. 5363.
Back View.
SINGLE-PLATE WHEEL FOR STREET-CARS.

Fig. 5364.
Back View.
OPEN-PLATE WHEEL FOR STREET-CARS.
Figs. 5364-5376. **Truck Details, Wheels; Contracting-chills.**

Fig. 5364. Elevation.

Fig. 5365. Plan.

Fig. 5366. Half Cross Sections.

Fig. 5367. Plan of Bed Plate.

**The Barb Contracting-chill.**

Fig. 5368. Plan of Chill.

Fig. 5369. Half Cross Section and Half Side Elevation.

**The Whitney Contracting-chill.**

Fig. 5370. Perspective View of Segmental Chilling-blocks.

Fig. 5371-5373. Enlarged Plan and Cross Sections of Segmental Chilling-blocks.

**The Cana Contracting-chill.**
Note.—If the method of molding does not permit of placing the letters M. C. B. on the side of the journal box, they may be placed on the top, between the hinge lug and the arch-bar seat.

By letter ballot in 1894 the Master Car Builders' Association voted to leave off the lugs at sides of arch-bars on top of journal-box, and to make the wedge curved and the bearing flat, as shown in Figs. 5380-5381.
Fig. 5383-5388. MASTER CAR BUILDER STANDARDS; Journal Boxes.

Fig. 5381. Half Plan and Half Longitudinal Section.

VoiK. — If the method of molding does not permit of placing the letters M.C.B. on the side of the journal-box, they may be placed on the top, between the hinge-lug and the arch-bar seat.

Fig. 5388. Longitudinal Section.

Fig. 5386. Half Plan and Half Longitudinal Section.

NOTE — If the method of molding does not permit of placing the letters M.C.B. on the side of the journal-box, they may be placed on the top, between the hinge-lug and the arch-bar seat.

Fig. 5387. Half End Elevation and Half Cross Section.


(Adopted as standards in 1893.)
Note.—The journal-box and details as shown in these drawings were adopted as standards of the Association, by letter ballot, in 1893, and revised in 1894. For former action, see Proceedings 1874, page 40; Proceedings 1891, pages 14, 15 and 27.

The revision made in 1894 consisted in correcting the drawing at the top of the journal-box, and in leaving off the lugs at sides of arch-bar; also in changing the wedge and bearing of the 3½ x 7-in. journal so as to make the latter flat on top instead of curved, as therefrom, and in curving the top of the wedge, thus making this construction similar in general arrangement to the standard forms for the 14 x 8-in. journal-box.

Figs. 3103-3103. WEDGE.

Figs. 5301-5303. BRACING.

STANDARD WEDGE AND BRACING FOR 3½ X 7-IN. JOURNAL.
Adopted in 1893 and revised in 1894.
Fig. 5419. Standard Axle with 3\(\frac{3}{4}\) x 7 in. Journal.
Standard for Cars of 10,000 lbs. capacity. Recommended in 1873 and revised in 1884.

Fig. 5420. Standard Axle with 4\(\frac{3}{4}\) x 8 in. Journal.
Standard for Cars of 60,000 lbs. capacity. Adopted in 1889.

Fig. 5421. Standard Wheel-gage.
Maximum distance allowed between flanges is 4 ft. 5\(\frac{1}{2}\) ins. and the minimum distance is 4 ft. 1\(\frac{1}{2}\) ins.
Adopted by letter ballot in 1885.

Fig. 5422-5423. Standard Wheel-circle Circumference Measure.
Adopted in 1889.

Fig. 5424. Standard Wheel
Tread and Flange.
Adopted in 1889.


**MASTER CAR BUILDERS' STANDARDS; Brake-gear.**

Fig. 5425-5441

**Standard Brake-head, Brake-shoe and Key.**

Adopted in 1836, and Revised in 1888 and 1891.

The height of Center of Brake-shoe above the top of the Rail should be: For inside-hung Brake-beams, 13 ins.; for outside-hung Brake-beams, 16½ ins.

**Fig. 5422. Standard Data for Iron Brake-beam.**

Fig. 5423-5440. Elevation and Plan.

**Standard Air-brake Gear for Freight-cars.**

Adopted by letter ballot, 1889, subsequent actions in 1892, 1891 and 1893. The following data are also standard:

1. Maximum train-pipe pressure, 70 lbs. per square inch.
2. Maximum braking power in freight cars, 75 per cent. of the light weight of car.
3. All levers 1 inch in thickness, all pins turned 1 3/32 inches in diameter; all jaws and clevises made of ¾ in. × ¾ in. iron; all rods ¾ in. diameter.
4. Angle of brake-beam lever, 45° with vertical.

The general arrangement is also shown in Car-body Details, Brake-gear, Figs. 1457-1537 and 1693-1693.
Fig. 5442-54483. Master Car Builders' Standards; Brake Gear and Pedestal.

Figs. 5449-5483. Details of Foundation Brake-gear for Freight-cars. Adopted as Standard 1889; revised in 1890, 1891 and 1893.

Fig. 5480. Cross Section.
Fig. 5481. Sectional Elevation.
Fig. 5482. End Elevation.

Fig. 5483. Sectional Plan with part of Oil-box.

Master Car Builders' Standard Pedestal. Recommended in 1871, again approved in 1881, and adopted as standard in 1893. Weight, 141 lbs.
Fig. 5484. Standard Guard Rail and Frog Wing Gage.
Adopted in 1891.

Fig. 5485. Standard Terms and Gaging Points for Wheels and Track.
Adopted in 1891.

Fig. 5486. Standard Check Gage for Mounting Wheels.
Adopted in 1891.

Diameter of chill moulds for 33" wheels to be 33", for 30" wheels to be 30% measured on line A B.

Wheel Tread.
Fig. 5487. Standard Wheel Tread. Adopted in 1891.

Max. Flange Thickness Gauge.
Fig. 5488. Gages for Standard Maximum and Minimum Thickness of Flanges. Adopted in 1894.

Min. Flange Thickness Gauge.

Steel Tire Limit Figure.
Fig. 5489. Recommended Practice for Minimum Thickness for Steel Tires. Adopted in 1894.
Figs. 5490-5498. MASTER CAR BUILDERS' STANDARDS; Gages and Screw-threads.

Fig. 5490. M. C. B. STANDARD LIMIT GAUGE. For 1/4 in. round iron. See Dictionary for table of other standard Limit gauges.

Fig. 5491. M. C. B. STANDARD LIMIT GAUGE FOR LIMIT OF SELLERS' STANDARD LIMIT GAUGE.

Fig. 5492-94. M. C. B. STANDARD LIMIT GAUGE. For 1/4 in. round iron. See Dictionary for table of other standard Limit gauges.

Fig. 5497. SELLERS' STANDARD SCREW-THREADS (U. S. and M. C. B. standard).

Figures 5498-94. SELLERS' STANDARD SCREW-THREADS (U. S. and M. C. B. standard).

MASTER CAR BUILDERS' STANDARD DIMENSIONS FOR BOLTS AND NUTS (SELLERS STANDARD THREADS).

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16</td>
<td>0.062</td>
<td>0.060</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
<td>0.056</td>
</tr>
<tr>
<td>3/32</td>
<td>0.093</td>
<td>0.090</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
<td>0.086</td>
</tr>
<tr>
<td>1/8</td>
<td>0.185</td>
<td>0.180</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
<td>0.176</td>
</tr>
<tr>
<td>5/32</td>
<td>0.234</td>
<td>0.230</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
<td>0.226</td>
</tr>
<tr>
<td>3/16</td>
<td>0.355</td>
<td>0.350</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
<td>0.346</td>
</tr>
<tr>
<td>7/32</td>
<td>0.437</td>
<td>0.430</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
<td>0.426</td>
</tr>
<tr>
<td>1/4</td>
<td>0.711</td>
<td>0.700</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
<td>0.696</td>
</tr>
</tbody>
</table>

(Square nuts are of the same widths, between parallel faces, as hexagon. The following are the general rules for the dimensions of nuts and bolt-heads on which the above table is based:

Diameter Rough Nut = one and one-half diameter of bolt + 1/16.

Finished Nut = one and one-half diameter of bolt + 1/16.

Thickness Rough Nut = diameter of bolt.

Finished Nut = diameter of bolt + 1/16.

Rough Head = one and one-half diameter of bolt + 1/16.

Finished Head = one and one-half diameter of bolt + 1/16.

(372)
Figs. 5525-5551. MASTER CAR BUILDERS' RECOMMENDED PRACTICE.

Fig. 5525. Draft-spring.

Fig. 5526. Stop-plate.

Fig. 5527. Yoke or strap-pocket.

Fig. 5528-5529. Recommended Practice in Attachment of Couplers.

Fig. 5530-5531. Carry-iron.

Fig. 5532-5533. Follower-plate strap.

Fig. 5534-5537.

Fig. 5538. Platform safety-chains for passenger equipment. Recommended Practice, adopted in 1893.

Fig. 5539.

Fig. 5540-5545. Markings for fast freight line cars. Recommended Practice, adopted in 1901.

Fig. 5546. End elevation.

Fig. 5547. Side elevation of car end.

Fig. 5548-5549. The location of buffer-blocks and buffer-beam.

Fig. 5550-5551. The location of buffer blocks and buffer-beam.

Recommended Practice for the Protection of Trainmen.
Fig. 5553. Plan of End-sill and Chains.

Fig. 5554. Cross Section of End-sills.

Fig. 5555. Details of Chain and Hook.

SAFETY CHAINS FOR FREIGHT-CARS.
Recommended in 1894 by Master Car Builders' Association.

Fig. 5572. Recommended Practice in Racking a Car for Loading Barn.
AIR BRAKE CUT OUT

CAR CAN BE PLACED BETWEEN AIR BRAKE CARS.

Car No. Initials. Date.
Card applied at. for following
Defects

Train No.

Fig. 5577. Reverse Side.

Defective Air Brake.

CAR CANNOT BE PLACED BETWEEN AIR BRAKE CARS.

Car No. Initials. Date.
Card applied at. for following
Defects

Train No.

Fig. 5578. Reverse Side.

AIR-BRAKE CUT-OUT AND DEFECT-CARD.

Other Standards and Recommended Practice and particulars with regard to those illustrated are described in the text under the name or title of each.
HAND-CARS; General Views. Figs. 5581-5588

Fig. 5581. Perspective View showing Steel Wheels.

The Kalamazoo Standard Section Hand-car.
Platform, 6 3/4 ft. x 4 1/4 ft. Wheels, 20 in. in diameter. Weight, 550 lbs.

Fig. 5582. View of Underside, showing Roller Bearings.

Fig. 5583. Perspective View.
Propelling levers detached.
Platform, 6 ft. x 4 1/4 ft. Weight, 500 lbs.

The "Cyrus Roberts" Truss-frame Combination Car.

Fig. 5584. Perspective View.
Light quick-service car.
Platform, 6 ft. x 3 ft. Weight, 185 lbs.

Roberts, Turner & Company.

Fig. 5585. Perspective View.
Sheffield No. 1 Section Hand-car.
Platform, 6 ft. x 4 1/4 ft. Wheels, 20 in. Weight, 410 lbs.

Fig. 5586. Perspective View.
Roadmaster's Hand-car.
20-in. wheels. Weight, 525 lbs.

Fig. 5587. Inspection Hand-car.
Platform, 6 ft. x 4 1/4 ft. Wheels, 22 in. Weight, 400 lbs.

(The Sheffeld Car Company,)

Fig. 5588. Weed-cutting Car.
Cutting-bar folded for running.
Weight, 720 lbs.
Fig. 5586. Hand-cars. General Views and Working Drawings.

Fig. 5586-93. Perspective Views.

Combination Walking-beam Hand and Push-car.
The walking-beam frame may be detached as shown. Turn-buckle Pitman connection.

Roberts, Throp & Company.

Platform 6 ft. x 4 1/4 ft. Weight, 480 lbs.

Fig. 5590. Plan.

Hand-car for Track and Bridge Inspectors. Wabash Railroad.

Fig. 5591. The Buda No. 1 Hand-car.

Fig. 5592. End Elevation.

Fig. 5593. Side Elevation.
HAND-CARS, Working Drawings.

Fig. 5595. Side Elevation.

Fig. 5596. Plan of Framing.

STANDARD HAND-CAR OF THE PENNSYLVANIA RAILROAD.

Fig. 5597. Half Plan.

Fig. 5598. Side Elevation.

Figs. 5601-5611. PUSH-CARS AND VELOCIPEDES. General Views.

Fig. 5601. Perspective View.
The Buda Push-car No. 6. Platform, 7 ft. x 9 ft. Weight, 400 lbs.

Fig. 5602. Perspective View.
Kalamazoo Mine-car.

Fig. 5603. Track-laying Car.
Size, 7 ft. 8 ins. x 6 ft. 3 ins. Capacity, 2000 lbs. Weight, 1,500 lbs.

Fig. 5604. Push-car.
Platform, 7 ft. x 5 ft. Weight, 600 lbs.

Fig. 5605. Sheffield Odometer Velocipede-car.
For measuring track.

Fig. 5606. Sheffield Velocipede-car No. 2.
For Rider and Passenger. Weight, 160 lbs.

Fig. 5607. Sheffield Velocipede-car No. 3.
For two Riders, and with Toolbox. Weight, 175 lbs.

Fig. 5608. Sheffield Velocipede-car No. 4.

Fig. 5609. The Kalamazoo New Speeder Velocipede-car.
Sprocket-wheels and Chain, and Roller-bearings.

Fig. 5610. Kalamazoo New Speeder Velocipede-car.

Fig. 5611. Telegraph-line Repairers' Velocipede-car.
Capacity, two men and 200 lbs. Weight, 120 lbs.
**Fig. 5612. Steam Inspection-Car.**
Capacity, 7 persons. Weight, 1,000 lbs. Speed, 10 to 20 miles an hour.

**Fig. 5613. Inspection Velocipede-Car.**
For four riders and two passengers.

**Fig. 5614. Four-seated Telegraph Gang Velocipede.**
Four-wheeled and with roller bearings. Weight, 300 lbs.

**Fig. 5615. Four-wheeled Steel Velocipede.**
For switch-lamp lighters. Weight, 150 lbs.

**Kalamazoo Railroad Velocipede and Car Company.**

**Fig. 5616. Crank Inspection Hand-car.**
(Old style.)

**Fig. 5617. Mine Velocipede.**

**Fig. 5618. Mine and Tunnel Velocipede Car.**
Sheffield Car Company, Three Rivers, Michigan.

**Fig. 5619. Mine and Tunnel Velocipede Car with Rider.**
Figs. 5620-5641. HAND-CARS AND VELOCIPEDES; Wheels. Warehouse-trucks.


Fig. 5640. The Reynolds Depot Truck for Baggage and Express.
Fig. 5642. Closed Cable-car. Metropolitan Traction Company, New York City.
The John Stephenson Company, New York.

Fig. 5643. Closed Electric-motor Car. Jackson & Sharp Company, Wilmington, Delaware.
Length of Car-body, 18 ft. 6 ins. Length Over-all, 26 ft. 6 ins.
No. 1A McGuire Columbian Trucks.

Fig. 5644. Special Closed Electric-motor Parlor-car for "TrolleyParties."
West End Street Railway Company, Boston.
Length, 20 ft. Width, 7 ft. 4 ins. Seating capacity, 20 persons. Car-body built by J. M. Jones' Sons, West Troy, N.Y.
West End Trucks built by the Laconia Car Co., Laconia, N.H.
Fig. 5645. CLOSED CABLE-CAR. THIRD AVENUE RAILROAD COMPANY, NEW YORK CITY.
BUILT BY THE LACLEDE CAR COMPANY, ST. LOUIS.

Fig. 5646. CLOSED ELECTRIC-MOTOR CAR. WEST END STREET RAILWAY, BOSTON.
BUILT BY J. M. JONES & SONS, WEST TROY, N. Y.
Equipped with Bemis Four-wheeled Trucks.

Fig. 5647. TWELVE-SEAT OPEN ELECTRIC-CAR. J. G. BRILL COMPANY, PHILADELPHIA.
Length over-all, 36 ft. Width of Underframe, 6 ft. 4 in. Seating capacity, 60 persons. Total weight, 14,000 lbs.
Brill's Eureka Maximum-traction Pivotal Trucks.
Fig. 5648. Open Electric-motor Car. The John Stephenson Company.
Seating capacity, 50 persons. Ends closed with sashes. Monitor Roof.
Tackaberry Truck with Stephenson Super-spring Running Gear.

Fig. 5649. Open Electric-motor Car, with inclosed ends and Steam car roof.
Length over-all, 30 ft. No. 6E Peckham Trucks.
Jackson & Sharp Company, Wilmington, Delaware.

Fig. 5650. Street-car Double-decked Trailer-car, for Cable or Electric Roads.
Pullman's Palace Car Company.
Figs. 5651-5653. STREET-CARS, Electric and Horse; General Views.

Fig. 5651. Double-decked Street-car for Electric Roads. Pullman Railway. Pullman's Palace Car Company.

Fig. 5652. Double-decked Street-car. John Stephenson Company. Built for Foreign Trade.

Fig. 5653. Mail, Baggage and Express Car for Electric Roads. J. G. Brill Company. Length of Car Body, 15 ft. 10 ins. Width, 7 ft. 4 ins. Weight, 3,500 lbs.
STREET-CARS, Electric-motor Cars; Detail Drawings.

Fig. 5654. Half Side Elevation and Half Longitudinal Section.

NAMES OF PARTS OF STREET-CARS.
Figs. 5654-5667.

A. Intermediate-sill.
B. Floor-joist.
C. Moveable Floor-joist.
D. Corner-brace.
E. Beam-block.
F. Knee-iron.
1. Wheel.
2. Spoke.
3. Tread.
4. Flange.
5. Hub.
6. Axle.
10. End-sill.
11. Truck Sub-sill.
12. Transverse Floor-timber.
13. Transverse Floor-timber Plate.
14a. Longitudinal Tie-rod.
15. Over-hang Truss-rod.
15a. Truss-rod Anchor.
15b. Truss-rod Anchor-bolts.
16. Truss-rod Queen-post.
17. Queen-post Base-plate.
18. Turnbuckle.
19. Floor.
20. Floor-strips.
21. Wheel-box.
22. Side-post.
23. Window-blind Rest.
25. Window-sash Rest.

Fig. 5655. Half Plan of Car Floor and Half Plan of Underframe.

(387)
Fig. 5639. Half Side Elevation and Half Longitudinal Section.

Names of Parts of Street-Cars.

Fig. 5654–5657.

(Continued.)

37. Trap-door Ring.
38. Trap-door Hinge.
40. Panel-furring.
40a. Body End-rail.
41. Guard or Fender-rail.
42. Guard-fender or Rail-strap.
43. Upper Outside or Convex-panel.
44. Lower Outside or Concave-panel.
45. Upper End-panel (removable).
46. Lower End-panel.
47. Top-rail or Body Side-plate.
49. Letter-board.
50. Water-table or Window-lintel.
52. Concave-panel Corner-iron.
54. Roof-board.

(Continued.)

Fig. 5660. Half Plan.

Fig. 5662. Half Cross Section and Sectional End Elevation of Framing.

An Open Cable or Electric-car. Pullman's Palace Car Company.
STREET-CARS: List of Names of Parts.

(NAMES OF PARTS OF STREET CARS. Figs 5651-5687. (Continued.)

55. Lower-deck Roof.
56. Lower-deck Carline or Rafter.
57. Clear-story or Upper Deck.
57a. Upper-deck Roof.
57b. Upper-deck Guard-strap.
58. Upper-deck Carline.
58a. Upper-deck Furring-strap.
58b. Upper-deck Guard-strap.
59. Compound-carline (Steel or Iron).
60. Platform-hood.
61. Platform-hood Molding.
62. Platform-hood Box.
63. Platform-hood Band.
64. Platform-hood Carline.
64a. Platform-hood Shoulder Carline.
65. Platform-hood Bracket.
66a. Post-bracket.
66b. Platform.
67. Center-piece or Platform End-timber.
68. Crown-piece Corner-iron.
69. Platform-knee or Timber.
70. Platform Timber-clamp.
72. Platform Sub-sill.
73. Step-tread.
74. Step-tread or Hanger.
75. Step-fender.
76. Platform Step-rod.
77. Platform Safety-gate (extension).
78. Safety-gate Holder.
79. Dasher or Dash-board.
80. Dasher-post.
81. Dasher-post Clip or Dasher-strap.
82. Dasher-post Washer.
83. Hood-support or Platform End-post.
84. Dasher-rail or Platform End-rail.
85. Dasher-rail Cap.
86. Buffer.
86a. Buffer-beam.
86b. Buffer-hand.
87. Radiating Draft-bar.
88. Draft-bar Slide or Draw-bar Sector.
89. Sector-bar Bolt.
90. Draft-head.
91. Brass Pin.
92. Draft-spring.
93. Draft-spring Casting.
94. Key.
95. Seat-bottom.
95a. Seat-bottom Cover.
96. Seat-leg.
97. Front Seat-rail.
100. Seat-bearing Cross-bars.
101. Seat-bottom Cross-bars.
102. Seat-front.
102a. Seat-front Guard-rail.
103. Seat-front Panel.
104. Locker.
105. Locker-catch.
106. Locker-catch Plate.
109b. Seat-back Cover.
110. Finished Upper Seat-back Rail.
111. Seat-back Bottom-rail.
112. Seat-back Top-rail.
113. Window.
113a. End-window (stationary).
114. Upper Window-rail.
115. Lower Window-rail.
116. Window-stile.
117. Window-guard.
118. Window-sash Lift.
119. Window-sash Leather.
120. Window-sash Leather-plate.
121. Window-blind.
122. Upper Window-blind Rail.
123. Lower Window-blind Rail.
124. Lower Window-blind Stile.
125. Window-blind Mullion.
126. Window-blind Slat.
127. Window-blind Lift.
128. Window-blind Spring.
129. Sand-box.
130. Sand-box Valve.
131. Sand-box Lever.
133. Sand-box Connecting-rod.
134. Door-stile.
135. Top Door-rail.
136. Bottom Door-rail.
137. Door-rail.
138. Door-sill.
139. Sliding-door Hook.
140. Sliding-door Strip.
141. Sliding-door Handle.
142. Sliding-door Hook.
143. Sliding-door Sheave.
144. Sliding-door Roler.
145. Upper Door-track.
146. Lower Door-track.
147. Intermediate Door-track.
148. Head-piece or Body End plate.
149a. Body End-furring.
150. Trolley-inspection Steps.
151. Roof-ladding.
152. Roof-ladding Irons.
152a. Roof-ladding Grab-handle.
153. Upper-deck Grab-handle.
154. Upper-deck Grab-board.
155. Trolley-board Cleats.
156. Trolley Base-blocks.
158. Ventilator-casing.
159. Upper-deck Bottom-rail.
160. Rail Roof-molding.
161. Upper-deck Bottom-rail Head-lining Molding.
162. Upper-deck Top-rail.
163. Upper-deck Eave-rail.
164. Deck-post or Muntin.
165. Upper-deck Hood.
166. Upper-deck Hood-base.
168. Lower-deck Sash-rail.
169. Upper-deck Corner-post.
170. Ventilator-sash Pivot.
171. Upper-deck End-transom.
172. Transom Pivot-stail.
172a. Top-transom Glass.
173. Transom Stationary-light.
174. Transom Roof-rafter.
175. Transom Head-lining Blocking.
176. Corner Transom-muntia or Mullion.
177. Center Transom-muntia or Mullion.
178. Upper Transom-finish Molding.
179. Transom-casing.
180. Advertising-rack Rail.
181. Upper Advertising-molding.
182. Lower Advertising-molding.
183. Head-lining.
185. Hand-pole.
186. Hand-pole Straps.
188. Hand-pole Tip.
189. End-lining.
190. Face-board Circle.
191. Door-leave Transom.
192. End-lining Hinged-sash.
193. Hinged-sash Bar.
194. Mirror.
195. Cripple-post.
196. End-lining Panel (glass).
197. Signal-bell.
199. Pedal Alarm-gong.
201. Alarm-gong Button.
202. Center-lamps.
203. Lamp-jack.
204. Headlight.
205. Headlight-clip.
206. Fare-register.
207. Fare-register Block.
208. Cur-stove.
209. Stove-box.
210. Stove-pipe.
211. Smoke-jack.
212. Roof-collar.
213. Stove-brick Top-plate.
216. Brake-handle.
217. Brake-panel.
218. Brake-shaft.
220. Lower Brake-shaft Bearing.
221. Brake-shaft Ratchet-wheel.
222. Brake-shaft Chain.
223. Brake-shaft Stirrup.
224. Lower Pulverum-bracket.
225. Middle Pulverum-bracket.
226. Left-hand Lever.
227. Right-hand Lever.
228. Top-roller.
229. Top-roller Housing.
230. Transverse Connecting-bar.
231. Sash-attachment for Adjustment.

(Continued.)
Fig. 5663. Half Side Elevation of Framing and Half Longitudinal Section.

Fig. 5664. Half Plan of Framing.

Fig. 5665. Sectional Views showing End Framing and Mechanism of Sliding Doors.

Fig. 5666. Half Cross Section and Half End Elevation.

Fig. 5667. Half End Elevations of Interior and Framing.

NAMES OF PARTS OF STREET-CARS.

Figs. 5654-5667. (Concluded.)

238. Sliding-door Bottom-sheave.
239. Sliding-door Bottom-track.
240. Sliding-door Top-sheave.
244. Steel Truss-plate.
245. Post Cross-rail.
246. Seat Bottom-rail.
247. Seat End-panel.
249. Seat-end Cross-rail.
251. Seat-front Rail.
252. Seat-rail Back.
255. Seat-back Arm.
256. Seat-back Arm-bolts.
257. Seat-pockets.
258. Sash-pocket Post (inside).
259. Sash-pocket Post (outside).
260. Transom Bottom-rail.
261. Transom Middle-rail.
262. Transom Top-rail.
263. Signal-lens.
264. Transom-glass Bottom (center.)
265. Transom-glass Bottom (side).
266. Curtain-roller.
269. Side-post Strap-bolts.
270. Wire-guard Keeper.
271. Wire-guard Keeper.
Fig. 5868. Truck for Street Cars. J. G. Brill Company.

Fig. 5869. McGuire Columbian Truck, with Fox Pressed-steel Frame.

Fig. 5870. Truck for Street Cars. The Peckham Standard.

Fig. 5871. Side Elevation.

Fig. 5872. Plan of Truck on a Tangent.

Fig. 5873. Plan of Truck on a Curve.

The Robinson Radial Truck for Electric Cars.

(Other styles of trucks are shown in General Views of Street Cars.)
Types of Electric Motors for Street-Railway Cars.
Showing several methods of Attaching the Motors to Car Axles.
PROMOTERS AND BUILDERS of Electric Roads, as well as officials of roads already in operation, must sooner or later devote some time and attention to Rolling Stock. This is, therefore, a fitting opportunity to display a number of illustrations of Cars and Trucks built by J. G. Brill Company. The illustrations show varied styles of cars, suitable for the different climates and requirements, as well as some specially designed cars for private use, and centre-vestibule compartment cars such as designed by J. G. Brill Company and used in St. Louis.

To all parties interested in Electric Roads a perusal of the following pages may not only be interesting but a benefit.

Detailed information, prices, etc., can be obtained from

Western Office
J. G. BRILL COMPANY
1038 Monadnock Bldg., CHICAGO

PHILADELPHIA
CLOSED CARS

Standard 16 ft. Electric Motor Car Body. Inside finish can be made, as desired, in palace No. 1, 2 or 3. Car body illustrated is mounted on a truck, first-class at the time furnished, but not possessing the advantages of Brill No. 21-B. To illustration and description following attention is respectfully called.

Inside Seating Arrangement of above car, showing Style of Finish.
Brill No. 21-B Electric Motor Truck. Is rigidly attached to the car body, and by the system of springs used overcomes all oscillation.

Axle-box frame (see cut below) is entirely a solid forging, free from bolts, nuts and rivets; nothing to rattle loose and require attention and repairs, thereby contrasting strongly with trucks having frames composite, built up of a multiplicity of parts and always requiring more or less attention.

No. 21-B Truck has springs under the journal-boxes, cushioning the blow to rail joints, special work, etc., when the vehicle passes over them.

For simplicity of construction, ease of riding, solidity and slight cost of maintenance, Brill No. 21-B Truck stands far ahead of all competition.

The axle-box frame of Brill Trucks, *a solid forging*, one piece, no bolts, no nuts, no rivets, no steel or malleable castings.
CLOSED CARS

Standard 18 ft. motor body mounted on Brill No. 21 Truck. Arranged with dasher, closed at one side and doors at diagonal opposite corners, facilitating loading and unloading. This type of car is used largely in Buffalo, N. Y., Camden, N. J., and other places, with excellent results. Inside finish can be made, as desired, palace No. 1, 2 or 3.

Standard 18 ft. Motor Body, mounted on Brill No. 13 Truck, identically same as car above, excepting doors are in centre of each end.
CLOSED CARS

Standard 8 ft. motor body, mounted on Brill No. 7 truck, but suitable for mounting on Brill No. 21-B truck. Has full monitor deck extending over platforms. Platforms are vestibuled and fitted with folding doors, making perfectly tight compartment for motorman. Finish can be, as desired, No. 1, 2 or 3.

Standard 20 ft. motor body, with open platforms, double doors, etc. Mounted on “Eureka” Maximum-Traction Trucks (as per following illustration and description). Finish can be, as desired, No. 1, 2 or 3. This is the style of car adopted by the New Orleans Traction Company who have upwards of 200 in operation.
Brill's "Eureka" Maximum-Traction Pivotal Truck, having 33 in. driving-wheels, and resting the car body 27\frac{1}{2} in. from rail to underside of sill, 87 per cent. of the weight of car body, load and motors comes on the driving-wheels, greatly increasing the tractive force of the truck, and utilizing almost all the electric energy. Side bars are a solid piece, free from bolts and nuts. Spring compression device on rear of truck to throw weight on rear wheels when truck radiates on going through curves. Increased effectiveness of brakes, as eight points of friction are presented. Is easier on roadbed, as there is no oscillation; the motion of a double-truck car, as against a single-truck car, is a rolling weight versus a pounding weight.

Trail Truck. Where it is desired to operate a car with one motor and "Eureka" truck, for the saving in expense, a trail truck, as above, can be used under rear end of car.
CLOSED CARS

Twenty-two feet Vestibuled Motor Car Body, mounted on Brill's "Eureka" Trucks. Identically similar to car No. 209, page 5, except two feet longer in body and equipped with vestibules on platforms.

Twenty-five feet Motor Body, with open platforms and mounted on Brill's Maximum-Traction Trucks. Finish can be made, as desired, No. 1, 2 or 3.
CLOSED CARS

Twenty-five feet six inches Motor Body, having vestibuled ends, with doors and transverse seats and aisle through center. Sash double on each side, top sash stationary, bottom sash arranged to lower, flush with window rail.

Specially advantageous on inter-urban lines, where in almost all cases passengers desire to face the direction in which car is running. Is equipped with Brill’s patented seat arms, saving room and decreasing the width of car and consequently the cost of construction. Finish can be No. 1, 2 or 3, as desired. Mounted on Brill’s Maximum-Traction Trucks.
CLOSED CARS

One View of Patented Center Vestibule Compartment Car.

Another View of Center Vestibule Compartment Car, showing Entrance.

Showing Seating Arrangement of Center Vestibule Compartment Car.

Car specially designed for Lindell Ry. Co., St. Louis, and used quite largely by them. Embodies the advantage of separate compartments—one for smokers and one for regular passengers. Finish of both compartments can be, as desired, No. 1, 2 or 3. Car mounted on Brill's Maximum-Traction Trucks.
OPEN CARS

Standard 8-Seat Open Motor Body, mounted on Brill No. 12 Truck, and arranged for Brill No. 21 B Truck. Has monitor deck roof full length of body. Spindle back seats, spring roller curtains, etc. Finish can be No. 1, 2 or 3, as desired.

Eighteen feet Convertible Car Body, designed for mounting on electric motor truck, but shown as a trail car on running gear. Seats are arranged transversely of car and aisle through center. In winter panels and glass are fixed stationary in the openings between posts and over screens, making an air-tight car. Finish can be No. 1, 2 or 3, as desired.
OPEN CARS

Standard Eight-seat Open Car, having enclosed front ends, with sash. Monitor deck roof full length of body. Spring roller curtains, solid seat backs. Finish can be No. 1, 2 or 3, as desired. This car can be arranged having seats on platforms (see cut below) by lengthening the platforms 13 in. each. Mounted on Brill No. 13 truck.

Twelve-seat Open Car, mounted on Brill Eureka Maximum-Traction Truck. Spring roller curtains, monitor deck extending over platforms. Bulkheads in ends, with sash, seats on platforms. Length, 34 ft.; seating capacity, 60 passengers.
**DOUBLE-DECK CARS**

Sixteen-feet Double-deck Car, without canopy, but having pedestal in center for support of trolley apparatus. Stairway at each end. Mounted on Brill No. 13 truck. Finish inside can be No. 1, 2 or 3, as desired.

Seven-seat Open Car, double-deck, with stairway at one end and with canopy. Spindle-back seats in lower deck, spring roller curtains, etc. Finish can be No. 1, 2 or 3, as desired. Mounted on Brill No. 13 truck.
DOUBLE-DECK CARS

Twenty-five feet Double-Deck Car, with auxiliary motorman's platform. Double-deck canopy and stairway at each end. Finish inside can be No. 1, 2 or 3, as desired. Car mounted on Brill's Maximum-Traction Trucks.

Eighteen feet Double-Deck Car, with canopy and stairway at each end. Stairway specially designed with less pitch, allowing room under stairway for motorman and electrical controlling devices. Mounted on Brill No. 21 Truck.
DOUBLE-DECK CARS

Combination Open and Closed Double-Deck Car. Compartments can be made any length and any finish desired. Stairways at each end, and can be arranged with canopy if desired. Mounted on Brill No. 13 Truck.

Seven-Seat Open Car with Double Deck and Canopy. Stairways at each end. Finish can be as desired, and car can be mounted on Brill No. 21-B Truck, and operated as a motor car or on running gear as a trail-car.
Twenty-feet Combination Passenger and Baggage Car, having compartments of equal length and Vestibuled ends. Finish to passenger compartment can be, as desired, No. 1, 2 or 3. Mounted on Brill No. 21 Truck.

Twenty-five feet Combination Passenger and Baggage Car, having 10-ft. baggage room and 16-ft. passenger compartment. Finish can be No. 1 to 3.
Twenty-nine feet Combination Open and Closed Car, mounted on Brill's Eureka Trucks. Seating capacity, as shown, 40 persons; but compartments can be made any desired length and finish, either 1, 2 or 3.