

(No Model.)

2 Sheets—Sheet 1.

G. J. PORTER.
CAR BODY.

No. 461,173.

Patented Oct. 13, 1891.

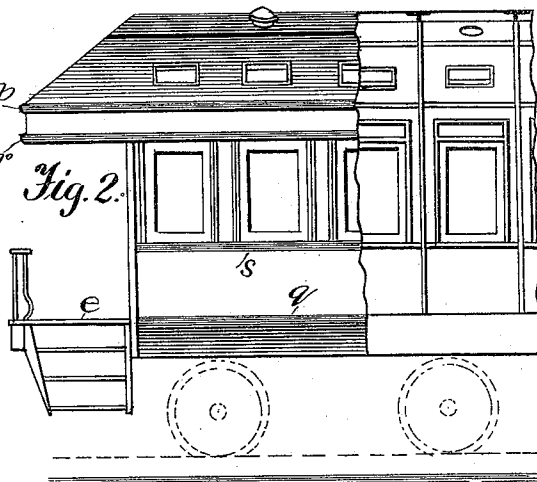
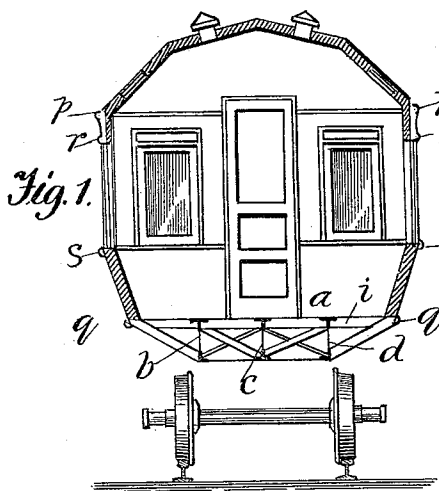


Fig. 3.

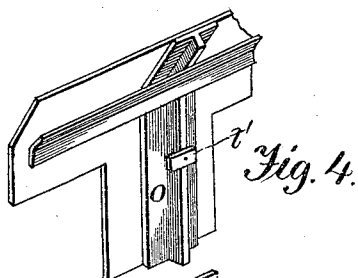


Fig. 4.

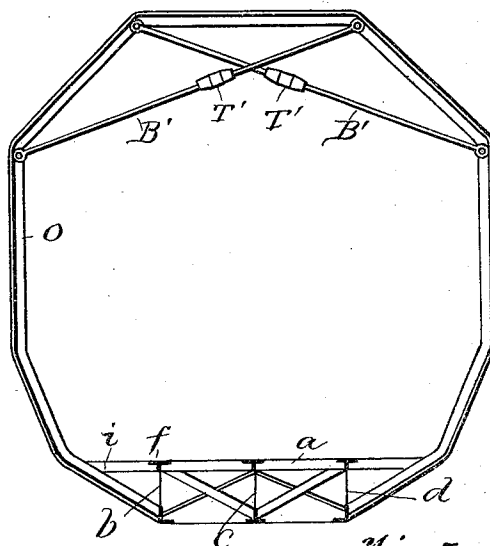
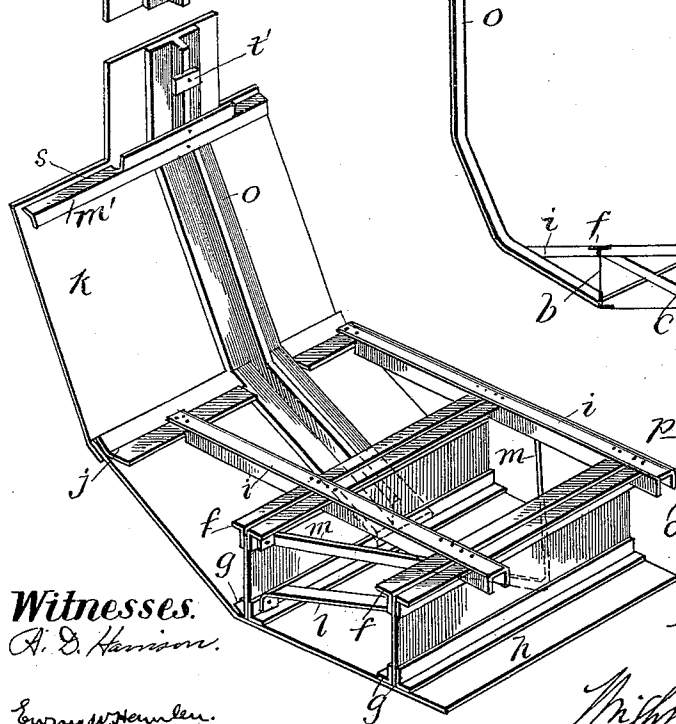


Fig. 5.



Witnesses.

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Att'y.

(No Model.)

2 Sheets—Sheet 2.

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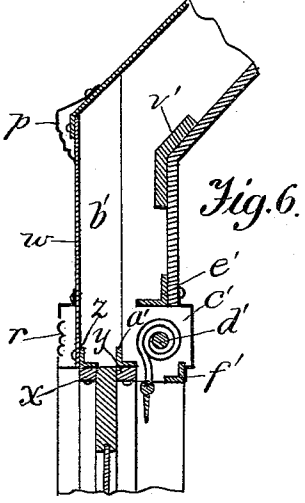


Fig. 6.

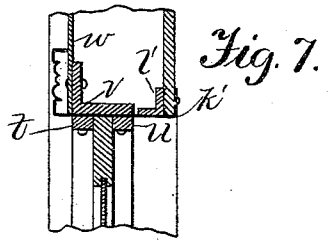


Fig. 7.

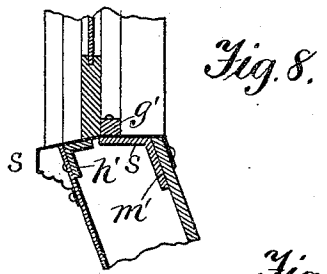


Fig. 8.

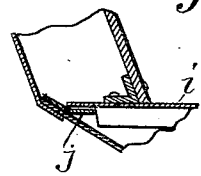


Fig. 9.

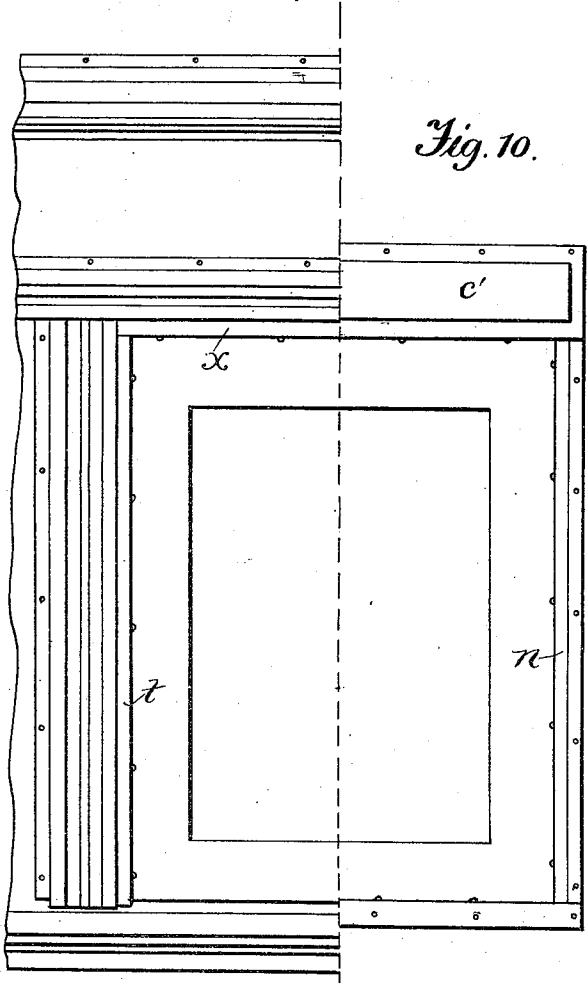


Fig. 10.

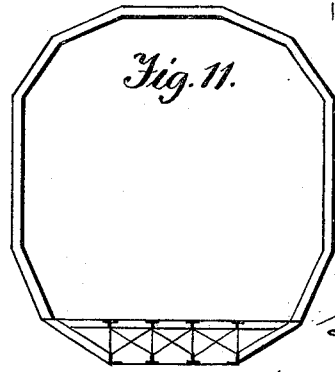


Fig. 11.

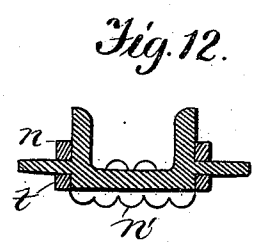


Fig. 12.

Witnesses.
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Inventor:
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by
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Attys.

UNITED STATES PATENT OFFICE.

GEORGE J. PORTER, OF MEDFORD, MASSACHUSETTS.

CAR-BODY.

SPECIFICATION forming part of Letters Patent No. 461,173, dated October 13, 1891.

Application filed September 15, 1890. Serial No. 364,975. (No model.)

To all whom it may concern:

Be it known that I, GEORGE J. PORTER, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Car-Bodies, of which the following is a specification.

Car-bodies as commonly constructed are composed for the most part of wood, though for the sake of safety and for other reasons it is expedient that they should be constructed of metal. It has been found that a car-body of substantially rectangular form in cross-section, when constructed of metal, is unduly heavy, and, besides this, cannot readily be made to withstand the torsional strain to which car-bodies in service are continually subjected. These facts have led inventors and artisans in devising and constructing metallic car-bodies to adopt the cylindrical form, and while with this form the requirements as to strength and lightness are to a great extent answered other difficulties are met with, chief among which are the expense and trouble of properly bending or curving the metal plates employed in the body of the car and the difficulty of providing economic and easily-operated windows. The first-mentioned difficulty in the cylindrical form of car-body is unavoidable. The second is overcome in two ways: first, by building upon the car-body a dormer-like projection for each window, and, second, by using a curved sash and curved glass. The first-mentioned expediency is cumbersome and extremely expensive, while by the second method it is difficult to make a sash which can easily be opened and closed and which will fit tightly enough to exclude dust and cinders, and, like the first, it is expensive.

To meet the requirements of the car-building art and to overcome the objections and difficulties hereinbefore recited, is the object of my invention, which object is accomplished by constructing the car-body of substantially regular polygonal form in cross-section and making it of straight and angular metal plates bolted or otherwise secured to straight or angular metal ribs, it being well known that the polygonal form is easier of attainment than the cylindrical form, the fact that the bending of the parts whereat all essential or desirable need be made only at a

few points, while in forming curved parts the bending must be made at practically all points. Furthermore, by making the car-body of polygonal form, being an approach to a "box-girder-like" form and so in itself a truss, I am enabled to better brace and truss the car than if it were of the form of an absolute circle or cylinder, and in this way make it of maximum strength and durability.

For a full and clear understanding of my invention I will now proceed to describe the same in detail, making reference to the accompanying drawings, and the letters marked thereon, forming a part of this specification, of which drawings—

Figure 1 shows a transverse or cross-section of a car-body constructed in accordance with my invention. Fig. 2 is a side view of a portion of the car portrayed in Fig. 1, showing on the left the exterior and on the right the interior of the car. Fig. 3 represents in outline a modified form of the car-body, and shows also a form of means for bracing or trussing the upper part or deck of the car. Fig. 4 is a perspective detail showing the form of the different parts of the frame and the trussing or bracing of the lower part of the car. Fig. 5 is a sectional detail herein-after referred to. Figs. 6, 7, and 8 are sectional details of the window head, jamb, and ledge, respectively. Fig. 9 is a sectional detail of the angular part below the window-ledge and at the point where the floor intersects the side of the car. Fig. 10 is a diagram intended to illustrate the outside and inside of a window and window-frame. Fig. 11 is a diagram showing still another modified form of my improved car. Fig. 12 shows a modified form of rib.

The same letters of reference designate the same parts in all of the views.

The car-body is composed of plates of metal supported upon ribs running around or nearly around the interior of the car between the windows, the plates and the ribs being fastened together by rivets. The general form of the car, as will be seen by reference to Figs. 3 and 11, is that of a symmetrical and fairly-regular polygon.

In the space between the floor *a* and bottom of the car are three girders *b c d*, Figs. 1, 3, and 4, running the entire length of the car,

the two outside ones projecting to form a support for the platform *e*. At the top and bottom of the girders are riveted angle-irons *f* *g*. The angle-irons *g* are also riveted to the bottom plate *h* of the car. Across the tops of the girders at suitable intervals run channel-bars *i*, Fig. 4, which are fastened to the girders by knees, and at their ends to pieces like the one shown at *j*, Fig. 4. These pieces are at the junction of the bottom plate *h* and the adjacent side plate *k*, and are riveted thereto. The girders are further strengthened by the cross-braces *l* and *m*, running from the upper part of one girder to the lower part of another, and the latter extending diagonally and the former at right angles with reference to the length of the car, this form of bracing being efficient for the purpose of protecting the car against torsional strain and preventing it from being twisted askew from any cause.

The floor *a*, which is composed of metal plates, rests upon the channel-bars *i* and the upper angle-irons *f* of the girders. The form in cross-section of the ribs running around or partly around the body of the car is shown at *o*, Figs. 4 and 5. The remainder of the car consists of metal plates riveted to the flanges of the ribs *o*, suitable openings being left for windows and ventilators. The exterior finish consists of moldings of thin metal at *p* and *q*, covering the angles of the car-body at these points, a molding *r* along the tops of the windows, one at *s*, forming the window-ledge. The sides of the side windows and also the margins or sides of the deck-lights are provided with moldings.

The windows are very simple in construction. The sash is held in place at the sides by the beads *t* and *u*, Fig. 7, screwed to the angle-iron *v*, which is riveted to the shell of the car *w* at the sides of the window-opening. At the top the sash is held between the beads *x* and *y*, Fig. 6, fastened to the angle-irons *z* and *a'*. The sash, when raised, slides into the space *b'*, Fig. 6. The bead *t* also serves to receive the edge of the molding *r*, which is turned under where it comes to a window-space. The head *t*, Fig. 7, does the same for the molding at the sides of the window-frame. At the top of the window is a case *c'*, Fig. 6, which contains the shade and roller *d'*. It is secured to the angle-iron *e'* and the angle-iron *f'*, which run from rib to rib. The window-ledge, Fig. 8, is secured in place by the bead *g'*, and also has its outer edge fastened to the brace *h'*, which runs from rib to rib. The window-jamb *k'*, Fig. 7, is fastened to the frame in a similar manner by the bead *u* and to the brace *l'*, which runs from angle-iron *e'* to angle-iron *m'*. The form of angle-iron *m'* is shown more clearly in Fig. 4. It is an "opened angle," but the upper portion at the window-opening is turned down, as shown, to form a support for the window-ledge *s*, Fig. 8.

Another form of rib may be used, as shown in Fig. 12. This form would simplify the window construction somewhat, as the side

beads *u* and *t* may be secured to the sides of the channel, thus dispensing with the angle-iron *v*. The brace *l'* would also not be needed, as the channel between the windows would be covered by a metal cap *n'*, which is secured by the beads *u* *t*.

Fig. 5 shows the lining and inside finish more in detail. Upon the inner surface of the shell and the flanges of the ribs is a layer of mica cement *o'*, or felt cemented to the shell of the car, or other sound-deadening compound. This is necessary to stop or deaden the sonorous vibration of the metallic car-body. Next the cement is a layer of hair felt *p'* or other insulating material. Next comes the inside finish *s'*, which is fastened to clamps secured to the tongue of the ribs. *w'* is an ornamental cap or molding to cover the joints in the finish, which are intended to come over the ribs. At the horizontal angles of the car the interior finish is to be fastened to opened angle-irons which run from rib to rib. A section of one of these is shown at *v'*, Fig. 6. The interior finish may be of sheets of any suitable material—such as wood, paper, leatheroid, or metal—and may be strengthened by iron bars, if necessary.

Another method of attaching the interior finish may be adopted. Pieces of wood may be secured to the inside of the car-body wherever desired. These would preferably be secured to the ribs or near them. The interior finish may then be screwed or nailed to these pieces of wood. A similar method may be employed in constructing the windows. Pieces of wood may be secured to the car-body in place of the angle-irons *h' v z a'*, and the sashes may be of wood; also, pieces of wood may be secured to the girders, and the floor fastened to them. The use of wood in this manner would cheapen and facilitate the building of a car very materially, as it would do away with all necessity for "tapping" for machine-screws; and the small amount of wood used thus would not be regarded as making the car dangerously combustible.

For freight-cars the construction may be similar to passenger-cars except that the windows would be omitted and doors placed in the sides where needed; also, the framing of the floor might be stronger, one or more additional girders being inserted, as shown in Fig. 11. Additional girders may also be used in long passenger-cars.

The form of car-body shown in Fig. 8 is regarded as being generally suited for passenger service, though it may be constructed with a greater or less number of straight sides so long as the polygonal form, all of the sides of which touch upon an imaginary circular line, is preserved. Figs. 3 and 11 show forms differing somewhat from that shown in Fig. 1. In Fig. 3 the sides and lower part of the car is the same as in Fig. 1, while the top or deck has fewer straight sides or planes, and the deck is strengthened by brace-rods *B'*, attached to the ribs and drawn taut by means

of turn-buckles T' or other suitable devices. The form of bracing shown in Fig. 3 is applicable as well to the common form of car-body or the cylindrical or other form as to my improvements. In Fig. 11 the lower part of the car is similar to that shown in Fig. 1, except as to the extra girder; but the top or deck has a greater number of straight sides planes.

10 As regards the material of which my improved car is constructed it is to be observed that every part of the body is of metal, preferably "low-grade" steel. The lining of the car is composed, preferably, of hair-felt with
15 an interior surface finish of paper or other suitable material.

The ribs extending substantially around the car and supporting the angular plates are important features of my invention, as is
20 also the bracing below the floor in connection with the girders.

Among the many advantages attending my improved car-body may be enumerated the following: It is fire-proof, for no combustible
25 material is needed in its construction. It is unquestionably durable and cannot practically be twisted or knocked askew or out of shape, since by its approach to a box-girder-like form it is in itself a truss. It is easy of
30 construction, since it deals with plane surfaces, straight lines and definite angles. It possesses substantially all of the advantages embodied in the cylindrical form without meeting any of its objections.

35 Although I have been particular to describe the form of the various parts of my improved car-body and their arrangement and relationship to each other, it is obvious that these may be changed or varied without departing
40 from the nature or spirit of the invention.

Having thus described the nature of my invention, and describing a way of constructing and using the same, I declare that what I claim, is—

45 1. A car-body each side of which is formed in cross-section with a vertical portion and two or more inclined portions, composed of angular metal ribs extending around or nearly around the car-body, longitudinal
50 metal girders in the bottom of the car, metal bracing intermediate of the girders, and metal plates secured to the said ribs and bent at angle-points thereof to conform to the form of the ribs, substantially as set forth.

55 2. A car-body of polygonal form in cross-section, composed of ribs *o*, extending around or nearly around the body, the metal plates

k, secured to said ribs and bent at angle-points thereof to conform to the form of the car-body, sound-deadening material secured to the ribs and plates, and the inside finishing material *s'*, secured upon the ribs and sound-deadening material, as set forth.

3. A car-body the sides of which are each formed in cross-section with a vertical portion and two or more inclined portions, composed of metal plates and metal ribs *o*, extending around or nearly around the body, metal plates *k*, secured to said ribs and bent at the angle-points thereof to conform to the form of the car-body, the longitudinal metal girders in the bottom of the car, metal bracing intermediate of the girders, cross-bars *i*, and the floor resting upon said bars, substantially as set forth.

4. A car-body of polygonal form in cross-section having straight or vertical sides composed of ribs *o*, extending around or nearly around the body, metal plates *k*, secured to said ribs and bent at angle-points thereof to conform to the form of the car-body, material *s'*, forming the inside finish or facing, and sound-deadening material intermediate of the finishing material, and the metal plates, substantially as set forth.

5. A car-body the sides of which are each formed in cross-section with a vertical portion and two or more inclined portions composed of metal plates and metal ribs to which the plates are secured, the longitudinal metal girders in the bottom of the car, said ribs extending around the car from the outermost of said girders, and intermediate metal braces, substantially as set forth.

6. A car-body of polygonal form in cross-section, the sides having various planes or angles, all of the points of the angles touching upon an imaginary circular line, and portions of the sides being constructed in vertical or nearly vertical planes, composed of angular metal plates and flanged metal ribs extending around or nearly around the car-body, to which the said plates are secured, sound-deadening material *o'*, secured to the plates, a layer *p'* of insulating material, and an inside finish *s'*, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of August, A. D. 1890.

GEORGE J. PORTER.

Witnesses:

ARTHUR W. CROSSLEY,
A. D. HARRISON.