No. 856,435. PATENTED JUNE 11, 1907.

W. G. WAGENHALS.

PRESSED STEEL CAR.

APPLICATION FILED APR. 16, 1906.

4 SHEETS—SHEET 1.

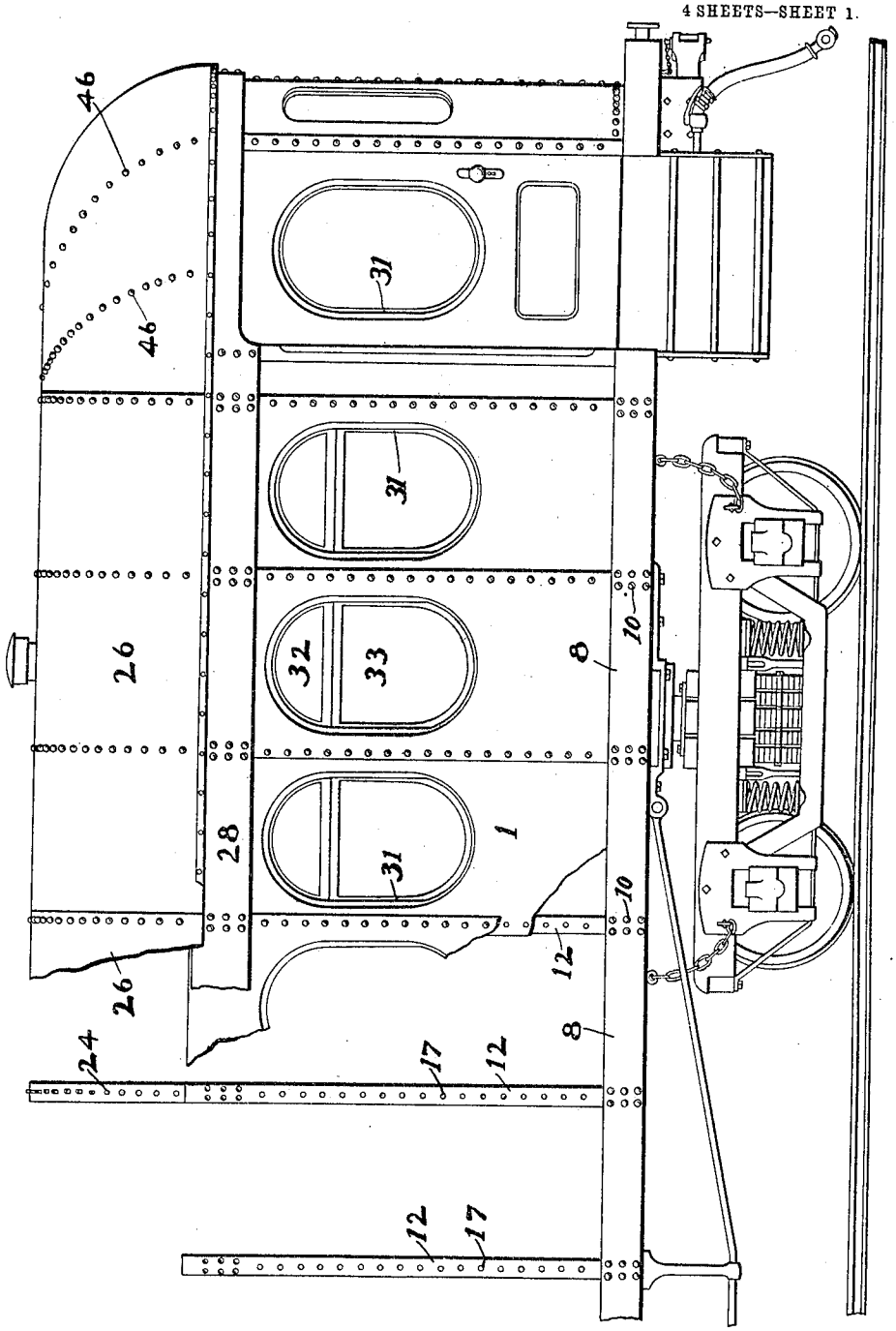


Fig. 1.

Witnesses.
Homer Bradford.
Glena Pritchard

Inventor.
William G. Wagenhals
by Alfred M. Allen
Atty.

No. 856,435. PATENTED JUNE 11, 1907.

W. G. WAGENHALS.

PRESSED STEEL CAR.

APPLICATION FILED APR. 16, 1906.

4 SHEETS—SHEET 2.

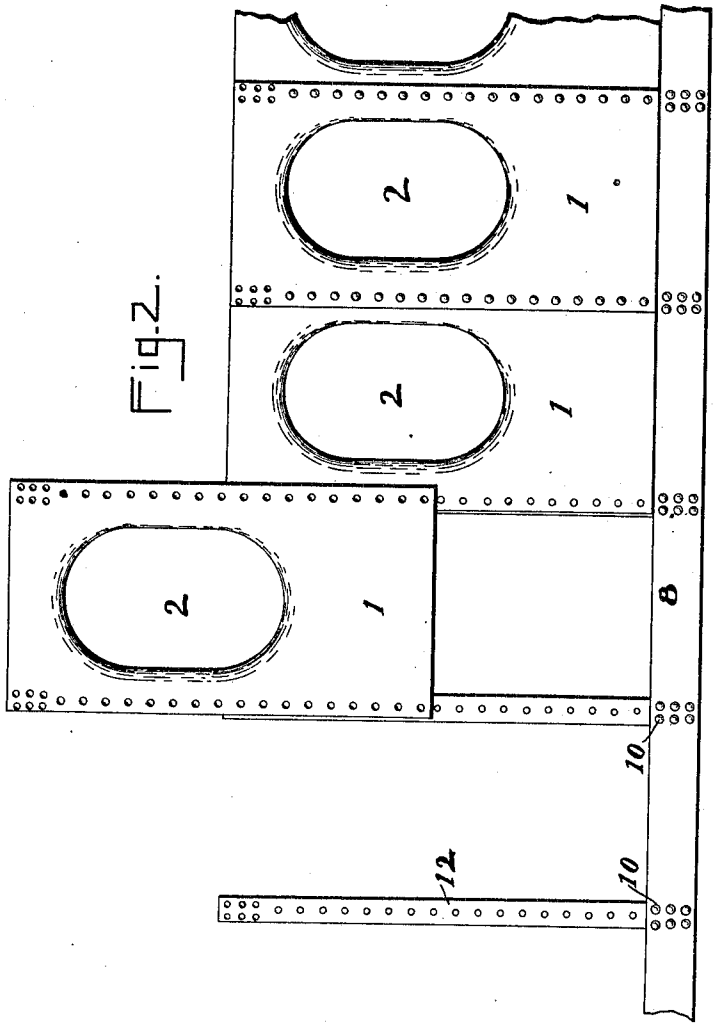


Fig. 2.

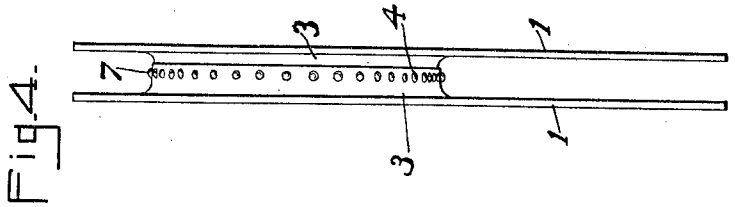


Fig. 4.

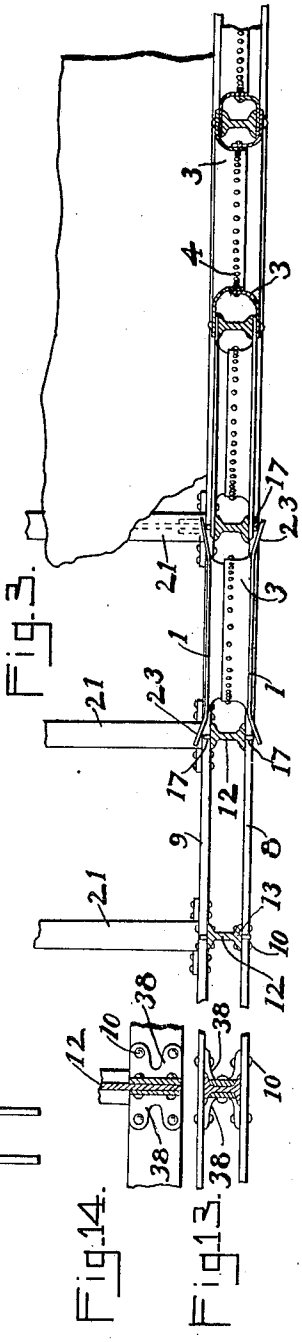


Fig. 3.

Fig. 14.

Fig. 13.

Witnesses.
Homer Bradford.
Glena Pritchard

Inventor.
William G. Wagenhals
by Alfred M. Allen
Atty.

No. 856,435. PATENTED JUNE 11, 1907.

W. G. WAGENHALS.

PRESSED STEEL CAR.

APPLICATION FILED APR. 16, 1906.

4 SHEETS—SHEET 3.

Fig. 5.

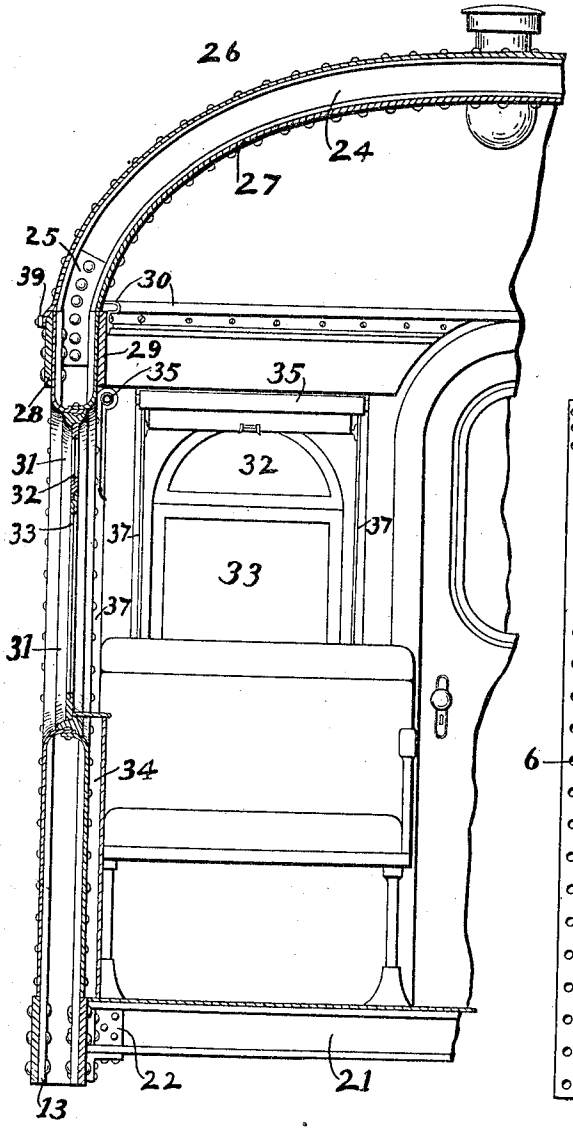


Fig. 8. Fig. 9. Fig. 10. Fig. 11.

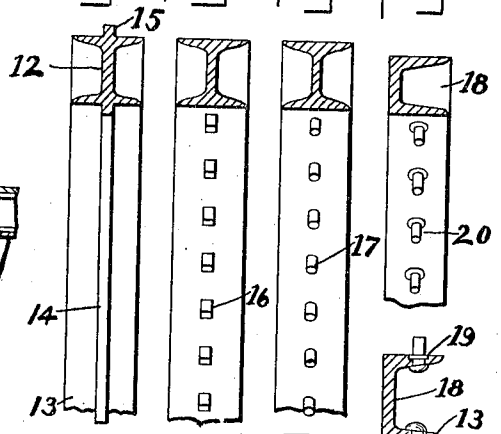


Fig. 12.

Fig. 6.

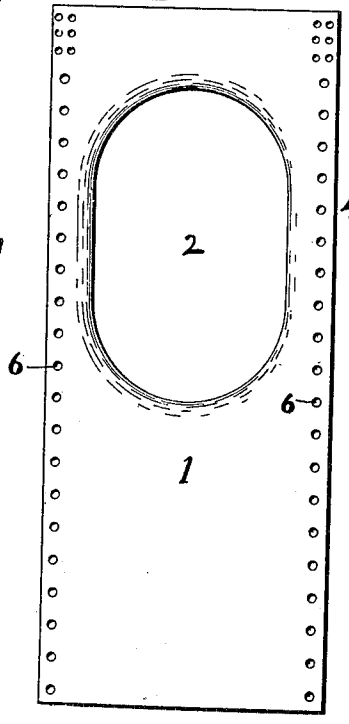
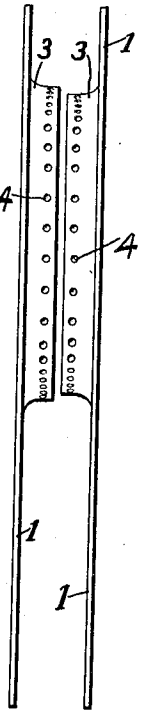


Fig. 7.



Witnesses

Homer Bradford.

Glenn Pritchard

Inventor.

William G. Wagenhals

by Alfred N. Allen

Atty.

No. 856,435. PATENTED JUNE 11, 1907.

W. G. WAGENHALS.

PRESSED STEEL CAR.

APPLICATION FILED APR. 16, 1906.

4 SHEETS—SHEET 4.

Fig. 15.

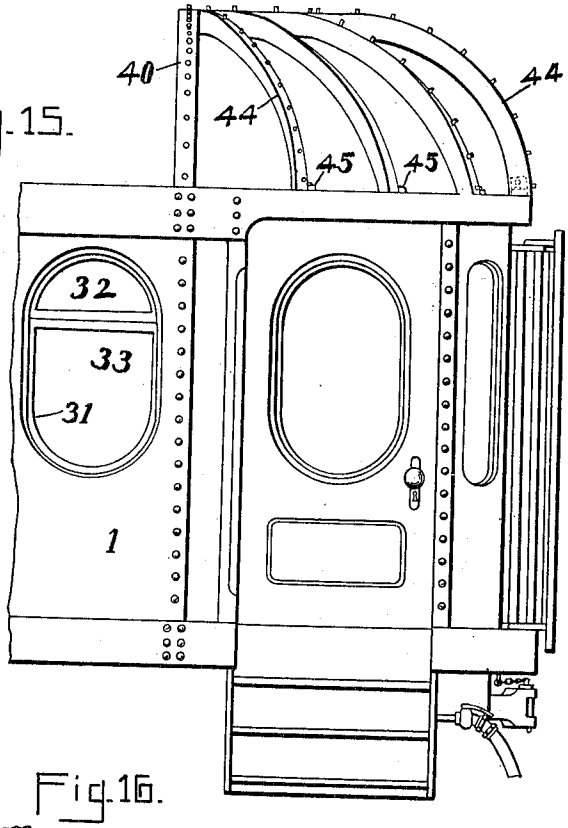


Fig. 16.

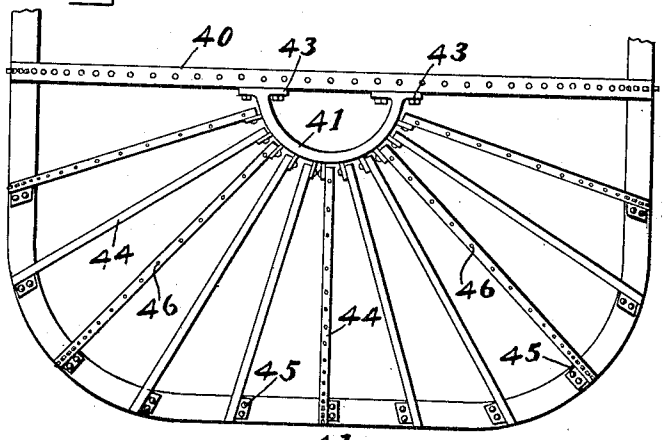
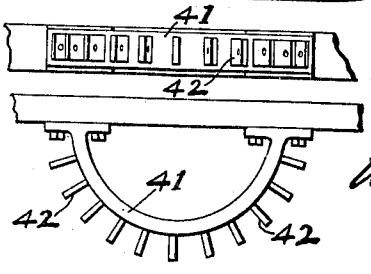


Fig. 17.



Witnesses.
Homer Bradford
Glena Pritchard

Inventor.
William G. Wagenhals
by Alfred H. Allen
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM G. WAGENHALS, OF ST. LOUIS, MISSOURI.

PRESSED-STEEL CAR.

No. 856,435. Specification of Letters Patent. Patented June 11, 1907.

Application filed April 16, 1906. Serial No. 311,956.

To all whom it may concern:

Be it known that I, WILLIAM G. WAGENHALS, a citizen of the United States, residing in the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Pressed-Steel Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My improvements relate to the construction of passenger coaches for railway use, made from steel plates properly riveted together with metallic girders, and beams, so that the car may be constructed entirely of steel, and the purpose of the invention is to provide a construction much simpler, and obviating the necessity of cutting and fitting the parts to follow the design of wooden car construction, as is the practice of car builders at the present time.

In the drawings Figure 1 is a side elevation of one end of a passenger coach of my improved construction, with parts of same broken away. Fig. 2 is a side elevation of a portion of one side of the car, showing the method of setting up in place, and riveting together. Fig. 3 is a horizontal section of the construction shown in Fig. 2. Fig. 4 is an end elevation of two of the side plates riveted together. Fig. 5 is a vertical cross section of half of the car. Fig. 6 is a side elevation of one of the plates for the side. Fig. 7 is an end elevation of one inside and one outside plate, showing the method of flanging same for riveting together. Figs. 8, 9 and 10 are perspective views of the side beams, illustrating the method of forming the rivets on the beams. Figs. 11 and 12 are perspective cross sectional views of a modified form of side beam. Figs. 13 and 14 are transverse and vertical sections through the I-beam, showing the method of riveting the sills to the beams. Fig. 15 is a side elevation of one end of the car, showing the construction of the hood for the roof. Fig. 16 is a plan view of the hood construction. Fig. 17 shows respectively plan and front views of the casting to which the hood beams are secured.

In constructing my car, I take steel plates 1 of about one-eighth inch in thickness, and of a length of the height of the side of the car, and of sufficient width to give whatever window opening may be desired, and I provide as many of these plates as may be necessary for the length of the car. Each plate is then placed in a specially designed press, or stamp, and the oval window opening 2 is punched therein, the plates are then placed on another press and the edges of the opening bent down into the circular flange 3. The plates are then put on a specially designed punch, and all the rivet holes 4 in the circular flange, and the side rows of rivet holes 6—6 along the side edges of the plates, are all punched at one operation. These plates are made up in pairs, exactly alike, one for the outside, and one for the inside wall of the car, and the circular flange on one of these plates, preferably the inside plate, is formed somewhat smaller than the flange on the outside plate, so that one flange can be placed inside the other to overlap, and the two plates are then riveted together with rivets 7, so that the two plates are thus secured together.

In forming my frame for the car, I provide two longitudinal or side sill plates 8—9, which run the entire length of the car, and by rivets 10—10 I rivet the upright beams or posts 12 thereto at the bottom. These beams are substantially I-beams, and the riveting of same to the longitudinal sill plates is accomplished through the flanges 13 of these beams, or as a preferable construction, I provide special casting 38, as shown in Figs. 13 and 14, and rivet these castings to the central web of the I-beam, and then rivet the sills to the castings as shown. In order to provide rivets on these upright beams for my side plates, I proceed as illustrated in Figs. 8, 9 and 10.

The I-beams 12 are rolled with projecting flanges 14—15 running lengthwise of the beam, and the beams are rolled preferably from soft Norway iron, suitable for riveting. The beam is then placed in a special machine, and with dies, sections are cut from the projecting flanges 14—15, leaving the square lugs 16—16, and if only square holes are punched in the side edges of the side plates, these square lugs may be left as they are, but as I prefer to employ circular rivets, these square lugs 16 are then rounded up as shown at 17, in Fig. 10. Instead of employing I-beams for the side beams of the car, I can also make use of U-beams or channel beams, as shown at 18 in Figs. 11 and 12, and in this construction openings are punched in the flanges 19—19 of the U-beam

and the double headed rivets 20 employed, but I prefer the construction as illustrated in Figs. 8, 9 and 10.

Both sides of the car being made up as above described, a suitable number of floor beams or girders 21 are then riveted to the sills by means of the angle-plates 22, and these floor beams are also preferably of the I-beam construction, but without the rivets formed thereon, and the floor beams are of the proper length for the width of the car.

My framework having been thus constructed, the inside and outside plates 1—1 which have been previously riveted together as described, are then lowered into position over the side beams 12, the side edges of these plates being sprung out as shown at 23—23 in Fig. 3, so as to pass over the rivets 17 on the beams, one plate overlapping the adjoining plates both inside and outside, and then the sides plates are bent back and riveted to the beams, one set of rivets being all that is required to rivet the two adjoining overlapping plates to the side beams.

After the sides are constructed, the roof beams or car lines are riveted in place. These roof beams 24 are of the same construction as the side beams, except that they are curved to form an oval or turtle back roof, and are somewhat lighter in weight and size than the side beams as they are not required to carry any strain, except the holding of the roof, and the spacing of the sides. The rivets on these roof beams are formed in the same way as they are in connection with the side beams, these beams are bolted or riveted to the upper ends of the side beams by the plates 25. The roof and ceiling plates 26—27 are riveted to these car lines, or roof beams, in the same way as the sides, the plates running entirely across the roof, and being in width about equal to the distance of four or five side beams. The outside plates are first riveted on, and then the ceiling plates.

Before riveting the roof plates in place, the letter board plates 28 and transom plates 29 are riveted in place at the top of the side plates. The roof plates 26 overlap the upper edge of the letter board plate, and the edges of same are secured by a finish molding running longitudinally, and screwed in place. The ceiling plates are riveted in place last of all, and the joint between the ceiling plates and this inside plate is concealed by a metal molding 30.

For the window frames, I propose to use a frame work of aluminium or brass 31 to fit the opening formed as a window opening in the side plates, which frame will cover the rivet heads in the window section, and, in this frame, is mounted the stationary window 32 and a movable window 33, which can be lowered to open the window by drawing in the lower end of the window sash, and dropping same into the pocket 34 between the seats. The sash for the windows 32 and 33 are aluminium castings. The shade roller 35 is mounted above the window on the inside of the car, in a metallic case, which case has extensions 37 that reach to the bottom of the windows, and said extensions 37 cover the rivet heads of the plate joints inside the car, and also have grooves on the inner sides of same to guide the curtain to the bottom of the window, and to retain same in position, and carries the shade roller 35 for the window.

The construction of the ends of the car, the side walls of the vestibules, the door frames, and the doors, is the same as the construction for the sides of the car, but for the hoods over the vestibules, or car ends, I provide as follows, as shown in Figs. 15, 16 and 17.

40 represents the last car line at each end of the car, which runs straight across from one side to the other. To the middle of this car line is bolted by the bolts 43 a semi-circular casting 41 of brass, steel, or malleable iron, with lugs 42 cast thereon, and extending out radially from the outside of the casting. Holes are cored in these wings or lugs and hood car lines 44 bent to the shape of the roof required are bolted or riveted to the lugs 42 of the casting 41, and radiate therefrom to the edge beam of the roof to which they are secured by angle plates 45. The beams 44 for the hood car lines are constructed in the same way that the side posts and main roof car lines are constructed with the rivets 46, formed integrally as hereinbefore described on the top of the beams. Each of the hood beams may be formed with these rivets or some of them may be provided without the rivets, as illustrated in the drawings, so as to form mere supports and give shape to the hood construction.

Instead of punching oval openings in the side plates for window openings, rectangular window spaces can be formed, and the flanges riveted together as in the case of the oval openings, but in such construction the corners of the flanges would have to be cut or severed, and the openings can then be covered by an ornamental molding forming part of the window frame, but I prefer the oval construction as obviating the necessity of severing the flanges.

It will be noticed that with my construction for the sides of the car, I virtually establish a truss bridge of the sides, enabling me to have a lighter floor system, and to carry the floor and roof therefrom, while in the ordinary constructions just the opposite effect is the result.

The riveting together of the outside and inside side plates at the window openings, and the riveting of these plates to the posts gives a rigid side construction without other bracing.

By reason of the construction of my side

beams or posts, to which the side plates are riveted, all unnecessary riveting is avoided, which materially lowers the cost of construction, in addition to enhancing the appearance of the car by reducing the number of rivet heads.

Instead of riveting the inside and outside plates together by the window flanges, and then bending out the edges of the plates to let them down over the rivets on the beams, under some conditions, the inside and outside plates could be first riveted to the beams, and then the window flanges riveted together, but as this method would be much more tedious than first riveting the plates together by the window flanges, I much prefer the former construction.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is:

1. In a steel car construction, plates for the side walls, consisting of an inside and an outside plate, with flanged window openings, said plates being secured together by rivets through the flanges, substantially as described.

2. In a steel car construction, plates for the side walls, consisting of an inside and an outside plate, with flanged window openings, the flange of one plate overlapping the flange of its corresponding plate, and rivets for securing the overlapping flanges together, substantially as described.

3. In a steel car construction, plates for the side walls, consisting of an inside and an outside plate, with flanged window openings formed oval in shape, the flange of one plate overlapping the flange of its corresponding plate, with rivets for securing the overlapping flanges together, substantially as described.

4. In a steel car construction, plates for the side walls, consisting of an inside and an outside plate, with flanged window openings, said plates being secured together by rivets through the flanges, and window frame castings to serve as frames for the window sashes, and to cover the rivets at the window openings.

5. In a steel car construction, plates for the walls, and beams for holding the same, said beams provided with a vertical row of rivets formed integral therewith, with the plates passed over said rivets and secured thereon.

6. In a steel car construction, side beams for the framework having a vertical row of rivets formed integral therewith on each side edge, and inside and outside plates secured together and passed over said rivets, said plates overlapping each other, with the overlapping edges secured to said beams, and to each other by said rivets.

7. In a steel car construction, side beams for the framework having a vertical row of rivets formed integral therewith, and side plates consisting of an inside and an outside plate, with flanged window openings, said plates being secured together by rivets through the flanges, and with their side edges overlapping and secured to said beams, and to each other, by said integral rivets on the beams.

8. In a steel car construction, beams for securing the plates to the framework of the car, consisting of I-beams with central longitudinal flanges, having sections cut therefrom to form rivets for the plates.

9. In a steel car construction, beams for securing the plates to the framework of the car, consisting of I-beams with central longitudinal flanges having sections cut therefrom to form rivets, and plates overlapping each other with the overlapping edges secured on said rivets, substantially as described.

10. In a steel car construction, a casting provided with wings or lugs, with curved beams, secured thereto, extending radially therefrom to form a frame for the roof hood.

11. In a steel car construction, in combination with a transverse car line, a casting provided with radial wings or lugs, said casting secured at the medial portion of said car line, with curved beams secured to said radial wings and extending radially to the top of the side walls to form the framework for the hood.

WILLIAM G. WAGENHALS.

Witnesses:
GEO. A. H. MILLS,
EDWIN S. MCGEE.