Sept. 13, 1932. A. E. SMALL 1,877,369

RAILWAY CAR CONSTRUCTION

Filed Nov. 13, 1929 2 Sheets-Sheet 1

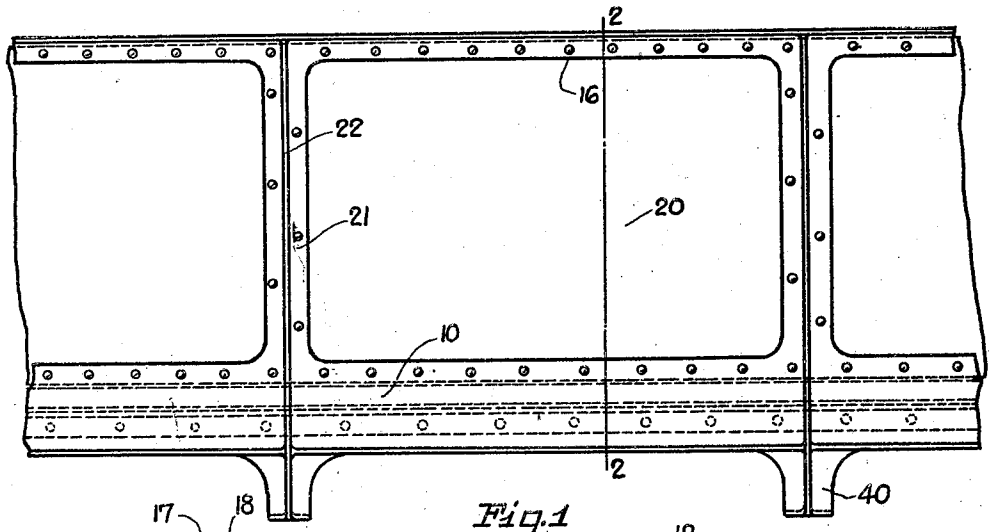


Fig. 1

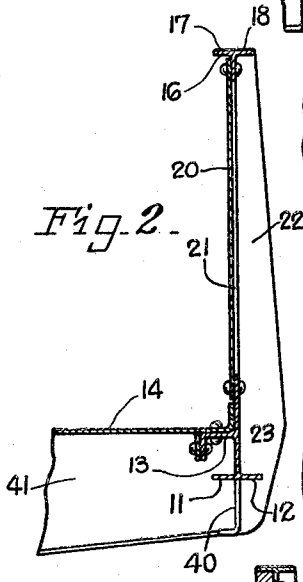


Fig. 2

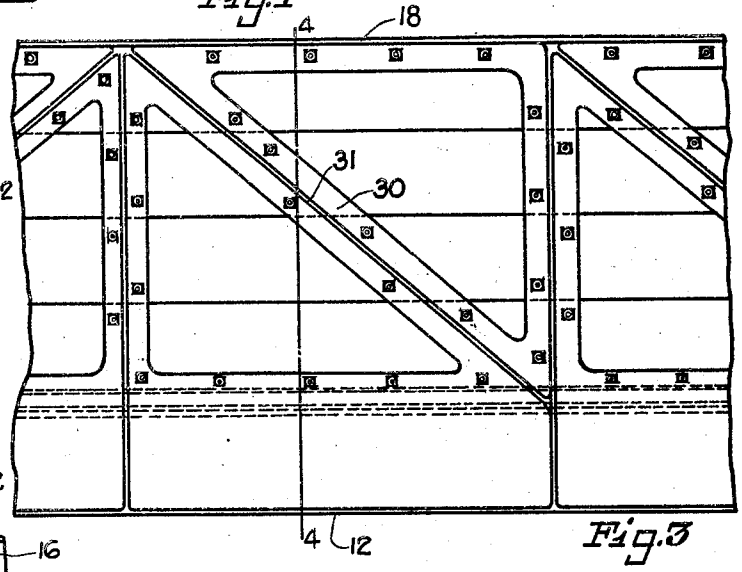


Fig. 3

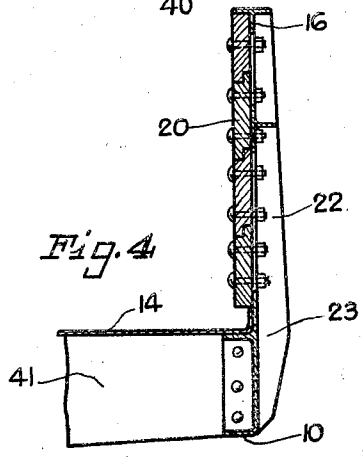


Fig. 4

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Sept. 13, 1932. A. E. SMALL 1,877,369

RAILWAY CAR CONSTRUCTION

Filed Nov. 13, 1929 2 Sheets-Sheet 2

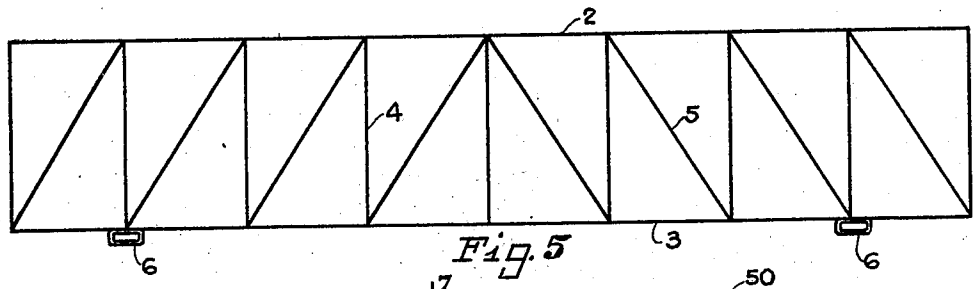


Fig. 5

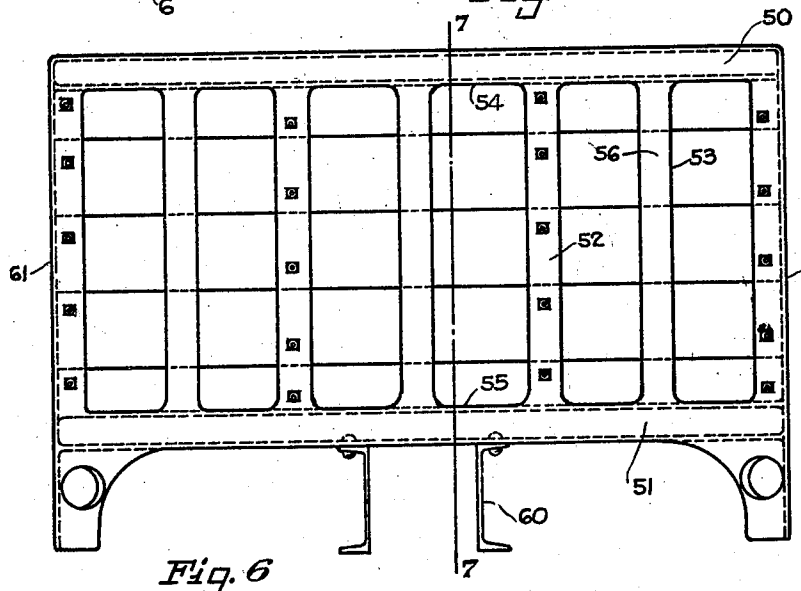


Fig. 6

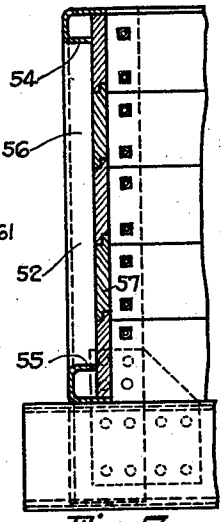


Fig. 7

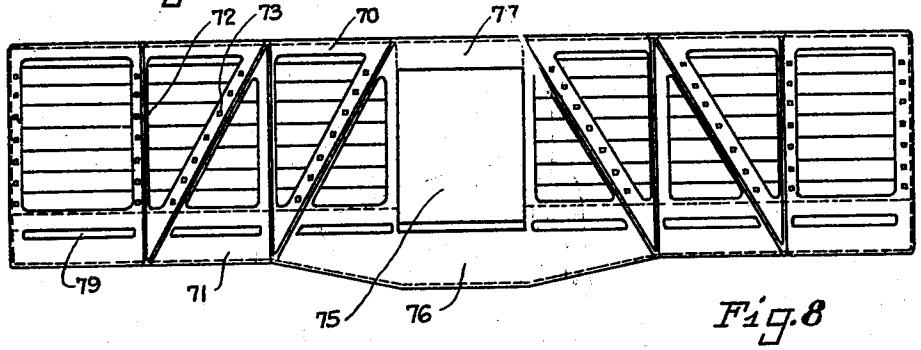


Fig. 8

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Patented Sept. 13, 1932 1,877,369

UNITED STATES PATENT OFFICE

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RAILWAY CAR CONSTRUCTION

Application filed November 13, 1929. Serial No. 406,801.

The invention relates to railway cars and has for its object to provide a one piece casting forming a truss or girder which when used as a side wall of a railway car carries the load to the spaced apart bolsters of the car and when used as an end wall carries the load to the spaced apart side walls of the car.

When my invention is used as a truss the one piece casting comprises the upper compression member; the lower tension member; the vertical posts and the diagonal braces.

When my invention is used as a girder it comprises the top chord; the bottom chord and the vertical posts. The web of the girder may be cast integral with these parts or formed of a rolled steel plate.

These side and end walls are usually the load retaining means as well as the load carrying means.

By nature of their requirements railway freight train cars are out of doors substantially all of the time, therefore, are subjected to corrosive action of the elements, and while paint and other non-corrosive coatings have been applied to the car parts, such protection not only has been found to be expensive in time and money, but the lading removes the coating. This is particularly true of the inside of open type cars which are turned upside down in unloading machines causing the load to slide across the inside surface of the car body and also when the discharging load slides across the surface of a drop door and also when the long lading rests upon the lowered drop end gate of a gondola car the friction therebetween caused by the movement of the car also removes the protective coating from the end gate. Furthermore, certain ladings, such as sulphur, wet coal, which forms sulphuric acid, and saline water (in refrigerator and stock cars) cause rolled steel or iron to corrode. On account of its increased strength rolled steel in the form of plates and bars has supplanted wood in car construction but the corrosive action of the elements eats away the rolled steel or iron material reducing their strength and their length of life. This applies to both the load carrying members, such as the sills, plates and diaphragms and also to the lading retaining members, such as side and end walls, floors, hoppers, hopper doors, etc. It has been found that cast metal, particularly cast steel, has more than twice the resistance to corrosion than rolled steel, therefore, one of the objects of the invention is to make the car part of cast metal, preferably cast steel, to enable the car part to resist corrosion, and furthermore, to produce a construction wherein the metal can be disposed and positioned to accommodate the stresses set up by the car in service. Such a cast construction necessitates a minimum amount of material for strength requirements.

Another object is to eliminate the cost and delay in fabricating the numerous component parts of the present structural steel car parts.

Another object of forming the car part of cast metal is to eliminate the possibility of loose connections which would permit relative motion between the component parts of the car part, as it is common knowledge that the vibration of the car in motion, due to rough and uneven track, and steel wheels rolling on steel rails, together with longer trains and high speeds in present day practice, cause riveted joints and built-up sections to work loose and the railroads look with favor upon any device which reduces the number of parts and joints as these are the weak parts of the car and the more such weak parts are eliminated, the longer the life of the car.

In the drawings:

Fig. 1 shows a typical side girder of a railway car.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 shows a typical side truss of a railway car.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is a skeleton stress diagram of the side truss of a car.

Figs. 6 and 7 show a modified construction.

Fig. 8 shows the invention applied to a box car.

In the diagram shown in Fig. 5 the load is carried by the floor of the car to the bottom portion of the truss constituting, therefore, an equally distributed load. The upper chord 2, the lower chord 3, vertical post 4

and diagonal braces 5 carry the load to the spaced apart bolsters 6 according to known principles of trusses. From the bolsters the load is carried to the trucks.

Figs. 1 and 2 show a typical panel of a girder, which consists of a one piece casting comprising a tension member 10 having lateral flanges 11—12—13 adjacent the lower margin, one of which (13) is arranged to support the floor 14 of the car and to which the floor may be attached. The compression member 16 is provided with lateral flanges 17—18, one of which preferably overlies the side sheathing 20 of the car. This sheathing may be formed of wood and bolted to the truss, or if additional strength is required, it may comprise a rolled steel plate (20) riveted to the tension and compression members so as to form the web of the girder. The vertical posts 21 connecting the tension and compression members preferably have a smooth interior surface flush with the corresponding surfaces on the tension member against which the sheathing bears. The vertical post is also provided with an outwardly projecting rib 22 which merges into the flanges 18—12 of the compression and tension members, respectively, and as the post is also a stake to resist the lateral thrusts of a plastic lading, it is preferably formed wider adjacent the floor line (23) of the car, which is the line of maximum bending moment. This contour is shown in Figs. 2 and 4.

When formed as a truss, diagonal braces 30 are provided which extend from the upper end of one post to the lower end of an adjacent post and are also provided with a smooth interior surface flush with the interior surfaces of the posts mentioned above. These diagonal braces are also provided with an outwardly projecting rib 31 merging into the ribs 22 of the adjacent post and preferably also merging into the ribs 12—18 of the tension and compression members respectively.

The integral side truss or girder is also preferably provided with brackets 40 extending below the tension members 10 in alignment with the post 21, which brackets are attached to the cross bearers 41 of the car.

In Figs. 3 and 4 the lower or tension member is extended to the bottom of the cross bearers 41 of the car. These figures also show a wooden siding or lining 20 bolted to the side truss.

Figs. 6 and 7 show a modified construction used as an end wall of a gondola car. In this modification the upper 50 and lower 51 members are formed of a U-section to give them strength in either tension or compression because in the end wall of a car, if the center sills 60 droop the upper member 50 is thrown into compression, whereas if the side walls 61 droop the upper member 50 is thrown into tension and vice versa with the lower member 51. The posts 52 are also formed of a U-section having spaced apart flanges 53 which merge into the inturned flanges 54—55 of the top and bottom chords respectively. Nailing strips 56 are positioned in some of these posts to which the inside wooden lining 57 is nailed.

Fig. 8 shows a modified form showing the invention used as the side wall of a railway box or house car. In this modification the one piece casting comprises an upper member 70, a lower member 71, vertical posts 72 and diagonal braces 73. The side door opening 75 virtually eliminates the center panel from the truss, therefore, I have increased the depth of the lower member below the side door (76) opening and also increased the strength of the upper member above the side door opening 77 to accommodate the stresses usually taken care of by the center panel.

When the invention is used in a stock car I attach the usual spaced apart slots to the integral post and braces. Also I provide clean out slots or openings 79 in the lower member.

The accompanying drawings illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof, within the scope of the claims, will occur to persons skilled in the art.

I claim:

1. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member, a compression member, vertical posts connecting the tension and compression members, and diagonal braces extending from the upper end of one post to the lower end of an adjacent post, said members, posts and braces having flush interior surfaces.

2. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member, a compression member, vertical posts connecting the tension and compression members having a smooth interior surface, and diagonal braces extending from the upper end of one post to the lower end of an adjacent post, said braces having a smooth interior surface in combination with a sheathing bearing against said surfaces and secured to certain of said members.

3. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member having lateral flanges, a compression member, vertical posts connecting the tension and compression members, and diagonal braces extending from the upper end of one post to the lower end of an adjacent post in com-

bination with a flooring resting upon one of the flanges of the tension member.

4. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member, a compression member, vertical posts connecting the tension and compression members, and brackets extending below the tension members in alignment with the posts in combination with a cross bearer secured to said brackets.

5. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member having lateral flanges, a compression member, vertical posts connecting the tension and compression members having a smooth interior surface, brackets extending below the tension members in alignment with the posts in combination with a sheathing bearing against said surfaces and secured to certain said members, a flooring resting upon one of the flanges of the tension member, and a cross bearer secured to said brackets.

6. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member having lateral flanges, a compression member having lateral flanges, vertical posts connecting the tension and compression members having a smooth interior surface and an outwardly projecting rib merging into flanges of the compression member and diagonal braces extending from the upper end of one post to the lower end of an adjacent post.

7. A wall for a railway car consisting of a one piece casting forming a load sustaining element comprising a tension member having lateral flanges, a compression member having lateral flanges, vertical posts connecting the tension and compression members having a smooth interior surface and an outwardly projecting rib merging into flanges of the compression member, and diagonal braces extending from the upper end of one post to the lower end of an adjacent post, said braces having a smooth interior surface and an outwardly projecting rib merging into the ribs of adjacent posts.

8. In a wall for a railway car, a unitary casting comprising spaced apart substantially horizontal U-shaped members and spaced apart substantially vertical U-shaped posts connecting said members.

9. In a wall for a railway car, a unitary casting comprising spaced apart substantially horizontal U-shaped members and spaced apart substantially vertical U-shaped posts connecting said members in combination with nailing strips secured within some of said posts, and sheathing secured to said nailing strips.

10. A truss for the side wall of a railway box car consisting of an integral casting comprising an upper horizontal member, a lower horizontal member, vertical posts connecting said members, and a door opening adjacent the middle of the truss, the depth of said lower member being increased below the door opening.

11. A truss for the side wall of a railway box car consisting of an integral casting comprising an upper horizontal member, a lower horizontal member vertical posts connecting said members, and a door opening adjacent the middle of the truss, the depth of the upper member being increased above the door opening.

12. A truss for the side wall of a railway box car consisting of an integral casting comprising an upper horizontal member, a lower horizontal member, vertical posts connecting said members, diagonal braces extending from the upper end of one post to the lower end of an adjacent post, and a door opening adjacent the middle of the truss, the depth of said lower member being increased below the door opening and the depth of the upper member being increased above the door opening.

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