

Oct. 28, 1941.

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2,260,512

RAILWAY CAR END STRUCTURE

Filed Dec. 20, 1939

2 Sheets-Sheet 1

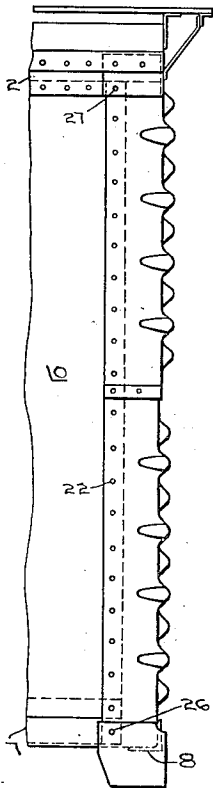


Fig. 1

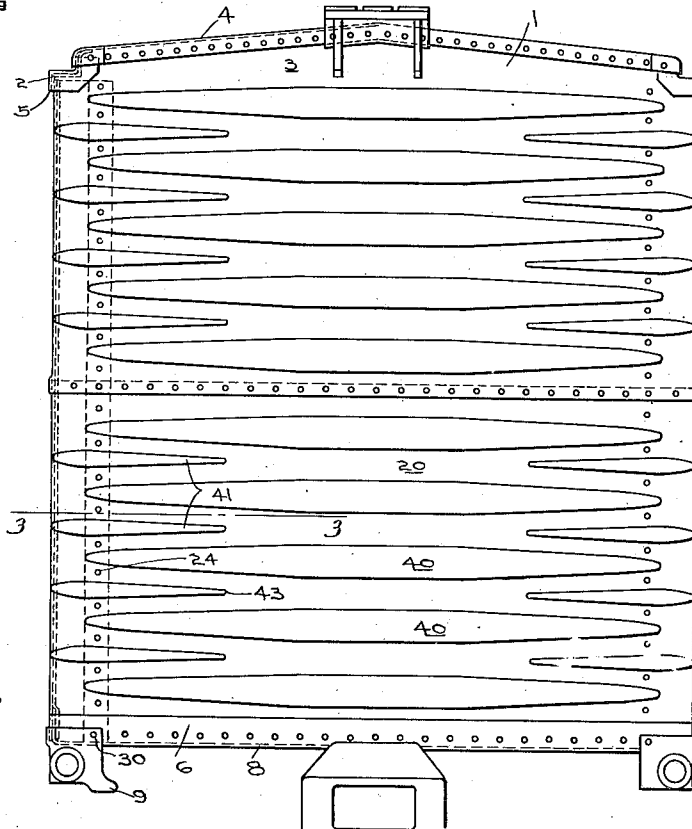


Fig. 2

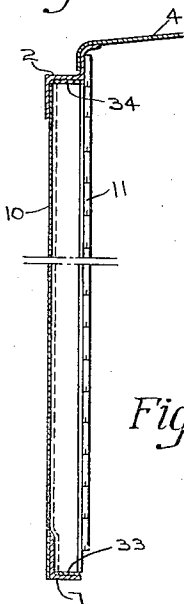


Fig. 4

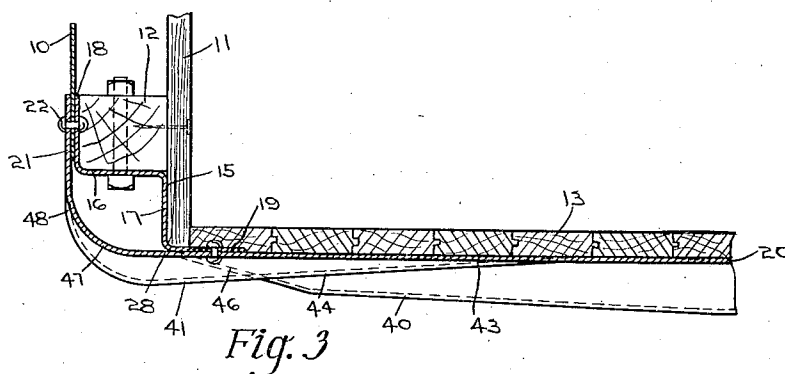


Fig. 3

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2 Sheets-Sheet 2

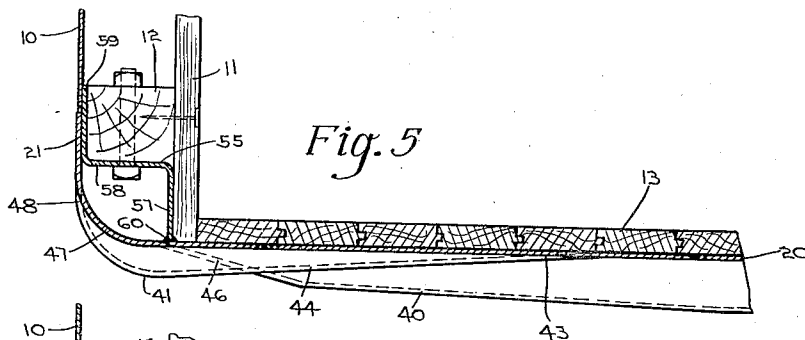


Fig. 5

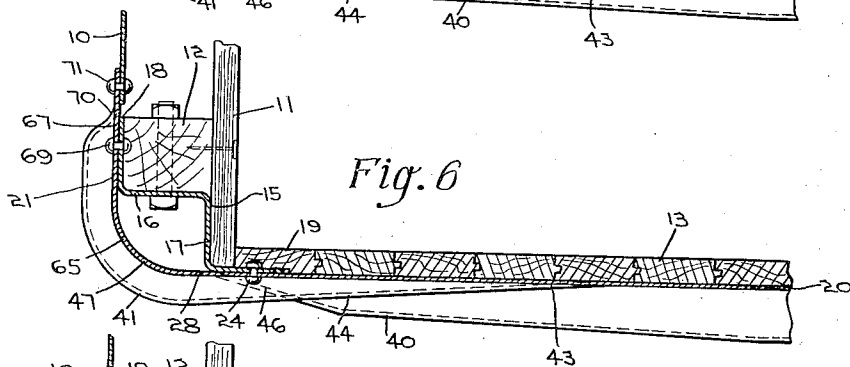


Fig. 6

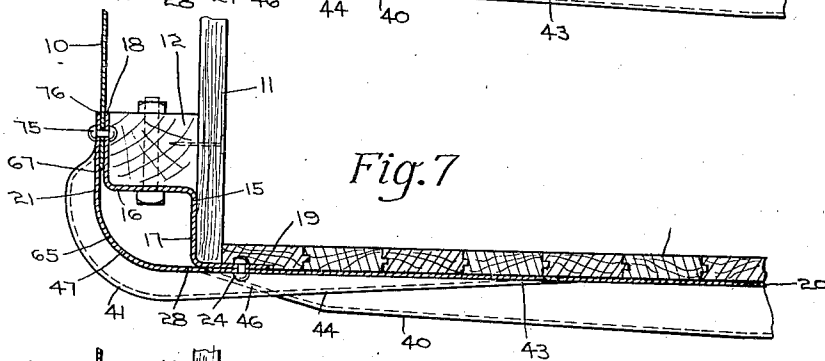


Fig. 7

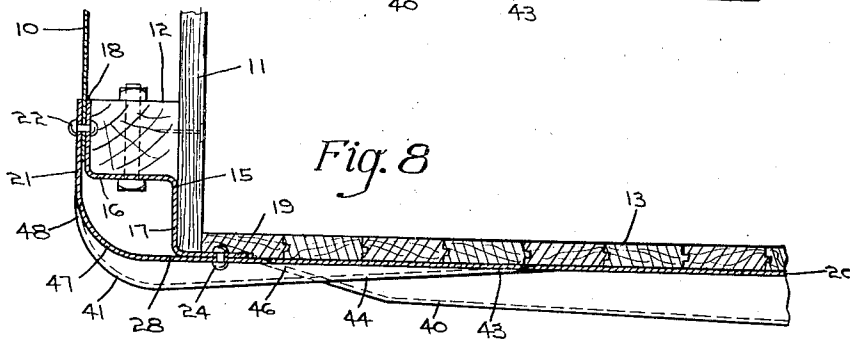


Fig. 8

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UNITED STATES PATENT OFFICE

2,260,512

RAILWAY CAR END STRUCTURE

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6 Claims. (Cl. 105—410)

The invention relates to railway house cars, such as box, automobile and refrigerator cars, and has for its object to provide very strong corner posts for use with a car end wall made of relatively thin metallic sheets and provided with a plurality of substantially parallel horizontal corrugations, which corrugations form a plurality of beams between the opposite corner posts of the car to resist a shifting load and to keep the car in square. More specifically the object of the invention is to provide a corner post which is so formed and has its opposite ends so secured to the roof structure and underframe structure, respectively, as to provide a very strong semi-restrained beam between these structures to resist forces in any horizontal direction and to also secure the corner post to these structures so as to prevent it from rotating about its vertical axis, or in other words, to resist torque.

A shifting load in a railway freight car exerts a horizontal force against the end wall and if the end wall deflects outwardly the middle portion of the corner posts are pulled inwardly, while the tops and bottoms, respectively, of the corner posts are held in position and prevented from coming toward each other by the end plate and end sill, respectively, thus causing a bowing or horizontal beam action on each corner post. Railway cars are frequently "cornered" in service; that is, some outside object is thrown against the corner post (or the car is thrown against the outside object) causing a horizontal force to be exerted toward the inside of the car.

Each corner post is also a strut of the overhanging portion of the side truss of the car; (that is, the portion beyond the body bolster) and as such must act as a column or compression member between the side plate and side sill of the car.

A further object is to associate the vertical marginal portion of the corrugated metallic end wall with a vertically disposed member to form a box structural beam and column between the roof structure and the underframe structure, which combined structure functions as a corner post to resist the forces heretofore mentioned. A further object is to stop the major corrugations (in the end wall sheet) short of or at the corner of the car and to provide minor corrugations disposed between the ends of the major corrugations in overlapping relation therewith. The opposite ends of the minor corrugations extend around the corner of the car and are attached to the vertical member in the plane of the end wall and also preferably in the plane of

the side wall. Therefore, any load imposed upon the end wall is carried by the major corrugations to the vertical margins of the sheet and transferred to the minor corrugations due to the overlapping relation between the major and minor corrugations. Since the minor corrugations are preferably attached to the vertical member in two places, the entire end wall functions as a restrained or semi-restrained beam.

A further object is to secure one of the elements of the aforesaid box structural beam to the metallic side wall sheet so as to obtain cooperation therebetween to resist the various stresses to which a car is subjected in service.

A further object is to associate the corrugations with the corner post so as to transmit at least a part of the stresses imposed thereon to the side wall sheet.

A further object is to form the vertical marginal portion of the corrugated end wall sheet with a lateral flange formed on a relatively large radius to form in effect an arch between the vertical margins of the inside vertical member to resist exterior horizontal forces. Such large radius would also enhance the appearance of the car.

Although the drawings show my invention used in the end wall of a railway car, it is obvious that it could be equally well adapted to use as a side wall, roof, side door or hopper door of a railway car.

In the drawings:

Fig. 1 shows a side elevation of a railway car embodying one modification of my invention.

Fig. 2 is an end elevation of a portion of the car shown in Fig. 1.

Fig. 3 is an enlarged sectional view through the corner as indicated by line 3—3 of Fig. 1.

Fig. 4 is a vertical section through the side wall of the car shown in Figs. 1 and 2.

Figs. 5 to 8 are views similar to Fig. 3 showing modified forms of corner construction.

The drawings show the usual parts of the car, such as the roof structure 1 (including the side plates 2; end plates 3 and roof proper 4; corner casting 5 and other associated elements); the underframe structure 6 (including the side sill 7; end sill 8; corner casting 9 and other associated elements); side wall sheet 10; side lining 11; side lining nailing strip 12 and end lining 12.

Figs. 1, 2, 3 and 4 show the vertical member 15 comprising angularly disposed arms 16 and 17 provided with flanges 18 and 19, respectively, and a corrugated end wall sheet 20 formed with a flange 21 secured to the arm 16 by means

of the flange 18 and the rivet 22. The flanges 18 and 21 are also preferably secured to the side wall sheet 10 by means of the rivet 22. The end wall sheet 20 is secured to the arm 17 by means of the flange 19 and the rivet 24. The flange 21 of the end wall sheet and the flange 18 of the member 15 are secured to the side sill 7 by means of the rivets 26 (Fig. 1) and to the side plate 2 by means of the rivet 27 (Fig. 1). The vertical marginal portion 28 of the end wall sheet 20 and the flange 19 of the member 15 are secured to the end sill 6 by the rivet 30 (see Fig. 2) and the corner casting 9. The vertical margin 28 of the end wall sheet 20 and the flange 19 of the member 15 are secured to the roof structure by the upper corner casting 5. (The upper part of the corrugated end wall sheet performs the functions of the usual horizontal beam secured to the tops of the corner posts and called an end plate.) The arms 16 and 17 of the vertical member 15 are welded to the underframe structure, as shown at 33 (Fig. 4) and these arms are also securely welded to the roof structure, as shown at 34 (Fig. 4), thus means are provided to secure the arms 16-17 of the member 15 to the roof structure and underframe structure 6, respectively, and also means are provided to secure the flange 21 of the end wall sheet 20 and the adjacent marginal portion 28 of the end wall sheet to the roof structure and underframe structure 6, respectively. Also means are provided to secure the arms 16 and 17 of the member 15 to the flange 21 of the end wall sheet 20 and the body of the end wall sheet 20, respectively, to form a box structural element. In other words, I have shown and described a corner post comprising a box structural element secured to the roof structure and underframe structure, respectively, to provide a very strong beam therebetween and to resist torque.

The end wall sheet 20 is reinforced by a plurality of substantially horizontal major corrugations 40 which, in the modification shown in Fig. 3, terminate and merge into the end wall sheet 20 adjacent the rivets 24. Minor corrugations 41 are disposed between the major corrugations 40 and spring from the end wall sheet 20 at 43. The end portions 44 of the minor corrugations 41 overlap the end portions 46 of the major corrugations 40 so that a load imposed upon the major corrugations 40 is transferred to the minor corrugations 41. Each flange 21 of the end wall sheet 20 is formed on a curve of relatively large radius to form an arch 47 between the arms 16, 17 of the vertical member 15. The minor corrugations 41 extend around the arch 47 and merge at 48 into the flange 21 of the end wall sheet 20, thereby stiffening said arch and forming a partially restrained end wall.

Fig. 5 shows a modified form of vertical member 55 comprising angularly disposed arms 57, 58, the arm 58 having a flange 59. The arm 57 is secured preferably by the welded material 60 to the body part of the end wall sheet 20 near the emergence of the major corrugations 40. The flange 21 of the end wall sheet 20 and the side wall sheet 10 are each secured, preferably by welding, to the flange 59 in flatwise relation thereto and in abutting relation to each other.

Fig. 6 shows a modification embodying a vertical member 15 substantially the same as shown in Fig. 3. The wall sheet flange 21 is comprised of the curved portion 65 and a substantially flat edge portion 67. The minor corrugations 41 and major corrugations 40 are disposed in overlap-

ping relation as hereinabove described. However, the minor corrugations 41 extend completely around the curved portion 65 of the flange 21 and are secured to the arm 16, preferably by the rivets 69 and flange 18. The minor corrugations 41 merge into the flange 21 of the end wall sheet 20 (at 70) and the side wall sheet 10 may be secured to the flange 21 by the rivets 71.

In the modification shown in Fig. 7, the minor corrugations 41 extend around the curved portion 65 and merge into the flat portion 67 as pointed out in reference to Fig. 6. The rivets 75, however, instead of passing through the corrugated part of the flange 21 pass through the uncorrugated portion 76 and secure the flange 21 and side wall sheet 10 to the flange 18 of the vertical member 15.

The modification shown in Fig. 8 is somewhat like Fig. 3 except that the major corrugations 40 terminate and merge into the end wall sheet 20 at a greater distance from the corner of the car so that no part of said major corrugations is secured to the member 15 by the rivets 24.

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. In a railway car corner structure comprising a vertical member, a wall sheet comprising a body part formed with a flange, means to secure the body part of the wall sheet to said member and means disposed in spaced relation to the first mentioned means to secure the flange of the wall sheet to said member, the flange of the wall sheet being formed on a curve of relatively large radius to form an arch substantially between the first mentioned and second mentioned means, a part of said member between said first mentioned and second mentioned means being spaced from said arch to form a box structural beam, said wall sheet being formed with a plurality of substantially horizontal corrugations which terminate and merge into the uncurved part of said sheet in overlapping relation with said first mentioned means, and a plurality of minor corrugations between the first mentioned corrugations and in overlapping relation therewith, said minor corrugations extending substantially around said arch.

2. In a railway car corner structure comprising a vertical member comprising angularly disposed arms, a wall sheet comprising a body part formed with a flange, means to secure the body part of the wall sheet to one of said arms and means to secure the flange of the wall sheet to the other of said arms, the flange of the wall sheet being formed on a curve of relatively large radius to form an arch substantially between the first mentioned and second mentioned means, thereby providing in cooperation with said member a box structural beam, said wall sheet being formed with a plurality of substantially horizontal corrugations, which terminate and merge into the uncurved part of said sheet in overlapping relation with said first mentioned means and a plurality of minor corrugations between the first mentioned corrugations and in overlapping relation therewith, said minor corrugations extending substantially around said arch.

3. In a railway car, spaced apart vertical members, a wall sheet comprising a body part formed

with flanges on the opposite vertical edges, means to secure each of said flanges to one of said members and means disposed in spaced relation to the first mentioned means to secure the body part of the wall sheet to said members, said flanges being formed on curves of relatively large radius to form arches substantially between the first mentioned and second mentioned means, parts of said members being spaced from said arches to form box structural posts, said wall sheet formed with a plurality of substantially horizontal major corrugations extending substantially between said members and terminating in the uncurved body part beyond said second mentioned means, and a plurality of minor corrugations between the end parts only of said major corrugations, said minor corrugations extending substantially around said arch.

4. In a railway car, spaced apart vertical members, a wall sheet comprising a body part formed with flanges on the opposite vertical edges, means to secure each of said flanges to one of said members and means disposed in spaced relation to the first mentioned means to secure the body part of the wall sheet to said members, said flanges being formed on curves of relatively large radius to form arches substantially between first mentioned and second mentioned means, parts of said members being spaced from said arches to form box structural posts, said wall sheet formed with a plurality of substantially horizontal major corrugations extending substantially between said members and terminating in the uncurved body part in overlapping relation with said second mentioned means, said major corrugations being relatively wide at their central parts and tapering toward their opposite ends, and a plurality of minor corrugations between the end parts only of said major corrugations, said minor corrugations tapering toward the center of said sheet and merging therein between the tapered parts of said major corrugations, said minor corrugations extending substantially around said arch.

5. In a railway car corner structure comprising a vertical member, a wall sheet comprising a

body part formed with a flange, means disposed adjacent said flange arranged to secure the body part of the wall sheet to said member and means disposed in spaced relation to the first mentioned means to secure the flange of the wall sheet to said member, the flange of the wall sheet being formed on a curve of relatively large radius to form an arch substantially between the first mentioned and second mentioned means, a part of said member between said first mentioned and second mentioned means being spaced from said arch to form a box structural beam, said wall sheet being formed with a plurality of substantially horizontal corrugations which terminate and merge into the uncurved part of said sheet between said flange and said first mentioned means, and a plurality of minor corrugations between the first mentioned corrugations and in overlapping relation therewith, said minor corrugations extending substantially around said arch.

6. In a railway car corner structure comprising a vertical member, a wall sheet comprising a body part formed with a flange, means disposed adjacent said flange arranged to secure the body part of the wall sheet to said member and means disposed in spaced relation to the first mentioned means to secure the flange of the wall sheet to said member, the flange of the wall sheet being formed on a curve of relatively large radius to form an arch substantially between the first mentioned and second mentioned means, a part of said member between said first mentioned and second mentioned means being spaced from said arch to form a box structural beam, said wall sheet being formed with a plurality of substantially horizontal corrugations which terminate and merge into the uncurved part of said sheet between said flange and said first mentioned means, and a plurality of minor corrugations between the first mentioned corrugations and in overlapping relation therewith, said minor corrugations extending substantially around and merging into said arch.

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