April 12, 1932. A. E. SMALL 1,853,936

CAR CONSTRUCTION

Filed Sept. 3, 1929 3 Sheets-Sheet 1

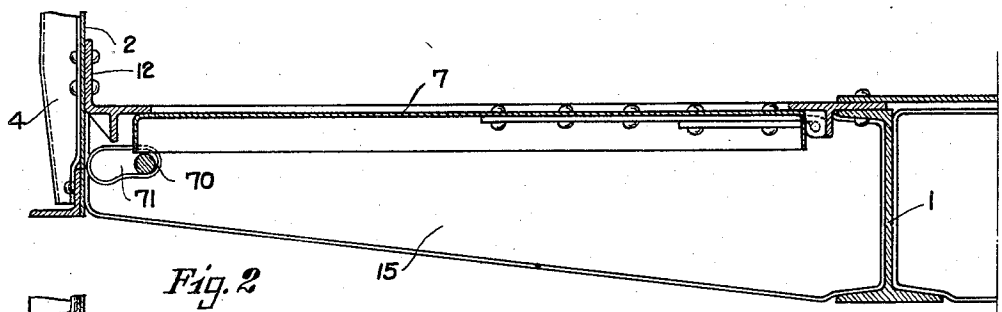

Fig. 2

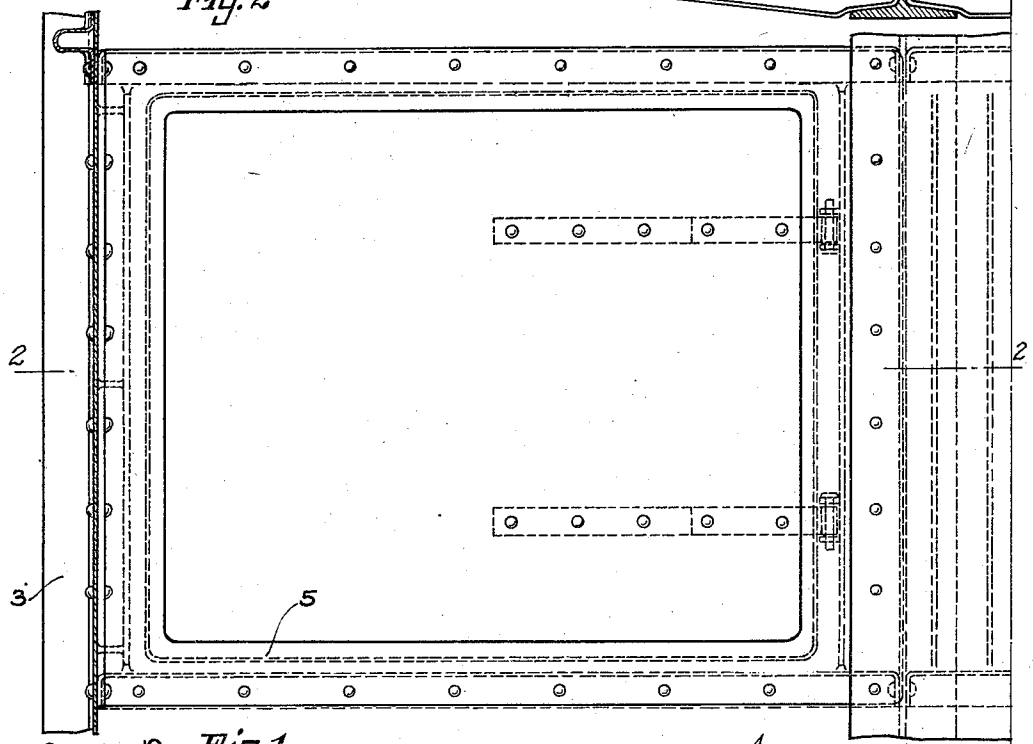

Fig. 1

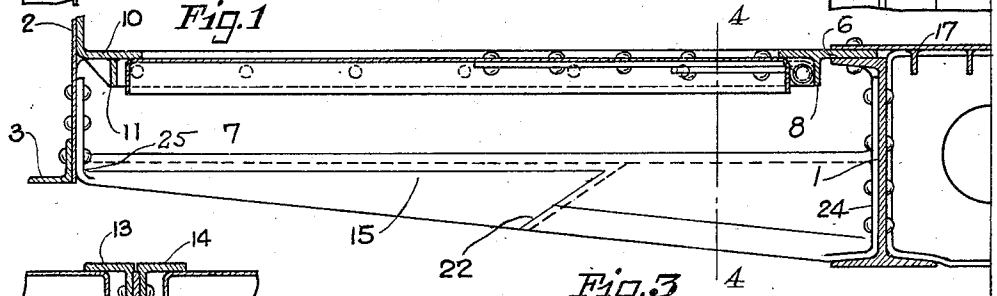

Fig. 3

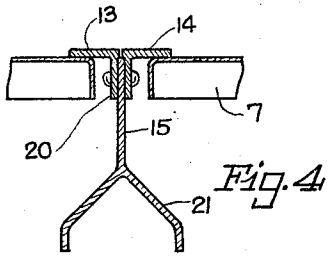

Fig. 4

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CAR CONSTRUCTION

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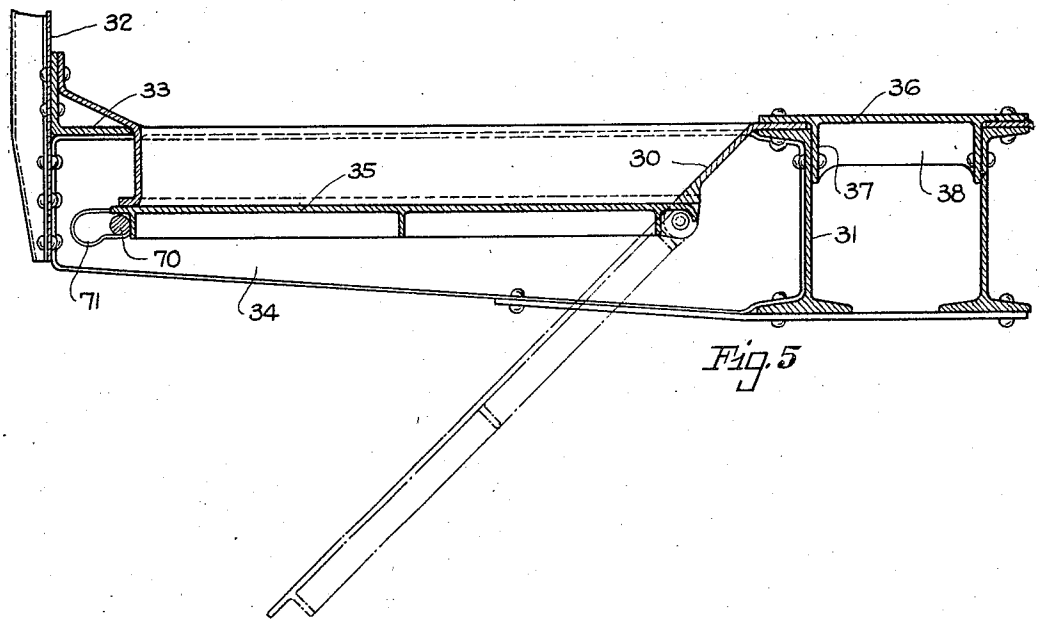

Fig. 5

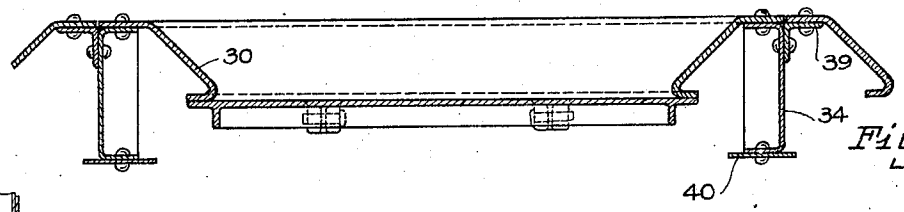

Fig. 6

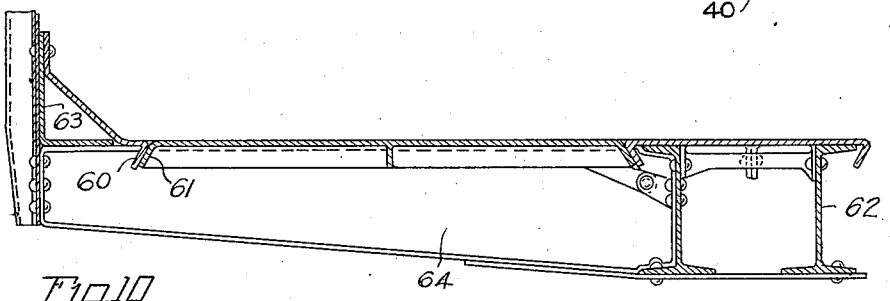

Fig. 10

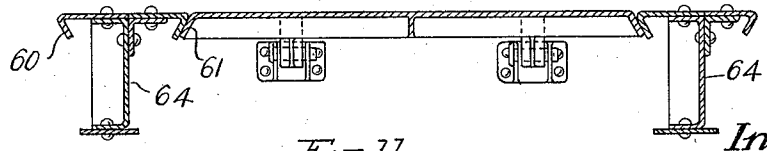

Fig. 11

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CAR CONSTRUCTION

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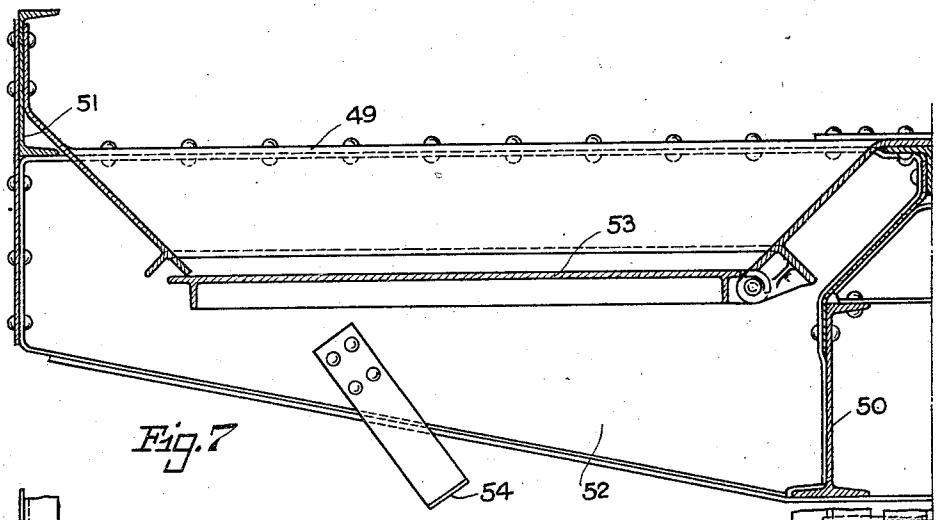

Fig. 7

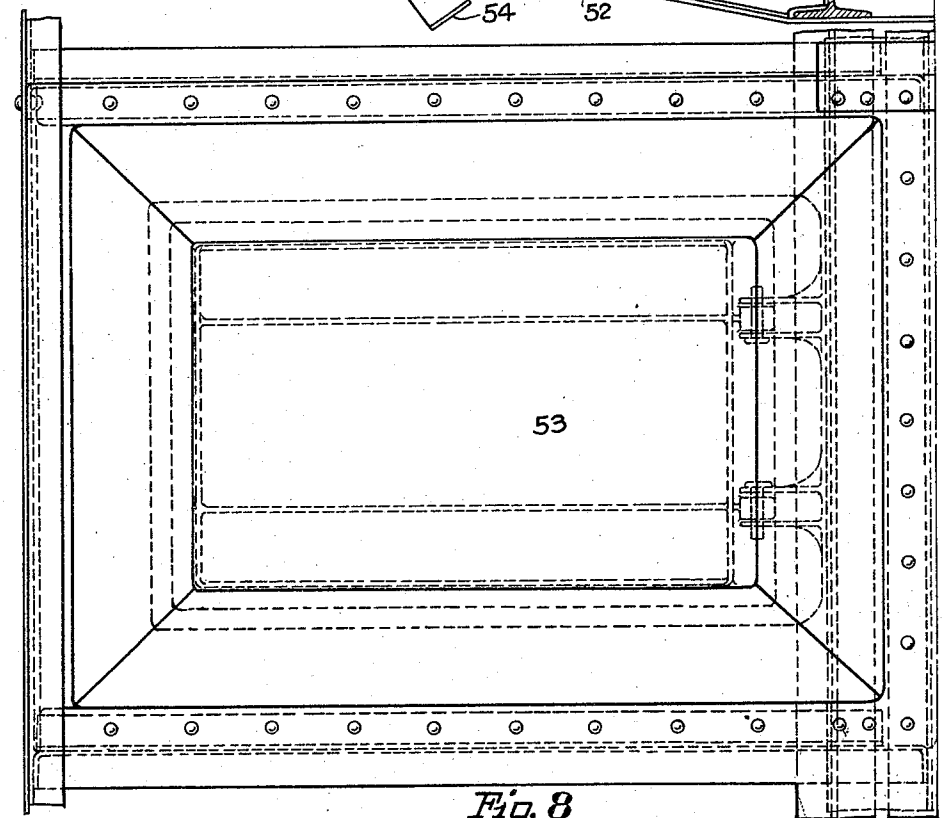

Fig. 8

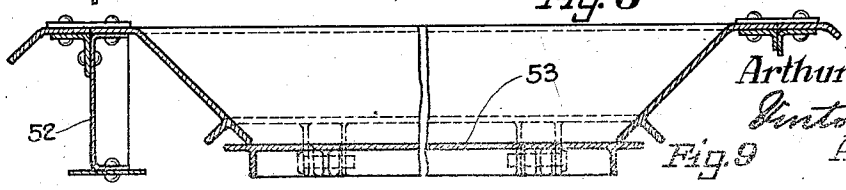

Fig. 9

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Patented Apr. 12, 1932 1,853,936

UNITED STATES PATENT OFFICE

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CAR CONSTRUCTION

Application filed September 3, 1929. Serial No. 390,067.

My invention relates to the construction of railway freight cars, and more particularly to that type of gondola car wherein a portion of the floor consists of doors hinged to the car body so that they may be dropped to discharge part of the lading. Such cars are used largely to transport coal and ballasting material, such as sand, chats, gravel, etc.

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 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 door frame of cast metal, preferably cast steel, to enable it 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 of forming the door frame of cast metal is to eliminate the possibility of loose connections which would permit relative motion between the component parts of the frame, 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.

Another object of the invention is to provide a frame for the door opening which also is capable of resisting the torsional and weaving movements of the car in service, which movements tend to distort the car out of shape. Such distortion not only weakens the car structure, but also prevents the doors from properly closing the door opening, allowing a leakage of the lading.

In the drawings:

Fig. 1 shows a typical application of my cast metal frame to a railway car.

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

Fig. 3 shows a modified cross-bearer of cast metal.

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

Figs. 5 and 6 show a modified construction.

Figs. 7, 8 and 9 show another modified construction.

Figs. 10 and 11 show still another modified construction.

Figs. 1 to 4 inclusive show a typical application of my construction to a railway car, wherein the center sills 1; side wall 2; side sill 3 and side stake 4 are of the usual construction. My cast metal frame 5 comprises a part 6 secured to the center sill 1 under which the door 7 fits, which part is preferably provided with a depending flange 8 to form a seal for the door and a stiffener for

the frame. The outer portion of the frame comprises a portion 10 which is also preferably provided with a depending flange 11 to form a seal for the door. This outer portion is also preferably provided with an upstanding flange 12 secured to the side wall of the car. The meeting edges of adjacent door frames (13—14) are secured to the diaphragm or cross bearer 15 of the car. The center sill cover plate 17 is also preferably made of cast metal and I also prefer to use cast metal doors with my construction.

From the above it will be noted that the entire portion of the floor of the car in contact with the lading is of cast metal, thus practically eliminating corrosion due to the lading coming in contact with parts of the car. My cast metal frame 5 not only forms a frame for the door opening but also forms the upper member of the cross bearer (15) which is a girder; furthermore, the floor portions of the door frame 5, with the cover plate, forms the rigid floor of the car. The floor is assembled by putting the several frames in place.

In the form shown in Figs. 1 to 4 inclusive, I provide a cast metal diaphragm or cross bearer (15) which preferably fits between flanges 20 of the adjacent frames and is riveted or otherwise secured thereto. (See Fig. 4.) The bottom portion of this cross bearer or diaphragm comprises oppositely projecting obliquely disposed flanges 21. They are obliquely disposed so as to shed the lading when the door is dropped. I also form these flanges to provide a stop 22 for the door. That portion of the flange (23) behind the stop may be flared, as shown in Fig. 2, to better brace the car structure against weaving. This cross bearer is provided with a flange 24 to secure it to the center sill 1 and other flanges 25 to secure it to the side sill 3.

In the modified form shown in Figs. 5 and 6 I have provided the cast metal frame with a continuous inwardly sloping flange 30 forming a well below which the door is positioned. This construction permits of a very much smaller, and consequently, lighter door, which is easier to manufacture and operate. It also increases the cubical capacity of the car. The lower part of the depending flanges 30 are flared to form bearing surfaces for the door. The usual parts of the car are shown, such as center sill 31; side wall 32; side sill 33; cross beam 34 and door 35.

The cover plate 36 is preferably of cast metal and is shown formed with attaching flange 37 and stiffening flanges 38. The diaphragm 34 is shown of pressed steel with an upper angle 39 and lower plate 40.

Another advantage of the construction shown in Figs. 5 and 6 is that long, heavy lading, such as rails, pipe, telegraph poles, etc., are supported by the cross bearers and not by the doors.

In Figs. 7, 8 and 9 I have shown my construction applied to a so-called one hundred percent dump general service car, wherein the floor line 49 is positioned above the center sills 50. The usual parts of the car are shown, such as side wall 51; diaphragm 52; door 53 and door stop 54.

Figs. 10 and 11 show a modified construction wherein the cast metal frame is provided with an outwardly projecting depending flange 60 (preferably continuous) around the door opening and the door is provided with an outwardly inclined depending flange 61 at its periphery which co-acts with the flange 60 of the door frame to completely close the door opening. The usual parts of the car are shown in these figures, such as center sill 62; side wall 63 and cross bearer 64.

Where rolled steel members are used I preferably form the cast metal frame so as to cover them and protect them from the lading.

Any convenient door raising or lowering mechanism may be used with my construction. The form shown in Figs. 2 and 5 consists of a revolving shaft 70 which rests in the slot 71 in the cross bearers and is rolled below the door to support it after the door is in closed position.

The doors may be hinged to or adjacent the center sill, as shown in the drawings, or they may be hinged to any other portion or part of the car and still come within the scope of the invention.

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 having a substantially horizontal floor, comprising a cast metal door frame having a door opening and horizontal floor portions, said floor portions provided with integral reinforcing flanges surrounding said openings.

2. In a railway car having a substantially horizontal floor, comprising a cast metal door frame having a door opening, horizontal floor portions, and integral depending flanges adjacent the edges of said opening.

3. In a railway car having a substantially horizontal floor, comprising a cast metal door frame having a door opening, horizontal floor portions, and integral depending flanges spaced away from the edges of the door opening to form a rabbet for the reception of a door.

4. In a railway car having a substantially

horizontal floor, comprising a cast metal door frame having a door opening, and horizontal floor portions, secured to the center construction, said floor portions provided with integral reinforcing flanges surrounding said opening.

5. In a railway car having a substantially horizontal floor, and a side wall, said floor comprising a cast metal door frame having a door opening and horizontal floor portions, one of said floor portions secured to the center construction and the opposite side of the frame secured to the side wall.

6. In a railway car having a substantially horizontal floor, a side wall, and a stake, said floor comprising a cast metal door frame having a door opening, and horizontal floor portions, said door frame secured to the center construction, side wall and side stake.

7. In a railway car having a substantially horizontal floor, and a side wall, said floor comprising a cast metal door frame having a door opening and horizontal floor portions, said door frame provided with an upstanding flange secured to the side wall.

8. In a railway car having a center construction, a side wall, a cross bearer secured to the center construction and the side wall, and a substantially horizontal floor, said floor comprising a cast metal door frame on each side of said cross bearer, each of said door frames comprising a door opening and horizontal floor portions, and an integral depending flange secured to the cross bearer.

9. In a railway car having a center construction, a side wall and a pair of cross bearers extending between the center construction and side wall and secured thereto, the combination of a cast metal frame surrounding a door opening and having floor portions forming the floor of the car between the center construction and the side wall and between said cross bearers.

10. In a railway car having a center construction, a side wall and a pair of cross bearers extending between the center construction and side wall and secured thereto, the combination of a cast metal frame surrounding a door opening and having floor portions forming the floor of the car between the center construction and the side wall and between said cross bearers, said frame having an extension overlying said center construction and secured thereto.

11. In a railway car having a center construction, a side wall and a pair of cross bearers extending between the center construction and side wall and secured thereto, the combination of a cast metal frame surrounding a door opening and having floor portions forming the floor of the car between the center construction and the side wall and between said cross bearers, said frame having depending flanges secured to said cross bearers respectively.

12. In a railway car having a center construction, a side wall and a pair of cross bearers extending between the center construction and side wall and secured thereto, the combination of a cast metal frame surrounding a door opening and having floor portions forming the floor of the car between the center construction and the side wall and between said cross bearers, said frame having an upstanding flange secured to said side wall.

13. In a railway car having a center construction, a side wall and a pair of cross bearers extending between the center construction and side wall and secured thereto, the combination of a cast metal frame surrounding a door opening and having floor portions forming the floor of the car between the center construction and the side wall and between said cross bearers, said frame having an extension overlying said center construction and secured thereto and having depending flanges secured to said cross bearers, respectively, and having an upstanding flange secured to said side wall.

14. In a railway car having a substantially horizontal floor and a center construction, the combination of a cast metal door frame comprising a door opening and horizontal floor portions between the door opening and the center construction.

15. In a railway car having a substantially horizontal floor, a center construction, and a side wall, the combination of a cast metal door frame comprising a door opening and horizontal floor portions between the door opening and the center construction and between the door opening and the side wall.

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