April 23, 1940. F. OYEN 2,198,369

DOOR FOR RAILWAY CARS

Filed March 15, 1937 3 Sheets-Sheet 1

FIG. 1.

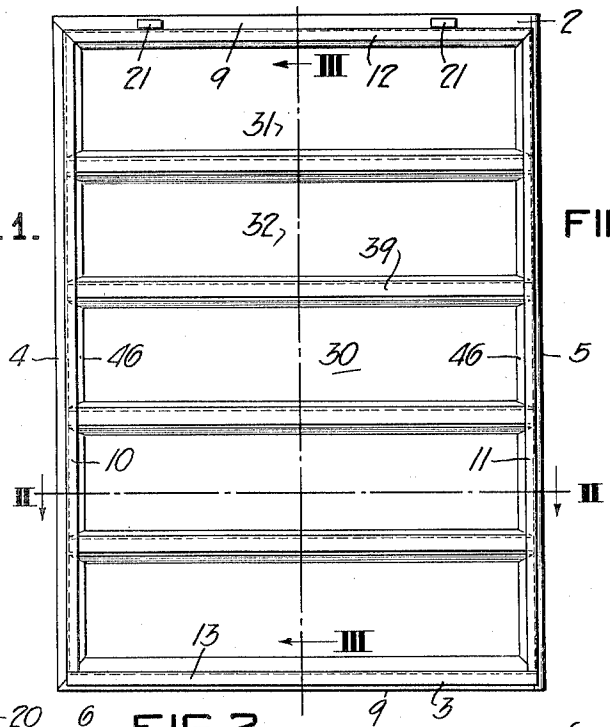


FIG. 3.

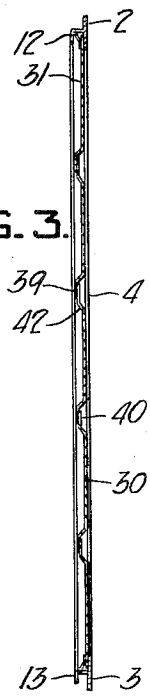


FIG. 4.

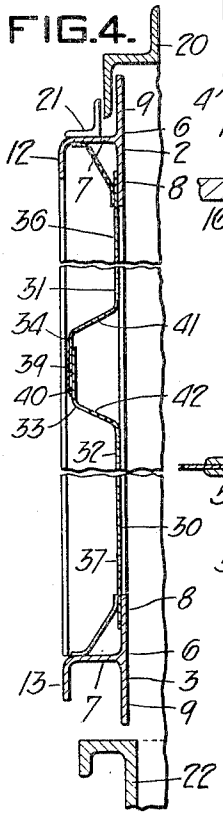


FIG. 2.

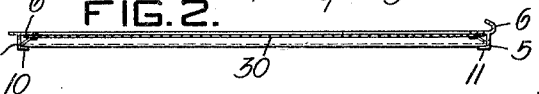


FIG. 5.

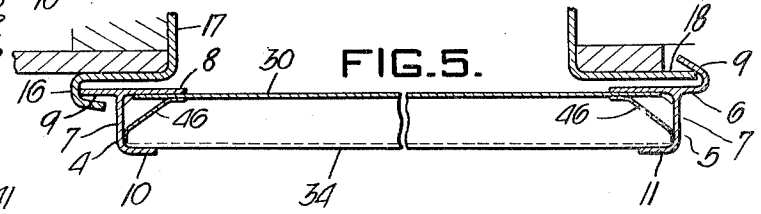
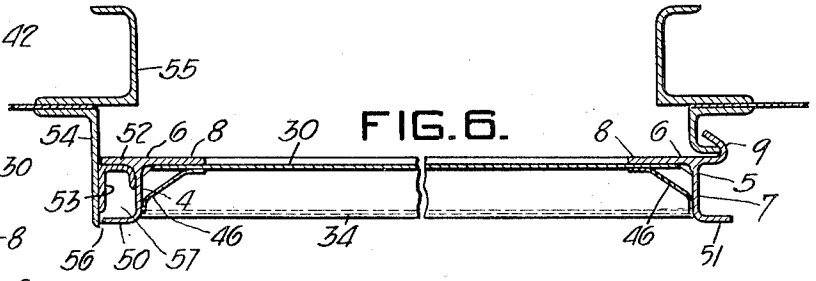


FIG. 6.



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DOOR FOR RAILWAY CARS

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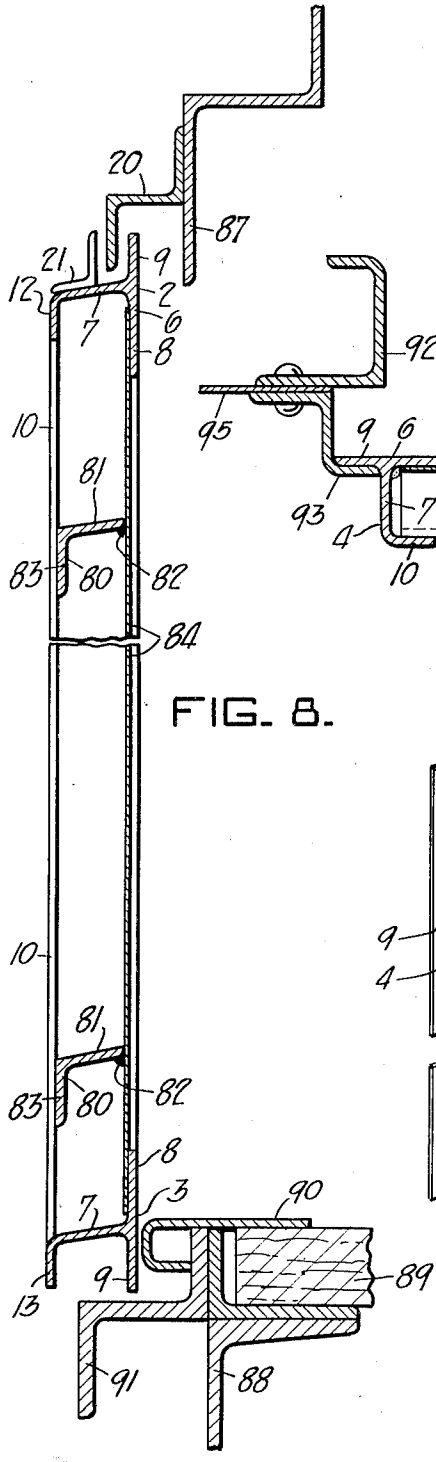


FIG. 8.

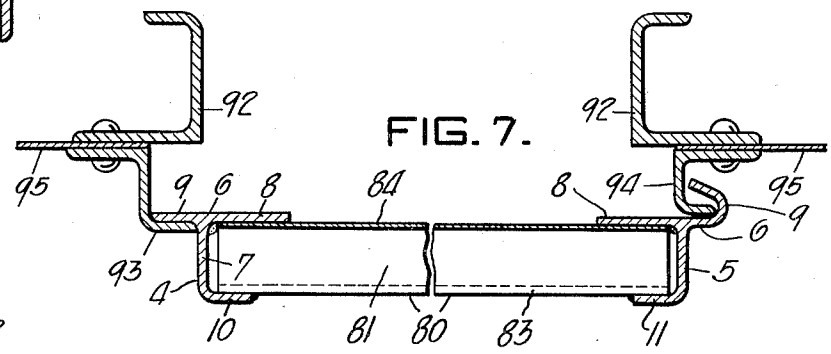


FIG. 7.

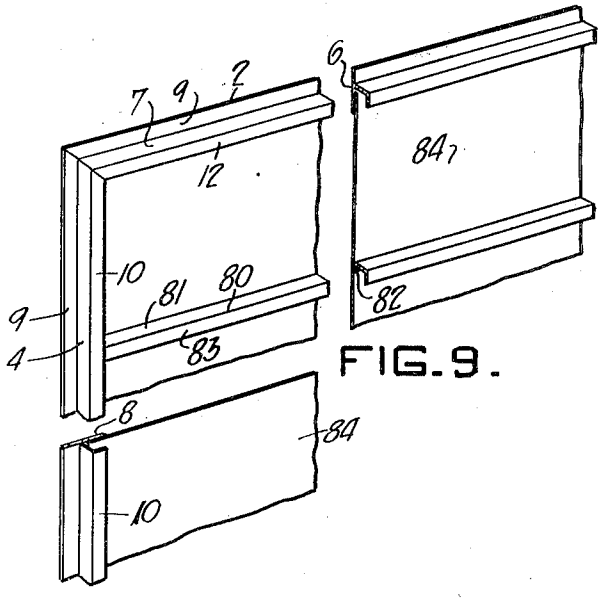


FIG. 9.

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DOOR FOR RAILWAY CARS

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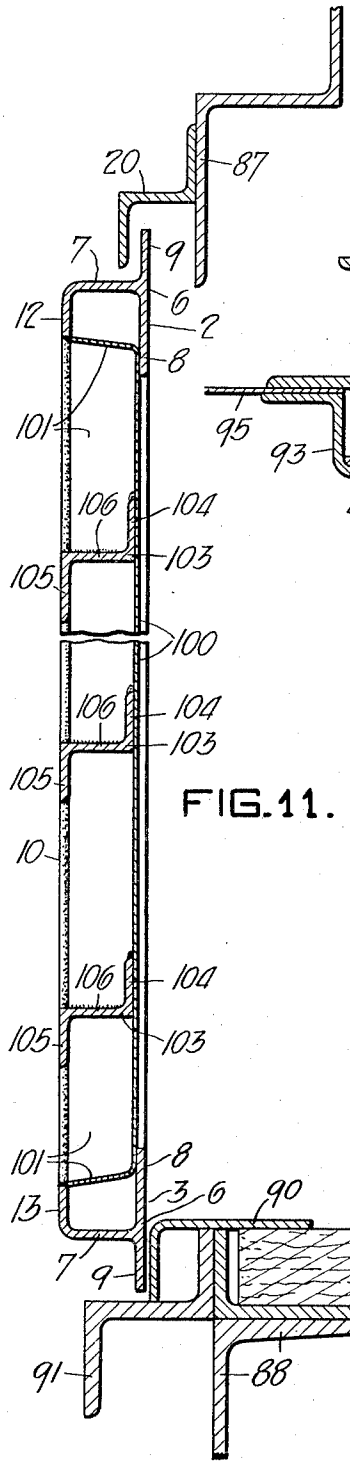


FIG. 11.

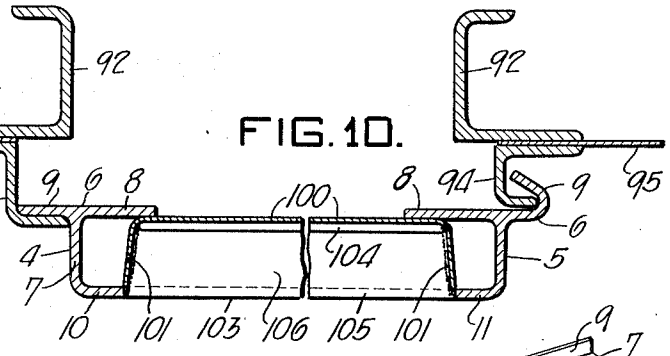


FIG. 10.

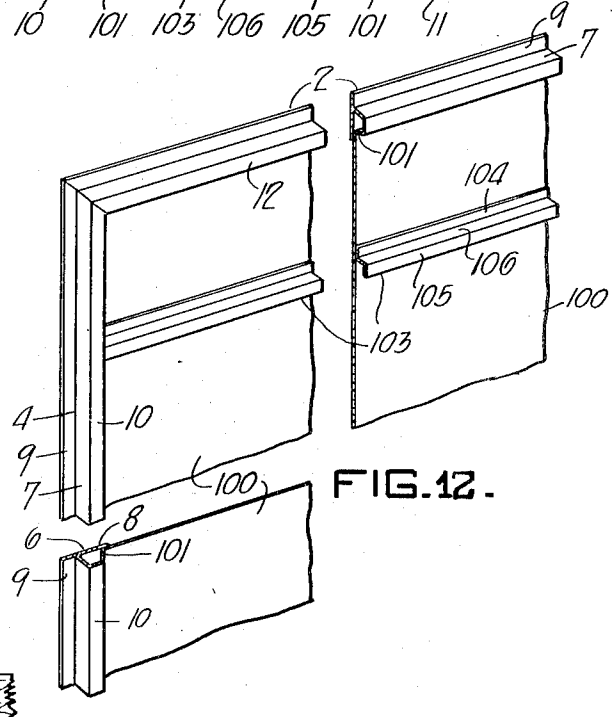


FIG. 12.

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Patented Apr. 23, 1940 2,198,369

UNITED STATES PATENT OFFICE

2,198,369

DOOR FOR RAILWAY CARS

Finn Oyen, Dormont, Pa., assignor to Railroad Research Bureau, a corporation of New Jersey

Application March 15, 1937, Serial No. 131,098

4 Claims. (Cl. 189—46)

This invention relates to railway freight cars and more particularly to side doors therefor, which move horizontally parallel to the car to close openings in the side walls of such cars for the loading and unloading of the lading.

Such a door is hung by hangers at its upper edge to the side plate of the car or is supported by brackets at its bottom edge to the side sill of the car. Rollers or other anti-friction means are generally used in such hangers or brackets. Sometimes a lower track is used and rollers are mounted in the lower edge of the door.

When in closed position the side door is a part of the retaining wall and as such must retain the load and must also withstand the impact of the lading due to rough track and rough train operation. These forces tend to bulge the door and if it deflects it binds in the associated parts on the car, making it very difficult to open.

A side door is subject to severe impacts by being closed quickly and forcibly, which impacts are theoretically distributed along its entire front edge by a stop on the car body. However, if the door (or car) is not square the impacts are received either on the top or bottom corner of the door. These doors are also jambed into the back stop upon being opened. It frequently happens that the cars are moved with the doors not fastened so that they are slammed back and forth against the front and back stops, respectively, by the movement of the train. When the door is closed its inertia causes a severe tug or pull upon the fastening means, causing a severe local stress at this point. These several forces distort the door so that it does not properly fit the weather proofing means which are provided on the car, resulting in a leaky car and damage claims. A door must also prevent sparks from the locomotive entering the car. Therefore, a door must be capable of preserving its rectangularity.

One of the objects of the invention is to provide a door for a railway car, comprising a rectangular metallic frame having the component members thereof formed, associated and secured together to provide a very strong and very light weight frame to resist the stress tending to distort or warp the door and to attach a relatively thin metallic wall sheet to such a frame to form a retaining wall and at the same time to strengthen the frame.

Another object is to deform the wall sheet of the door so that the deformed portion reinforces the wall sheet and also provides means to attach the wall sheet to the frame members so that they mutually reinforce each other.

In the drawings:

Figures 1, 2 and 3 show a door for a railway car constructed according to by invention, wherein

Figure 2 is a section on line II—II of Figure 1, and

Figure 3 is a section on line III—III of Figure 1.

Figure 4 is an enlarged vertical section of part of line III—III of Figure 1.

Figure 5 is an enlarged horizontal section of part of line II—II of Figure 1.

Figure 6 shows a modified construction of Figures 1–5 inclusive.

Figures 7, 8 and 9 show a modification of the wall sheet of the door and reinforcing means therefor.

Figures 10, 11 and 12 show a method of forming the wall sheet of the door and associating it with the frame members so that they mutually reinforce each other to produce a stronger door.

In the form of my invention shown in Figures 1–5 inclusive, the door comprises upper 2, lower 3, front 4 and rear 5 frame members of T-section with each member comprising a base 6 and a stem 7, projecting normally from the middle of the base to form an inwardly projecting base flange 8, and an outwardly projecting base flange 9. The frame members are arranged to form a rectangular frame with the bases 6 of the T members in substantially the same plane. The stems are bent to form reflanges with the reflanges 10—11 of the front and rear stems projecting inwardly and the reflanges 12—13 of the upper and lower members projecting downwardly to shed water.

The outwardly projecting flanges 9 of the bases 6 engage parts on the car body to form weatherproofing means. For instance the flanges of the front member 4 engage the front weatherproofing strip 16 on the front door post 17. The flange of the rear member 5 is bent to engage the weatherproofing strip 18 on the back door post. The flange of the top member 2 is overlapped by the hood 20 which is usually secured to the side plate of the car, and the guide 21 holds the hood 20 and flange 9 in proper relationship. The flange 9 on the lower member 3 usually helps retain a roller housing in place; 22 is a roller track.

The bases 6 and the stems 7 of the members 2, 3, 4 and 5 are preferably mitered and rigidly

secured together at the corners of the door, preferably by welding, to form a rigid continuous rectangular frame. The reflanges 10, 11, 12 and 13, whether preformed or bent from the stems are also rigidly secured together at the corners of the door.

Note that the four frame members 2, 3, 4 and 5 are arranged and secured together to form a continuous U-section around the entire perimeter of the door which provides an exceedingly strong structure as the bases 6 form the compression members while the reflanges 10, 11, 12 and 13 form the tension members and the stems 7 form the webs of this continuous beam.

Such a construction resists warping and holds the door structure in a single plane so that the outwardly projecting flanges 9 may cooperate with the several car parts 16, 18, 20 to provide weatherproofing and sparkproofing means, for example of the type disclosed and claimed in my copending application Serial Number 267,673, filed April 13, 1939. Such a construction, particularly in combination with the stiffeners hereinafter described, is very strong to resist horizontal thrusts such as are caused by a shifting or wedging lading. And, thirdly, such a construction tends to maintain the rectangularity of the door against its impact against the front and rear door stops which tend to knock the door out of square.

The wall sheet 30 extends between and is secured to the inwardly projecting flanges 8 of the lower, upper, front and rear frame members preferably by welding. The wall sheet preferably comprises an upper 31 and a lower 32 sheet, with the upper margin of the lower sheet 32 formed with an L-shaped flange 33 and the lower margin of the upper sheet 31 formed with an L-shaped flange 34 overlapping and secured to the L-shaped flange of the lower sheet to form a stiffening and reinforcing member of box girder construction. The L-shaped flanges preferably underlie (see Figure 5) and are secured to the reflanges 10—11 of the front and rear frame members, thereby forming the box girder beams into restrained beams to resist horizontal thrusts of a shifting lading. The main portion 36—37 of the upper and lower sheets are in one plane and secured to the bases 6 of the front and rear frame members while the flanges 39 and 40 of the L-shaped flanges are in a plane spaced apart therefrom. The flanges are connected to the main portions by the webs 41—42. The webs 41—42 are preferably welded to the stems 7. These stiffening members also prevent the front and rear frame members from twisting out of position.

Each of the frame members is preferably reinforced by a diagonally positioned sheet or part 46 with one edge welded to the wall sheet 30 and the other edge welded to the stem 7 of the member. These reinforcing parts 46 ar also preferably mitered and secured together at the corners of the door. These reinforcing parts 46 are also preferably welded to the webs 41 and 42 of the L-shaped flanges on the wall sheets so as to stiffen the entire structure against distortion. These parts also prevent the frame members twisting or buckling.

Figure 6 shows a modification wherein the reflanges 50—51 project outwardly from the door. The outwardly projecting flange 52 and the reflange 50 form a groove which is engaged by the piece 53 secured to the angle 54 fastened to the door post 55. Water entering the crack 56 is directed downwardly in the flue 57 to the outside of the car. In other words, the arrangement forms a baffle against rain or sparks.

Figures 7, 8 and 9 show a modification wherein an angular member 80 (or members) is used as a horizontal stiffener with the edge of the sloping (horizontal) arm 81 welded, as at 82, to the wall sheet 84 and also preferably to the bases (through the wall sheet) and with the vertically positioned arm 83 underlying the reflanges 10—11 and secured thereto to form a restrained beam. In this arrangement the vertical arm 83 forms the tension member and the wall sheet 84 forms the compression member of the beam with the horizontal arm 81, forming the web thereof.

In these figures, 87 is the side plate; 88 the side sill; 89 the floor; 90 the threshold; 91 the door roller track; 92 the door post; 93 the front weatherstrip; 94 the back weatherstrip; and 95 the side sheathing.

Figures 10, 11 and 12 show a modification wherein the wall sheet 100 extends between the bases of the frame members 2, 3, 4 and 5 and is secured thereto adjacent the margins thereof and then bent to form substantially normal flanges 101 with the outer edges of the flanges 101 welded to the edges of the reflanges 10, 11, 12 and 13 to form box constructions. The substantially normal flanges 101 at the top, bottom and vertical sides are preferably welded together at the corners of the door to form a continuous box construction around the perimeter of the door. These figures show a stiffener 103 of Z formation having a vertical arm 104 secured to the wall sheet 100, a vertical arm 105 outwardly disposed therefrom and a web 106 connecting the arms. These stiffeners extend between the normal flanges 101 of the wall sheets and the outer vertical arms are preferably in alignment with the reflanges and welded thereto as shown in Figure 12.

If desirable, the positions of the wall sheets and stiffeners may be reversed; that is, the wall sheets may be secured to the reflanges 10, 11, 12 and 13 and the stiffeners (33, 34 or 80 or 103) positioned on the inside thereof. Such an arrangement would provide a door with a smooth exterior surface.

While I have shown and described certain embodiments of the present invention, it will be seen that I do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention as defined in the following claims.

I claim:

1. A rectangular door for a railway car comprising upper, lower, front and rear structural steel frame members of T-section, each member including a base and a stem projecting normally therefrom and outwardly with respect to the railway car, the stem of each member being provided with a reflange extending at substantial right-angles thereto, the respective bases, stems and reflanges being rigidly secured together at the corners of the door to form a rigid frame having substantially equal strength at said corners, and a wall sheet extending between and secured to said members.

2. A rectangular door for a railway car comprising upper, lower, front and rear structural steel frame members of T-section, each member including a base and a stem projecting normally therefrom and outwardly with respect to the railway car, the stem of each member being provided with a reflange extending at substantial right-angles thereto, and a sheet extending between and secured to said members, each of said members

being reinforced by a diagonal sheet rigidly secured to the base and stem thereof, the respective bases, stems and reflanges and diagonal sheets being rigidly secured together at the corners of the door to form a rigid frame having substantially equal strength at said corners.

3. A rectangular door for a railway car comprising upper, lower, front and rear structural steel frame members of T-section, each member including a base and a stem projecting normally therefrom and outwardly with respect to the railway car, the stem of each member being provided with a reflange extending at substantial right-angles thereto, and an upper and a lower wall sheet extending between and secured to the bases of all four members, the upper margin of the lower sheet formed with an L-shaped flange and the lower margin of the upper sheet formed with an L-shaped flange overlapping and secured to the L-shaped flange of the lower sheet, the said L-shaped flange overlapping and secured to the L-shaped flange of the lower sheet, the said L-shaped flanges underlapping and secured to the reflanges of the front and rear frame members, each of said members being reinforced by a diagonal sheet rigidly secured to the base and stem thereof, the respective bases, stems, reflanges and diagonal sheets being rigidly secured together at the corners of the door to form a rigid frame having substantially equal strength at said corners.

4. A rectangular door for a railway car comprising upper, lower, front and rear structural steel frame members of T-section, each member including a base and a stem projecting normally therefrom and outwardly with respect to the railway car, the stem of each member being provided with a reflange extending at substantial right-angles thereto, and a sheet extending between and secured to said members, each of said members being reinforced by an angular sheet rigidly secured to the base and reflange thereof, the respective bases, stems, reflanges and angular sheets being rigidly secured together at the corners of the door to form a rigid frame having substantially equal strength at said corners.

FINN OYEN.