Dec. 31, 1940. V. WILLOUGHBY 2,226,681

METALLIC CAR DOOR

Filed Jan. 20, 1938 2 Sheets-Sheet 1

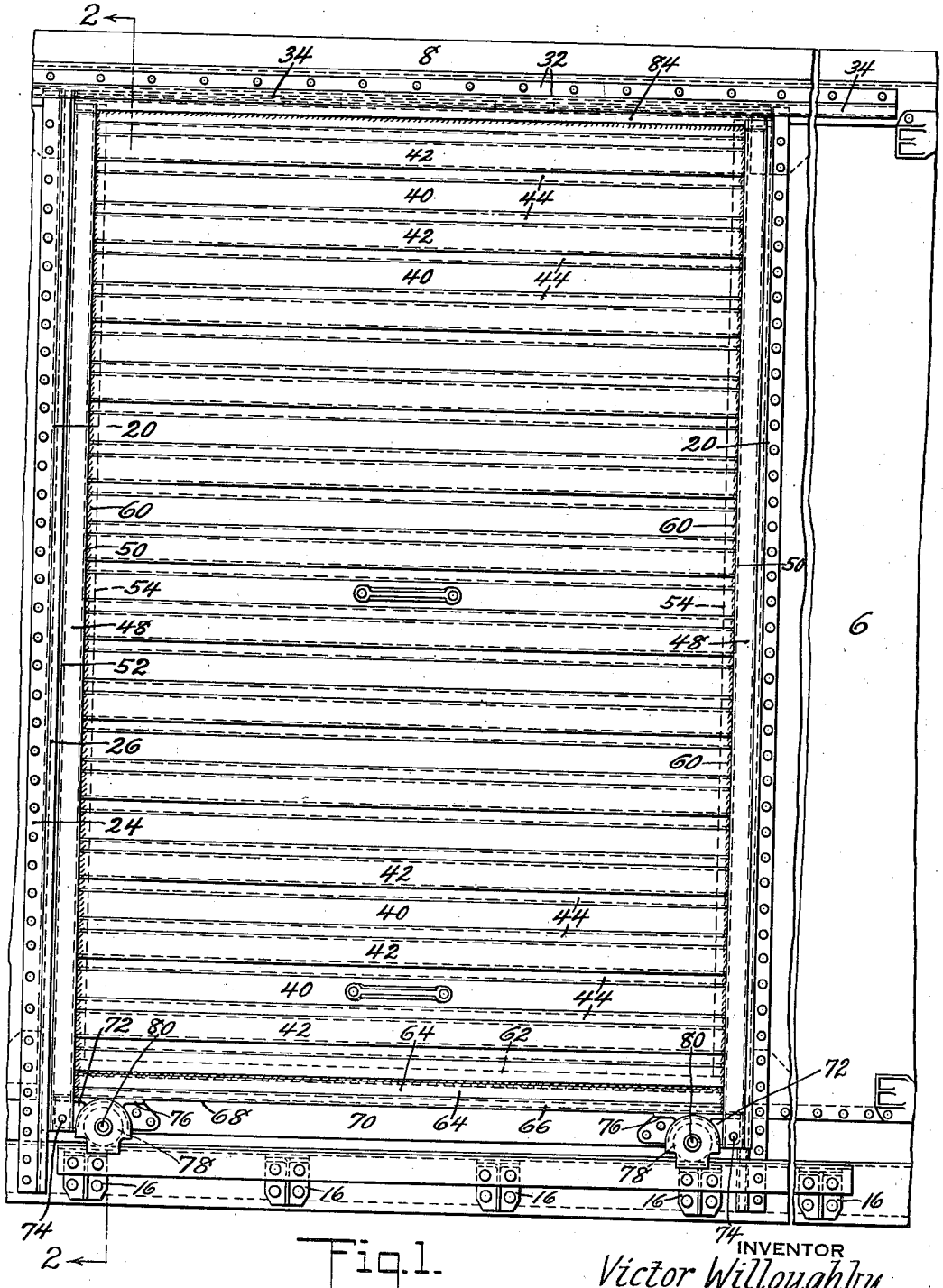

Fig. 1.

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Fig. 3.

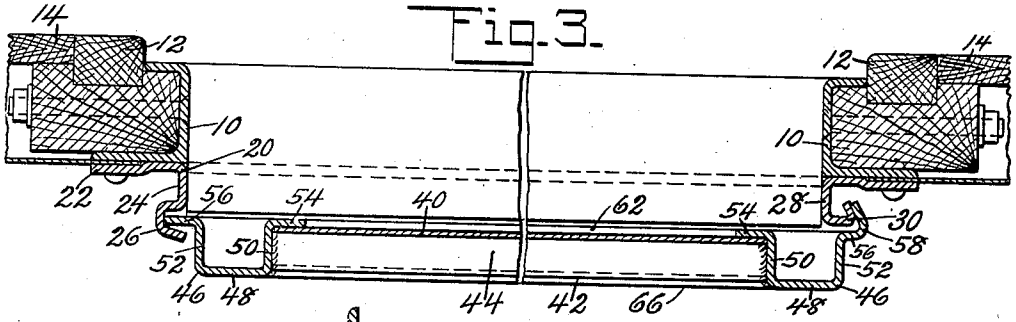


Fig. 2.

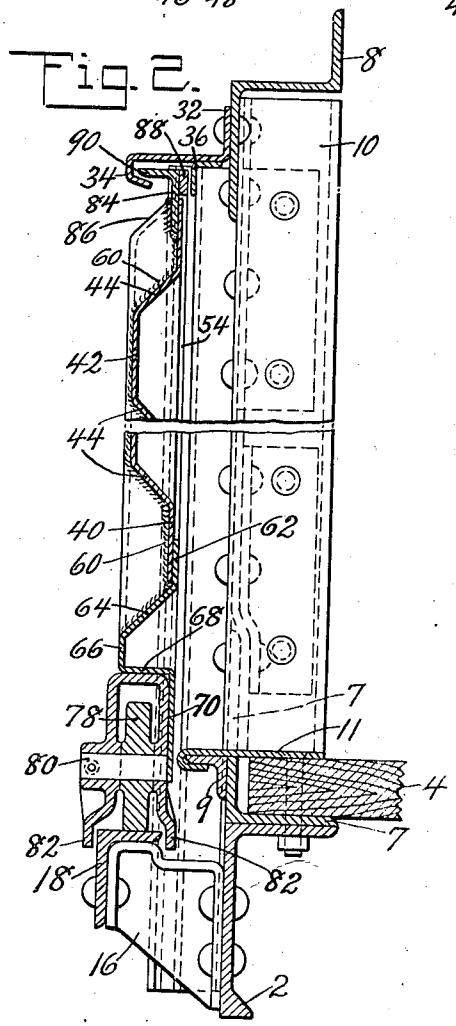


Fig. 4.

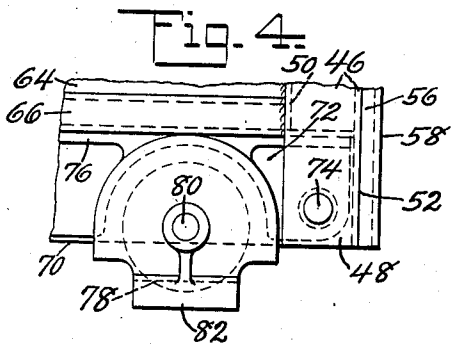
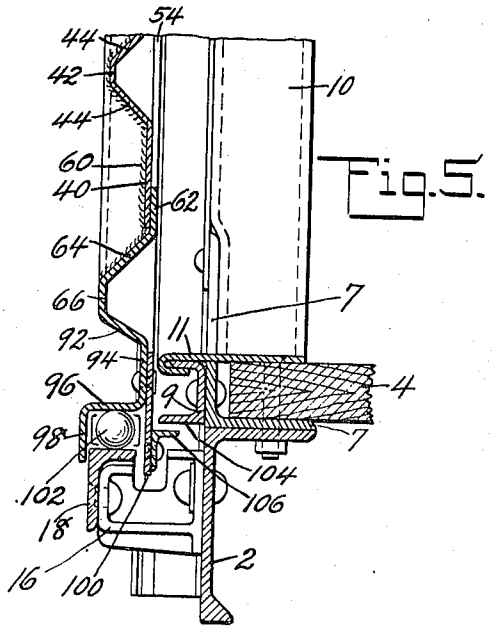


Fig. 5.



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Patented Dec. 31, 1940 2,226,681

UNITED STATES PATENT OFFICE

2,226,681

METALLIC CAR DOOR

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Application January 20, 1938, Serial No. 185,948

13 Claims. (Cl. 189—46)

This invention relates to metallic doors in general and in particular to sliding metallic doors for use on railway or similar vehicles.

In the past most metallic doors for railway cars have been built of a plurality of parts riveted together and which required frequent inspection to prevent damage of lading due to leakage. It is an object, therefore, of the present invention to form a metallic door of integral one-piece construction by welding component parts together.

A further object of the invention is the provision of a metallic door for railway cars formed of a plain corrugated metal panel butt welded at its edges to rigid metal stiles.

A still further object of the invention is the provision of a metallic door having a rigid metal frame to which is continuously seam welded a corrugated panel, thus forming a rigid one-piece door.

A yet further object of the invention is the provision of a metallic door for railway cars having a corrugated metal panel welded to a metal frame which has a relatively strong bottom rail of substantial depth forming part of the securing means for antifriction door supporting devices.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which

Figure 1 is an elevational view showing the door as applied to a railway car;

Fig. 2 is a sectional view taken substantially on line 2—2 of Figure 1;

Fig. 3 is a horizontal sectional view through the door and adjacent car structure;

Fig. 4 is an enlarged detail view of the lower corner construction, and

Fig. 5 is a sectional view similar to Fig. 2 but showing a slight modification thereof in order that a different door supporting means may be used.

Referring now to the drawings in detail, it will be seen that the door has been illustrated as applied to a box car of generally conventional construction having side sills 2 supporting the floor 4 and side sheets 6 as well as the plate 8 and door posts 10. The edge of the flooring will be protected as is customary by an angle 7 which in turn supports a suitable angular structure 9 to which is slidably attached the customary threshold plate 11. As is customary, the door posts have wooden posts and fillers 12 secured thereto for the attachment of the car lining 14. The side sills have brackets 16 secured thereto and supporting an angular shaped track 18 upon which the door may be suitably supported. One of the door posts has secured thereto in any suitable manner an angular front edge sealing member 20 having a leg 22 secured to the post and side wall and an outwardly directed leg 24 terminating in a channel-shaped pocket 26 having the open side directed toward the door opening as clearly shown in Fig. 3. The other door post has an angular rear edge sealing member secured thereto in any suitable manner and is provided with an outwardly directed leg 28 terminating in a V-shaped flange 30 with the point of the V directed away from the door opening as is clearly shown in Fig. 3. In order to seal the upper edge of the door against ingress of moisture and dirt an upper sealing strip 32 of angular formation is provided having one leg secured to the plate while the outwardly directed leg terminates in a reflanged portion 34, thus forming an inwardly opening channel directed toward the door opening and toward a spaced angular guiding and additional sealing strip 36 (Fig. 2). These front, rear and upper sealing members have been shown as riveted to the car structure, thus permitting shifting thereof to obtain an exact fit with the prefabricated door, but it is obvious that a like result may be accomplished by welding the sealing members to the car structure.

The door itself is formed of a single corrugated panel pressed with valleys 40 and crests 42 connected by inclined portions 44 preferably located at an obtuse angle with respect to the connected crest and valley. These corrugations are formed in a single panel without necessity of any particular die since the corrugations extend completely to the edge of the panel and as shown in Figs. 1 to 4 inclusive the width of the crests and valleys are equal, thus forming a sheet which may be turned end to end without in any way affecting the appearance or strength of the door. The door frame is formed by front and rear stiles 46 of substantially flanged channel cross section having a web 48 from which the laterally directed inner and outer flanges 50 and 52 extend to terminate in inwardly and outwardly directed reflanges 54 and 56 respectively located in a plane substantially parallel to the plane of the web. As clearly shown in Fig. 3 the outwardly directed flange 56 of the front stile engages within the channel-shaped portion of the front sealing means, while the outwardly directed flange of the rear stile is deformed as at 58 to provide a V-shaped groove adapted to engage the V-shaped flange of the rear sealing means. The depth of the stiles and the spacing between the crests and valleys of the corrugated panel are so chosen as to place the crests slightly below the plane of the web of the stiles, thus permitting the panel to be laid directly upon the inturned reflanges 54 with the ends of the corrugations in abutment with the flanges 50 of the stiles. With the panel placed in this abutting relation to the stiles it may be welded thereto by continuous seam welds 60, thus integrally connecting the crests, valleys and inclined portions of the corrugated panel di-

rectly to the stiles. In order to stiffen the corrugated panel as well as to provide support for door securing devices a bottom rail is provided pressed from heavier metal than the panel and formed with an upstanding flange 62 located in the plane of the stile reflanges from which an outwardly and downwardly inclined portion 64 extends to merge with a vertical portion 66 which is substantially parallel to the flange 62 and in the plane of the stile webs. This vertical portion merges into an inwardly directed horizontal portion 68 which in turn merges into a vertical flange 70 located substantially in alignment with the flange 62 previously referred to. In order that the bottom rail may be securely welded to the stiles, flange 62, inclined portion 64 and vertical portion 66 are clipped inwardly from the end of the rail in order that they may abut and be welded to the flange 50 and reflange 54 of the adjacent stile, while the horizontal portion 68 and vertical flange 70 extend across the stile into abutment with the flange 52 to which they are welded. The projection of these portions into the stile is permitted by clipping the flange 50, thus providing a pocket within which an arm 72 of the door supporting device may be received and secured by means of rivet, pin or other device 74 (Fig. 4). The door supporting devices in the present instance are shown as being formed of cast housings having one portion abutting and secured to the flange 70, while an upper portion 76 rests under and is secured to the horizontal portion 68. Each housing carries a roller 78 mounted upon pin 80 and is extended downwardly beyond the roller and on either side thereof as at 82 in order to engage the edges of the trackway and prevent inward or outward movement of the door assembly. The bottom rail is seam welded at its edges to the front and rear stiles which it abuts and to the lower edge of the door panel, thus effectively tying the rail to the stiles and to the bottom edge of the panel and providing a space within which the door supporting devices may be attached as previously described. This arrangement not only provides a rigid door construction but also one in which the stiles and rail mutually interact at the corners to form a seal preventing ingress of moisture. It is to be noted that the depth of the inclined portion 64 is sufficiently great to position the vertical portion 66 in the plane of the stile web, while the vertical flange 62 is substantially in the plane of the reflanges 54, thus necessitating a clipping of the reflanges at the lower edge of the stiles, while permitting the door panel to directly overlap the flange without any offsetting. The door is completed by seam welding one leg 84 of an angular top rail thereto. The upper ends of the stiles are suitably notched and cut in order that the leg 84 may project into abutment with the stile flanges 54 to which they are welded, while the web 48 may be inclined inwardly as at 86, thus closing the stile and buttressing the connection of the top rail to the stile. A customary wear strip 88 is attached to the top rail and adapted to abut the additional sealing means 36, while the outwardly directed leg 90 of the top rail will engage within the channel 34 of the top sealing means (Fig. 2).

With the construction as just described, it is obvious that the metallic stiles, metallic top and bottom rails and corrugated metallic panel, when welded together, constitute a one-piece metallic door with the corrugations terminating in the stiles and that all parts are so connected together as to prevent any possible ingress of moisture or foreign material at any of the points of juncture between the component parts.

The modification shown in Fig. 5 is substantially identical with that just described and wherever possible the same reference numerals have been used. It will be noted in this modification that the bottom rail is formed differently in that the vertical portion 66 instead of merging into a horizontal portion, merges into a downwardly and inwardly inclined portion 92 which in turn merges into a vertical portion 94 terminating in an angular portion having a horizontal flange 96 and vertical flange 98, the latter being of sufficient length to overlap the door trackway and prevent inward movement of the door relative to the track. A door retaining plate 100 is secured to the vertical portion 94 and overlaps the inner side of the track, thus preventing outward movement of the door and providing a housing for door supporting balls 102 which engage the track and horizontal leg 96 of the bottom rail. As shown the angular threshold supporting member is formed as a channel with the lower flange 104 directed outwardly in overlapping relation to an angle member 106 secured to the door retaining plate 100, thus forming an effective seal against ingress of moisture or foreign material at the bottom portion of the door.

While the door has been described more or less in detail, it is obvious that various door supporting means may be used by slightly modifying the bottom rail and that various sealing arrangements may be utilized by varying the reflanges of the door stiles, but all these modifications as well as others that will be apparent to persons skilled in the art and that fall within the scope of the following claims are contemplated.

What is claimed is:

1. In a metallic car door the combination of channel form front and rear stiles, a metal panel having corrugations extending continuously from side edge to side edge thereof and having the side edges butt welded to the stiles, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door.

2. In a metallic car door the combination of channel form front and rear stiles having the flanges thereof extending laterally of the door, a metal panel having corrugations extending continuously from side edge to side edge thereof and having the side edges butt welded to the adjacent flanges of the stiles, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door.

3. In a metallic car door the combination of channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side, a metal panel having corrugations extending continuously from side edge to side edge thereof, said corrugations being of a depth substantially equal to the depth of the stile flanges and being butt welded thereto thereby sealing the ends of the corrugations, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door.

4. In a metallic car door the combination of reflanged channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side thereof, the adjacent flanges of said stiles terminating in reflanges directed toward each other, a metal panel having corrugations extending continuously from side edge to side edge thereof and being of a depth substantially equal to the depth of the

stile flanges, said corrugations resting upon the stile reflanges and having their ends butt welded to the stile flanges thereby sealing the ends of the corrugations, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a rigid one-piece door.

5. In a metallic car door the combination of reflanged channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side thereof and terminating in reflanges certain of which are directed toward each other and others of which are directed away from each other, a metal panel having corrugations extending continuously from side edge to side edge thereof and being of a depth substantially equal to the depth of the stile flanges, said corrugations resting upon the inwardly directed reflanges and having their ends butt welded to the stile flanges thereby sealing the ends of the corrugations, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door, and said outwardly directed reflanges being so formed and arranged as to engage sealing means upon the structure carrying the door.

6. In a metallic car door the combination of reflanged channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side thereof and terminating in reflanges certain of which are directed toward each other and others of which are directed away from each other, a metal panel having corrugations extending continuously from side edge to side edge thereof and being of a depth substantially equal to the depth of the stile flanges, said corrugations resting upon the inwardly directed reflanges and being butt welded to the stile flanges, said outwardly directed reflanges being so formed and arranged as to engage sealing means upon the structure carrying the door, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door, said bottom rail having a portion thereof substantially normal to the plane of the door for reception of means supporting the door.

7. In a metallic car door the combination of reflanged channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side thereof and terminating in reflanges certain of which are directed toward each other and others of which are directed away from each other, a metal panel having corrugations extending continuously from side edge to side edge thereof and being of a depth substantially equal to the depth of the stile flanges, said corrugations resting upon the inwardly directed reflanges and being butt welded to the adjacent stile flanges, said outwardly directed reflanges being so formed and arranged as to engage sealing means upon the structure carrying the door, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door, said bottom rail being of heavier metal than the panel and having at least a portion of one corrugation formed therein similar to the panel corrugations and also having a portion thereof substantially normal to the plane of the door for reception of means supporting the door.

8. In a metallic car door the combination of channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side, a metal panel having corrugations extending continuously from side edge to side edge thereof, said corrugations being of a depth substantially equal to the depth of the stile flanges and being butt welded thereto, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door, said rails having at least parts thereof extended into the stiles and butt welded to both flanges of each stile to stiffen the door corners.

9. In a metallic car door the combination of channel form front and rear stiles having the flanges thereof extending laterally of the door and toward the inner side thereof, a metal panel having corrugations extending continuously from side edge to side edge thereof, said corrugations being of a depth substantially equal to the depth of the stile flanges and being butt welded thereto, and angular top and bottom rails welded to the stiles and ends of the panel thereby forming a one-piece door, said bottom rail having its ends extended into the stiles and being butt welded to the web and both flanges of each stile to increase the stiffness of the lower corners of the door.

10. In combination a metallic panel, a plurality of horizontal corrugations formed in said panel, said corrugations being open at their ends and extending from edge to edge of said panel, vertical metallic members disposed along said edges of the panel, said members extending across the open ends of said corrugations and continuous lines of welding extending from top to bottom of said panel and conforming to the edge contour of said panel securing said vertical members to said panel.

11. A welded car door comprising a metallic panel, a plurality of horizontal corrugations formed in said panel, said corrugations opening through the vertical edges of said panel, metallic marginal sealing strips positioned along the vertical margins of said panel and extending across the open ends of said corrugations, and continuous lines of welding extending from top to bottom of said panel and conforming to the edge contour of said panel securing said marginal reinforcing members to said panel.

12. In combination a panel, said panel comprising a metallic sheet and a plurality of horizontally disposed reinforcements extending from edge to edge of said sheet, vertical metallic reinforcing members positioned along said edges of said sheet and extending across the ends of said reinforcements and continuous lines of welding extending from top to bottom of said panel and following the edge contour of said panel securing said vertical members to said panel.

13. In combination a metallic panel, a plurality of horizontal corrugations formed in said panel, said corrugations being open at their ends, metallic marginal reinforcing members positioned along the vertical margins of said panel, portions of said reinforcing members extending across the open ends of said corrugations and lines of welding disposed in the angles formed by said panel and said portions of said reinforcing members and extending continuously from top to bottom of said panel for securing said marginal reinforcing members to said panel, said lines of welding following the contour of said ends of the corrugations.

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