

Jan. 28, 1936.

B. F. FITCH

2,028,902

DEMOUNTABLE BODY

Filed Sept. 13, 1933

4 Sheets—Sheet 1

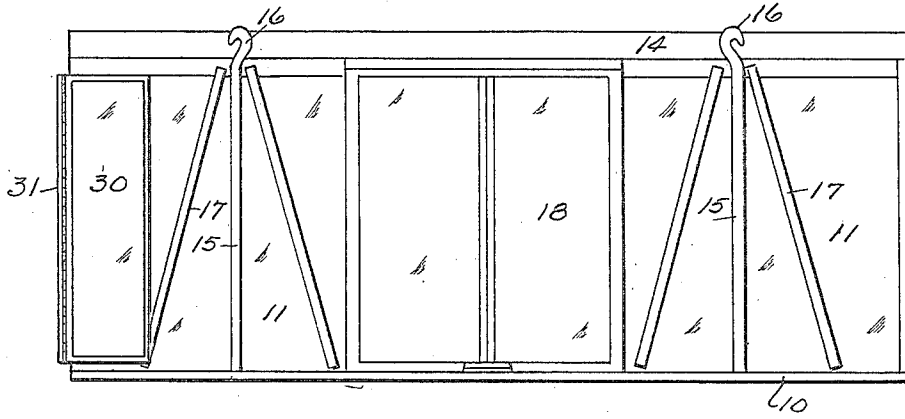


FIG. 1

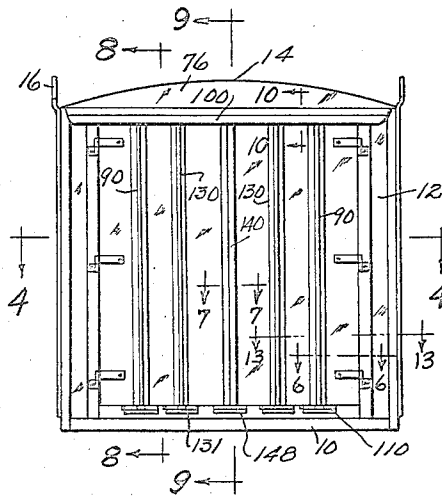


FIG. 3

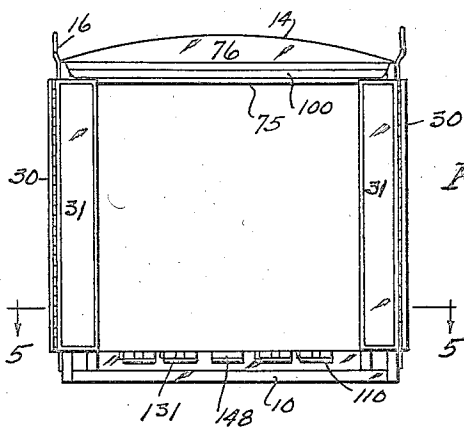


FIG. 2

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4 Sheets-Sheet 2

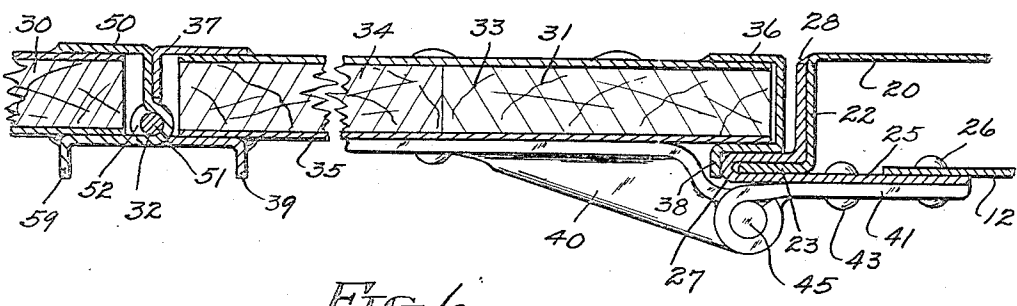
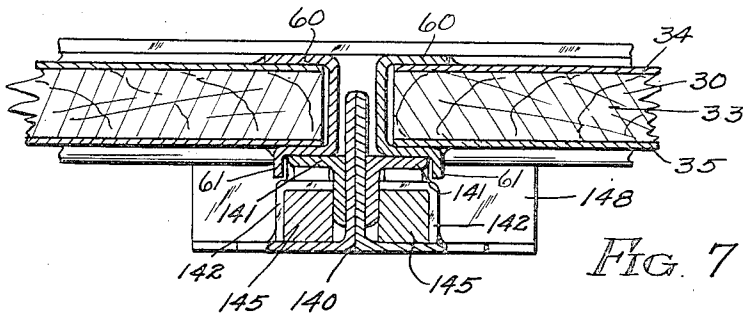
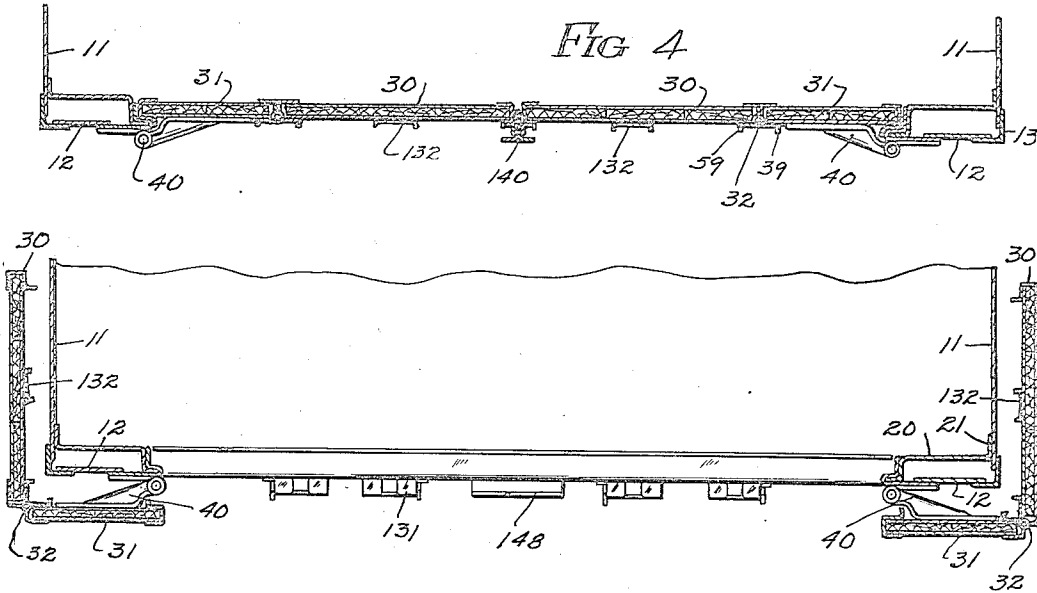


FIG. 6

FIG. 5

FIG. 7

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4 Sheets-Sheet 3

FIG. 11

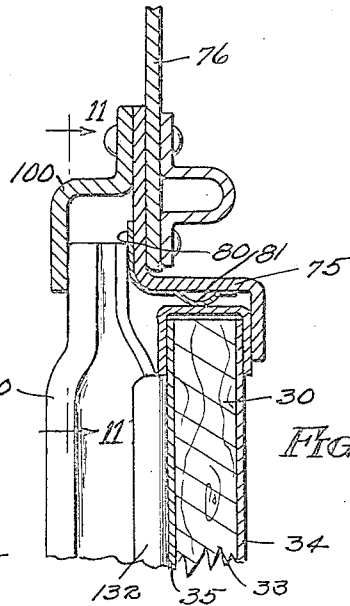
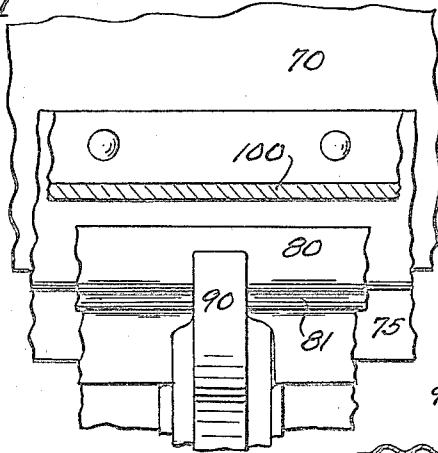


FIG. 10

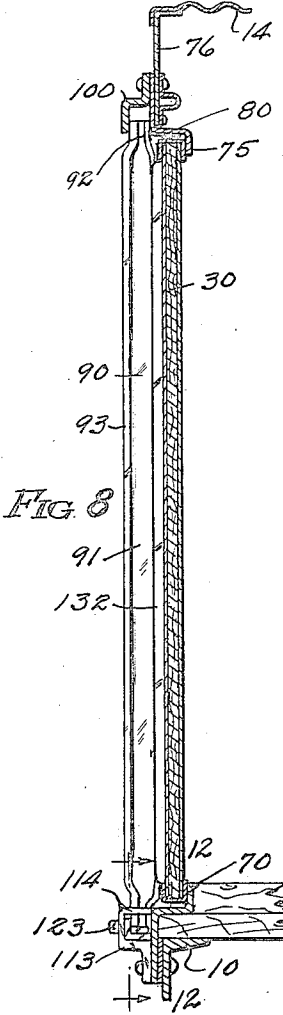


FIG. 8

FIG. 9

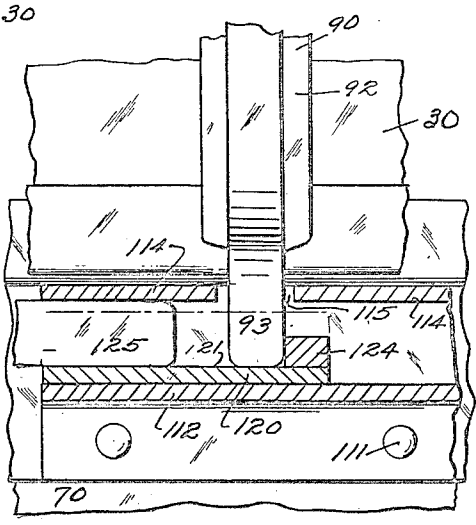
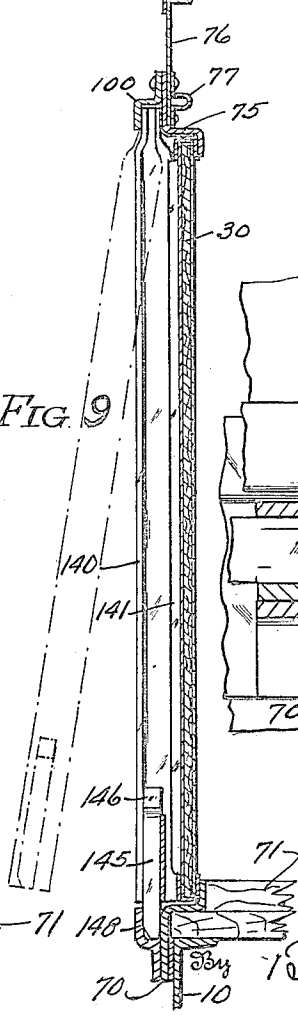


FIG. 12

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DEMOUNTABLE BODY

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4 Sheets-Sheet 4

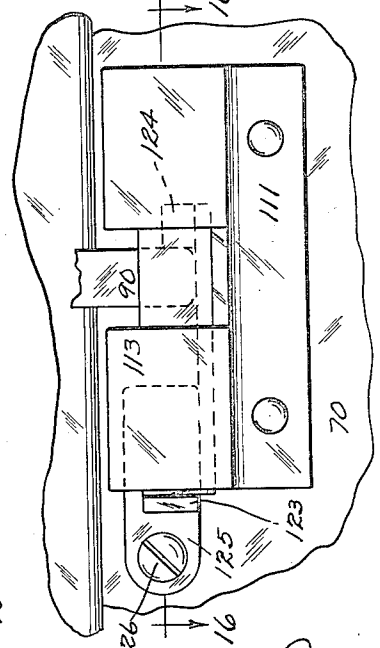
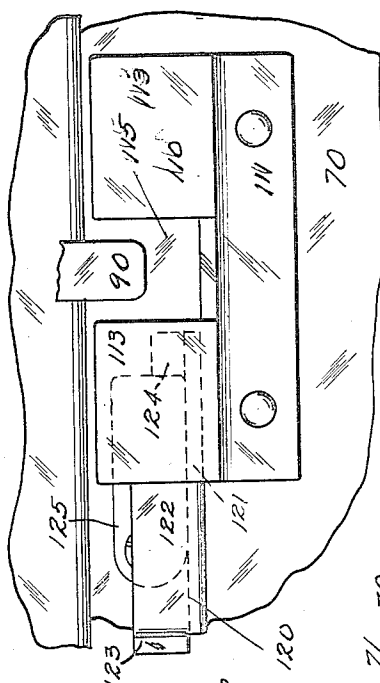
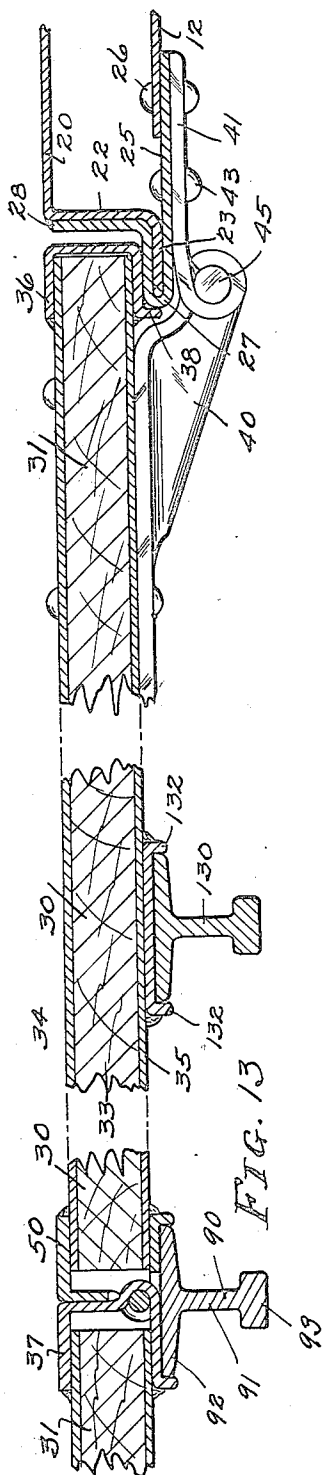


FIG. 15

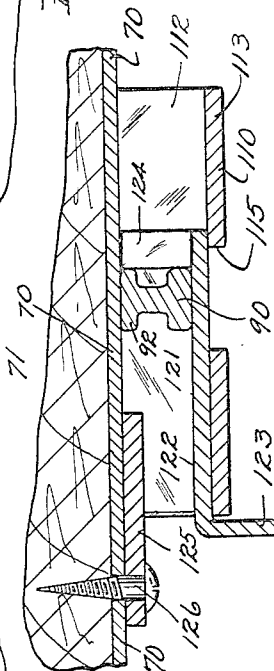


FIG. 16

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UNITED STATES PATENT OFFICE

2,028,902

DEMOUNTABLE BODY

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Application September 13, 1933; Serial No. 689,230

20 Claims. (Cl. 189—46)

This invention relates to a demountable automobile body for transporting freight, the body being arranged to be lifted intact with its load form a highway truck to a railway car or vice versa. For efficient operation, such bodies should be as large as can be conveniently carried on highway trucks, bodies of such proportions being well adapted for mounting end to end on a railway car.

In order that such containers, which may carry large articles, may be effectively loaded and unloaded, it is very desirable that there be wide door openings in the ends of the containers. However, on account of the weight of the contents of the container, and the stresses to which it is subjected in railway transportation, there is frequently a very heavy impact against the end doors, particularly in the starting and stopping of the train. Accordingly, due to the size of the doors and the force of such impact, it is important that the doors be thoroughly braced at their hinges and free edges and preferably intermediately.

On account of the large end doorway, doors of substantially half the width of the doorway, and carried by hinges at their outer edges, are troublesome in that they project unduly beyond the sides of the container when opened, or interfere with the loading and unloading if allowed to extend longitudinally. I avoid this difficulty by making each door of a wide and a narrow panel, hinged together, the narrow panel being hinged adjacent its outer edge to the narrow end wall of the container at the side of the doorway, and the hinges folding in such direction that the narrow panel may be swung to lie substantially against the end wall and the wide panel be swung against the side of the container. This is one of the features of my invention.

The articulated construction above outlined provides excellently for holding the doors out of the way, when they are opened, but presents a problem in effectively supporting the door at its intermediate hinge against impact from the interior of the container. It is important that provision be made to prevent the access of water to the interior at the various hinge lines or at the meeting edges of the doors or the top thereof. And finally, it is desirable that the doors, while very strong and stiff, shall be light in weight.

Means for meeting the above indicated requirements are comprised within my invention, which includes special construction of the door panels, special arrangement of the hinges, special bracing means in the region of the hinges, and special

waterproofing at such hinges and elsewhere, all of which is more fully hereinafter described in connection with the embodiment illustrated in the drawings.

In the drawings, Fig. 1 is a side elevation of a demountable body or container equipped with the articulated end doors of this invention, showing one of the end doors having a panel folded onto the side of the container; Fig. 2 is an end elevation of the container with the doors open; Fig. 3 is an end elevation with the doors closed; Figs. 4 and 5 are horizontal sections on the correspondingly numbered lines on Figs. 3 and 2 respectively, showing the doors in closed position and in open position; Figs. 6 and 7 are horizontal sections on a larger scale through portions of the doors, as indicated by the correspondingly numbered lines on Fig. 3; Figs. 8 and 9 are vertical sections through one of the end doors, as indicated by the correspondingly numbered lines on Fig. 3; Fig. 10 is an enlarged fragmentary detail of the upper portion of Fig. 8; Fig. 11 is a detail illustrating the brace, its retainer and the waterproofing features adjacent the upper end of the door, being a section on the line 11—11 on Fig. 10; Fig. 12 is a sectional elevation on the line 12—12 on Fig. 8, showing the keeper mechanism at the lower end of the door; Fig. 13 is a horizontal section on the line 13—13 on Fig. 3, but broken away intermediately, showing the vertical door braces in place; Figs. 14 and 15 are fragmentary front elevations of the keeper mechanism at the lower end of the vertical brace, showing such mechanism in locked and unlocked position respectively; Fig. 16 is a detail of the keeper mechanism, being a horizontal section on the line 16—16 of Fig. 14.

The demountable body illustrated in Figs. 1, 2 and 3, comprises a floor frame 10, side walls 11 and end walls 12, connected at the corners by vertical angle bars 13, and a roof 14. Suitable lifting devices are attached to the side walls; they are shown as straps 15 terminating in hooks 16. Diagonal brace bars 17 attached to the side walls brace the hook straps adjacent their upper ends, and suitable roof beams (not shown) brace them laterally. The body is equipped with side doors 18 which may be of any suitable construction. It is also equipped with end doors, which, together with their carrying and bracing means, constitute the subject matter of this invention.

I provide a wide doorway in each end of the container and accordingly the end wall comprises only the horizontal portion above the doorway and narrow vertical portions between the door-

way and the sides of the container. These narrow vertical end walls, however, are important features, and they are braced in a peculiar manner to coact with the doors and not only make a tight junction with the door when it is closed, but receive the impact on the doors independently of the hinges. Thus the hinges need be made only heavy enough to carry the weight of the doors and resist the resulting leverage.

As shown in Figs. 5, 6 and 13, in addition to the outside end wall 12, there is an inner sheet parallel therewith designated 26. This sheet is flanged at its outer end at 21, where it is secured to the side wall 11. Near its inner end it is bent at a right angle toward the end wall as at 22, and then bent again into the plane with the end wall as shown at 23. The end wall sheet 12 and the interior sheet 20 are shown as connected by a reinforcing sheet 25 riveted at 26 to the sheet 12 and intermediately doubled at 27 over onto the rear face of the flange 23 of the sheet 20 and then lies alongside of the web 22 of the sheet 20 and is finally welded to that sheet at 28. This makes a very stiff lip or flange projecting across the doorway and serving as an abutment for the door, as hereinafter described.

Each end door comprises two panels 30 and 31 hinged together at their proximate edges, this hinging being preferably by continuous succession of alternate leaves and a continuous pin 32 to produce a hinge commensurate in height with the doors, such hinge being commonly referred to as a "piano hinge". The outer panel 31 has secured to it a hinge strap 40 which mates with a hinge strap 41 on the end wall of the container, being shown as riveted by the rivets 26 already mentioned and additional rivets 43 engaging the sheet 25. The hinge pin 42 connecting the straps 40 and 41 stands in front of the abutment lip, made by the projecting portions 23 and 27 of the bent plates 20 and 25, and the door panel 31 carried by the hinge extends behind such lip to make a tight connection therewith when the door is closed. It results from this construction that impact against the inner face of the door panel 31 is received at the outer edge by a very rigid portion of the body itself, rather than by the hinges, so that there is no danger of the hinges being distorted, even though they are comparatively light in construction.

The doors themselves are constructed in a peculiar manner. They comprise light internal material having compressive strength, as for instance laminated cork 33 compressed under heavy pressure, steel facing sheets 34 and 35 and reinforcing channel-shaped boundary members 36 and 37 embracing vertical edges and similar members at the top and bottom. All of these boundary channels are welded to the two sheets 34 and 35.

Due to the very heavy pressure employed in compressing the cork layer (I have used to advantage a 150-ton press for this purpose) the elasticity of the cork is substantially eliminated, so that the layer acts as a compression member between the inner and outer facing sheets of the door. Accordingly, stresses against either facing tending to bend the same are transmitted by means of the cork layer to the other sheet, so that both these sheets are effective in resisting binding stress acting on the door.

Each vertical boundary channel as 36 and 37 has its outer portion flanged outwardly as illustrated at 38 and 39 in Fig. 6. The flange 38 is adapted to form a close rubbing connection with the doubled portion 27 of the end plate 25. Ac-

ordingly, when the door is closed, not only is there engagement between the outer face portion of the boundary member 36 and the doubled plate 25, but the latter is further engaged by the flange 38 which rubs against the rounded portion of such plate. This makes a very tight water-proof connection between the door and end wall of the body, preventing access of moisture to the interior in this region.

The boundary member 37 on the door panel mates with a corresponding boundary member 50 on the door panel 30. Each of these boundary members has its intermediate portion off-set in substantially semi-cylindrical form away from the door which carries the boundary member, to provide spaced ears 51, the ears of one member extending through notches 52 on the other, to provide the continuous aligned hinge ears connected by the continuous pintle 32. This enables the panels to be hinged together throughout their height. At the same time, a very tight junction is made when the panels are in alignment, as the two intermediate portions of the boundary members 37 and 50 are then in face engagement, as shown in Fig. 6.

When the doors are closed and the two panels 30 and 31 are in alignment, the outer face of the boundary members 37 and 50, together with their flanges 39 and 53 provide a continuous upright outwardly facing channel across the junction of the door panels. In use, a suitable vertical brace, hereinafter described, occupies this channel and prevents any outward bowing of the door panels in this region, and also any inward passage of moisture at the hinge ears.

The boundary member 60 at the free edge of the panel 30 is constructed in the same manner as the boundary member 36 and thus embraces the edge of the door and is secured to the side sheets 34 and 35 and has the outward flange 61. To allow the doors to swing freely, they are arranged to have a space between their extreme edges when closed, as shown in Fig. 7. In use, this space is closed by a removable locking post, which is to be hereinafter described, which occupies the outwardly facing vertical channel provided by the face of the boundary members 60 and end flanges 61. This post and the braces heretofore mentioned at the piano hinges make tight connections with the door, receiving the thrust in such regions and preventing access of moisture in such regions, all as hereinafter described.

As shown in the drawings, the outer panels 31 of the doors are narrower than the inner panels 30, these outer panels being only slightly greater in width than the width of the end wall of the body. The piano hinge is substantially in line with the outer face of the two panels 30 and 31. The result is that when the door is swung open, the narrow panel 31 may stand parallel with the end wall of the container, while the panel 30 may be swung into position parallel with the side wall 11, as illustrated in Figs. 1 and 5. This is a very advantageous construction, since it provides for a wide door opening, for convenient loading and unloading, while enabling the doors to be conveniently carried out of the way at such time and thereafter be readily swung into closed position.

The floor frame 10 of the body carries at the base of the doorway a jamb 70 (Figs. 8 and 9) which extends upwardly above the floor frame proper, then again inwardly and again upwardly. The floor frame supports a double layer of floor-

ing 71, of which the lower layer rests on the floor frame and extends beneath the horizontal web of the Z-bar 70, while the upper layer rests on the outward web and abuts the extreme end of the Z-bar. This feature, however, is claimed in my copending application, No. 500,160, filed December 5, 1930.

A construction somewhat similar to that just described is employed at the upper end of the doorway, where a Z-bar 75 is secured to the top end sheet 76 and braced by an internal transverse beam 77.

The two Z-bars 70 and 75 provide seats for the upper and lower ends of the door panels, limiting the inward movements thereof and enabling a comparatively tight connection above and below. The upward flange of the lower Z-bar 70 prevents any moisture working into the body under the door. At the upper end of the door I provide a weather strip to engage the top boundary member of the door and prevent access of moisture in that region. This protection comprises a strip 80 Figs. 10 and 11, preferably of metal, riveted to the top Z-bar 75 on the outer face thereof and bent inwardly beneath it and then bowing down at 81 to engage the top of the door. The strip extends continuously from one end of this top door jamb to the other and thus engages the tops of all the panels, insuring a tight connection.

As heretofore mentioned, removable vertical brace bars are placed in the vertical channels in front of the piano hinges. Such brace bars may readily be in the form of railroad rails 90 Figs. 3, 8 and 13. The webs 91 of the rails are reduced at the upper and lower ends and the base flange 92 and heads 93 of the rails bent toward each other in that region as shown in Fig. 8. The upper end of this brace bar is designed to pass behind a structural retaining flange shown as comprising a Z-bar 100 riveted to the top end sheet 76 and also the top flange of the Z-bar 75 and to the internal brace bar 77. This not only provides an effective keeper for the upper end of the brace bars 90, but forms a very stiff cross beam across the top of the doorway.

The lower end of the brace bar 90 seats in a keeper 110 secured to the floor frame. Details of the preferred construction of this keeper appear in Figs. 12 to 16, inclusive. As there shown, the keeper has a lower flange 111 secured to the floor frame, an outward web 112, an upwardly extending web 113 and a final horizontal flange 114 secured to the floor frame. A central notch 115 is cut in the vertical web 113 and the top flange 114 to enable the passage of the lower end of the brace bar 90, this brace bar having its base flange 92 narrowed adjacent its ends.

Slidable in the space between the vertical web 113 of the keeper 110 and the vertical face of the door jamb Z-bar 70 is a locking bolt 120 in the form of an angle bar having a base flange 121 resting on the horizontal web 112 of the keeper and having an upright flange 122 bearing against the inner face of the upright web 113 of that keeper. When the brace bar 90 is to be installed, the locking bolt is pulled away from the notch 115, that is, toward the left in Fig. 15, thus leaving the notch unobstructed; then, after the brace bar has entered the notch, the bolt is returned to bring its vertical flange in front of the brace bar and across the notch as shown in Fig. 16, thus locking the brace bar within the keeper. Since the base flange 92 of the brace bar in this position seats throughout

its length between the channel flanges 39 and 59 in front of the piano hinge, any lateral or swinging movement of the brace bar is prevented.

To provide ready means for operating the locking bolt 120 and also retain it permanently within the keeper 110, I turn outwardly the free end of the bolt as at 123 to provide a handle by which it may be readily shoved or driven onto or out of locking position. I also provide a low upward boss 124 on the base flange 121 of the bolt which may engage the side of the brace bar, and I form on the body of the container a suitable stop adapted to be engaged by such boss to prevent the bolt moving out of the keeper in that direction. This stop is shown as comprising a small plate 125 secured by a screw 126 to the Z-bar 70 and the lower layer of floor planking.

The operation of the device just described is as follows: When the brace-bar is to be inserted, its upper end is shoved behind the top keeper 100 in the region of one of the outwardly facing door channels and the lower end of the bar is swung toward the door so that it passes through the notch 115 of the keeper, the bolt 120 at this time being in the left-hand position shown in Fig. 15. Then, before the brace bar is lowered, the bolt 120 is brought back to the position shown in Figs. 14 and 16, the boss 124 passing beneath the lower end of the elevated brace bar. Then the brace bar is dropped down so that it rests on the horizontal flange 121 of the bolt. The brace bar is thus effectively boxed in the keeper.

To remove the brace bar, it is only necessary to elevate it within the clearance allowed by the upper keeper 100 so that it stands above the top plane of the boss 124; then the bolt is shoved to the left, freeing the notch 115, and allowing the removal of the brace bar.

Brace bars similar to the bars 90 may be employed if desired, to brace the intermediate regions of the wide door panels 30. Such bars are shown in Fig. 3 and designated 130. They are similar in all respects to the bars 90 and seat at their upper ends in the continuous keeper 100 and at their lower ends in keepers 131 corresponding to the keepers 110. To prevent lateral movement of these additional brace bars, I may secure to the outer side of the door panels 30, channel bars in which the brace bars seat, such channel bars being indicated at 132 in Fig. 13 where the channel bar is shown as welded to the outer sheet 35 of the door. These channels have the same dimensions at the channel provided by the boundary members 37 and 50 which the braces 90 seat, but comprise a single member.

Reference is made to my copending application No. 668,514, filed April 29, 1933, for claims on the feature of the removable brace bar extending across an intermediate region of the door and secured to the body above and below the door.

The center locking post, which extends vertically and cooperates with the boundary members 60 at the free edges of the two doors, if of the form shown in Fig. 7, is made in accordance with my application No. 689,231, filed September 13, 1933, and reference is made to that application for claims on such locking post. Briefly, as shown, the locking post comprises two angle bars 140 secured together, back to back; two additional angle bars 141 secured to the outer sides of the main angle bars and two angle plates 142 welded in place behind the aligned flanges of the bars 140 to provide box-like housings. A pair of locking bolts 145 are slidably mounted in these housings. These bolts have integrally turned ends

146 Fig. 9 above the housings, by which they may be raised or shoved down, as may be desired.

5 The locking post described is put in place with the lower end away from the floor frame, the inclined position being shown in broken lines in Fig. 9, the upper end of the post being passed behind the keeper 100. The lower end of the post is then swung over a centrally located keeper 148
10 which is secured to the floor frame and has an upwardly extending cavity and the bolts 45 are shoved downwardly into this cavity. In this position the rear faces of the angle bars 141 bear against the front face of the boundary members 60 while the edges of such angle bars lie snugly between the flanges 61. This makes a tight bracing connection. The flanges prevent lateral shifting or swinging of the post and the construction prevents access of water to the interior
15 in the region of the post. Extra depth is provided for the post by inward extensions of the angle bars 140 so that the post has sufficient depth to give it the necessary stiffness to resist any outward pressure on the doors adjacent the central region of the container.

20 It will be seen, from the description given, that I have provided a container with the doors so constructed to allow a very wide doorway into the container, and I have so arranged such doors
30 that they will be out of the way during the loading or unloading operation. The door panels are individually strong and stiff, and, notwithstanding each door is intermediately hinged in itself, I have provided effective means to brace the hinge junction. The free edges of the doors are
35 braced by the locking post, and the outer edges braced by the body itself. Accordingly, the end of the container, when the doors are closed, is amply able to resist the internal impact even
40 though the load may shift violently, due to a sudden jerk or sudden stopping of the railway car carrying the container. Finally, in accomplishing these results, I have weather-proofed the various hinged regions, and also at the top
45 of the doors, so that the contents are not affected by external water or snow. The construction is comparatively simple and at the same time is efficient in producing the results desired.

I claim:—

50 1. The combination of a container having a wall with a doorway through it, a hinge connecting the wall and door with the hinge axis on the outer side of the wall and door, and a flange on the outer face of the door projecting at an angle to such outer face, the location of the flange and the hinge axis being such that when the door is closed the flange will abut a stationary edge on the container.

60 2. The combination of a container having a wall with a doorway through it, said wall having a flange projecting crosswise of the doorway, a door adapted to extend behind the flange, a hinge connecting the wall and door with the hinge axis on the outer side of the plane of the flange, and
65 a flange on the door projecting at an angle to its outer face and adapted to abut the edge of the body flange when the door is closed.

70 3. The combination of a container having an end wall with a doorway through it, the end wall at its vertical edge having a flange projecting from its outer portion crosswise of the doorway, a door adapted to extend at its outer edge behind said flange, said door having on its outer edge a marginal reinforcing portion which extends onto the outer face of the door in position
75

to engage the rear face of the body flange and have its end flanged outwardly to engage the edge of the body flange, and means for so hinging the door to the container that the reinforcing member may abut the rear face and edge of the body flange when the door is closed.

4. A container having a wall with a doorway through it, said wall comprising an outer and inner member, the inner member being spaced from the outer member and then bent toward it and flanged to lie against it and the outer member bent over said flange to provide a projecting lip of three thicknesses of metal, a door adapted to extend behind said lip, and mutually pivoted hinge straps connected to the door and to said outer wall member with the hinge axis in such position that the door swings away from the wall-lip as the door is being opened.

5. A container having a doorway, an articulated door hinged to the container and adapted to be closed in the doorway or swung open with reference thereto and folded on itself, and a brace extending parallel with the folding axis and connected with opposite portions of the doorway for retaining rigid the folding axis of the door when the door is closed.

6. The combination of a container having a wide doorway in its end with narrow end walls between the doorway and sides of the container, a pair of folding doors each hinged to the end wall on respectively opposite sides of the doorway and adapted to have their free edges adjacent when closed, each folding door comprising a comparatively narrow panel which is hinged to the container and a comparatively wide panel hinged to the narrow panel, the narrow panel being at least as wide as the end wall between the doorway and side of the container, whereby the wide panel of the door may be folded onto the side of the container.

7. The combination of means having a doorway, a folding door adapted to be closed within said doorway or swung open and fold on itself, a vertical brace adapted to outwardly overlie the hinge joining the two panels of the door when the door is closed, and means above and below the doorway for so holding the brace bar.

8. The combination of a container having a doorway, a door formed of two panels hinged together, means hinging one of the panels to the container, a vertical brace adapted to stand adjacent the hinge between the two panels on the outside of the door when the door is closed, and means on the container for holding the upper and lower end of the brace, whereby the panel hinged to the container is held in closed position independently of its articulating hinge.

9. The combination of a container having a doorway, an articulated door hinged to the container and adapted to seat in the doorway with two panels of the door in alignment, a vertical brace adapted to be secured to the container above and below the doorway and extend longitudinally over the hinge axis, and flanges on the door panels for preventing the lateral shifting of the brace.

10. The combination of a folding door comprising two panels hinged together, each panel having a reinforcing member which lies along the outer face of the panel adjacent the edge and then turns outwardly, whereby when the panels are in alignment a vertical recess is provided in front of the hinge axis, a vertical brace bar adapted to occupy such recess, and means for holding the brace bar in place.

11. The combination of a door comprising two panels hinged together by an axis adjacent one face of the panels whereby the panels may be folded on such axis, each panel having a channel-shaped reinforcing marginal member on its edge, each marginal member having its intermediate web interruptedly bowed away from the panel to provide a succession of hinge bars and intermediate recesses and a hinge rod occupying the opening presented by the alternate ears of the adjacent panels.

12. The combination of a container having a doorway and a flange projecting across the doorway at its outer edge, a door hingedly carried by the container and adapted to extend behind the flange when the door is closed, said door having an outward projection to abut the end of the container flange to prevent access of water to the interior at the hinged region.

13. The combination of a container having an articulated door, comprising two panels hinged together, one of the panels being hinged also to the container, each of said panels having an outward flange extending from its face adjacent the mutual hinge of the panels, and a longitudinal brace bar adapted to occupy and substantially fill the space between the said two projections and thus overlie the mutual hinge of the panels and prevent access of water thereto.

14. The combination of a container having a doorway in its end, and narrow end walls between the doorway and sides of the container, a pair of doors hinged respectively to said end walls and adapted to be folded into alignment to substantially close the doorway, each door comprising a narrow panel hinged to the container and a wide panel hinged to the narrower panel, and a series of vertical braces adapted to be secured to the container above and below the doorway and extend adjacent the hinges connecting the wider and narrower panels and intermediately across the wider panels and above the free edges of the two doors, whereby all of the panels are effectively held closed and prevented from outward distortion.

15. A container having a doorway, a door jamb for the doorway having an inwardly extending web with a downwardly extending flange at the top of the doorway, a water-proofing strip secured to the outer face of the wall above the doorway and then bent beneath the horizontal web of the door jamb and in such region bowed downwardly to engage the top of the door, combined with a door adapted to seat in the door jamb with the

top of the door engaging the waterproofing strip.

16. The combination of a container having a doorway, an articulated door hinged to the container adapted to swing onto the doorway, means on the two mutually hinged panels of the door to provide a channel-shaped seat on the outer side of the door, a vertical brace having base flanges adapted to stand in such channel-shaped seat, means for holding the upper end of the brace to the container above the door, a keeper below the door for receiving the lower end of the door, and a sliding bolt in the keeper to lock the brace therein.

17. A door panel comprising a layer of cork compressed to substantially eliminate its elasticity, facing sheets of metal on opposite sides thereof, and channel-shaped metal members at the edges of the panel having end flanges extending over the outer sheets and secured thereto.

18. The combination of a container having a doorway, a folding door for said doorway, said door having one panel hinged to the container wall and having the other panel hinged to the first mentioned panel by a continuous hinge extending substantially throughout the height of the doors and having its axis located substantially in the outer plane of the panels and acting to maintain the crack between the panels closed, and bracing means disposed outside the door and cooperably associable with the container walls in substantial alignment with the said hinge axis to hold the hinge elements in crack closing position.

19. An articulated door comprising two panels and channel-shaped metal members embracing the edges of the respective panels, the web portions of said embracing members being formed to provide hinge ears, and cooperating means passing through said ears for joining the two panels together.

20. The combination of a container having a doorway, a door mounted on the container and adapted to close the doorway, a vertically extending channel-shaped seat mounted on the outer side of the door, the channel facing in a direction normal to the plane of the door, a vertical brace having a base portion adapted to stand in and be positioned by such channel-shaped seat, said bar being independent of and removably associated with the door, and means on the body above and below the doorway for demountably holding the ends of the brace when seated in said channel.

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