

Aug. 19, 1941.

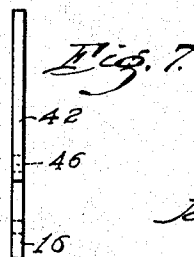
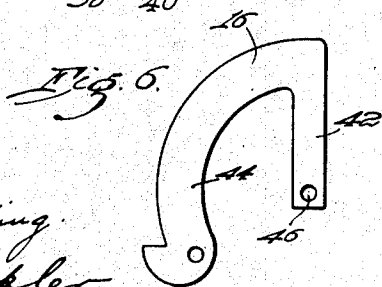
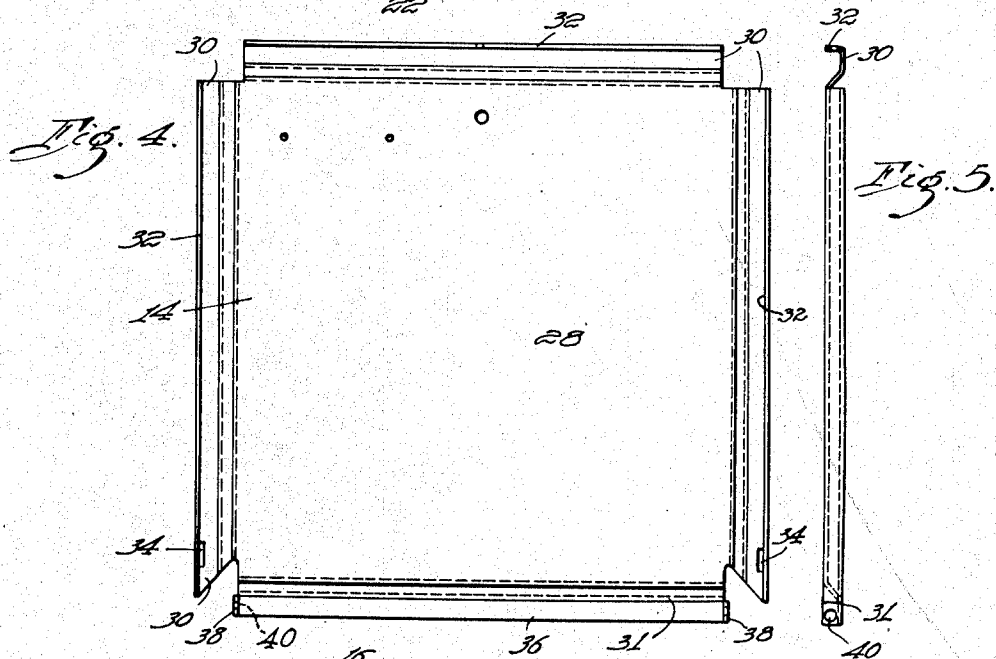
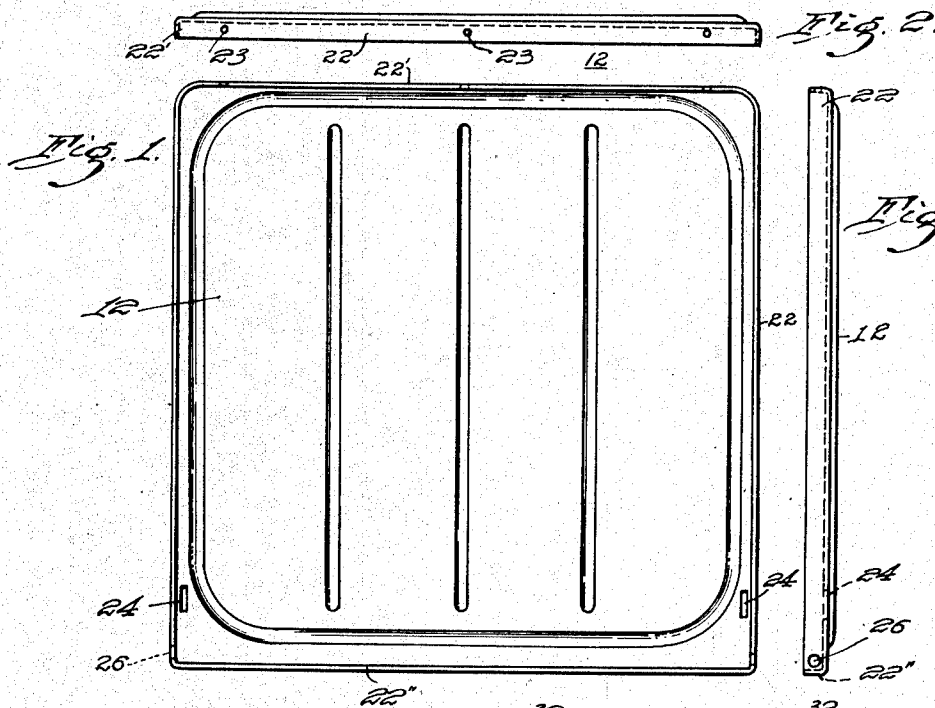
J. H. REIFENBERG

2,253,398

ENAMELED DOOR STRUCTURE

Filed July 13, 1939

3 Sheets-Sheet 1



WITNESSES:

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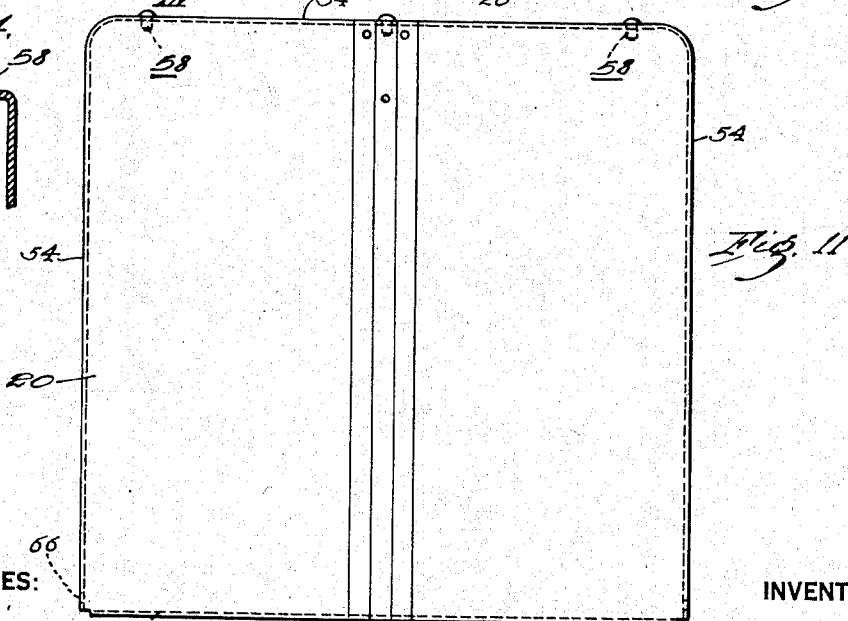
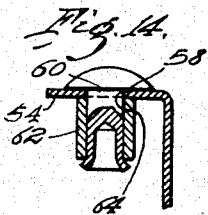
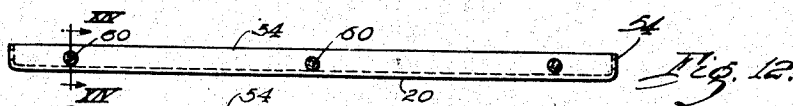
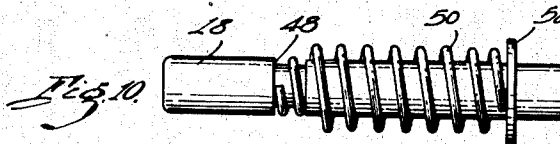
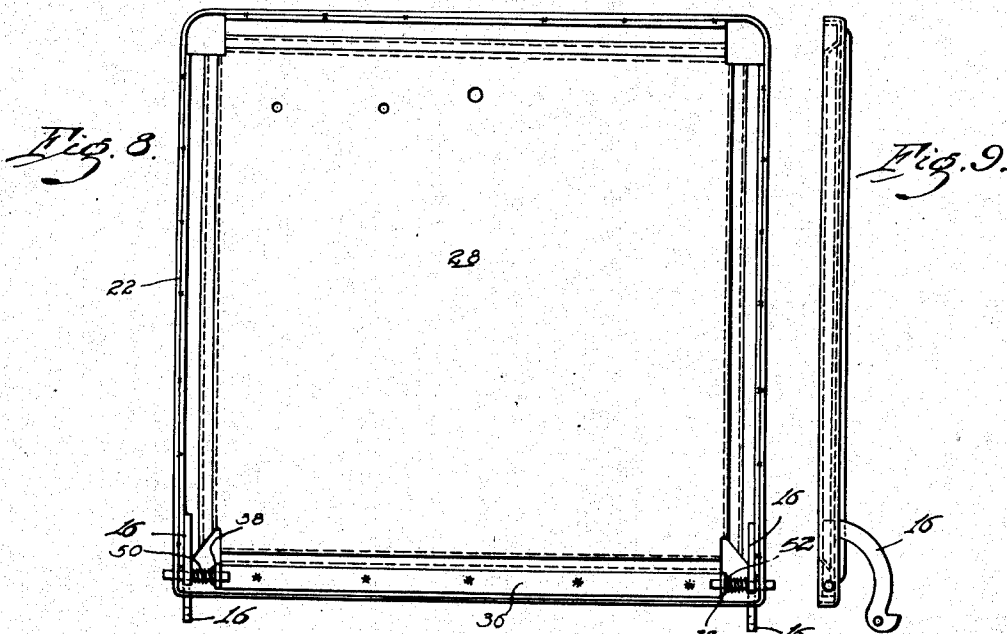
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3 Sheets-Sheet 2



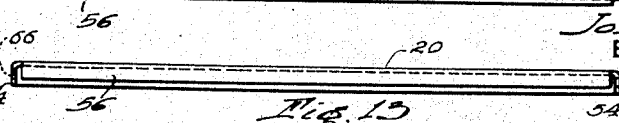
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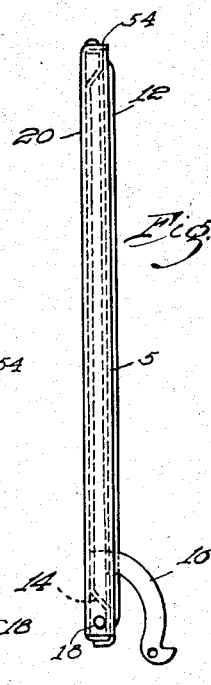
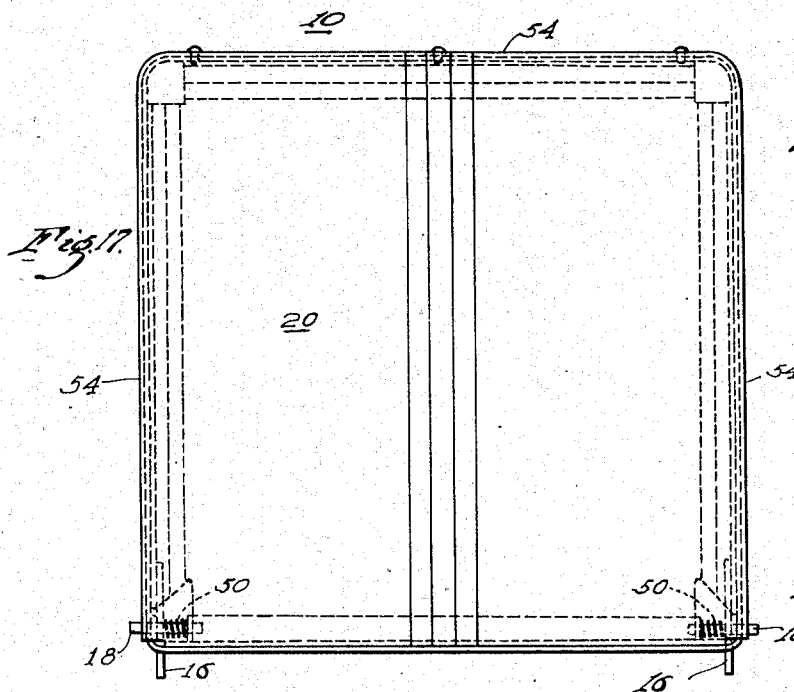
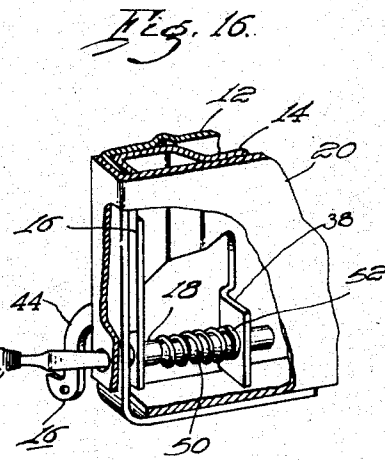
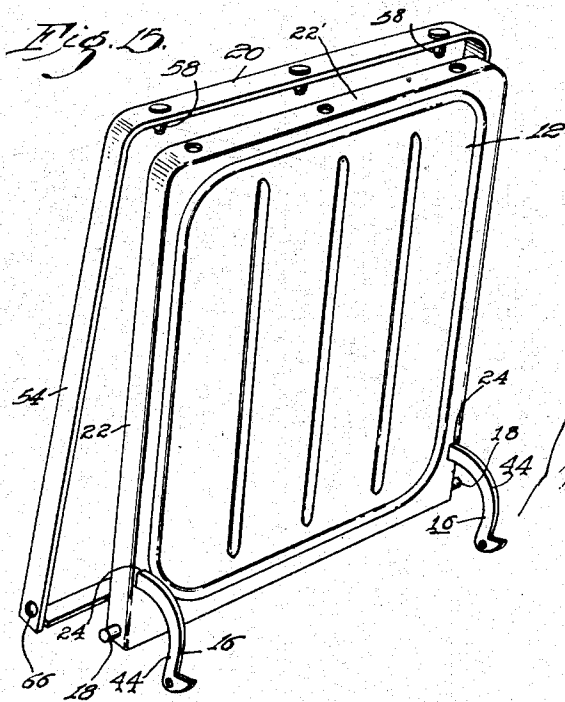


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3 Sheets-Sheet 3



WITNESSES:

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UNITED STATES PATENT OFFICE

2,253,398

ENAMELED DOOR STRUCTURE

Joseph H. Reifenberg, Mansfield, Ohio, assignor
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Company, East Pittsburgh, Pa., a corporation
of Pennsylvania

Application July 13, 1939, Serial No. 284,150

6 Claims. (Cl. 189-46)

My invention relates to an enameled fabricated door structure having a removable panel and, more particularly, to the method of manufacture and assembly of such structure.

An object of my invention is to provide a method of economically making a rigid, fabricated door structure which permits the use of enameled panels.

A further object of my invention is to provide a fabricated door structure which has a removable front panel functionally integral therewith.

Another object of my invention is to provide a functionally integral, rigid, inexpensive door structure in which the hinge pins thereof removably retain the front panel functionally integral with such door structure.

Still a further object of my invention is to provide a fabricated door structure having spring biased hinge pins which lock the fabricated door structure into a functionally integral unit and which affords means for rotatably mounting the unitary door structure.

Other objects of my invention will either be pointed out specifically in the course of the following description of a device embodying my invention, or will be apparent from such description.

In the accompanying drawings, Figures 1, 2 and 3 are elevational, top and side views, respectively, of a portion of a door structure embodying my invention;

Figs. 4 and 5 are elevational and side views, respectively, of a second portion of a structure embodying my invention;

Figs. 6 and 7 are elevational and side views of a hinge blade used in a structure embodied in my invention;

Figs. 8 and 9 are elevational and side views, respectively, of a partially assembled door structure;

Fig. 10 is an enlarged view of the hinge pin used in the door structure;

Figs. 11, 12 and 13 are elevational, top and bottom views, respectively, of the front panel for such door structure;

Fig. 14 is a fragmentary sectional view taken on the line XIV-XIV of Fig. 12;

Fig. 15 is a perspective view illustrating the method of assembling the door structure embodying my invention;

Fig. 16 is an enlarged fragmentary perspective view illustrating the method of assembling the structure embodying my invention; and

Figs. 17 and 18 are front elevational and side

views of the completed door structure embodying my invention.

Referring to the accompanying drawings, in which like reference characters indicate like parts in the several figures, I show a prefabricated door structure 10 including a rear panel 12, a reenforcing panel 14, a plurality of hinge blades 16, a plurality of hinge pins 18 and a front panel 20.

The rear panel 12 (see Figs. 1, 2 and 3) is, in this instance, formed from a single metallic sheet and has depending side, top and bottom flanges 22, 22' and 22'', respectively, located substantially at right angles to the main portion of such panel. A plurality of apertures 23 are located within the top flange 22' to permit the cooperation of front panel 20 therewith, as hereinafter described. A plurality of embossed ribs may be formed within the rear panel 12 to give it additional mechanical strength. Substantially rectangular shaped apertures 24 are located near the bottom corners of the rear panel (see Fig. 1). The apertures 24 are relatively narrow and elongated to permit the free passage of the hinge blades 16, as hereinafter described. A substantially circular shaped aperture 26 is located within the side flanges 22 near the lower corners thereof (see Fig. 3). These apertures 26 are adapted to receive the hinge pins 18 and to movably support such pins, as hereinafter described.

The reenforcing panel 14 (see Figs. 4 and 5) is also preferably formed from a single metallic sheet. The panel 14 includes a central portion 28 and outwardly and downwardly extending irregularly shaped supporting side and top ledges 30 and a bottom ledge 31. The ledges 30 have along their outer edge an upturned flange 32 which cooperates with the inner surface of the side flanges 22 of the rear panel 12 in a manner hereinafter described. The bottom ledge 31 is similar in shape to the side ledges 30 except that it does not have an upturned outer flange. However, the bottom ledge 31 does have upturned end portions 33 located at both ends thereof. The reenforcing panel 14 having the outwardly displaced portions 30 and 31 functionally integral therewith, acts as the reenforcing member for the rear panel 12 and gives it the desired strength for reenforcing the door structure, as hereinafter described.

Elongated rectangular apertures 34 are located within the displaced side portions 30 and are adapted to cooperate with the apertures 24 in a manner hereinafter described. The upwardly turned end portions 33 of the bottom ledge 31

have apertures 40 located substantially in the mid-points thereof. These apertures 40 are adapted to be positioned substantially in alignment with the apertures 26 of the rear panel 12 to cooperate therewith in supporting the hinge pins 18, as hereinafter described.

The hinge blades 16 are substantially flat and are preferably punched from a metallic sheet in a somewhat irregular configuration having a main substantially rectangular portion 42 and a bent hinge portion 44. The hinge portion 44 is adapted to pass through the elongated apertures 24 and 34 and to extend outside the door structure 10, as hereinafter described. A substantially circular aperture 46 is located in the free end of the main portion 42 of hinge blade 16 and is adapted to cooperate with the apertures 26 and 40 to movably support the hinge pins 18.

The hinge pins 18 (see Fig. 10) comprise, in this instance, an elongated cylindrical pin having an annular notch 48 cut within one end thereof. The main diameters of the pins 18 are slightly less than the apertures 26, 40 and 46 to permit the free movement of pin 18 within such apertures, as hereinafter described. A helically wound resilient member or spring 50 is located about the pins 18. One end of the resilient member 50 is wound with a substantially smaller diameter than the main portion thereof, and is adapted to fit within the annular notch 48 in pins 18. Accordingly, it follows that with the end of the resilient member 50 firmly located within the annular notch of pin 18 that pin 18 may move with respect to the main portion of resilient member 50 without having any relative movement between the pin 18 and the reduced diameter end portion of such resilient member. A smooth or closely fitting washer 52 is located about the pin 18 to engage the free end of resilient member 50. The washer is loose enough to permit relative movement between the washer and pin 18. However, the washer 52 prevents the spring 50 from wedging in the aperture 40, as hereinafter described.

The front panel 20 is preferably formed from a single metallic sheet and has formed integral therewith depending side and top flanges 54 and a bottom flange 56. The flanges 54 are formed substantially perpendicular to the surface of the front panel 20 and are adapted to cooperate with and engage the outside of the side and top flanges 22 and 22', respectively, of the rear panel 12, as hereinafter described. However, the bottom flange 56 is adapted to cooperate with and engage the inner surface of the bottom flange 22" of rear panel 12. A plurality of inwardly extending studs 58 are rigidly attached to the top flange 54. The studs 58 comprise, in this instance, a hollow rivet 60 and a tubular bushing 62. The rivet 60 is inserted through apertures 64 in the upper flange 54, whereupon the tubular member 62 is positioned about the shank portion of the rivet 60, permitting the bottom portion of such rivet to be spun over tightly against the tubular member 62 so as to form a rigid stud 58 functionally integral with the top flange 54 of the front panel. The studs 58 are adapted to extend through apertures 23 in the top flange 22' of the rear panel 12, as hereinafter described.

When assembling the door structure embodying my invention with the various parts thereof formed as hereinabove described, the reinforcing panel 14 is first placed within the rear panel 12. The flange portions 32 of the reinforcing panel 14 are then spot welded or rigidly attached to the

inner surface of the sides 22 and top 22' of rear panel 12 while the main portion 36 of the bottom flange portion 31 of panel 14 is welded to the inner surface of the rear panel 12 (see Figs. 8 and 9). The rear panel 12 and reinforcing panel 14 thus are united to form a functionally integral partial structure. The apertures 24 and 34 of panels 12 and 14, respectively, will be located substantially in line with each other, permitting the hinge portion 44 of the hinge blade 16 to be passed therethrough. The hinge blades 16 may then be rigidly attached to the upturned flanges 32 of reinforcing panel 14, say by spot welding. However, it is obvious that the hinge blades may be attached to the panel structure either before or after the panels are attached together. The circular aperture 46 located within the free ends of the main portion of the hinge blades 16 is located substantially coaxially with the circular apertures 26 and 40 located within the rear panel 12 and reinforcing panel 14, respectively. The hinge pins 18 are then positioned within the apertures 26, 40 and 46, one in each lower corner, with the washer 52 located against the upturned end portions 38 of the reinforcing member 14 (see Figs. 8 and 16), and with the annularly notched end of the pins 18 extending outwardly from the lower portions of the sides of rear panel 12. The resilient member 50 is then adapted to bias the hinge pins 18 outwardly from the rear panel 12 while the hinge pins themselves are free to move within the apertures 40, 46 and 26, respectively. The side and top flanges 54 of front panel 20 fit outside the side and top flanges 22 and 22', respectively, of rear panel 12 while the bottom flange 56 of front panel 20 fits inside the bottom flange 22" of rear panel 12. However, the outwardly extending hinge pins 18 engage the depending sides 54 of the front panel and prevent the front panel from making complete engagement with the rear panel structure. The hinge pins 18 are then biased inwardly by means of, say, a screw-driver or the like (see Fig. 16), so as to permit the side flanges 54 of the front panel 20 to pass downwardly in front of the hinge pin 18. With the continued movement of the front panel 20 in such a manner, the pins 18 will be substantially in line with the apertures 66 in the depending side flanges 54. At such time the compressed resilient member 50 will bias such pin outwardly through the aperture 66. Each hinge pin 18 is thus movably supported or retained by the rear panel and is adapted to engage the front panel through the aperture 66 to lock the two panels together into substantially a functional integral structure.

It is therefore, obvious that a structure formed in accordance with my invention provides a fabricated door structure having a spring biased hinge pin which locks the fabricated structure into a functionally integral unit permitting such hinge pin to extend outwardly from the door structure to afford means for rotatably mounting such structure on any suitable supporting structure.

The outwardly biased hinge pins 18 also provide an easy means of assembling the complete door with any suitable structure, such as a dishwasher, or the like. When assembling the door embodying my invention with such a structure, the pins 18 are biased inwardly, but not sufficient to disengage the two panels, and are lined up with suitable apertures in the frame of the supporting structure then allowed to move outwardly into these apertures. The door is thus free to

rotate about the hinge pins in a well known manner.

Various other modifications may be made in the device embodying my invention without departing from the spirit and scope thereof, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art and the appended claims.

I claim as my invention:

1. A rotatably mounted door structure including, in combination, a rear panel, a re-enforcing panel positioned within and rigidly attached to the rear panel, a hinge pin, a resilient member cooperating with the re-enforcing panel and pin for biasing the pin outwardly from the rear panel, a front panel, and means comprising the biased hinge pin for restraining the front panel in cooperative engagement with the rear panel.

2. A door structure including, in combination, a rear panel, a front panel adapted to cooperate with such rear panel, means attached to the front panel and adapted to engage the rear panel for retaining the two panels in cooperative engagement, a pair of hinge pins extending outwardly from the respective sides of the rear panel and movably supported thereby, and a pair of resilient members cooperating with the respective pins and rear panel for biasing the pins outwardly therefrom, said hinge pins adapted to engage the front panel to lock the two panels together.

3. A rotatably mounted door structure including, in combination, a rear panel, a re-enforcing panel positioned within and rigidly attached to the rear panel, a hinge pin extending outwardly from each side of the rear panel and movably supported by the rear panel and re-enforcing panel, a pair of resilient members cooperating with the re-enforcing panel and pins for respectively biasing the pins outwardly from the rear panel, a front panel adapted to cooperate with the rear panel, and a plurality of inwardly extending studs attached to the front panel and

adapted to engage the rear panel to retain these two panels in cooperative engagement, said hinge pins adapted to engage the front panel to lock the front and rear panels together.

4. A door structure comprising, in combination, a front panel and a rear panel forming a substantially completely enclosed structure, a third panel enclosed within said front and rear panels and secured to one of them, said third panel having a projection disposed at an intermediate point thereof, and a hinge pin interconnecting said front and rear panels and said projection.

5. A door structure comprising, in combination, a front panel and a rear panel forming a substantially completely enclosed structure, a third panel enclosed within said front and rear panels and secured to one of them, said third panel having a projection disposed at a point spaced from an edge of said third panel, a hinge pin mounted in said projection and also in said front and rear panels, a resilient member cooperating with said pin for biasing the pin outwardly of said panels, and means comprising said biased hinge pin for retaining the front and rear panels in cooperative engagement.

6. A door structure comprising, in combination, a front panel and a rear panel forming a substantially completely enclosed structure, a third panel enclosed within said front and rear panels and secured to one of them, said third panel having a portion turned at substantially right angles to the body of said third panel, a hinge pin having one end mounted in said portion and the other in said front and rear panels, a resilient member cooperating with said pin for biasing the pin outwardly of said panels, and means comprising said biased hinge pin for retaining the front and rear panels in cooperative engagement.

JOSEPH H. REIFENBERG.