

June 17, 1958

R. D. STRUB

2,839,347

BREAKER FRAME CONSTRUCTION

Filed Feb. 21, 1956

4 Sheets-Sheet 1

FIG. 1.

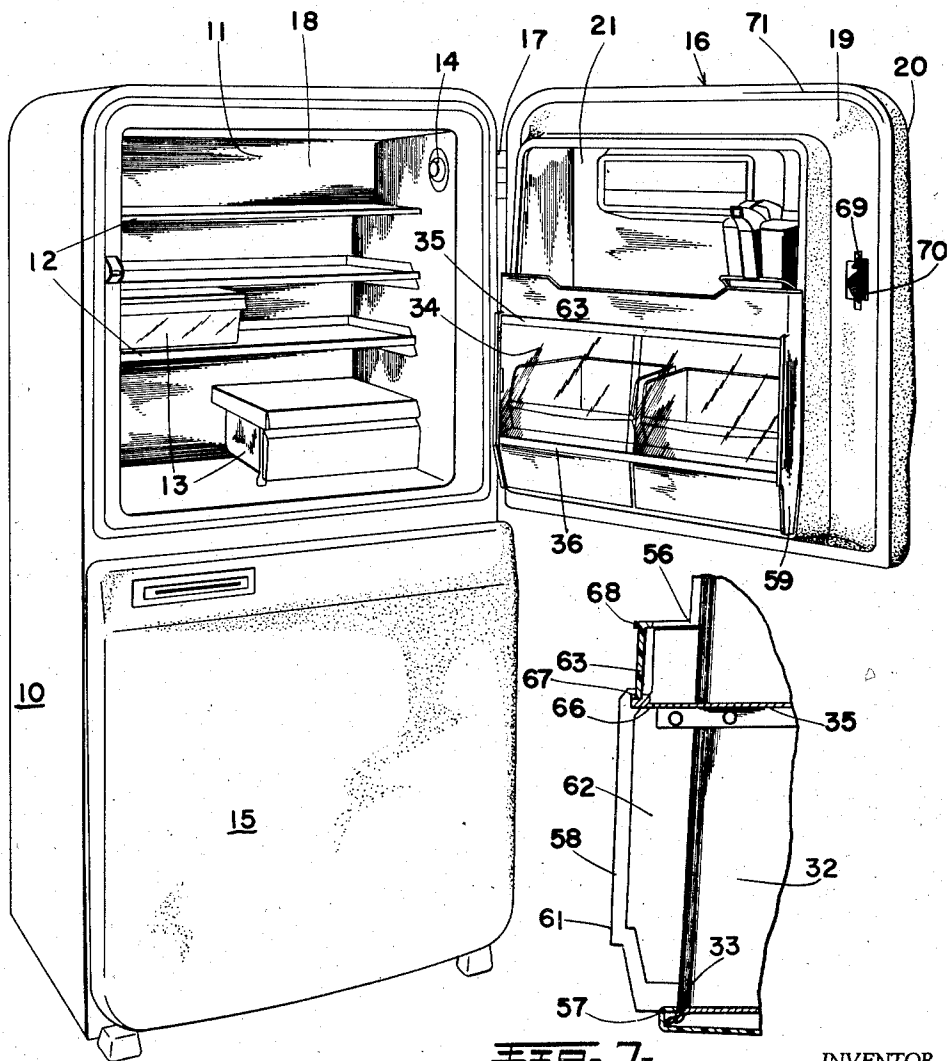


FIG. 7.

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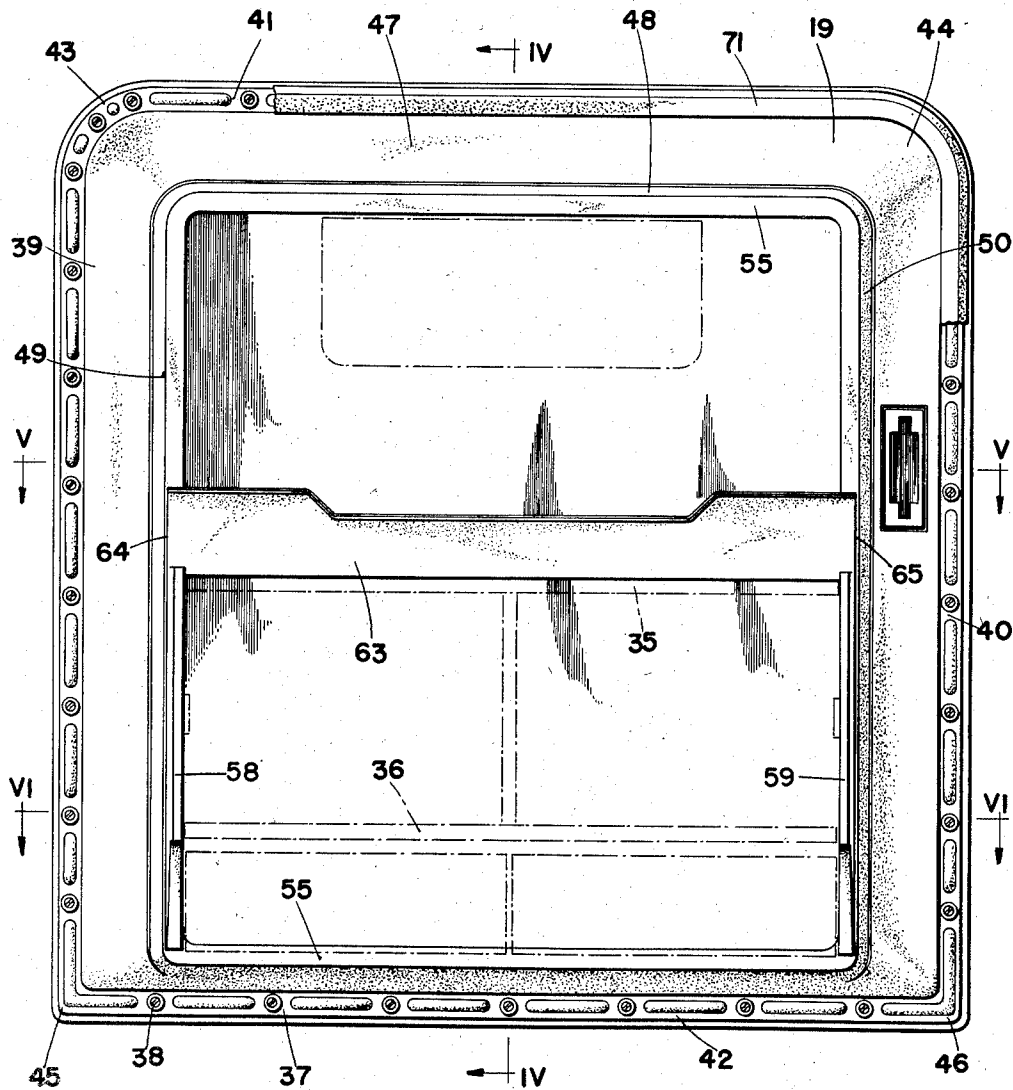
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

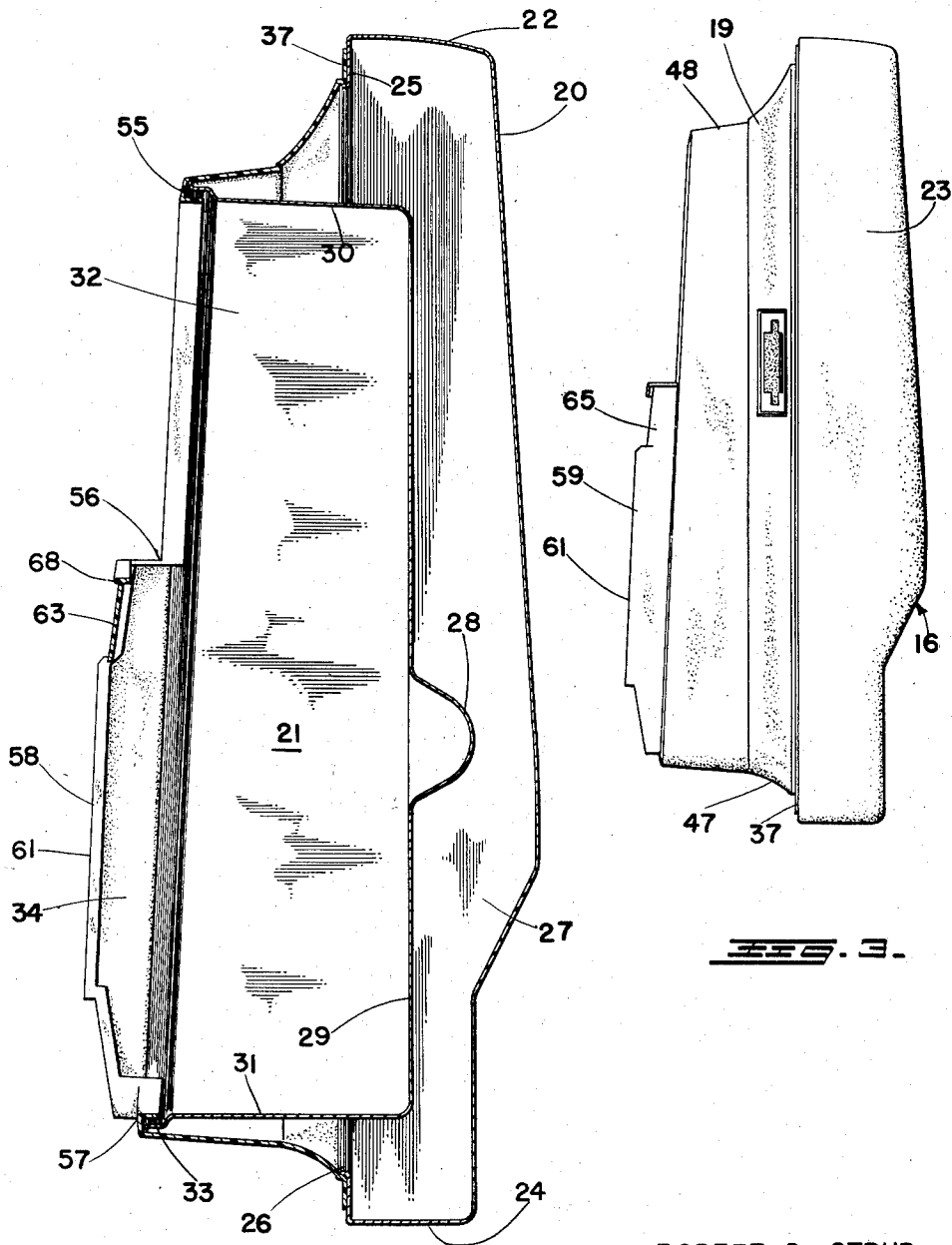


Fig. 3.

Fig. 4.

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4 Sheets-Sheet 4

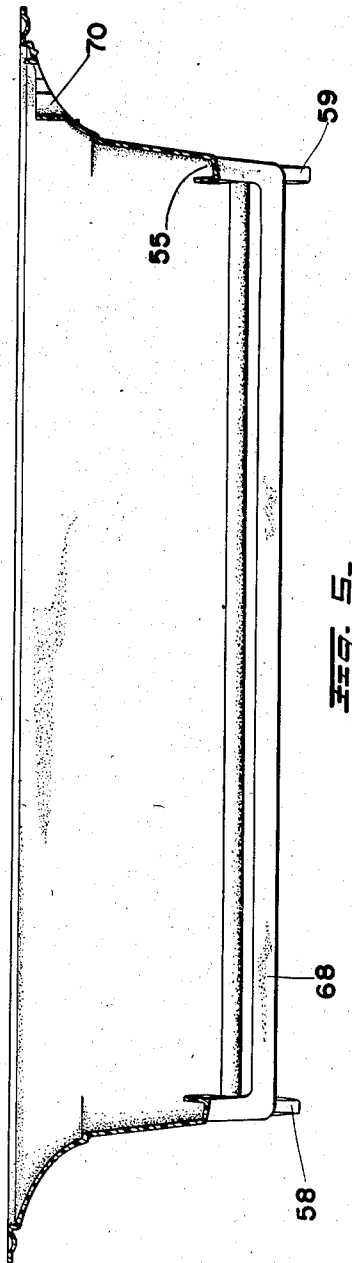


Fig. 5-

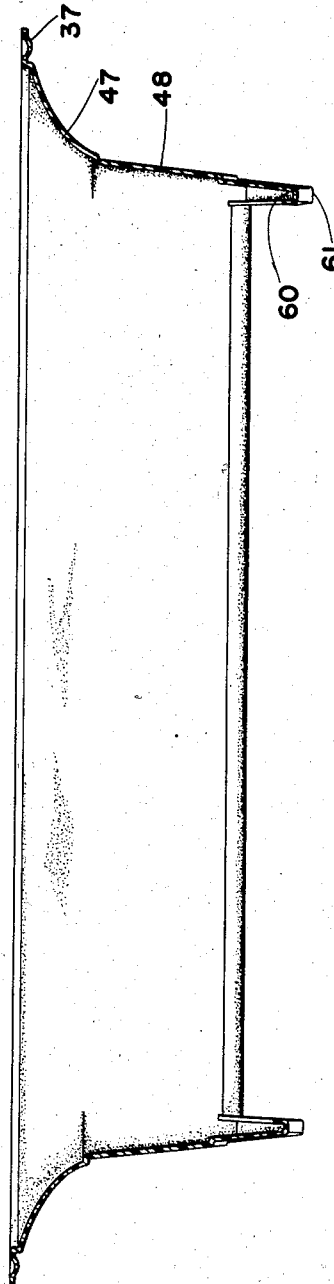


Fig. 6-

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BREAKER FRAME CONSTRUCTION

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2 Claims. (Cl. 312-214)

This invention generally relates to an inner door structure for cabinets and more particularly to an improved breaker frame construction for refrigerators and cabinets having refrigerated compartments.

One of the objects of my invention is to provide a breaker frame which spans the area between an inner door pan and an outer door shell thus providing a neat and attractive finished appearance. The breaker frame is substantially rectangular and is attached to the periphery of the outer door shell by means of screws or other suitable fastening devices which are in turn overlapped by a gasket which seals about the periphery of the door when it is closed. At the inner periphery of the breaker frame an integral channel overlaps the edge of the inner door pan in such a manner that unsightly junctions and joints are avoided and at the same time the necessity for additional fastening means is completely eliminated.

One of the primary objects of this invention is to provide a new and novel breaker frame for use on an inner structure of a refrigerator cabinet which not only spans the distance between the outer door shell and the inner door pan in an improved manner but also the breaker frame itself extends beyond the plane of the inner periphery of the inner door pan and in combination with it defines an even deeper compartment within the refrigerator door itself. The breaker frame, of course, has a top, bottom and two side walls. Beginning at the bottom of each side wall and to a point slightly more than half way upward along the length of the side wall are two extensions of the breaker frame beyond the plane of the inner periphery of the inner door pan. These side wall extensions are oppositely disposed, are identical, and are offset centrally a distance sufficient to align the inner surfaces thereof with the same plane as an extension of the side wall of the inner door pan itself.

Another object of my invention was to provide as an integral part of the improved breaker frame a horizontal reinforcing planar member. This member is integral with the extreme top edges of the side wall extensions, and extends therebetween as an additional feature of this improved breaker frame. To add greater structural rigidity, this planar member is transversely flanged along its top edge throughout its entire length.

Another object of my invention is to provide a vertical retaining wall for a shelf even though the edge of this shelf itself, which is positioned within the inner door pan, extends a substantial distance beyond the edge of the inner door pan. This is of course made possible by constructing the breaker frame in such a manner that it can suitably support a horizontal member in horizontal spaced relation beyond the plane described by the terminal flanges of the inner door pan.

It is also an object of my invention to provide a continuous one-piece breaker frame having integral therewith a vertical shelf retaining wall and also side wall extensions which increase the suitable storage space by in-

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creasing the size of the refrigerator inner door compartment.

By combining many features in a continuous one-piece molded structure, it is readily apparent that assembling costs would be substantially reduced in the manufacturing process.

It is further object to provide oppositely disposed side-wall extensions in a breaker frame construction having a rigidifying integral member longitudinally disposed along the remote edges thereof.

These and other objects will become clear to those skilled in the art when considered with the drawings which are submitted as a part of this application, and the description which follows.

In the drawings:

Figure 1 is a perspective view of a combination freezer and refrigerator showing the breaker frame construction on the interior of the refrigerator door;

Figure 2 is a front elevational view of the breaker frame construction;

Figure 3 is a side elevational view showing my breaker frame attached to the outer door shell and the side wall extensions;

Figure 4 is a vertical view taken on line IV-IV of Figure 2;

Figure 5 is a horizontal cross-sectional view of the breaker frame taken on line V-V of Figure 2;

Figure 6 is a horizontal cross-sectional view of the breaker frame taken on line VI-VI of Figure 2;

Figure 7 is a fragmentary vertical sectional view showing a partial interior of my breaker frame construction. As shown in the drawings:

Figure 1 illustrates a combination freezer and refrigerator cabinet 10 which encloses a freezer compartment at the bottom and a refrigerator compartment 11 at the top. These compartments may be cooled by any suitable refrigeration system such as the conventional one which utilizes a compressor, a condenser and an evaporator operatively connected. The refrigerator compartment 11 is provided with shelves 12, conventional food storage containers 13, and a control knob 14 which may be selectively set to assure the proper and desired amount of cooling. A door 15 covers the access opening of the freezer compartment and a door 16, attached to the cabinet 10 by hinges 17, provides an air tight cover for the front access opening 18 of the refrigerator compartment 11. The refrigerator door 16 includes a new and unique inner door structure which constitutes my invention and particularly embodies an improved breaker frame 19.

The refrigerator door 16 includes a deep-drawn outer door shell 20, preferably metal, and an inner door pan 21 also deep-drawn and preferably metal. The outer door shell 20 has a transversely arcuate top wall 22 and substantially straight side walls 23 and bottom wall 24. Integral with these walls and substantially perpendicular thereto is a terminal flange 25 which completely circumscribes the inner periphery 26 of the outer door shell 20. The inner door pan 21 seats partially within the recess 27 which is formed by the outer door shell as previously described. The inner door pan 21 is rigidly attached by any suitable thermal barrier (not shown) at its four corners to the outer door shell 20. Thus the inner door pan 21 when secured in position assists in rigidifying the refrigerator door 16 and is maintained in space relationship to the outer door shell 20 as best shown in Figure 4. The recess 27 which is not occupied by the inner door pan 21 is filled with any suitable thermal insulation material such as, for instance, fiberglass.

With the exception of an embossment 28, the back wall 29 of the inner door pan 21 is flat. A top wall 30, a bottom wall 31, and side walls 32 are all straight and substantially perpendicular to the back wall 29 of the

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pan 21. The walls 30, 31 and 32 together with the wall 29 form an integral structure, the inner door pan 21, which structure is further defined by a terminal offset edge 33 completely circumscribing the walls and integral therewith.

It will be noted that while the pan 21 extends partially within the recess 27 of the outer door shell 20 it extends an even greater distance outwardly from the recess whereby a comparatively large compartment 34 is provided at the inner side of the refrigerator door 16. Horizontal shelves 35 and 36 are secured within the compartment 34 and protrude outwardly beyond the terminal edge 33 of the pan 21 as best shown in Figure 1.

The breaker frame 19 spans the distance between the terminal offset edge 33 of the inner door pan 21 and the terminal flange 25 of the outer door shell 20. A flange 37 completely circumscribes the outer periphery of the breaker frame 19 and when assembled lies adjacent the terminal flange 25 and is rigidly attached thereto by means of screws 38 or other suitable fastening means. As best shown in Figure 2, the breaker frame 19 is substantially rectangular in configuration having straight side portions 39 and 40, a straight top portion 41, and a straight bottom portion 42, all interconnected by rounded corners 43, 44, 45 and 46. In cross section the breaker frame 19 is comprised of a peripheral flange 37 and integral therewith and extending centrally an arcuate section 47 which also extends outwardly from the plane described by the terminal flange 25 and lies in spaced relation to the walls 30, 31, and 32 of the inner door pan 21. Extending further outwardly and integral with the transverse arcuate section 47 is a straight wall section 48 which is maintained in spaced relation to the walls 31, 32 and 33 of the inner door pan 21 and is substantially parallel thereto. Integral with the top wall 41, the bottom wall 42 and the upper parts 49 and 50 of the side walls 39 and 40 respectively, is an inwardly opening channel 55 which overlaps the terminal offset edge 33 of the inner door pan 21. Since the pan 21 is rigidly secured to the outer door shell 20, the nesting relationship of the edge 33 within the channel 55 sufficiently rigidifies the breaker frame 19 such that it is not necessary to use any additional fastening means in the areas just described. In addition this provides a very neat appearance and tends to lower the cost of manufacture as well as enhancing the esthetic value of the inner door surface.

Integral with the side walls 39 and 40 and extending from point 56 to point 57 are side wall extensions 58 and 59 which protrude outwardly beyond the plane described by the edge 33 and are substantially normal thereto. These side wall extensions 58 and 59 are offset vertically to lie in substantially the same plane as that of the side walls 23 of the inner door pan 21, thus cooperating to make the food storage compartment 34 even larger. Each side wall extension is provided with an inwardly opening channel 60 along its outer edge 61 similar to the channel shown at 55. A filler panel 62 seats within the channel 60 and overlies a terminal edge 33 thereby providing a smooth and finished appearance from the interior of the compartment 34 as best shown in Figure 7.

Integral with the breaker frame 19 and extending horizontally across its inner periphery at the approximate center is a vertical retaining wall 63. This vertical retaining wall 63 extends between the tops 64 and 65 of the side wall extensions 58 and 59 respectively. It lies along the outside edge 66 of the horizontal shelf 35 and seats within a groove 67 thereof, thereby serving as a vertical retaining barrier for that shelf. The wall 63 is provided with a horizontal flange 68 at its top edge throughout its entire length which, in addition to the strength supplied by groove 67, further rigidifies the wall 63 so that it will withstand prolonged usage and even violent opening and closing of the door 16. It is to be noted that the breaker frame 19, which is com-

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prised of the flange 37, an arcuate section 47, the straight wall section 48, the channel 55, the side wall extensions 58 and 59, channels 60 and the vertical retaining wall 63, is an integral one-piece structure.

It is conventional for the latch 69 to protrude through opening 70 in the breaker frame 19. It is also well known to provide a sealing means 71 about the outer periphery of the door 16.

By my invention I have provided an inner door structure which combines many features of esthetic value, economy and utility. A large compartment 34 is provided for the storage of large quantities of food which are easily accessible. In addition, by utilizing a portion of the refrigerator compartment 11 for the inner door structure as disclosed by my invention, the shelves 12 within the compartment 11 are smaller and thus more easily accessible at the remote corners thereof. Since my inner door structure extends a considerable distance within the refrigerated compartment 11, optimum humidity and cooling conditions are maintained for the storage of selected foods.

These and numerous other advantages will be apparent to those skilled in the art. For instance, in the assembling process during manufacture, after the inner door pan is positioned within the outer door shell, it is only necessary to handle one piece which provides an attractive breaker frame, a deep food storage compartment and a shelf retaining wall in one simple operation.

Thus it may be seen that I have provided an improved inner door structure for the storage of food and in particular an improved breaker frame for the inner surface of a refrigerator door. Although only one preferred form has been illustrated and described in detail, it will be apparent to those skilled in the art that various modifications may be made in my invention without departing from the spirit or from the scope of the invention.

I claim as my invention:

1. In a refrigerator door, a deep drawn substantially rectangular one piece shell, a deep drawn substantially rectangular one piece pan mounted in said shell in spaced relation thereto and projecting for the major portion of its depth beyond the inner side of said shell, said pan being of materially less height and width than said shell and the latter having at its inner side a peripheral flange extending inwardly thereof substantially perpendicular to its top and bottom and side walls, said pan being open at its inner side and having the terminal edge portions of its top and bottom and side walls offset outwardly, and a one piece breaker frame extending between said shell and pan having at its outer end a peripheral flange seating on and secured to said flange of said shell, said frame having at its inner end a peripheral channel opening toward and receiving said outwardly offset terminal edge portions of said walls of said pan in nested relation effective for supporting the inner portion of said frame and concealing said offset terminal edge portions, said breaker frame having at the lower portions of the side walls thereof integral extensions projecting therebeyond substantially in the planes of the side walls of said pan and being provided with a transverse reinforcing wall integrally connecting the upper portions of said extensions.

2. In a refrigerator door, a deep drawn substantially rectangular one piece shell, a deep drawn substantially rectangular one piece pan mounted in said shell in spaced relation thereto and projecting for the major portion of its depth beyond the inner side of said shell, said pan being of materially less height and width than said shell and the latter having at its inner side a peripheral flange extending inwardly thereof substantially perpendicular to its top and bottom and side walls, said pan being open at its inner side and having the terminal edge portions of its top and bottom and side walls offset outwardly, and a one piece breaker frame extending between said

shell pan having at its outer end a peripheral flange seating on and secured to said flange of said shell, said frame having at its inner end a peripheral channel opening toward and receiving said outwardly offset terminal edge portions of said walls of said pan in nested relation effective for supporting the inner portion of said frame and concealing said offset terminal edge portions, said breaker frame having at the lower portions of the side walls thereof integral extensions projecting therebeyond substantially in the planes of the side walls of said pan and being provided with a transverse reinforcing wall integrally connecting the upper portions of said extensions, and a horizontal shelf mounted in said pan and

extending therebeyond between said extensions, said shelf having an upwardly opening lengthwise groove adjacent its outer edge receiving the lower portion of said reinforcing wall for imparting rigidity to and reinforcing the latter.

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