

June 1, 1954

E. T. MORTON

2,679,944

REFRIGERATOR BREAKER STRIP

Filed June 15, 1949

5 Sheets-Sheet 1

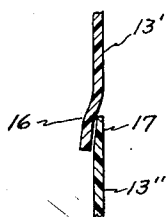
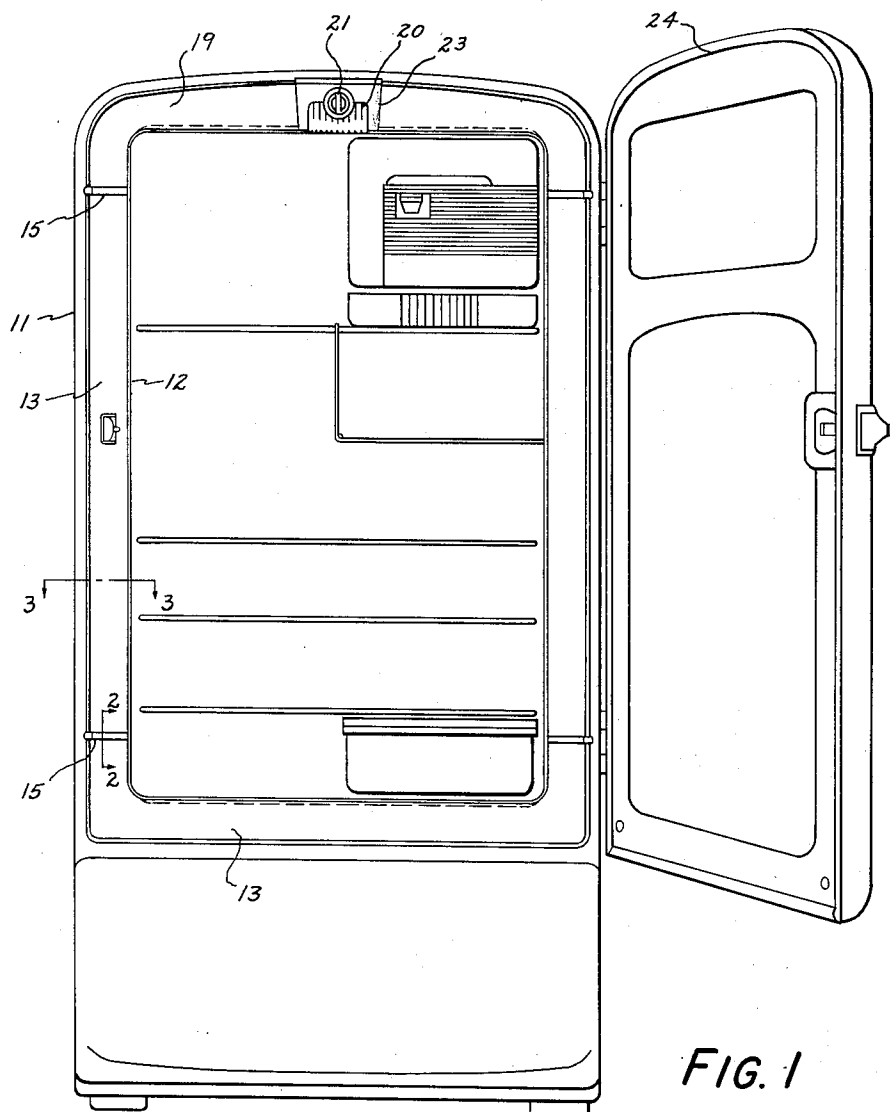


FIG. 2

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5 Sheets-Sheet 2

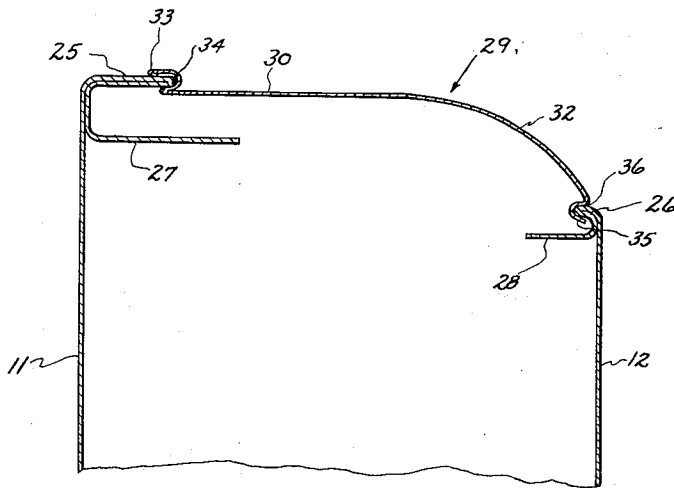


FIG. 3

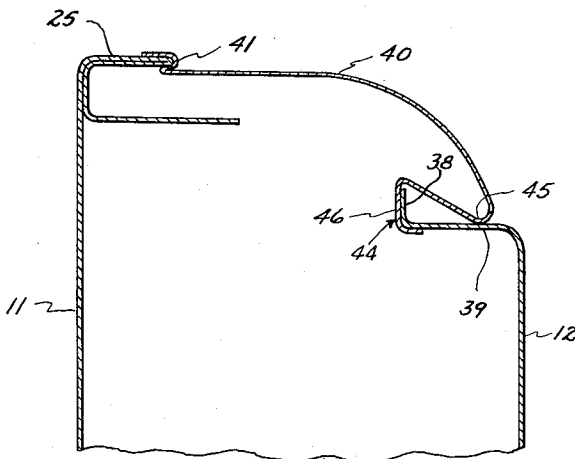


FIG. 4

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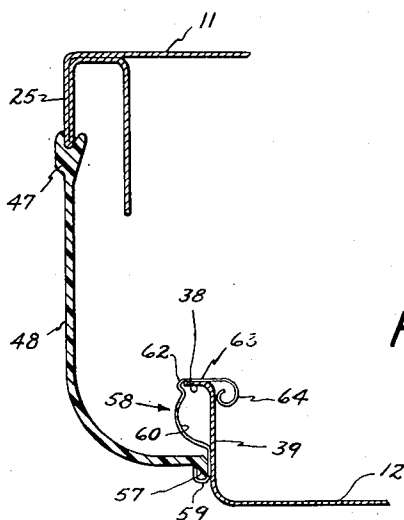
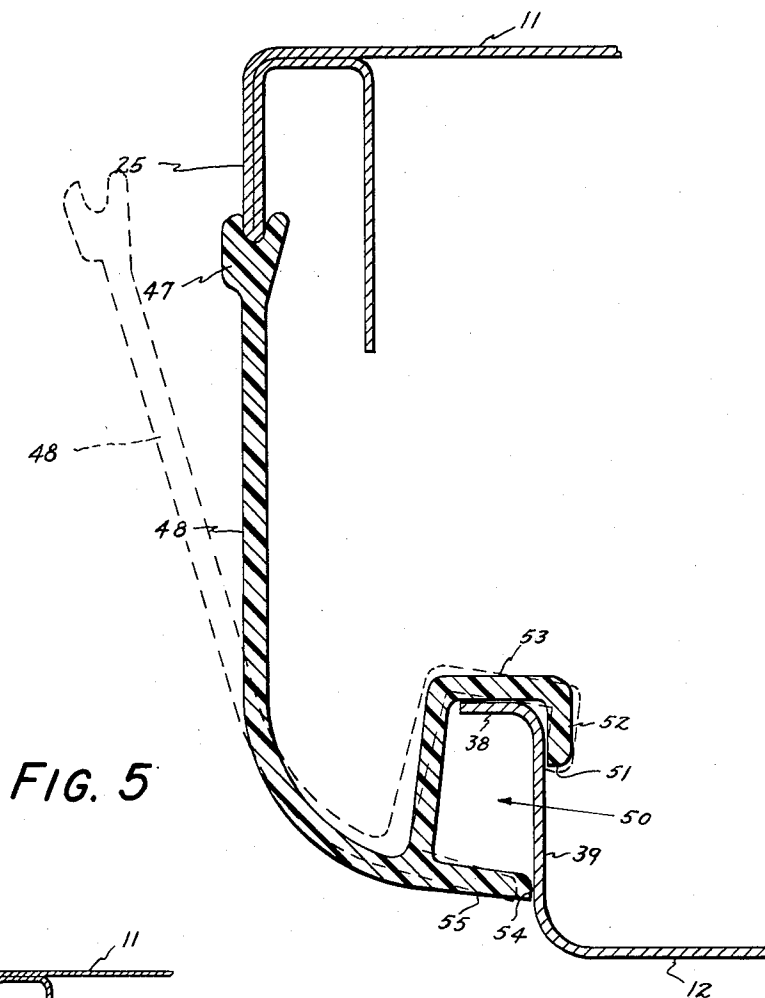
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5 Sheets-Sheet 3



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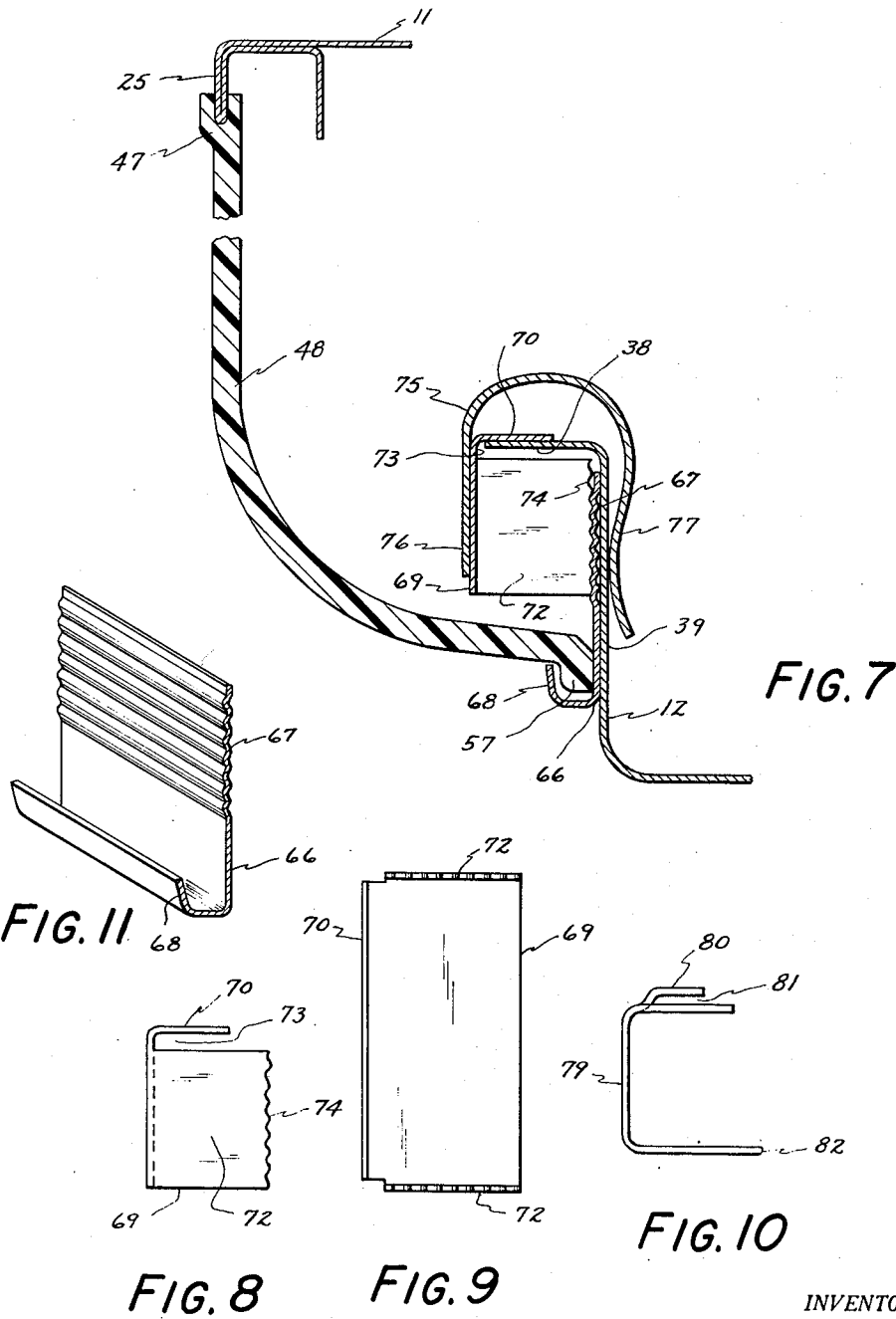
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5 Sheets-Sheet 4



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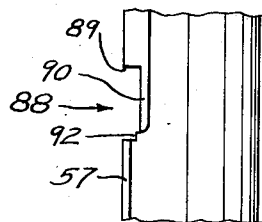
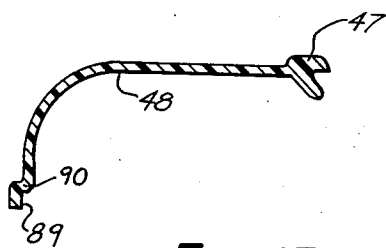
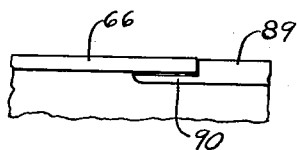
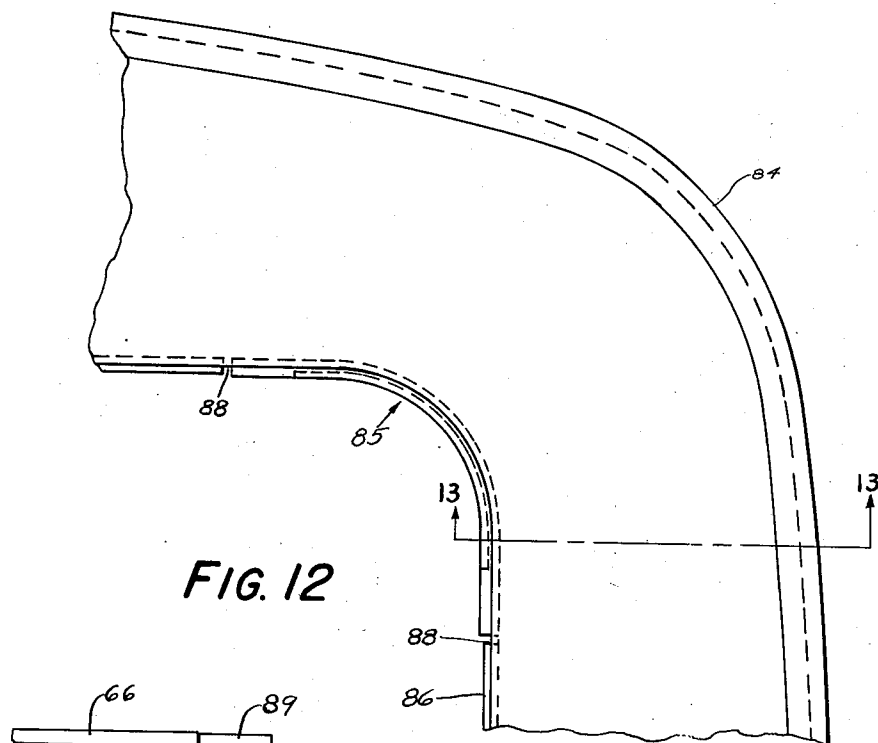
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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,679,944

REFRIGERATOR BREAKER STRIP

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Application June 15, 1949, Serial No. 99,293

1 Claim. (Cl. 220—9)

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This invention relates to breaker strips for household refrigerators including devices for holding the breaker strip in place between the outer shell and food compartment liner.

In the common household refrigerator, it is highly desirable to keep the heat conduction from the room to the inside of the food compartment to a minimum. To this end, continuous metal surfaces from inside to outside are avoided if at all possible. For this reason, a breaker strip of some low heat conducting material, generally one of the plastics, is used at the doorway to separate the inner metallic food compartment liner and the outer shell. This strip provides a low heat conductance surface which is hard enough to provide a surface on which a rubber gasket, usually carried by the door, can seat to provide a tight wall to prevent heat loss by leakage of warm air into or cold air out of the refrigerator.

The usual means of holding this strip in place consisted of a series of screws or clips through the breaker strip and threaded into flanges in the outer shell and the inner compartment liner. This method required an accurate alignment of holes in the breaker strip and the metal parts. Furthermore, the plastic material frequently took a set and formed slight gaps in the spaces between the screws.

By my invention, I eliminate many of these disadvantages, while at the same time producing a device more easy to assemble than prior devices. In its broadest aspects, my invention comprises a breaker strip which is formed at the edges thereof so that it will engage the inner and outer compartments of the refrigerator cabinet and hold itself in place by its formation and resilience. To that end I also provide some clip devices which make my invention additionally useful since they make possible an adjustment which will overcome the effects of slight deformities encountered in either the cabinet or the strip because of manufacturing methods. These adjustments are made without a local stressing of the breaker strip such as would be necessary in the prior forms of manufacture with the consequent danger of breakage or tearing of the breaker strip. In addition, since the strip is continuously supported at its edges, it will be pulled into close contact with the compartments of the cabinet. The plastic material is subject to what is known as "cold flow" so that after being held in this position for a short while, the strip assumes a permanent set in the shape in which it is held, thus giving the appearance and usefulness of a perfect fit regardless of small deformities encountered in manufacture.

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The details of my invention and the invention itself will become more apparent from reference to the following figures and description which form a part of this specification.

In the drawings:

Fig. 1 is a front view of a refrigerator cabinet showing my invention in use.

Fig. 2 is an enlarged sectional view along the line 2—2 of Fig. 1.

Fig. 3 is an enlarged sectional view along line 3—3 of Fig. 1 showing one form of the breaker strip.

Fig. 4 is a sectional view similar to Fig. 3 showing an alternate form of strip and its mode of attachment to the cabinet.

Fig. 5 is a view similar to Fig. 3 of a second alternate form of strip;

Fig. 6 is another view similar to Fig. 3 showing a third alternative form of strip;

Fig. 7 is a sectional view of a strip similar to that of Fig. 6 showing an alternative form of attaching means;

Fig. 8 is a side plan view of the tongued clip of this alternative attachment means;

Fig. 9 is a bottom view of the tongued clip;

Fig. 10 is an end view of an alternative form of tongued clip;

Fig. 11 is an isometric view of a portion of the corrugated strip used in this last mentioned mode of attachment;

Fig. 12 is a plan view of a breaker strip according to my invention for a top corner of a refrigerator;

Fig. 13 is a sectional view along line 13—13 of Fig. 12.

Fig. 14 is an enlarged fragmentary elevational view of the breaker strip alone at the region adjacent the corner; and

Fig. 15 is an enlarged fragmentary elevational view of the breaker strip shown in Fig. 14, installed.

A refrigerator cabinet, as shown in Fig. 1, generally comprises an outer shell 11 within which is disposed an inner food liner 12. These two walls, which may be formed of sheet metal, terminate at the front leaving a gap between them which is normally closed by a breaker frame which may be composed of several strips 13. In prior built refrigerators, these strips were customarily straight pieces for the bottom and sides and a molded piece for the top and were joined at the corners by a joining strip. However, I prefer to mold the strips around the corner, thus providing a surface at the corner which is easier to clean. All joints 15, with one possible exception, are

then made on the sides of the cabinet. This novel construction is made possible by my new mode of fastening the breaker strips 13 to the inner compartment 12 and the outer shell 11 as described hereinafter.

The joints between sections of the breaker frame are best shown in Fig. 2. These joints are formed by providing one of the strips, preferably the upper one 13' of the two, with an offset portion 16 which overlaps the edge 17 of the lower strip 13". The edge 17 may be tapered somewhat to provide a less noticeable joint.

As stated above, all the joints in the breaker frame are made on the side of the cabinet with one exception. The top 19 of the frame includes an escutcheon 20 which surrounds the refrigerator controls 21. In some cases, the controls are supported by a metal escutcheon which also forms a joining strip for two halves of the top piece. However, by use of my construction, it is possible to mold the ornamental escutcheon in the top piece to provide a mounting boss for the controls 21. The overlapping joint if desired can then be made at one side of the escutcheon 20 or the other. I prefer to make the joint along the right side as shown at 23 in Fig. 1 because then the door 24 need not be sprung open in order to remove the portion of breaker frame containing the controls. This is, however, a matter of preference and it is quite obvious that the joint could as readily be made along the other edge of the escutcheon or that there is no necessity that there be any joint at all, and that the strip could be made in one piece.

As previously stated, I provide a novel means of attaching my breaker strips which insulate the inner liner from the shell. Several variations have been devised, of which the simplest comprises merely a strip with forked edges adapted to engage the edges of the liner and the shell.

More specifically and referring particularly to Fig. 3, the simplest form is there shown made of a metal strip. This metal is preferably a poor heat conductor, such as stainless steel, or it may be a plastic material. In this configuration, the edges of the outer shell 11 and the inner liner 12 are stiffened by bending the metal back upon itself and then at right angles to form flanges 25 and 26 on the shell and liner respectively. There may also be a portion of the edge bent away from the metal to form supporting ledges 27 and 28 for installation. The breaker strip 29 is formed with a fairly wide flat surface 30. Inward of this flat 30, the strip 29 bends away from the door in a long curve 32. A forked formation is formed at the outer edge 33 of the strip by bending the metal back upon itself and then away to form the channel 34 which straddles the flange 25. A similar formation is used at the inner edge 35 to form a channel 36 straddling the flange 26. It will be obvious that a similar formation could be made of plastic material.

The assembly of the device is obvious. One of the channels is put in place astraddle the proper flange and the strip is sprung together until the other forked edge may be placed over the other flange and thereupon the strip is allowed to spring back holding itself in place by its inherent resilience.

The first alternative form (Fig. 4) is very similar to that just described except that it is for use with an inner liner 12 of slightly different formation at the edges. Instead of the flange 26 of Fig. 3, the stiffening here takes the shape

of a right angle Z section comprising the liner 12, the outer leg 38 and the cross piece 39. The body 40 of this breaker strip and the outer channel 41 are formed in the same manner as the original configuration. However, at the inner edge, in order to form a proper seal, the strip is formed to engage the cross piece 39 and be pressed in place thereon. This may be done by forming the edge in a form similar to that shown in the figure or any other form which allows the edge of the strip to form a hook arrangement 44. This arrangement causes the resilience of the strip to press the rounded part 45 of the strip firmly against the cross piece 39. I prefer the formation shown since it provides a flat surface 46 which will engage the outer leg 38 of the Z-shape over a fairly wide area to resist the spreading of the strip.

The assembly of this device is very similar to that previously described except that here the clip arrangement 44 must be put in place first and the outer channel 41 sprung into place over the outer flange 25.

A modification of this type of breaker strip is necessary in order to use a plastic material. One such modification is shown in Fig. 5 where the strip is shown in section having a forked end 47 and body 48 the same as previously described. The clip arrangement of the prior device is replaced in this embodiment by a substantially rectangular slot 50. This slot has an action similar to the clip arrangement of the prior device in that it holds the strip to the inner liner and resists the springing action of the strip.

An opening 51 through the greater portion of one side 52 of the slot allows the strip to be placed over the outer leg 38 of the Z formation on the liner. This leg 38 then abuts the side 53 to resist movement of the strip inward. This side 53, along with the partial side 52, forms a hook device around the edge of the liner 12 which causes the end 54 of the side 55 to press against the cross piece 39 to form a tight seal.

How this is accomplished is shown in Fig. 5 by the dashed lines. These lines show the strip in a position just prior to being sprung into place. It will be noted that the rectangular slot 50 is turned at a considerable angle to its final position. As the forked end 47 is pushed downward (Fig. 5), this slot formation 50 is rotated through that angle, and the end 54 is pressed against the cross piece 39 which is the desired result. Releasing the end 47 to engage the flange 25 is not sufficient release to relieve this pressure completely, and the breaker frame is held springably in this position until by the gradual "cold flow" process, the material acquires a permanent set and the strip becomes, in effect, a "custom built" strip fitting all the irregularities of the shell 11 and the liner 12.

An alternate configuration which avoids the expensive rectangular slot is shown in Fig. 6. In this configuration, the inner end of the strip is formed with a simple bead 57. A strip 58 of metal formed to clip over the outer leg 38 of the Z-shaped edge has a hook 59 at its inner edge which grasps the bead 57 and holds it firmly against the liner 12. The strip 58 is formed from metal to substantially the cross sectional shape shown having the bead engaging hook 59 and a bowed portion 60. A channel 62 engages the edge of the outer leg 38 and one side 63 presses against the surface of that leg. A rolled portion 64 pressing against the back surface of the cross piece 39 serves to hold the strip in place on the liner 12.

and to keep the hook 59 securely pressed in place thereon.

The assembly of this device is similar to all the others in that it is sprung into place and holds itself by its resilience when first installed. It is apparent that either the forked end 47 or the bead 57 could be put in place first and the other end sprung in by deforming the strip and allowing it to be restored to something approaching its original form.

Still another embodiment of my invention is shown in Figs. 7-10. This embodiment uses a breaker strip in all respects similar to that of the prior described embodiment, but it is held to the liner by adjustable means which comprises a set of clips. The first of the set of clips comprises a corrugated strip 66 (Fig. 11) which is preferably of equal length to the breaker strip. This strip has a series of small corrugations 67 running longitudinally whose lower surfaces lie in a plane with the lower surface of the flat portion of the strip 66. One edge of the strip is turned up to form a hook 68 which is of such size that it will enclose the bead 57 of the breaker strip.

The second clip device comprises a channel shaped clip 69 having a tongue 70 extending from one end and bent downward in spaced relationship with the edges of the sides 72 of the channel. This formation provides a slot 73 between the tongue and the sides of the channel which embraces the leg 38 of the Z-shaped flange. The ends 74 of the sides 72 of the channel are serrated to approximately match the corrugations on the strip 66.

Holding the tongued clip 69 in place on the inner wall is accomplished by providing a U-shaped clip 75 which may be the same width as the tongued clip 69 and is formed from spring steel. One leg 76 of this clip bears on the bottom of the channel of the tongued clip, and the other leg 77 bears on the cross piece 39 of the Z-shaped flange. Thus it holds the tongued clip 69 in firm contact with the corrugated strip 66.

To assemble my device, the tongued clips 69 are placed over the outer leg 38 of the Z-shaped flange on the inner liner 12. The first corrugation of the strip 66 is placed under the serrated edge of the clip 69. The spring clips 75 are then placed over the tongued clip to hold the whole assembly in place. The forked end 47 of the breaker strip is then placed over the flange 25 and the bead 57 brought into engagement with the hook portion 68 of the corrugated strip 66. This may require either slightly springing the breaker strip or the movement of the corrugated strip. The corrugated strip can now be pressed so that it slides under the serrated edges of the clip 69 until it firmly engages the bead 57 thereby holding the breaker strip in place.

An alternative form of the tongued clip of this embodiment of my invention is shown in Fig. 10. In this configuration I provide a U-shaped clip 79 in place of the channel shaped clip 69. This U-shaped clip has a tongue 80 struck from one leg of the U and in parallel spaced relationship thereto forming a slot 81 similar to that on the previously described clip 69. The action of this clip is also similar to that of the clip 69. In the U-shaped clip 79, the tip 82 of the leg of the U opposite the tongue serves to engage the corrugations of the strip to retain it in place in a manner similar to the action of the serrated edges of the clip 69.

Since it is impractical to use any of the devices

at the corner, and because of the additional stiffness of the strip there, it is necessary to use a somewhat different formation of breaker strip at these points (Figs. 12 and 13). The outer edge 84 may be the same around the corner as it is along the length of the strip. However, the inner edge where the clips of the latter described embodiments are used must be somewhat different. As previously described, the strip extends completely around the corner 85 with the joints being made at the sides of the cabinet. In order to anchor the ends of the top and bottom strips, therefore, I provide a short space 86, of the same section as described previously so that the clips may be used to hold the ends of the breaker strip. Between this section and the corner 85, I provide a notch 88 which cuts away the bead 57 (Fig. 7). This weakens the strip sufficiently at this section to allow the strip to adjust itself properly to the conformation of the flange 39 in accordance with the urging of the clips.

Around the corner the head is somewhat thicker and is formed with a section shown in Fig. 13. As shown there, the bead is formed with a ridge 89 extending downward from a lateral extending section 90. This ridge 89 is adapted to press on the flange 39 to maintain a seal around the corner.

The notch 88, as best shown in Figs. 14 and 15, is formed to provide a smooth continuous appearance when the corrugated strip 66 is in place. For the purpose, the notch 88 is formed by cutting away the entire bead 57 for a short space 92. Then the lateral extending section 90 is formed on the inside but having no ridge 89. The hook 68 on the strip 66 extends beyond the flange 57 and because of its thickness hides the space 92 and extends beneath the section 90 for the space of the notch 88. This overlapping arrangement forms a neat, easily cleaned joint with no gaps or spaces. At the top beyond a corresponding notch 88, the strip again takes the section shown in Fig. 7 although the total width of the strip may be somewhat greater.

Thus it is apparent that I have provided in several embodiments a breaker frame which is not only easier to clean, more tight sealing and, in effect, selectively fitted, but, in addition, it can be easily removed. This may be of considerable importance especially in the modern construction of household refrigerators where the refrigerant tubes run immediately behind the breaker frame rather than up the rear of the cabinet. Thus, if repairs are required, my strips may be readily removed merely by springing them out of engagement with the clips or flange dependent on the embodiment used.

Having thus described my invention in several embodiments, I am aware that numerous and extensive departures may be made therefrom without departing from the spirit or scope of my invention.

I claim:

In a refrigerator cabinet construction, the combination of spaced inner and outer shells forming a compartment open at its front, said outer shell having marginal portions along the open front of the compartment provided with an inwardly extending stiffening flange having a free side edge, said inner shell also having marginal portions along the open front of the compartment provided with a stiffening flange extending toward the outer shell and terminating in a forwardly extending laterally disposed lip spaced from the flange of said outer shell and offset rear-

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wardly from the plane of the said flange of said outer shell, and a breaker strip formed of insulating material and closing the gap between the inner and outer shells around the open front, said breaker strip comprising an elongated strip flat throughout the major portion of its width from one side edge and being then arcuate transversely and merging into a second flat side edge portion disposed laterally of the first side portion, the first mentioned side edge of said strip being thickened and formed with a longitudinally extending groove into which the free side edge of the stiffening flange of said outer shell fits, and a web integrally united with the second mentioned flat side edge portion of the strip and extending laterally therefrom towards the outer shell and carrying a flange extending rearwardly therefrom across the lip of the stiffening flange of the inner shell and terminating in an inwardly extending lip overlapping the rear side face of the said stiffening flange of the inner shell and firmly holding the breaker strip in place with the front side face of the

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stiffening flange of the inner shell abutted by the said second side edge of the breaker strip, and said flange of the web in face-to-face engagement with the forwardly extending lip of the said stiffening flange of the inner shell.

References Cited in the file of this patent

UNITED STATES PATENTS

	Number	Name	Date
10	2,162,271	Munters	June 13, 1939
	2,270,544	Nauert	Jan. 20, 1942
	2,279,050	Lenning	Apr. 7, 1942
	2,301,020	Daily	Nov. 3, 1942
15	2,329,647	Philipp	Sept. 14, 1943
	2,329,755	Goulooze	Sept. 21, 1943
	2,343,447	Drake	Mar. 7, 1944
	2,363,591	Howard	Nov. 28, 1944
	2,375,880	Yoxsimer	May 15, 1945
20	2,426,055	Rundell	Aug. 19, 1947
	2,455,781	Kruck et al.	Dec. 7, 1948
	2,464,526	Palmer	Mar. 15, 1949
	2,504,390	Caldwell, Jr.	Apr. 18, 1950