Oct. 31, 1950 G. K. IWASHITA 2,527,932

REFRIGERATOR CABINET BREAKER STRIP CONSTRUCTION

Filed May 7, 1948

Fig. 1.

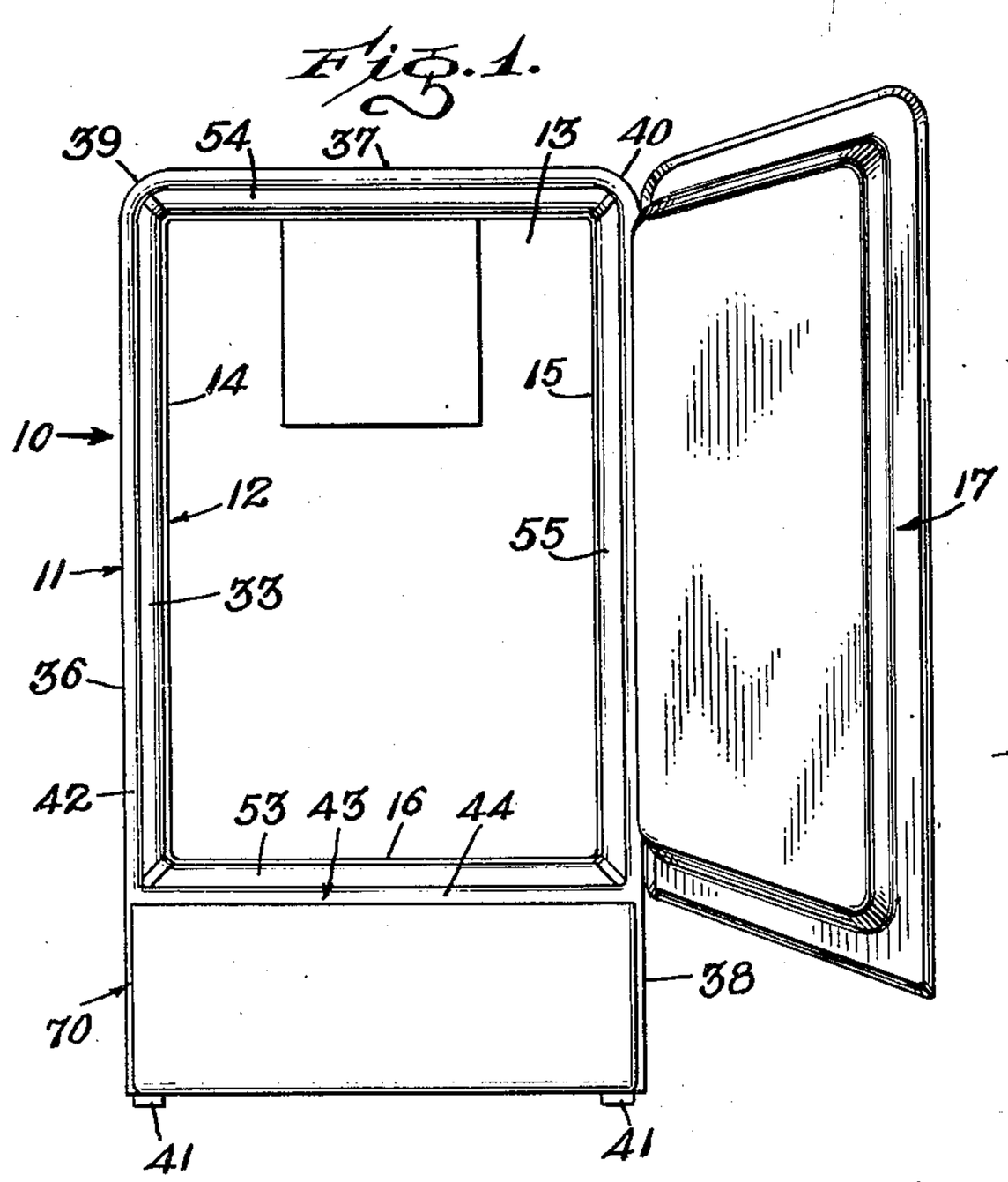


Fig. 2.

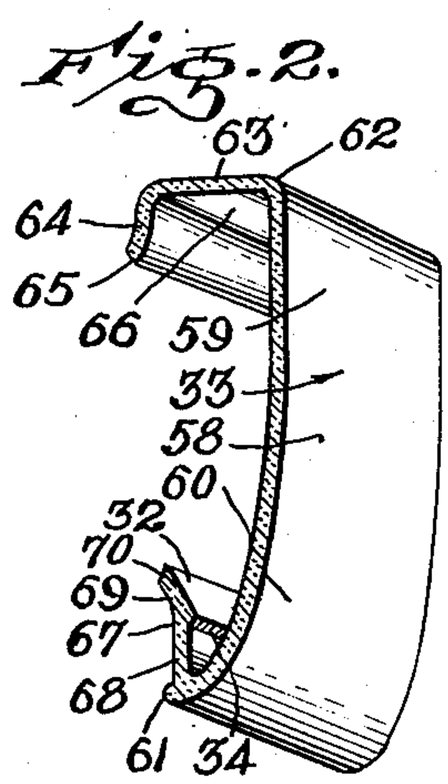


Fig. 3.

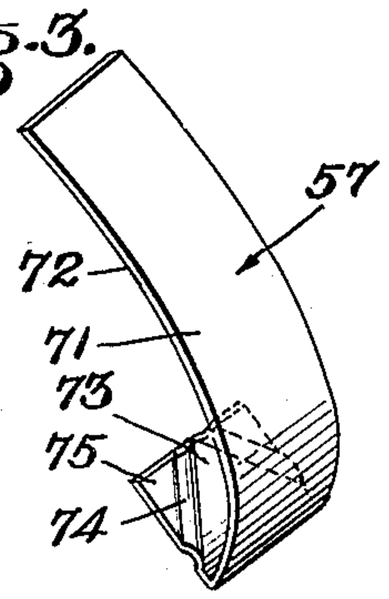


Fig. 4.

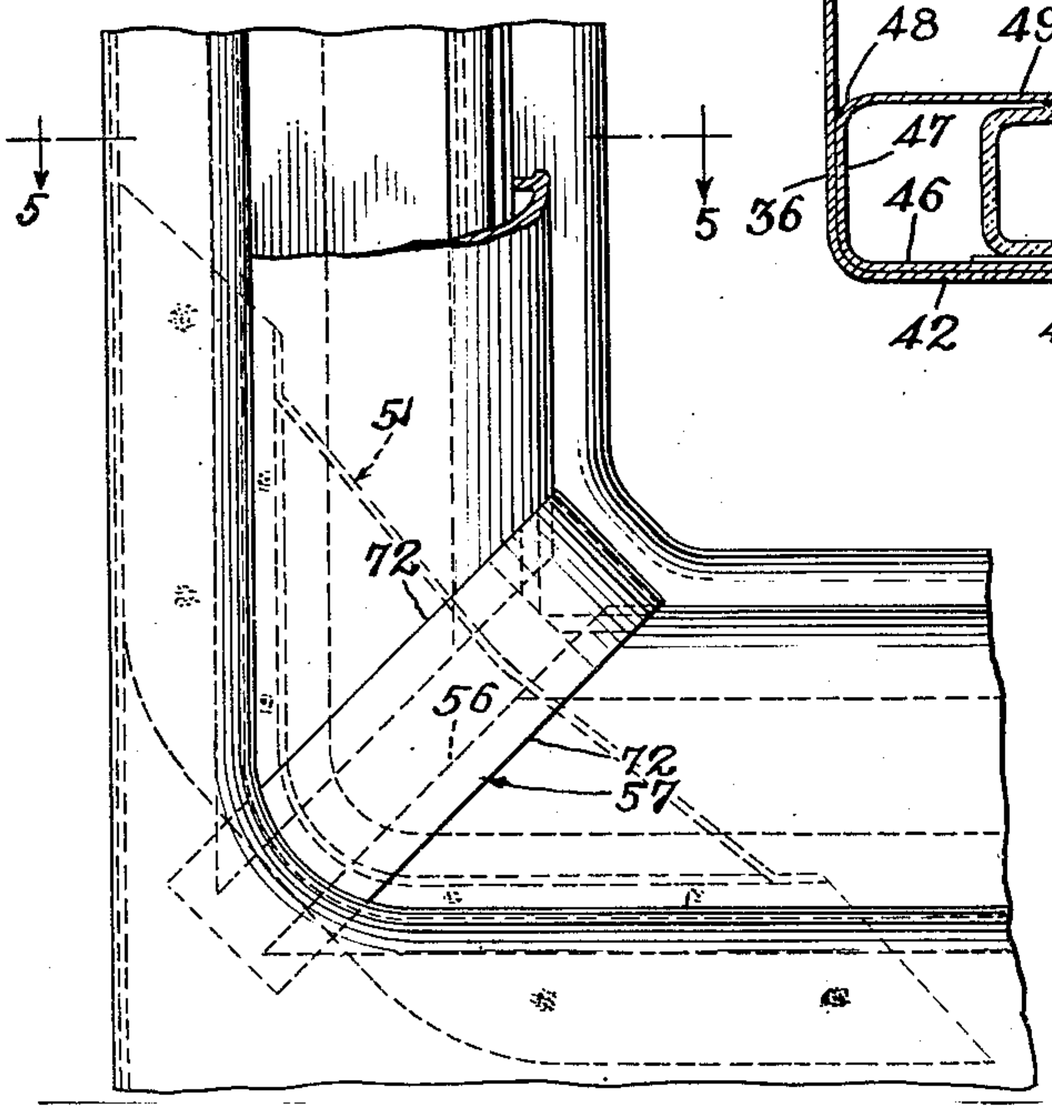
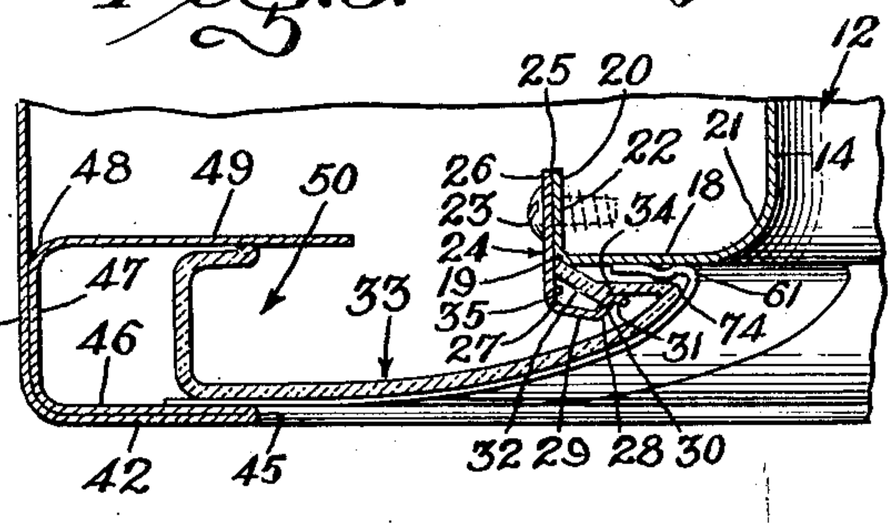


Fig. 5.



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REFRIGERATOR CABINET BREAKER STRIP CONSTRUCTION

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3 Claims. (Cl. 220—9)

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The present invention relates to refrigerator cabinet breaker strip construction, and is particularly concerned with an improved cabinet construction and breaker strip structure which may be assembled with the cabinet without the use of nails, screws or the like.

One of the objects of the invention is the provision of an improved breaker strip construction, the parts of which may be assembled with the cabinet merely by pushing or sliding the breaker strip elements into assembled position, where they are retained by suitable latching means provided on the liner for holding the breaker strip, and provided on the breaker strip for holding corner plates or the like.

Another object of the invention is the provision of an improved cabinet and breaker strip structure which may be manufactured at a low cost, which is simple in construction, which is readily attached to or detached from the cabinet, which provides a tight closure between the inner and outer shells without any open cracks which might detract from the appearance of the cabinet and without any recesses into which food or dirt might lodge.

Another object of the invention is the provision of an improved extruded breaker strip, which is capable of economical manufacture, which is sturdy and durable, which is easy to clean and maintain in a clean condition, which requires a minimum number of other parts to secure it in its proper position, which conceals all of the securing devices for the breaker strips and for supporting the inner liner from the outer shell, and which is adapted to give long service without necessity for repair or replacement of any of its parts.

Another object of the invention is the provision of an improved breaker strip assembly, which permits the attachment or detachment of the breaker strip parts without the necessity for using securing devices such as screws or bolts, and to provide for an assembly which is easily and quickly assembled with the cabinet and when assembled is securely held against moving or rattling during the ordinary use of the refrigerator.

Another object of the invention is the provision of an improved breaker strip construction and assembly in which the advantage is taken of the resilient characteristics of the breaker strip material, as well as the resilient action of spring clips which are preferably provided at regularly spaced points, and also in which provision is made to permit the expansion and contraction of the breaker strips without any possibility of damage to the breaker strips or cabinet, and without loosening the securing devices which hold the breaker strips in place.

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Another object of the invention is the provision of an improved refrigerator cabinet assembly in which the inner and outer shells are provided with grooves surrounding the door opening for receiving breaker strip elements, and in which advantage is taken of the fact that the sheet metal grooves have resilient characteristics, and the breaker strip elements are made of a composition which has resilient characteristics so that the breaker strip elements are resiliently clamped in these grooves to assure a close, crackless engagement between the breaker strip elements and the shells at all points about the door opening.

Another object of the invention is the provision of an improved refrigerator cabinet construction, including closely fitting breaker strips held by grooves carried by the inner and outer shells about the door opening, in which latching means is provided on one of the shells and on breaker strip elements for holding the breaker strip elements in place so that the assembly does not depend upon corner clips to hold the individual breaker strips.

Other objects of the invention will be apparent from the following description and the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Referring to the single sheet of drawings accompanying this specification,

Fig. 1 is a front elevational view of a refrigerator cabinet embodying the invention with the door open;

Fig. 2 is a fragmentary view in perspective of the insulating breaker strip, also showing the cross-sectional shape;

Fig. 3 is a view in perspective of the corner clips which are used to cover up the cracks between the liner strips at the corners;

Fig. 4 is a fragmentary elevational view in partial section, taken at the lower left corner of the door opening, showing the details of construction of the breaker strip assembly; and

Fig. 5 is a fragmentary sectional view taken on the plane of the line 5—5 of Figure 4, looking in the direction of the arrows.

Referring to Figure 1, 10 indicates in its entirety the improved refrigerator cabinet which includes the outer liner shell 11 and inner liner 12. The inner liner 12 is a box-like metal mem-

ber having a rear wall 13, side walls 14, 15 and bottom wall 16, and being open at the front where the door opening is closed by a suitable door 17.

The liner 12 has the forward edges of its side walls, top and bottom provided with an outwardly turned face flange 18 (Figure 5) which is turned backwardly at right angles at 19 to form an attaching flange 20.

Between the face flange 18 and the walls 13—16 of the liner, the liner is formed with an easy bend 21, the substantially curved portion 21 providing a finished forward surface for that portion of the face flange 18 which is exposed.

The attaching flange 20 is provided with a multiplicity of regularly spaced apertures 22 for receiving the self-tapping screw bolts 23, by means of which the spring strips 24 may be secured to the attaching flange 20. The spring retainer strips 24 may be made of spring steel suitably treated to resist corrosion, and provided with apertures 25 in the attaching flange portion 26 for registry with the apertures 22 and for passing the screw bolts 23.

The screw bolts 23 pass through the attaching flange 26 of the spring retainer strip 24, and are threaded into the aperture 22 of the liner attaching flange 20. The spring retainer strips 24 are preferably of sufficient length to extend substantially from top to bottom of the door opening and from side to side of the door opening, but in some embodiments of the invention, instead of continuous spring retainer strips a multiplicity of regularly spaced narrow spring retainers may be employed.

The attaching flange 26 of the spring retainer strip 24 is wider than the attaching flange 20, on the liner 12, and thus the spring retainer strip projects forwardly of the face flange 18 on the liner 12. At 27 the spring retainer strip is bent over at substantially right angles, toward the right in Figure 5, and at 28 the spring retainer strip is bent diagonally inward and upward in Figure 5.

The intermediate portion 29, in Figure 5, extends downward slightly because the spring retainer strip has been spread by the breaker strip, but in its initial condition the portion 29 may extend substantially parallel to the face flange 18.

The diagonally and upwardly extending portion 30 of the spring retainer strip is again curved downward at 31, the curved portion at the right of 31 serving as a camming surface for engaging the camming surface 32 on the breaker strip 33. The shoulder formed at the left of the diagonal portion 30, in Figure 5, serves as a retaining shoulder for engaging an opposed shoulder 34 on the breaker strip 33.

Thus, the assembly of the spring strip and liner causes the liner to present in front of its face flange 18 an inwardly facing groove 35 all around the door opening for receiving a part of the breaker strip 33.

The channeled shape of the portions 21, 18 and 20 of the liner serves to increase its rigidity and it is further re-enforced by the attachment of the spring retainer strips 24 about the door opening, particularly when these spring retainer strips are continuous strips extending the full length and width of the door opening. The groove 50 is preferably deeper than required for merely receiving breaker strip 33, because a face flange 42 of substantial width is needed to engage the door seal. The spring retainer strip 24 provides a positive stop for engaging the edge of rearwardly turned flange 67 to keep breaker strip 33 from going into groove 50 farther than needed to close the gap securely between the shells.

Referring to Figure 1, the outer shell 11 may have its side wall 36, top 37 and other side wall 38 formed of a single piece of metal bent at 39 and 40 to substantially U-shape, and extending down to the floor where it is provided with suitable foot formations 41.

The shell 11 has its side walls 36, 38 and top 37 formed with an inwardly turned face flange 42, which extends at right angles to the side walls and provides a suitable surface for engagement with the rubber sealing strip carried by the door 17.

A transverse frame member 43 joins the side walls 36 and 38 at the bottom of the door opening, and is provided with a similar face flange 44 so that the face flange extends all around the door opening.

The metal of which the shell 11 is made is bent backwardly upon itself at 45, and provided with a backwardly turned portion 46 that lies against the rear side of the face flange 42 and extends into engagement with the side wall 36 at the portion 47, which is bent at right angles to the portion 46.

Thereafter, the sheet metal, of which the shell 11 is formed, is bent inwardly again at 48 and provided with an inwardly extending flange 49, which is preferably of greater width than the face flange 42 for the reason that the flange 49 is used for attachment of brackets or struts which secure the liner to the outer shell.

Thus the outer shell is provided at its forward edge around the door opening with a doubled sheet metal portion formed to provide two parallel flange portions 49 and 42, which are separated by a groove 50 of sufficient size to receive another portion of the breaker strip 33.

The rear attaching flange portion 49 of the outer shell may be substantially in the same plane as the face flange 18 of the inner liner. The same grooved and flanged construction just described for the side walls 36, 38 and top wall 37 about the door opening are present in the transverse frame member 43, which defines the bottom of the door opening.

The inner liner 12 is supported upon the outer shell 11 by a plurality of corner supporting struts 51, and additional latch strike and switch strike struts of similar structure (not shown). The corner struts 51 may consist of segmental sheets of suitable heat-insulating fibrous material of sufficient width to extend and overlap the face flange 18 of the liner 12 at the corner at the same time it overlaps the attaching flange 49 of the shell 11, as shown in Figure 4.

A plurality of screw bolts 52 may pass through the corner strut 51, and may be threaded into punched or drilled holes in the face flange of liner 12 and attaching flange 49 of shell 11. As the struts must engage flatly against the front of face flange 18 on the liner, the spring retainer strips may be cut off on a line which is defined by the inner border of each corner strut 51 so that the spring retainer strips will not interfere with the corner struts.

Additional struts may be provided adjacent the hinges to increase the rigidity of the cabinet at these points. The struts 51 hold the liner walls in spaced relation to the walls of the shell, and this space is preferably filled with a suitable fibrous insulation.

The breaker strips 33 are preferably of sufficient length to extend from top to bottom of the

door opening, and from side to side of the door opening, all of the strips being of the same cross-sectional shape, shown in Figure 2, and the strips being miter-cut at the corners, thus four breaker strips will be required, the others beside strip **33** being indicated by the numerals **53** at the bottom, **54** at the top and **55** at the right side of Figure 1.

In some embodiments of the invention the breaker strips may be miter-cut at the corners in the manner of a picture frame or molding, to accomplish a substantially tight fit at the corners without necessity for any corner clip.

Sufficient space is preferably provided at **56** at each corner between the miter-cut ends of the breaker strips to allow for the heat contraction and expansion of the breaker strips, and to compensate for variations in dimensions due to the ordinary process of manufacture. This open space at each corner is later covered by the corner clips **57**, one of which is shown in Figure 3 (later to be described).

Referring to Figure 2, the breaker strips are preferably made by extruding strips of the cross-section, shown in Figure 2, of initially plastic material, which is chemically inert and resistive to attack by most acids and solvents and which is also heat insulating in character, flexible and somewhat resilient. For example, the breaker strips may be made of the plastic known as Ethyl Cellulose or Polystyrene. These materials have relatively hard surfaces which take a good finish, they are flexible and resilient and sufficiently strong structurally to be self-sustaining, and they may be manufactured in any desired color.

The breaker strip **33** comprises an elongated strip of this material, the face flange **58** of which is substantially plane and flat at its outer portion, that is, the left of Figure 5 or the top of Figure 2, outer portion **59**, and the face flange **58** is convexly curved at its forward portion **60** so that the face flange may extend inwardly from the edge **45** of the shell, and may also curve inwardly to bring its edge **61** into engagement with the liner face flange **18**.

The outer edge of the face flange **58** of the breaker strip **33**, Figure 2, is formed with an easy right angle bend **62**, a transverse portion **63** and a backwardly turned portion **64** which flares outwardly at its edge **65**, thus presenting an inner channel **66**. This channeled construction reenforces and strengthens that edge of the breaker strip and gives the breaker strip sufficient width so that it substantially fills the groove **50** in the outer shell **11** around the door opening.

The flaring portion **64**, **65** gives the channel a greater width than the groove **50** so that the flange **64** or the flange **49** on the shell may give slightly as the channeled edge of the breaker strip is pressed into the groove **50**. Thus the resilient nature of the breaker strip channel permits it to be compressed slightly to make a tight fit in the groove **50** of the shell to prevent rattling.

At its opposite edge, that is, the lower edge, Figure 2, the breaker strip **33** is provided with a backwardly turned flange **67**, which includes a portion **68** that is substantially parallel to the liner flange **18**, but is spaced therefrom by a relatively narrow rib at the edge **61**.

The backwardly turned flange **67** has a shoulder formed at **34** on the inside of flange **67** for engaging the stop surface on the diagonal portion **30** of the retainer spring **24**. From the shoulder **34** the backwardly turned flange **67** has an outwardly flared portion **69**, the inner face of which

has already been indicated as a camming surface **32**.

This flared portion terminates in a relatively sharp edge **70**, and the camming surface **32** serves to engage the curved portion **31** on the retainer spring **24**, to force the spring apart until the backwardly turned flange **67** moves inwardly to the position of Figure 5, where the breaker strip **33** is held by engagement of the shoulders **30** and **34**.

Thus it will be observed that the inner and outer shells have the grooves **50** and **35** which both extend inwardly, and the breaker strip elements are of such shape and size that they fit in these grooves, into which they may be moved by placing the breaker strip, with its flange **64**, against the flange **49** of the shell, and its flange **69** against the liner flange **18**, and then sliding the breaker strip in an outward direction with respect to the door opening, into the grooves **50** and **35**; there the breaker strip will be retained by the spring retainer strip **24**, which draws the edge **61** of the breaker strip into tight contact with the face of the flange **18** on the liner.

The width of the channeled portion **66** of the breaker strip is such that the flat face flange **59** of the breaker strip is kept in close contact with the rear side of the doubled wall **42**, **46** of the shell at the edge **45**.

Referring now to Figure 3, the corner clips **57** are preferably made of thin strips of resilient sheet metal bent or stamped to the shape shown in Figure 3. Each corner clip is of sufficient width to cover the crack at **56**, between the mitered ends of the breaker strip elements, and to overlap the breaker strips.

The corner clip **57** has its main body in the form of a gradually curved metal strip **71**, the inner surface of which is complementary to the outside surface of the breaker strip at the edges **72**, which are the point of engagement between the corner clips and the breaker strips.

The corner clip has its body **71** longer than the width of the breaker strip so that it can be forced in between the breaker strip and the doubled flange **42**, **46** of the shell at the edge **45** of the shell at each corner.

At its opposite end, that is, the bottom of Figure 3, the corner clip **57** is formed with a backwardly turned flange **73**, which extends substantially parallel to the face flange **18** on liner **12**. This backwardly turned flange is formed with a pair of inwardly projecting curved ribs **74**, which extend diagonally across the corners **75** of the backwardly turned flange **73**.

These ribs **74** extend in such a direction that when the corner clips are moved into place the ribs **74** are located behind the edge or rib **61** of the breaker strip. Thus the ribs **74** are confined outwardly of the rib **61** on the breaker strip, Figure 5, to hold the corner clips in place.

In some embodiments of the invention the ribs **61** of the breaker strips may be slightly recessed at the ends of the breaker strips so that the flange **73** on the corner clip does not space the breaker strip from the liner flange **18**. In a similar way the upper surface **59**, **60** of the breaker strip might be recessed to receive the corner **72** of the corner clip to prevent the corner clip from causing a spacing of the breaker strip from the flange **46**.

It will thus be observed that I have invented an improved breaker strip construction for refrigerator cabinets, which is characterized by

the total absence of nails or screws or the like for securing the breaker strips in place. All that it is necessary to do is to place the breaker strip against the flanges 49 and 18, and shove it outward until the flange 67 passes under the retainer spring 24.

After the four breaker strips have been put in place it is a simple matter to insert the corner clips between the breaker strip and the front flange 42, 46, and simultaneously to shove the flange 73 of the corner clip 57 under the edge 61 of the breaker strips at each corner.

The present construction permits the expansion and contraction of the breaker strips without tending to become loose, as the strips may slide longitudinally of the spring retainer strip. Much labor is saved by reason of the simple manner in which the breaker strips and corner clips are attached.

The present breaker strips have a hard finish which is not easily damaged, and which may be kept clean with a minimum amount of effort. Since the breaker strip is extruded it may be manufactured more cheaply than breaker strips which involve a rectangular frame that is molded all in one piece.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a refrigerator cabinet breaker strip construction, the combination of an outer shell formed with a door opening and having the said shell formed with an inwardly open substantially rectangular groove surrounding said door opening, with an inner liner supported upon said outer shell and spaced therefrom, said inner liner having its forward edge outwardly turned surrounding said door opening toward the inwardly open groove of said outer shell, and backwardly turned into the space between said shells to provide an attaching flange, said outwardly turned portion forming a facing flange, a breaker strip securing member carried by said attaching flange on each side of the door opening and comprising an angular resilient metal member formed with an attaching flange of greater width than the first-mentioned attaching flange and secured to the first-mentioned attaching flange, said resilient member having an inwardly extending resilient flange terminating in a retaining rib which is bent toward said facing flange, and a breaker strip comprising an insulating non-hygroscopic member of substantially uniform cross section, said breaker strip having a convexly curbed body of sufficient width to extend from said facing flange to a point just inside the inwardly turned groove of said outer shell, said body being provided at its outer edge with a backwardly extending flange and an inwardly extending flange forming an inwardly open rectangular channel of such size as to be resiliently gripped by the outer shell at its inwardly extending groove, the breaker strip being provided at its inner edge with an outwardly extending flange extending substantially parallel to said facing flange, said outwardly extending flange including an outwardly extending stop and keeper flange which is turned diagonally backward, the edge of said stop and keeper flange engaging in the corner against the facing flange and the attaching flange of said resilient member to prevent movement of the breaker strip in an outward direction when the inner corner of said stop and keeper flange engages said latching rib which holds the breaker strip in engagement with the facing flange and prevents the breaker strip from moving out of said position.

2. In a refrigerator cabinet breaker strip construction, the combination of an outer shell formed with a door opening and having the said shell formed with an inwardly open substantially rectangular groove surrounding said door opening, with an inner liner supported upon said outer shell and spaced therefrom, said inner lining having its forward edge outwardly turned surrounding said door opening toward the inwardly open groove of said outer shell, and backwardly turned into the space between said shells to provide an attaching flange, said outwardly turned portion forming a facing flange, a breaker strip securing member carried by said attaching flange on each side of the door opening and comprising an angular resilient metal member formed with an attaching flange of greater width than the first-mentioned attaching flange and secured to the first-mentioned attaching flange, said resilient member having an inwardly extending resilient flange terminating in a retaining rib which is bent toward said facing flange, and a breaker strip comprising an insulaitng non-hygroscopic member of substantially uniform cross section, said breaker strip having a convexly curved body of sufficient width to extend from said facing flange to a point just inside the inwardly turned groove of said outer shell, said body being provided at its outer edge with a backwardly extending flange and an inwardly extending flange forming an inwardly open rectangular channel of such size as to be resiliently gripped by the outer shell at its inwardly extending groove, the breaker strip being provided at its inner edge with an outwardly extending flange extending substantially parallel to said facing flange, said outwardly extending flange including an outwardly extending stop and keeper flange which is turned diagonally backward, the edge of said stop and keeper flange engaging in the corner against the facing flange and the attaching flange of said resilient member to prevent movement of the breaker strip in an outward direction when the inner corner of said stop and keeper flange engages said latching rib which holds the breaker strip in engagement with the facing flange and prevents the breaker strip from moving out of said position, the said breaker strip having at its inner edge a backwardly extending rib forming a continuation of said curved body for engagement with said facing flange.

3. In a refrigerator cabinet breaker strip construction, the combination of an outer shell formed with a door opening and having the said shell formed with an inwardly open substantially rectangular groove surrounding said door opening, with an inner liner supported upon said outer shell and spaced therefrom, said inner liner having its forward edge outwardly turned surrounding said door opening toward the inwardly open groove of said outer shell, and backwardly turned into the space between said shells to provide an attaching flange, said outwardly turned portion forming a facing flange, a breaker strip securing member carried by said attaching flange on each side of the door opening and comprising an angular resilient metal member formed with

an attaching flange of greater width than the first-mentioned attaching flange and secured to the first-mentioned attaching flange, said resilient member having an inwardly extending resilient flange terminating in a retaining rib which is bent toward said facing flange, and a breaker strip comprising an insulating non-hygroscopic member of substantially uniform cross section, said breaker strip having a convexly curved body of sufficient width to extend from said facing flange to a point just inside the inwardly turned groove of said outer shell, said body being provided at its outer edge with a backwardly extending flange and an inwardly extending flange forming an inwardly open rectangular channel of such size as to be resiliently gripped by the outer shell at its inwardly extending groove, the breaker strip being provided at its inner edge with an outwardly extending flange extending substantially parallel to said facing flange, said outwardly extending flange including an outwardly extending stop and keeper flange which is turned diagonally backward, the edge of said stop and keeper flange engaging in the corner against the facing flange and the attaching flange of said resilient member to prevent movement of the breaker strip in an outward direction when the inner corner of said stop and keeper flange engages said latching rib which holds the breaker strip in engagement with the facing flange and prevents the breaker strip from moving out of said position, the said breaker strip having at its inner edge a backwardly extending rib forming a continuation of

said curved body for engagement with said facing flange, and a similar breaker strip similarly installed upon one of the next adjacent sides of the door opening, the two breaker strips being miter cut at the corner between them but spaced from each other, and a corner clip comprising a thin sheet member having a body curved so that its edges have substantially the same curvature as the diagonal section of the breaker strip at said corner, said corner clip having a longer body for covering the crack between the breaker strips and the end of said body being inserted between the breaker strips and the shell at the faces of the breaker strips, said corner clip having at its inner end a backwardly turned straight flange provided with a pair of pressed formations which engage behind the ribs on the breaker strips when said backwardly turned flange is inserted between the breaker strips and said facing flange.

GEORGE K. IWASHITA.

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