Aug. 29, 1967 K. K. KESLING 3,338,451

REFRIGERATING APPARATUS

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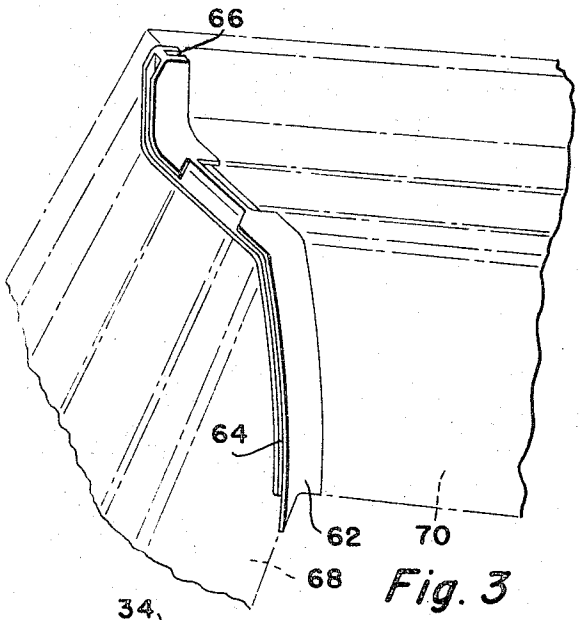


Fig. 3

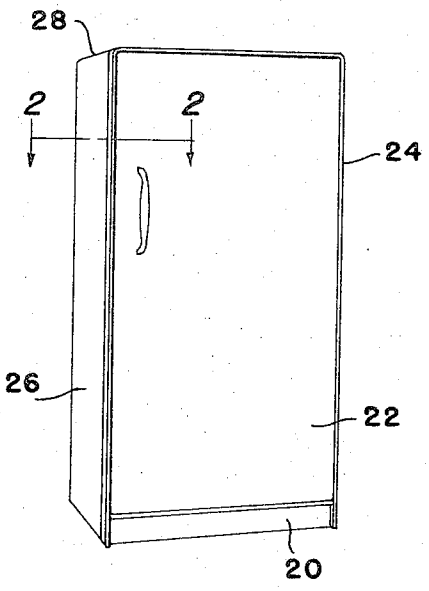


Fig. 1

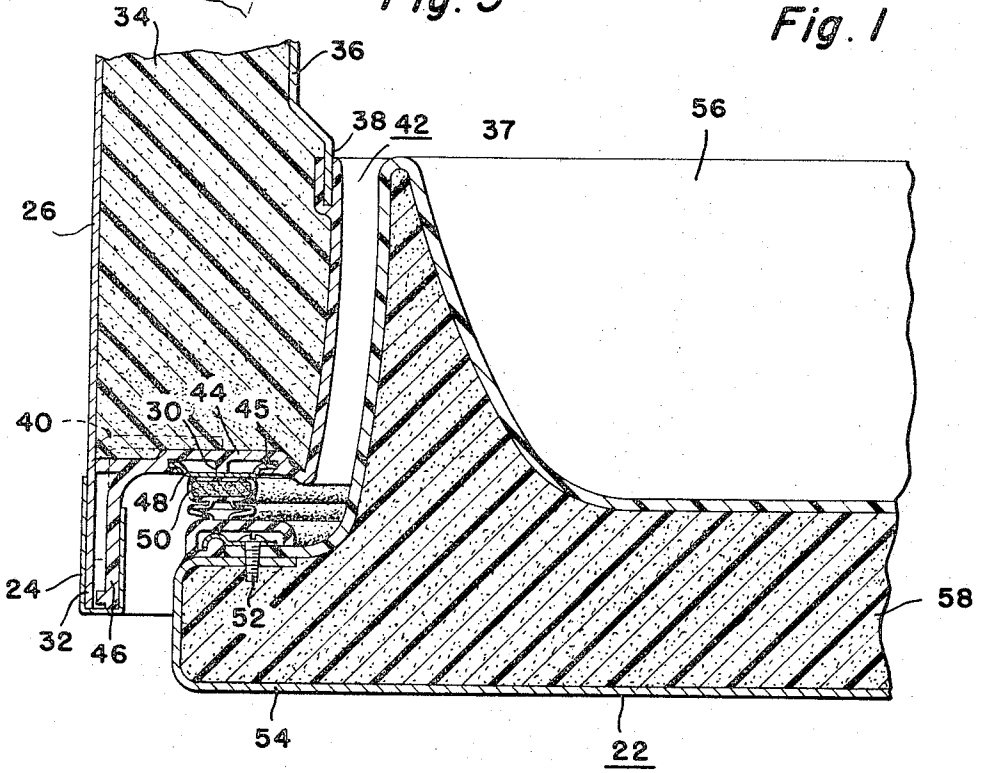


Fig. 2

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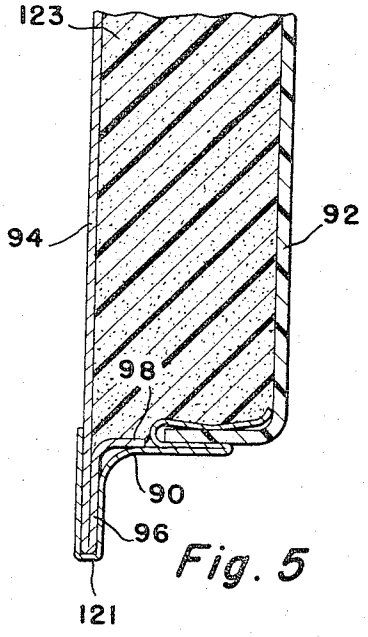


Fig. 5

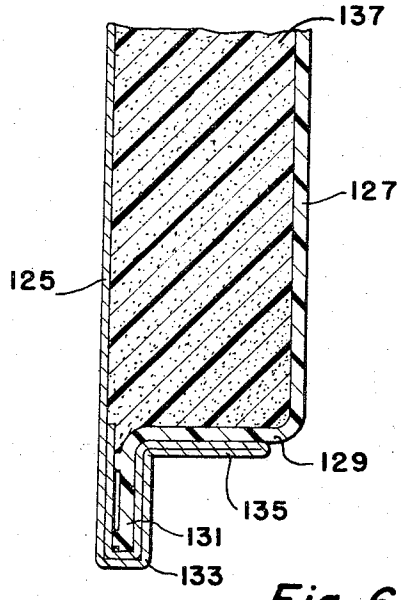


Fig. 6

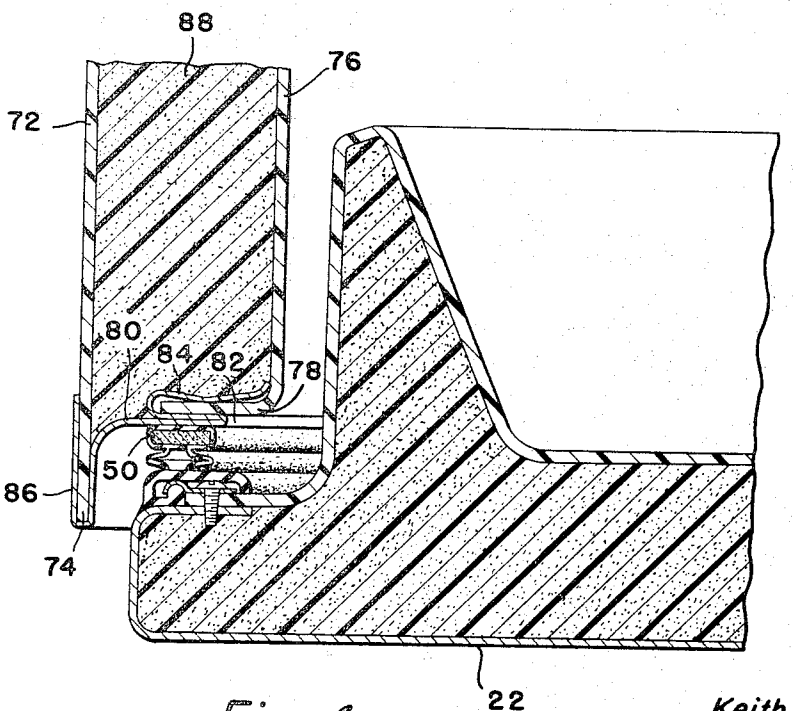


Fig. 4

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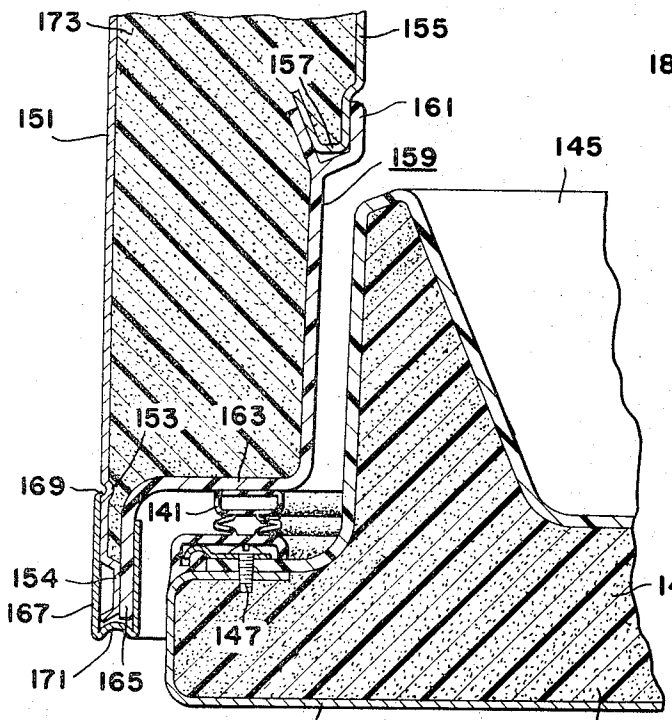


Fig. 7

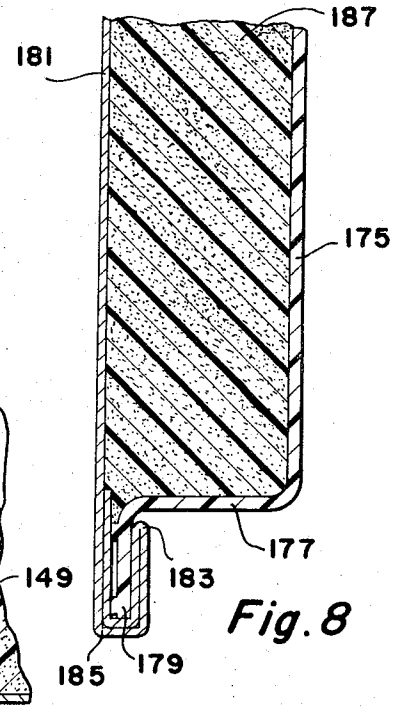


Fig. 8

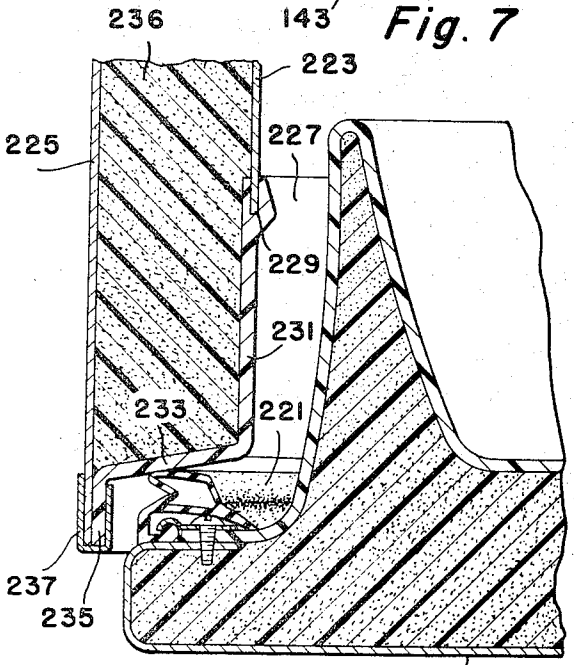


Fig. 9

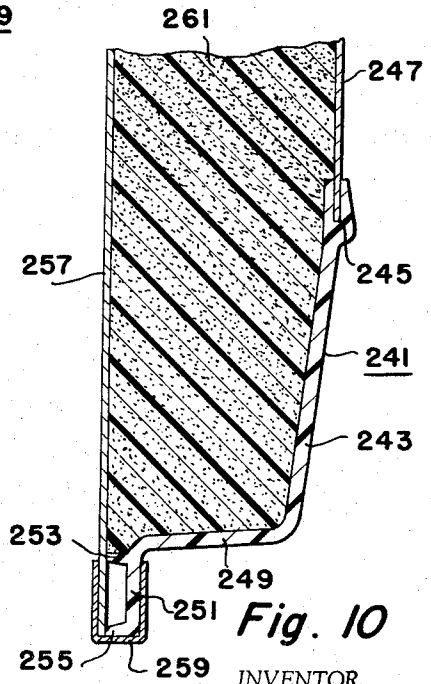


Fig. 10

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3,338,451

REFRIGERATING APPARATUS

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Filed Feb. 20, 1964, Ser. No. 346,149
3 Claims. (Cl. 220—9)

This invention pertains to refrigerating apparatus and more particularly to an improved and simplified refrigerator cabinet construction.

Refrigerator cabinet construction has been simplified from time to time through the years accompanied by changes in appearance and style. With the advent of increased competition and foam insulation, it is desirable to restudy the construction to obtain greater advantage from the use of the foam insulation together with greater efficiency, simplicity, lower cost, and improved appearance.

It is another object of this invention to provide a refrigerator cabinet construction which is simple, inexpensive, good in appearance, high in style which can be economically used with either cast-in or removable slab foam insulation.

It is another object of this invention to provide a simple, inexpensive, removable breaker strip construction for a refrigerator cabinet which will allow insertion and removal of substantially rigid or semirigid foam insulation slabs.

It is another object of this invention to provide a simple, inexpensive, removable breaker strip construction for a refrigerator cabinet in which all raw edges are covered and protected by a removable ornamental trim strip.

These and other objects are attained in the forms shown in the drawings in which the outer shell extends in a straight line forwardly and terminates substantially in a raw edge at the front. The inner liner, if made of metal, is connected by a removable offset or Z-shaped type of breaker strip principally of plastic having its front portion extended along side the front edge of the outer wall. An ornamental U-shaped trim strip extends around and covers the raw edges of both the outer shell and the breaker strip to provide a simple, high style construction which is excellent in appearance. If desired, the inner liner may be made of plastic and provided with an integral offset arrangement at the front which extends along side the front edge of the outer shell. The raw front edges likewise may be covered by the U-shaped ornamental trim strip. However, in other types of construction the front edge of the outer wall may be rolled over the front offset edge of the plastic inner liner. In a third alternate construction, a removable thin metal breaker strip may extend over the front edge of the outer shell to form a trim strip having an inwardly extended extension provided with a notch receiving the front edge of the plastic inner liner.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a perspective view of a refrigerator cabinet embodying one form of my invention;

FIGURE 2 is a fragmentary, horizontal sectional view taken along the lines 2—2 of FIGURE 1;

FIGURE 3 is a perspective view illustrating a corner trim arrangement for extruded plastic breaker strips;

FIGURE 4 is a fragmentary horizontal sectional view similar to FIGURE 2 of an alternate form of the invention illustrating outer and inner walls of sheet plastic connected by a sheet metal breaker strip;

FIGURE 5 is a fragmentary horizontal sectional view of a construction somewhat similar to FIGURE 4 but showing an outer sheet metal wall with the metal breaker strip and plastic inner liner;

FIGURE 6 is a fragmentary horizontal sectional view of an alternate form of construction in which the outer sheet metal walls are rolled over the front edge of the plastic inner liner;

FIGURE 7 is a fragmentary horizontal sectional view somewhat similar to FIGURE 2 showing the plastic breaker strip and ornamental trim used with an outer shell and inner liner having formed edges for additional stiffening;

FIGURE 8 is a similar fragmentary horizontal sectional view in which the front edge of the outer sheet metal shell is rolled over the front edge of the plastic inner liner;

FIGURE 9 is a fragmentary horizontal sectional view showing a straight sheet type of construction for the outer shell and inner liner with the breaker strip aligned directly with the inner liner; and

FIGURE 10 is a similar horizontal fragmentary sectional view showing a wider trim arrangement.

Referring now more particularly to FIGURE 1, there is shown a refrigerator cabinet **20** provided with a front door **22** surrounded by an ornamental trim strip **24** which is located at the front edges of the side walls **26** and the top wall **28**. The side walls **26** and the top wall **28** are a part of the outer sheet metal shell of the cabinet formed as shown in FIGURE 2 by a sheet metal wall extending forwardly straight to the front edge **32**. Within the outer sheet metal walls such as the side wall **26**, there is preferably provided foam insulation **34** in the form of cast rigid or semirigid removable slabs of polyurethane foam insulation. These slabs, because of the straight character of the wall **26**, may be easily slipped into place inside the walls **26** and **28**, and particularly between the walls **26**, **28** and the inner liner **36** which may also be of sheet metal and which encloses the compartment **37** to be insulated. This inner liner **36** has an inwardly offset front portion **38** terminating in a raw edge. At the corners the sheet metal walls **26**, **28** may be reinforced by an L-shaped bracket **40** of sheet metal in the shape of an angle iron.

A breaker strip **42** of any suitable plastic such as a vinyl polymer or copolymer or natural or synthetic rubber is provided with a slotted bead at its rear edge which envelops the front edge of the offset portion **38** of the inner liner **36** as shown in FIGURE 2. The plastic breaker strip has a portion extending generally parallel to the inner liner **36** and then has a laterally outward extending portion **44** which is joined to a forwardly extending portion **46** extending along side the front edge of the sheet metal wall **26** and also the L-shaped bracket **40** in the corners. The laterally extending portion **44** is provided with two slots having undercut sides **45** receiving and firmly holding the offset beveled edges of a metal strip **48** of magnetic material such as mild steel which extends along parallel to the edges of the breaker strip. The breaker strip has a longitudinal rib **30** supporting the center line of the metal strip **48**. This strip **48** cooperates with the magnetic door seal **50** which is fastened by the screw **52** to the door **22**. The screw **52** also joins the outer sheet metal pan **54** of the door with the inner plastic pan **56**. Preferably polyurethane foam insulation **58** is cast in between the inner and outer pan **54** and **56** to form a rigid door.

The raw edges **32** and **46** as well as the front edge of the L-shaped corner brackets **40** are covered and protected by the ornamental metal trim strip **24** which

is generally U-shaped in cross section and has sufficient inward spring in its leg portions to grip the front edges 32 and 46 sufficiently to hold it in place. This trim strip 24 extends along the side and top perimeter of the cabinet and may be of thin steel, chromium plated, or stainless steel or other ornamental metals such as aluminum or brass. The breaker strip 42 may be either injection molded or extruded. The four sides of the breaker strip surrounding the door opening may be made integral if desired. Normally each of the sides will be separate and made by extrusion. The corners will be mitered and joined by the corner trim members 62 shown in FIGURE 3 having slots 64 and 66 on its opposite sides which receive the adjacent ends of the separate pieces 68 and 70 of the extruded breaker strip.

In FIGURE 4 the door 22 is identical in construction to that shown in FIGURE 2 and carries a similar magnetic seal 50. The cabinet construction, however, although generally similar in principle, differs in that a plastic sheet outer wall 72 is provided terminating in a straight front edge 74. A plastic inner liner 76 is provided with a laterally outward extending front edge 78. Between the inner liner 76 and the outer wall 72 is a thin sheet metal breaker strip 80 of some suitable magnetic material such as steel having some spring qualities. This strip is provided with an inner fold 82 and a second fold 84 providing a notch which receives the laterally outward extending front portion 78 of the plastic inner liner 76. The second portion of the strip 80 extends forwardly and thence completely around the front edge of the outer wall 72 to form an ornamental U-shaped trim section 86 at the front edge around but spaced from and parallel to the edges of the door 22. Polyurethane foam insulation 88 is either cast in between the inner and outer walls 76 and 72 or is inserted in the form of separately cast removable slabs. The polyurethane foam insulation is sufficiently rigid to reinforce the inner and outer walls 76 and 72 to make the cabinet rigid without the use of a frame. The breaker strip 80, the insulation slabs, and the inner liner 76 may be removed when the cabinet is made with removable foam insulation slabs.

In FIGURE 5 a removable thin metal breaker strip 90 is provided which is similar to the thin metal breaker strip 80 in FIGURE 4. The plastic inner liner 92 is likewise similar to the inner liner 76. The outer wall 94, however, if of sheet metal and has its front edge reinforced by being folded over to provide an inwardly extending section 96 which terminates in an inwardly extending flange 98. This reinforces the front edge of the outer wall. The thin metal breaker strip 90 has a U-shaped portion 121 extending around the rolled or folded front edge of the outer sheet metal wall 94 to provide the ornamental trim in the styling desired. Between the outer wall 94 and the inner wall 92 is polyurethane foam insulation 123 which may be in the form of removable slabs or it may be cast in place.

In the modified form illustrated in FIGURE 6, the outer sheet metal wall 125 is folded to double its thickness at the front. The inner liner 127 is of a suitable plastic such as a vinyl polymer or copolymer having an offset front edge including a laterally extending portion 129 and a forwardly extending portion 131 which extends along side and parallels the front part of the outer sheet metal wall 125. The double thickness portion at the front of the sheet metal wall 125 is rolled over the forwardly extending portion 131 of the inner liner to form the U-shaped portion 133. This rolled over portion includes an inwardly extending portion 135 extending laterally inwardly from the innermost edge of the U-shaped portion 133. The polyurethane foam insulation 137 may be either cast directly in the structure or separately cast and inserted in the form of removable slabs. Both the forms shown in FIGURES 5 and 6 may be used with the door 22 and the magnetic seal 50.

In the form shown in FIGURES 7 to 10, no provision is made for the use of a door with a magnetic seal. Therefore, a door 139 with a standard pressure strip resilient seal 141 is used instead. This door 139 includes a similar outer sheet metal pan 143 and a plastic inner pan 145 connected together by the screw 147 which is also used to hold the seal 141. Polyurethane foam insulation 149 is cast in between the outer and inner pans 143 and 145 to insulate and make rigid the door.

The outer sheet metal shell 151 of the refrigerator cabinet is provided with a reinforcing groove 153 and a reinforcing channel 154 at the front edge. This will stiffen the wall of the cabinet at the front edge. The sheet metal inner liner 155 likewise has a front edge 157 which is reinforced by an offset and a rolled U-shaped edge portion. An offset type breaker strip 159 is provided with a bifurcated or forked rear edge 161 which surrounds the U-shaped front edge of the inner liner 155. The breaker strip 159 has a section extending forwardly and substantially in general alignment with the inner liner 155 which terminates in a laterally extending portion 163 which extends substantially to the outer wall 151 where it joins to a forwardly extending portion 165. The raw edges 154 and 165 at the front are covered and protected by a U-shaped trim strip 167 having one edge 169 which may be rolled into the groove 153 to prevent its removal. In this form the front of the trim strip 167 is provided with a frusto cylindrical groove 171. The polyurethane foam insulation 173 is cast in between the outer and inner walls 151 and 155 to make a rigid cabinet construction.

In the form shown in FIGURE 8, a plastic inner liner 175 is provided with an offset front edge portion including the laterally outward extending portion 177 which is joined to the forwardly extending portion 179. The forwardly extending portion 179 may be provided with a pair of ribs. The outer wall 181 is of sheet metal and has its front edge doubled over as indicated by reference character 183. This front edge 183 is rolled over the front edge 179 of the inner liner 175 to form a U-shaped section 185 of double thickness sheet metal to form a trim arrangement similar in appearance to that shown in FIGURE 6. Polyurethane foam insulation 187 is cast in between the outer and inner walls 181 and 175 to insulate and reinforce the walls of the cabinet.

In FIGURE 9 there is provided an insulated door 220 provided with a pressure type door seal 221. The cabinet includes sheet metal inner and outer walls 223 and 225 having straight front edges. These are joined by the plastic breaker strip 227 having a notch 229 in its rear edge which accepts the front edge of the inner liner 223. This plastice breaker strip 227 has a portion 231 extending forwardly from the notch 229 substantially in alignment with the inner liner 223. This terminates in an offset portion including a laterally outward extending portion 233 extending at an angle of about 80° relative to the portion 231. The laterally outward extending portion 233 terminates in a forwardly extending portion 235 extending along the inner face of and parallel to the outer sheet metal wall 225 at its front edge. The row front edges of the outer sheet metal wall 225 and the portion 235 of the breaker strip are covered and clamped together by the U-shaped thin metal trim strip 237 which may be chome plated or may be of stainless steel or other ornamental metal. The breaker strip 227 is securely locked in place by the notch 229 at the rear and the U-shaped trim strip 237 at the front. This is likewise true of the forms shown in FIGURES 2, 7, and 10. The space between the inner and outer walls 223 and 225 is filled with polyurethane foam insulation 236 which may be either cast in place or inserted in the form of foam slabs. By removing the breaker strip 231, the foam slabs 236 and the inner liner 223 may be pulled forwardly out of the outer walls or outer shell 225.

The form shown in FIGURE 10 is generally similar to

the form of wall and breaker strip construction shown in FIGURE 9 with the exception that the plastic breaker strip **241** is provided with a diverging wall portion **243** having a notch **245** at the rear receiving the front edge of the sheet metal inner liner **247**. This diverging wall portion **243** diverges as it extends forwardly to the laterally outward extending portion **249**. The laterally extending portion **249** extends outwardly at an angle of about 85° and terminates in a forwardly extending portion **251**. This forwardly extending portion is provided with two ribs, one rib **253** being at the rear and the other rib **255** being at the front. These ribs extend into contact with the inner face of the front edge of the outer wall **257** which is of sheet metal. The front edge of the breaker strip **241** and the outer wall **257** are clamped together and covered by the thin metal U-shaped trim strip **259** which may be of chrome-plated metal or may be made of a suitable ornamental metal such as stainless steel, aluminum or brass. The space between the inner and outer walls **247** and **257** may be filled with polyurethane foam insulation **261** which may be either cast into place or may be in the form of removable slabs. The breaker strip is readily removable especially in the forms shown in FIGURES 2, 7, 9, and 10, and is securely clamped in place by the removal trim strips which are U-shaped in cross-section. The removable trim strip are formed so as to spring inwardly to grip the faces of the outer wall and the breaker strip. They make a well sealed connection at the front of the breaker strip and through the use of a notch at the rear which envelops the front edge of the inner liner a second well sealed connection is made. The use of the polyurethane foam insulation in connection with the walls and breaker strips of this type of construction reduces or eliminates the need for additional strength. In the forms in which the front edge of the outer shell extends straight forward without any substantially inward extension, the breaker strip, the inner wall and the insulation may be readily pulled out through the door opening of the cabinet merely by removing the U-shaped trim strip. When this is desired, a releasing agent is provided on the inner face of the outer sheet metal walls to prevent adhesion between the insulation and the walls. Through this arrangement the interior of the cabinet is made more accessible.

While the embodiments of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. A refrigerator cabinet including an outer shell means provided with a door opening at the front, said shell means having side and top walls with edges at the front, an inner wall within and spaced from said outer shell means, a breaker strip means having an inner portion spaced inwardly from said outer shell means connecting with said inner wall and extending laterally substantially to said outer shell means a short distance to the rear of said edges and thence forwardly alongside and substantially in contact with said shell means substantially to said edges of said shell means and terminating in edges adjacent said edges of the outer shell means, and trim means having a thin metal portion U-shaped in cross section extending over and around said edges and gripping the outer and inner faces of said outer shell means and said breaker strip means a short distance rearwardly of said edges, said trim means and said shell means having an interengaging projection and groove arrangement for preventing the removal of said trim means, said trim means constituting the sole means directly holding together said edges.

2. A refrigerator cabinet including an outer shell means provided with a door opening at the front, said shell means having side and top walls with edges at the front, an inner wall within said outer shell means having an inner portion spaced inwardly from said outer shell means and provided with means at the front extending laterally substantially to said shell means a short distance to the rear of the edges and thence forwardly alongside of and substantially in contact with said shell means substantially to said edges of said shell means and terminating in edges adjacent said edges of the outer shell means, a narrow trim means having a thin metal portion U-shaped in cross section extending around said edges and gripping a portion of the adjacent outer surface of said outer shell means and an inner surface of said means at the front, said trim means and said shell means having an interengaging projection and groove arrangement for preventing the removal of said trim means, said trim means constituting the sole means directly holding together said edges.

3. A refrigerator cabinet including an outer shell means provided with a door opening at the front, said shell means having side and top walls with edges at the front, an inner wall within and spaced from said outer shell means provided with means at the front extending laterally substantially to said shell means a short distance to the rear of the edges and thence forwardly along said shell means substantially to said edges of said shell means and terminating in edges adjacent said edges of the outer shell means, and a trim member having a single narrow longitudinal groove in its rear face receiving and gripping the front edges of said outer shell means and said means at the front and constituting the sole means directly holding together said edges, said shell means being provided with a groove extending parallel to its front edge, said trim member being provided with a projection extending into said groove.

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