

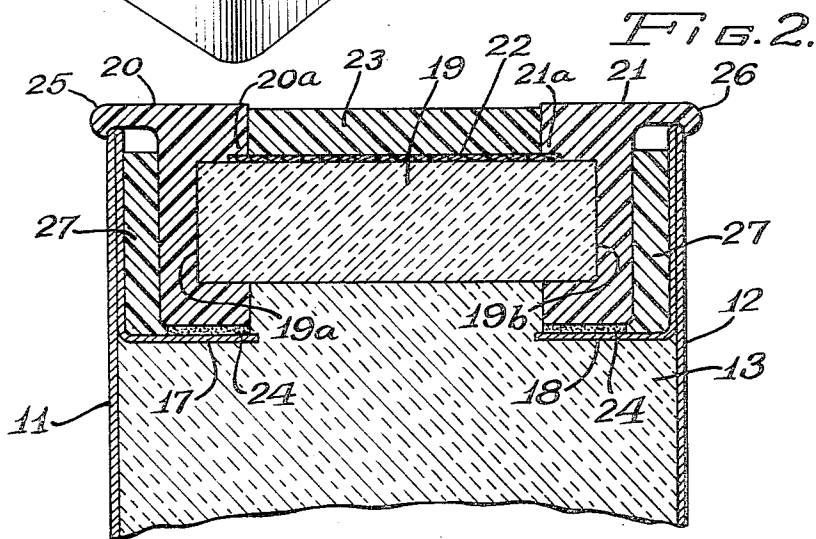
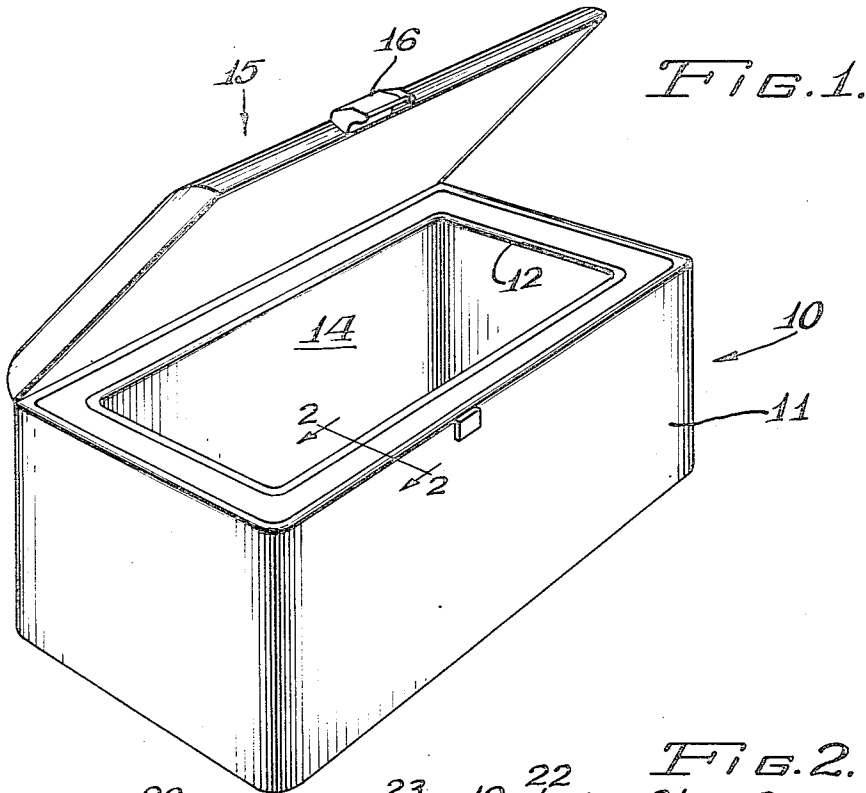
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DUO-PLASTIC MOLDED BREAKER STRIP

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1

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DUO-PLASTIC MOLDED BREAKER STRIP

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This invention relates to insulated cabinets of the type frequently used for the freezing and storing of frozen food products, but it is more specifically directed to a breaker strip or thermal heat-break construction, such as is employed for connecting together the inner and outer walls of cabinets of this character.

Heretofore, many different types of thermal heat-break constructions have been proposed and used for bridging the gap between the marginal edge portions of the inner and outer walls of such refrigerated cabinets, but such of those as have been commercially produced have not been entirely satisfactory. Many of such prior art devices were either too costly, difficult to install, unattractive, or not sufficiently rugged to withstand the abuse to which they were frequently subjected. As a consequence the industry has continued to develop and seek new breaker strip constructions which might be free of such basic objections of their predecessors.

It is a principal objection, therefore, of the present invention to provide a breaker strip construction which is inexpensive to fabricate and install, and which, additionally, is extremely rugged in construction.

Another object is to provide an improved breaker strip construction which lends itself to decorative embellishment without in any way impairing its effectiveness as a thermal heat-break device.

A further object is to provide a breaker strip device which may be partially prefabricated and assembled exteriorly of the cabinet, and the sub-assembly thereafter secured, in spaced relation between the walls of the refrigerated cabinet into which it is positioned, by means of a composition or material which is subsequently poured or flowed into position in a liquid or semi-liquid state.

A still further object is to provide a breaker strip construction which, in addition to providing substantial structural support between the inner and outer walls of a cabinet, also attractively covers and conceals the otherwise exposed marginal edge portions of said inner and outer walls.

A yet still further object is to provide a thermal heat-break assembly which also is effective for providing a highly efficient moisture barrier or seal over the insulated space disposed between the inner and outer walls of an insulated cabinet.

The foregoing and other objects and features of the invention will become apparent as the disclosure is more fully made in the following detailed description of a preferred embodiment of the invention, as illustrated in the accompanying sheet of drawings in which:

Figure 1 is a perspective view of a top-opening freezer chest into which the present invention has been incorporated; and

Figure 2 is a partial vertical sectional view taken on the line 2—2 of Figure 1, and showing the structural details of the present invention in enlarged dimension.

By referring to the drawings, it will be noted that the present invention is depicted as incorporated in the top-opening, horizontal or well type of cabinet which is com-

2

monly referred to as a freezer chest. While the top-opening or well type of cabinet has been selected, for purposes of illustrating a preferred application of the present invention, it will be appreciated by those skilled in the art that the invention is not limited to structures of this particular type and that it may be applied or utilized equally well with many types of refrigerated cabinets.

In the preferred embodiment illustrated herein a top-opening cabinet, indicated generally by the reference numeral 10, is shown as being fabricated with an outer shell 11 and an inner shell 12 spaced therefrom and having thermal insulating material 13 disposed therebetween. The inner shell 12 of said cabinet is arranged to provide a refrigerated compartment 14 that normally opens at the top, while a closure member, such as the door or top cover 15, is suitably and hingedly mounted thereover. A conventional combined handle and latching device 16 may be provided for lifting and fixedly securing said top cover in place, as desired. In conventional refrigerated cabinets or chests of this character it will be understood that portions of the evaporator and condenser coils of the refrigeration apparatus are usually secured by suitable means to the walls of said inner and outer shells, but, since this feature forms no particular part of the present invention, it was felt such elements and the details of their affixment could be omitted from the drawings and specification without impairing a complete and proper understanding of the instant invention.

The marginal edges of the outer shell 11 and inner shell 12 are bent back upon themselves and then inwardly flanged, as indicated, to provide the respective shelf-like supports or brackets 17 and 18, which extend toward one another at substantially the same elevation and are inwardly spaced from the marginal edge portions of said shells.

The proposed breaker strip is fashioned, preferably, as a sub-assembly and then positioned in place between the walls of the cabinet, after which a resinous material is poured therearound to provide a desired moisture seal as well as a suitable spacing medium for fixedly locating the breaker strip centrally disposed between and spaced from said inner and outer walls. A relatively rigid member 19, fashioned from a suitable low-heating conducting material having substantial strength, such, for instance, as compressed fiber board, pressed wood, or plastic sheeting, may be dimensioned to fit, as indicated, between the cabinet's inner and outer walls and, preferably, is shaped to resemble a rectangular frame so as to conform with the shape or peripheral configuration of the open insulating space between said walls. The opposite longitudinal edges 19a and 19b, of the support member 19, are each covered with molding-like or edging members, such as shown at 20 and 21, which, additionally, are adapted to overlie and cover marginal edge portions of the respective outer and inner walls 11 and 12. The members 20 and 21 are intimately secured to the member 19 by suitable bonding means, thus assuring a relatively good moisture seal around the edges of said rigid member. The edging members 20 and 21 are fashioned, preferably, from a resilient plastisol type of material which may be cast upon or molded to the strip 19 to assure a good tight bond therebetween, and this may be done at the fabricator's location prior to insertion of the breaker strip between the walls of the cabinet. The plastisols, as is well understood in the industry, are generally highly molecular weight polyvinyl chloride materials that are mixed with a plasticizer and stabilizer, and the Modern Plastic Encyclopedia and Engineers' Handbook for 1952 refers to a plastisol as "a vinyl chloride type dispersion resin of microscopic ultimate particle size, dispersed in a plasticizer by means of equipment similar to that used to grind paint pigment in oils." Since the compounded-

plastisol is in the form of liquid or, at most, a pasty material that can easily be poured into a mold, or pumped into a mold with a gear pump or other relatively low-pressure feed device, it will be appreciated that the pre-forming of the edging members 20 and 21 around the edges of the rigid strip 19 becomes a relatively simple operation. Although other moldable and resilient materials or compositions, such as rubber or the like, may conceivably be used in lieu thereof, the plastisol type of composition is preferred for this purpose.

If desired, this assembly may be decoratively embellished by the use of a colored or patterned sheet, such as 22, which is disposed adjacent the upwardly facing surface of the strip 19, while the edges of said sheet are firmly positioned beneath the portions 20a and 21a, of the respective molding members 20 and 21, which overlie the edges of the strip 19. When such a decorative sheet is employed it may be fixedly positioned simultaneously with the forming and securing of the edging members 20 and 21 around the edges of said rigid member.

Next the partially fabricated assembly is provided with a top coating or covering 23 which fills a cavity-like space that is delimited by the decorative sheet 22 and the oppositely disposed edging members 20 and 21. The upper surface of this top covering may be flush with the top surface of said edging members or, as illustrated, it may be slightly depressed therefrom without deviating from any of the teachings of the present invention. After the pouring, spreading or casting of the top coating 23 this covering material is suitably cured, in accordance with well-known practices in the industry adapted for the particular composition employed therein. The present invention contemplates the use of a sealing and covering material that is clear and transparent so as to effectively employ the previously mentioned interposed sheet of decorative material 22, when such is provided, or, in lieu thereof, be adaptable for incorporating therein a coloring pigment which will aid in harmonizing said material with a particular adjoining color scheme. Furthermore, such material should have superior adhesion qualities in order to provide a thoroughly effective moisture seal for the insulation space, and, of course, it must have good heat insulating properties so as to provide an efficient thermal break between the inner and outer shells of the cabinet. Since said material may be poured or molded in place without the aid of external heat or pressure for hardening or curing, it is essential that it be sufficiently fluid to flow readily at room temperatures, requiring no preforming when molded into an irregular shape, and that it have dimensional stability by way of relatively low shrinkage characteristics. In addition, it should be tough and have substantial mechanical strength so as to withstand the wear and abuse that breaker strip constructions frequently encounter during use. It is also desirable that it be insoluble and infusible so as not to be readily stained, marred or otherwise injured upon contact with many different foodstuffs. Finally, it is most desirable that it be relatively low in cost of construction and easy of assembly.

Although many of the potting compounds, such as allyl diglycol carbonate or the polyester and epoxy-resins, are suitable for use in the applications envisaged by this invention, the group of thermosetting resins marketed commercially by the Bakelite Division of Union Carbide & Carbon Corporation under the trade designation of C-8 resins were found to include a resin that was ideally suited, while the "Epon" resins marketed commercially by Shell Chemical Corporation are also believed to be adaptable for the purposes herein. The specific C-8 resin found to be most effective, and which is the same as was heretofore discussed in my copending U. S. application Serial No. 382,825 covering a plastic breaker strip construction, is a liquid resin designated only by the Bakelite catalogue nomenclature as Bakelite RR 18794 resin. This resin is one of the polyepoxy casting

resins and, although the exact formulation thereof is not known to the applicant, it is believed to be a reaction product prepared from the reaction of epichlorohydrin with poly-phenol, as for example bisphenol. This resin, when mixed with selected primary and secondary amine hardeners or reactants and a suitable filler all in the specific proportions hereinafter noted, was found to produce a composition that possessed all the attributes and requisite properties necessary to meet the requirements heretofore enumerated for such a composition. While many suitable hardeners, reactants or cross-linking agents may, of course, be used the compounds marketed commercially by the Bakelite Division of Union Carbide & Carbon Corporation and known by the trade designations of Bakelite RR 18796 and Bakelite RR 18803 for the primary and secondary amines, respectively, were found to be highly effective when used with the aforementioned Bakelite C-8 resin RR 18794. The fillers, which, preferably, are of the inert variety, may include either a sand, or aluminum oxide or a mica product.

One composition that was found to be highly effective for purposes of the present invention was formulated by utilizing a blend or mixture, by weight, of the particular ingredients in the following proportions:

- 75 parts of a diglycidyl ether
- 25 parts of a mixture of secondary amines
- 3 parts of a mixture of primary amines
- 1 part of a suitable color pigment
- 65 parts of a filler material

The epoxy-type resinous material utilized in this instance was the resin product designated Bakelite RR 18794, the secondary amines the hardener product designated as Bakelite RR 18803, the primary amines the hardener product designated as Bakelite RR 18796, the color pigment metallic oxides or carbon black, while the inert filler in this particular mixture was sand.

When the breaker strip assembly, embracing the rigid member 19, the edge molding members 20 and 21, the decorative sheet 22 and the top coating or covering material 23, is ready for positioning it is inserted between the cabinet walls 11 and 12 and supported or rested upon the respective support flanges 17 and 18. The edge molding members 20 and 21, in turn, are secured to the respective support flanges 17 and 18 by a suitable adhesive, indicated at 24, which additionally functions as a moisture seal to prevent moisture from entering or creeping around the edges of said molding members and into the space between the walls containing the insulating material 13. While any one of a large variety of adhesives are suitable for this purpose an adhesive formed from a two-part epoxy (hardener and resin) resinous composition would provide an excellent material since a solvent would not be required and, furthermore, because such material sets either by heat or chemical reaction. The solvent type of adhesives, however, are not recommended for this particular adhesive application.

The edge molding members 20 and 21 are fashioned with flaps or lip-like projections 25 and 26, respectively, which are dimensioned to overlie in close fitting relationship the respective adjacent marginal edge portions of the outer and inner walls 11 and 12. Since the material from which said edge molding members are formed is of a resilient character it will be appreciated that the lips or flaps 25 and 26 may readily be raised up and out of position so as to permit insertion of a spacing and sealing composition, such as indicated at 27, into the spaces between said edge molding members and the respective proximate cabinet walls. The spacing and sealing composition 27, preferably, is the same type of epoxy-resin plastic material that was described as one material suitable for use as the top coating or cover 23. Such resinous composition may be poured or flowed into position in a liquid state and then after it has been cured it will additionally function to provide an excellent mois-

5

ture seal around the outer edges of said edge molding members. After the sealing composition 27 has been positioned the flaps 25 and 26 are released and repositioned so as to again overlie and cover the edge portions of said inner and outer cabinet walls.

From the foregoing it will be readily appreciated that the above described breaker strip provides a construction which is simple and inexpensive to fabricate, and in addition to being attractive lends itself readily to change for purposes of decorative embellishment. Furthermore, it is rugged and not easily marred or defaced in use, and, since it may be remotely fabricated, in large measure as a sub-assembly or unit and then installed in the refrigerated cabinet, the overall cost thereof is reduced to a minimum.

Although only a preferred form of the invention has been illustrated, and that form described in detail, it will be apparent to those skilled in the art that various modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What is claimed is:

1. A breaker strip construction for a refrigerated cabinet formed with spaced apart inner and outer shells with insulating material between the shells and having bracket supports on said shells spaced from the marginal edges thereof, comprising: a rigid low-heat conducting member disposed between the inner and outer shells of the cabinet; a first longitudinally slotted member overlying an inner edge portion of said rigid member, and a second longitudinally slotted member overlying an outer edge portion of said rigid member; said longitudinally slotted members being fashioned of high molecular weight polyvinyl chloride plastic material and being bonded to said rigid member; said slotted members being spaced from respective adjacent shells of the cabinet, and having flap-like extensions projecting therefrom that overlie in close fitting relationship marginal edge portions of the respective proximate cabinet shells; means adhesively affixing each of said slotted members to a respective bracket support; a layer of decorative material covering the entire exposed area of an upper surface of said rigid member; a layer of transparent low-heat conducting epoxy-resin composition covering said decorative material and filling a space thereabove that extends between said slotted members; and a layer of low-heat conducting material, selected from the group of thermo setting casting resins having a cure shrinkage of less than 2% either as a pure resin or as a filled material, filling the space between each slotted member and a respective cabinet shell and intimately adhering to said shell and to said slotted member to provide a moisture seal for the insulating material disposed between the shells of the cabinet.

2. In a refrigerated cabinet formed with a continuously extending outer shell and a similarly contoured continuously extending inner shell spaced therefrom with heat insulating material disposed between the shells, and having bracket supports that extend inwardly toward each other from said shells and are spaced from marginal edge portions thereof, a breaker strip construction, comprising: a substantially flat one-piece endless open-center rigid frame member fashioned of low-heat conducting material; said rigid frame member being contoured to conform with the configuration of the space between the shells of the cabinet and dimensioned for positioning in peripherally extending relationship therewithin; an endless member of generally channel-shaped cross-section positioned around an inner edge of said frame and having the side arms of

6

the channel disposed to overlap the inner edge portion of said frame; another endless member of generally channel-shaped cross-section positioned around an outer edge of said frame and having the side arms of the channel disposed to overlap the outer edge portion of said frame; said endless members being fashioned of high molecular weight polyvinyl chloride plastic material and intimately bonded to the respective edge portions of said frame; said endless members being disposed so as to provide a space between each such member and a respective cabinet shell, and having each of said endless members further fashioned with a flap-like extension that overlies in close fitting relationship a marginal edge portion of a proximate cabinet shell; means adhesively affixing each of said endless members to a respective cabinet shell bracket support; a layer of decorative material covering the entire exposed area of an upper surface of said frame member; a layer of transparent low-heat conducting epoxy-resin composition covering said decorative material and filling a space thereabove that extends between said endless members; and a layer of low-heat conducting thermosetting casting resinous material, having a cure shrinkage of less than 2% either as a pure resin or as a filled material, filling the space between each endless member and a respective cabinet shell, and intimately adhering to said shell and said endless member to provide a moisture seal for the insulating material disposed between the shells of the cabinet.

3. A breaker strip construction for a refrigerated cabinet formed with spaced apart inner and outer shells with insulating material between the shells and having bracket supports on said shells spaced from the marginal edges thereof, comprising: a rigid low-heat conducting member disposed between the inner and outer shells of the cabinet; a first longitudinally slotted member overlying an inner edge portion of said rigid member, and a second longitudinally slotted member overlying an outer edge portion of said rigid member; said longitudinally slotted members being fashioned of high molecular weight polyvinyl chloride plastic material and being bonded to said rigid member; said slotted members being spaced from respective adjacent shells of the cabinet, and having flap-like extensions projecting therefrom that overlie in close fitting relationship marginal edge portions of the respective proximate cabinet shells; means adhesively affixing each of said slotted members to a respective bracket support; a layer of decorative material covering the entire exposed area of an upper surface of said rigid member; a layer of transparent low-heat conducting epoxy-resin composition covering said decorative material and filling a space thereabove that extends between said slotted members; and a layer of low-heat conducting material, selected from the group of thermo setting casting resins having a cure shrinkage of less than 2% either as a pure resin or as a filled material, filling the space between each slotted member and a respective cabinet shell and intimately adhering to said shell and to said slotted member to provide a moisture seal for the insulating material disposed between the shells of the cabinet, said bracket supports comprising an angle member carried by the outer shell and an angle member carried by the inner shell, each angle member having a wider flange secured to the shell and a narrower flange extending horizontally.

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