Sept. 2, 1941. A. A. QUIMPER 2,254,780

REFRIGERATION APPARATUS

Filed Nov. 23, 1938 2 Sheets-Sheet 1

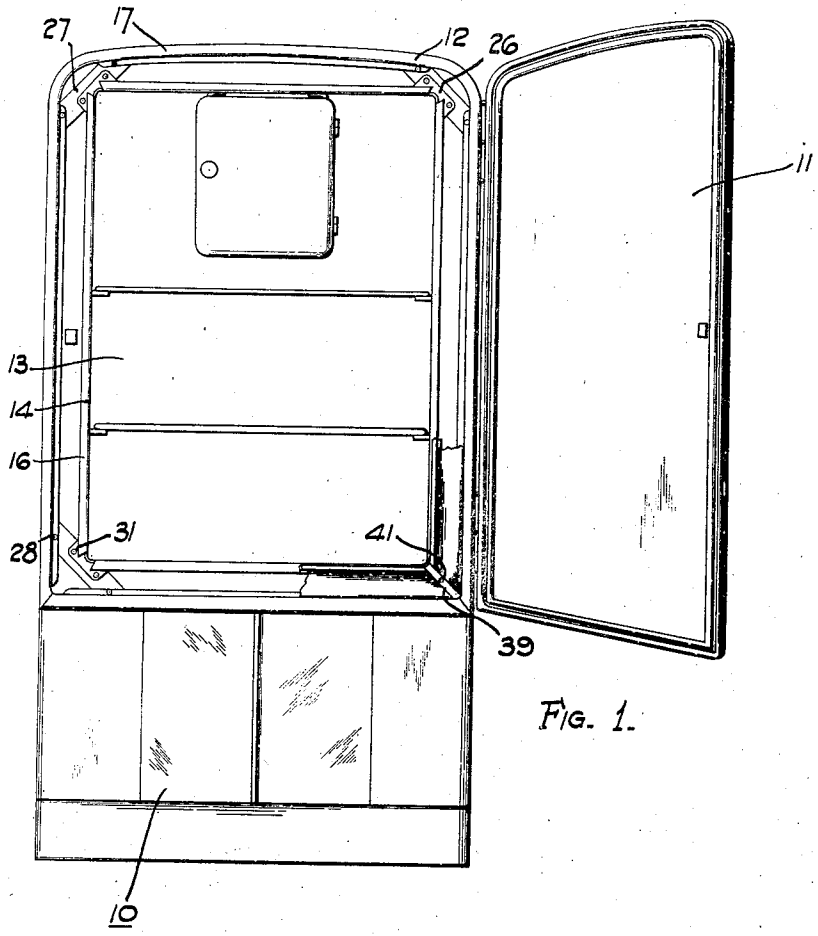


FIG. 1.

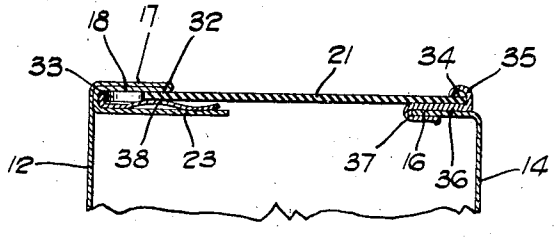


FIG. 4.

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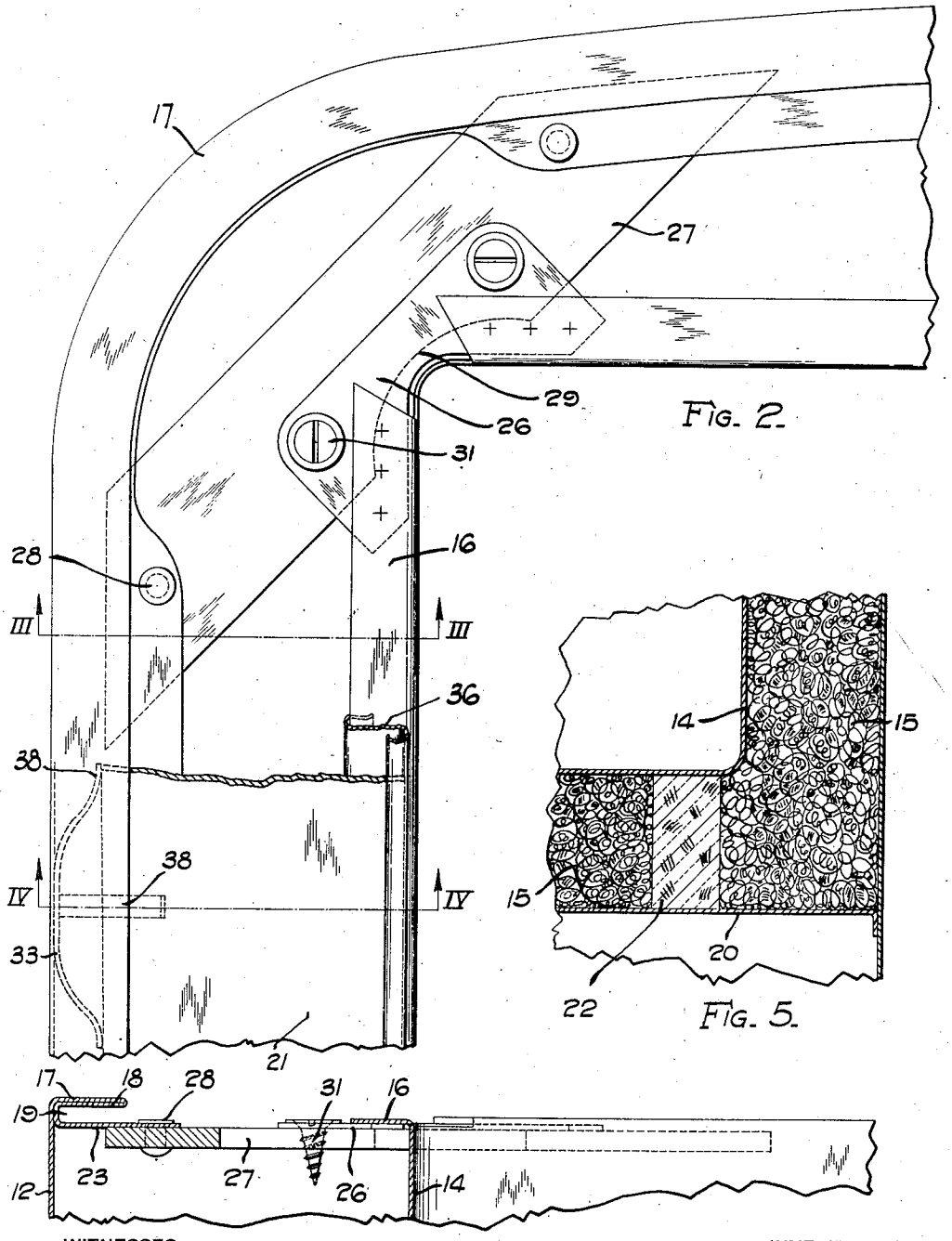


FIG. 2.

FIG. 5.

FIG. 3.

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Patented Sept. 2, 1941 2,254,780

UNITED STATES PATENT OFFICE

2,254,780

REFRIGERATION APPARATUS

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Application November 23, 1938, Serial No. 241,937

8 Claims. (Cl. 220—15)

This invention relates to refrigerator cabinet construction and more particularly to the support of the inner food compartment liner in the refrigerator cabinet.

One object of the invention is to provide a means for securing the inner food compartment liner in the refrigerator cabinet, which securing means is of simple design and is readily assembled.

Another object is to provide a means for securing the inner liner in the cabinet in such a manner that the outer shell of the cabinet and the inner liner are held in alignment but the space occupied by the breaker strip is not obstructed by the securing means.

Still another object of the invention is to provide a novel support for the inner food compartment liner of a refrigerator cabinet of the type wherein the breaker strips between the inner liner and the outer shell are disposed parallel to the front walls of the cabinet; and to support the food liner rigidly and independently of the breaker strips.

A further object of the invention is to provide a support for the inner liner which minimizes the heat leakage across the supporting means.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings forming a part of this application, in which:

Fig. 1 is a plan view of a refrigerator cabinet embodying the invention with portions of the breaker strip of the cabinet broken away to show the means for securing the inner liner in the cabinet.

Fig. 2 is an enlarged view of the upper left-hand corner of the refrigerator cabinet of Fig. 1 with portions of the breaker strip broken away;

Fig. 3 is a section on the line III—III of Fig. 2;

Fig. 4 is a section on the line IV—IV of Fig. 2; and,

Fig. 5 is a fragmentary vertical section showing the rear support of the inner liner.

In the drawings, the reference numeral 10 designates an insulated refrigerator cabinet for a mechanical refrigerator and a door 11 therefor. The cabinet 10 comprises an outer metal shell 12 having an opening 13 in the upper portion and a metal liner 14 insertable through the openings 13 which liner 14 forms the food storage compartment of the refrigerator. The walls of the inner liner 14 are spaced from the wall of the outer shell 12 and insulating material 15 is packed in the spaces. A horizontal partition 20 is provided in the outer shell 12 below the food liner 14 and insulation material 15 is also packed between the food liner 14 and the partition 20. The insulating material between the rear portions of the food liner and the partition comprises rigid blocks 22 which aid in supporting the food liner 14 at the rear thereof.

The edge portions of the food liner are turned outwardly to provide attachment flanges 16. The edge portions 17 of the outer shell 12 surrounding the opening 13 are turned inwardly, and a portion 18 is doubled back rearwardly and another portion bent reversely to define a groove 19 for a breaker strip 21 and an attachment flange 23. The configuration of the edge portions of both the inner liner 14 and the outer shell 12 are best shown in Figs. 3 and 4.

The flanges 16 of the inner liner 14 are cut away at the corners to facilitate the bending operation and the attachment flange 23 of the outer liner is likewise partially cut away at the corners for the same reason.

A metal plate 26 roughly in the form of a C is welded at the corners of the inner liner 14 to the inner surface of the flanges 16 thereof. A strip of stiff heat-insulating material 27, preferably formed of a material treated with a resinous condensate product, is secured diagonally across the corners of the opening in the outer shell 12 and is secured at its ends by rivets 28 to the attachment flanges 23 thereof. Small segments 29 are cut from the strips 27 at one edge to accommodate the corners of the inner liner 14. The inner liner 14 is then inserted in the opening 13 of the cabinet 10 and its metal corner plates 26 are secured to the strips 27 by screws 31.

The strips 27 form the sole connections between the inner liner 14 and the outer shell 12 and together with the insulating blocks 22 between the food liner 14 and the partition 20 form the sole supporting elements of this liner.

It will be observed that this construction leaves the entire front face of the flanges 16 and 23 of both the outer shell 12 and the inner liner 14 free for the attachment of the breaker strip 21.

The breaker strip 21 may be secured to the front faces of the flanges 16 and 23 in any desired manner. The manner here described is shown in greater detail in the copending application of Howard D. White, Serial No. 238,364 filed November 2, 1938, and now matured into Patent #2,212,964, and assigned to the assignee of this invention. It consists briefly of a strip of stiff heat-insulating material 21 which is attached to the cabinet by forcing one edge 32 into

the groove 19 against a spring 33 and inserting the other edge 34 into the hook portion 35 of an S-shaped strip 36, the other hook portion 37 of which passes over the attachment flange 16 of the inner liner 14. The spring 33 has also a central leg 38 which forces the breaker strip 21 against the doubled back portion 18 of the edge portion 17 of the outer liner 12.

It will be observed that the thickness of the plate is such that it compensates for the difference of the thickness of the space occupied by the leg 38 of the spring and the S-shaped attachment strip 26, so that the various pieces of insulating material forming the breaker strip lie in the same plane. The edge portions of the breaker strip 21 are mitered and concealed by corner clips 37 which are secured by screws 41 to the strips of heat-insulating material 27.

From the above description, it will be apparent that this invention provides an attaching means for a metal inner liner in a metal outer shell of a refrigerator cabinet which is of simple construction, is easily assembled, and offers no obstruction to the attachment of a breaker strip to the front face of the refrigerator. This attachment means, furthermore, has good heat-insulating qualities since the heat leakage paths along the insulating strips is of small cross sectional area.

The invention has been described with reference to a construction in which the breaker strips 21 lie in a plane surface. This construction is not an essential feature of the invention as the surface in which the breaker strips 21 lie may be a warped surface such as a cylindrical surface, in which case the door 11 would be constructed to conform to the cylindrical surface. Broadly, the construction may be such that the breaker strips lie in any continuous surface. By a continuous surface is meant any surface devoid of angular bends.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In a refrigerator cabinet, the combination of walls comprising inner and outer sheets with heat insulation disposed therebetween, said walls having a substantially rectangular access opening therein and a door therefor, said inner and outer sheets each having an edge portion about said opening, said portions lying substantially in the same plane and spaced from one another and a plurality of separate diagonal strips comprising stiff material secured across the corners of the opening of the outer sheet, said strips being spaced a considerable distance from each other and being secured to the edge portion of both the inner and the outer sheets to hold said portions in alignment, said strips providing a path of low heat conductivity between said inner and outer sheets and a breaker strip adjacent the outer face of said edge portions and bridging the space therebetween.

2. In a refrigerator cabinet having front, side and rear walls, the combination of an outer shell, an inner liner, heat insulation between the outer shell and the inner liner, said outer shell and inner liner having a substantially rectangular door opening provided in the front wall thereof, flanges substantially surrounding said door opening on the outer shell and on the inner liner, the flanges on the inner liner being spaced from the flanges on the outer shell, structural members including a plurality of separate rigid corner members secured to the rear surfaces of said flanges of the outer shell diagonally across the corners of the rectangular opening in said outer shell, said strips being spaced a considerable distance from each other, means for attaching the flanges on said inner liner to intermediate portions of said corner members, and breaker strips of thin heat resisting material secured between the flanges of the outer shell and the inner liner, said breaker strips extending about the door opening and being disposed in a plane substantially parallel to the front wall of the cabinet.

3. In a refrigerator cabinet, the combination of inner and outer shells of metal with heat insulation therebetween forming a substantially rectangular insulated food storage compartment having a rectangular access opening at the front thereof, a door for closing said access opening, said shells having edge portions spaced from each other peripherally of the access opening and lying in substantially the same plane, a separate strip of rigid material disposed across each corner of said access opening, means for attaching respective strips to adjacent edge portions of the outer shell on opposite sides of said corners, so that straight lines extending between points of attachment of respective strips extend diagonally across said corners, thus strengthening said outer shell, means for attaching said rigid strips to said inner shell adjacent the corners of the access opening and between the means for attaching the rigid strips to the outer shell, said strips providing the major support for the inner shell from the outer shell, said rigid strips and attaching means being constructed and arranged to provide a path of low heat conductivity between the inner and outer shells, and a breaker strip bridging the space between said edge portions and overlying said rigid strips.

4. In a refrigerator cabinet, the combination of inner and outer shells of metal with heat insulation therebetween forming a substantially rectangular insulated food storage compartment having a rectangular access opening at the front thereof, a door for closing said access opening, said shells having edge portions spaced from each other peripherally of the access opening and lying in substantially the same plane, a separate strip of rigid material disposed across each corner of said access opening, means for attaching respective strips to adjacent edge portions of the outer shell near the ends of the rigid strips and at opposite sides of respective corners, so that a straight line extending between the attaching means extends diagonally across said respective corners, thus strengthening said outer shell, means for attaching said rigid strips to the inner shell adjacent the corners of the access opening and between the means for attaching the rigid strips to the outer shell, said strips providing the major support for the inner shell from the outer shell, said rigid strips and attaching means being constructed and arranged to provide a path of low heat conductivity between the inner and outer shells, and a breaker strip bridging the space between said edge portions and overlying said rigid strips.

5. In a refrigerator, the combination of inner

and outer shells of metal with heat insulation therebetween forming a substantially rectangular insulated food storage compartment having a rectangular access opening at the front thereof, a door for closing said access opening, said shells having edge portions spaced from each other peripherally of the access opening and lying in substantially the same plane, a separate strip of rigid material disposed across each corner of said access opening, means for attaching respective strips to the adjacent edge portions of said outer shell near the ends of the rigid strips and at opposite sides of respective corners, so that a line extending between the attaching means extends diagonally across said respective corners, thus strengthening said outer shell, means for attaching said rigid strips to the inner shells adjacent the corner of the access opening and between the means for attaching the rigid strips to the outer shell, said rigid strips providing the major support for the inner shell from the outer shell, said attaching means for the inner shell lying substantially on said diagonal line extending between said attaching means to the outer shell, said rigid strips and attaching means providing a path of low heat conductivity between the inner and outer shells, and a breaker strip bridging the space between said edge portions and overlying said rigid strips.

6. In a refrigerator cabinet having front, side and rear walls, the combination of an outer rectangular shell and an inner rectangular shell disposed within and spaced from the outer shell, said inner shell having a door opening provided in the front wall thereof, said outer shell having a relatively larger and concentric opening provided in the front wall thereof, heat insulation disposed between the shells, said inner and outer shells having flanges disposed about the peripheries of their respective openings which flanges extend toward each other in a plane substantially parallel with the front wall of the cabinet, said inner and outer flanges being spaced from each other peripherally of said openings, struts extending diagonally across each corner of the outer shell and secured, respectively, at their ends to the rear side of the flange of the outer shell for structurally reinforcing the latter, means secured to the rear side of the inner flange at each corner portion of the latter and also secured, respectively, to adjacent diagonal struts for fixedly supporting the inner liner from the outer shell, breaker strips of heat resisting material extending in a plane parallel to the front wall of the cabinet and covering the space between the flanges of the inner and outer shells, said breaker strips extending about the door opening and overlapping the front sides of the inner and outer flanges, and means for securing the breaker strips between the flanges.

7. In a refrigerator cabinet, the combination of a substantially rectangular outer shell having a door opening in the front thereof and including vertical walls and a horizontal wall, a substantially rectangular inner liner having side, bottom, top and rear walls and also being open at its front, a single-piece corner plate having its sides substantially in a vertical plane which is substantially parallel to the front of the cabinet and extending between one of said vertical walls and said horizontal wall of the outer shell adjacent each front corner thereof, means for rigidly attaching each of said plates, respectively, substantially directly to said one vertical wall and to said horizontal wall at points spaced from said front corners of the outer shell, and means for rigidly attaching the inner liner to each of said plates at one or more points intermediate said points of attachment to said vertical and horizontal walls and adjacent a front corner of said inner liner, said plates providing the major support for the inner liner from the outer shell.

8. In a refrigerator cabinet, the combination of a substantially rectangular outer shell having a door opening in the front thereof and including vertical walls and a horizontal wall, a substantially rectangular inner liner having side, bottom, top and rear walls and also being open at its front, a single-piece corner plate having its sides substantially in a vertical plane which is substantially parallel to the front of the cabinet and extending between one of said vertical walls and said horizontal wall of the outer shell adjacent each front corner thereof, means for rigidly attaching each of said plates, respectively, substantially directly to said one vertical wall and to said horizontal wall at points spaced from said front corners of the outer shell, and means for rigidly attaching the inner liner to each of said plates at one or more points intermediate said points of attachment to said vertical and horizontal walls and adjacent a front corner of said inner liner, said plate providing the major support for the inner liner to the outer shell and a breaker strip including an exposed face extending between said outer shell and inner liner peripherally of the door opening, said corner plates so positioning said outer shell and inner liner that a major portion of the exposed face of the breaker strip is substantially at right angles to the sidewalls of the cabinet.

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