March 17, 1942. K. F. SCHMIDT 2,276,742

REFRIGERATOR

Filed May 2, 1938

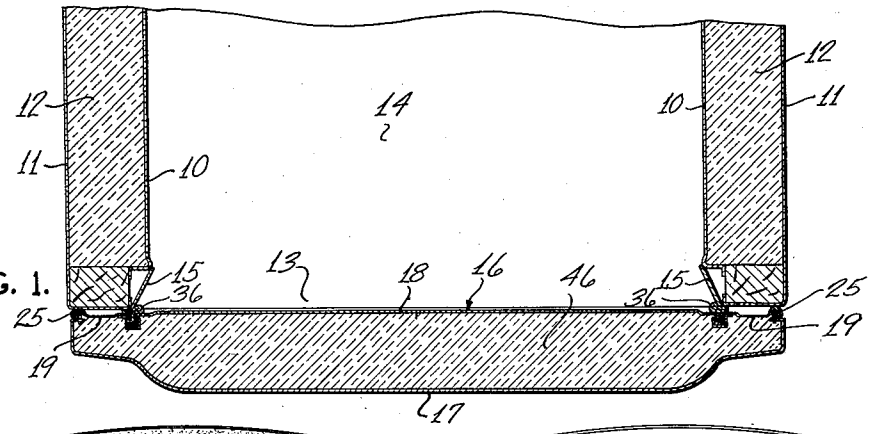


FIG. 1.

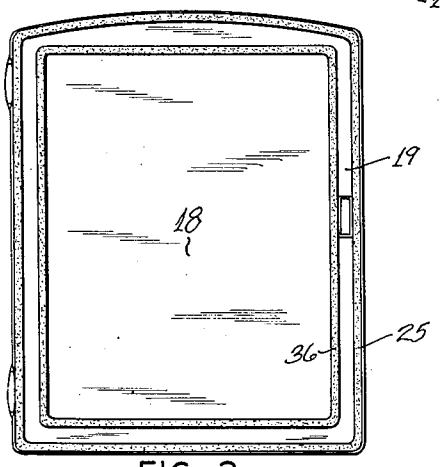


FIG. 2.

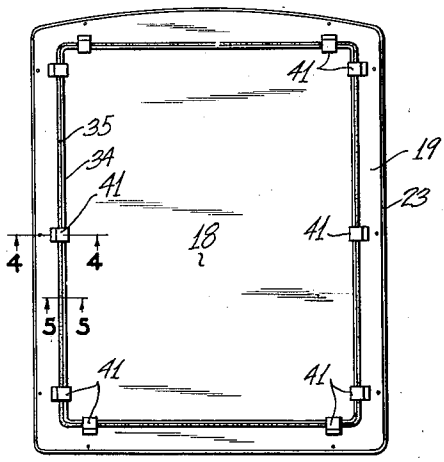


FIG. 3.

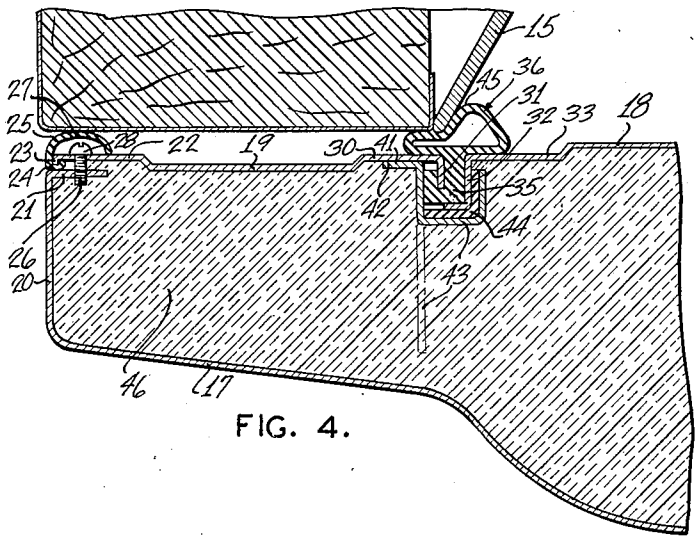


FIG. 4.

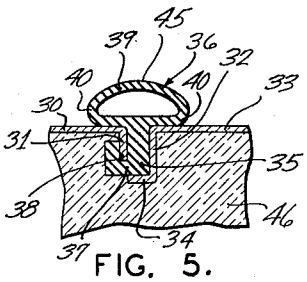


FIG. 5.

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REFRIGERATOR

Karl F. Schmidt, Indianapolis, Ind., assignor, by mesne assignments, to Philco Corporation, Philadelphia, Pa., a corporation of Pennsylvania

Application May 2, 1938, Serial No. 205,510

4 Claims. (Cl. 20—35)

This invention relates to improvements in refrigerators and more particularly to the structure of a closure or door for refrigerators of domestic type.

An object of the invention is to provide an improved refrigerator door of a so-called "flat" type wherein no part thereof projects within the refrigerator chamber, the door being of metallic sheet construction wherein the sheets are enameled or otherwise treated to give a pleasing appearance to the finished door as well as to facilitate surface cleaning thereof, the door comprising inner and outer facing sheets or panels and heat-insulating material therebetween, the sheets being assembled together in an improved manner, through insulating gaskets arranged to preclude conductive heat-transfer between the sheets.

Another object is found in the provision in a refrigerator door construction as above indicated, of heat-insulating gaskets which serve to air-seal the refrigerator at the door opening upon closure of the door, the gaskets further being assembled to the door in a manner to provide thereby, heat-insulating spacing of the door sheets.

A further object is to provide an improved form of sealing gasket for refrigerator doors of the type noted, the gasket being comprised of a resilient, hollow sealing bead engageable with the cabinet door-jam upon closure of the door, and a shank portion adapted for assembly engagement with spaced, flanged portions of the inner sheets of the door, the gasket shank serving in cooperation with metallic clips, and heat-insulating strips, to connect the inner sheets in the assembly of the door.

Other objects and advantages provided by the improved door construction will appear readily from the following description and from the accompanying drawing, in which:

Fig. 1 is a fragmentary, transverse section of a refrigerator structure embodying the features of the invention; Fig. 2 is a reduced plan view of a refrigerator door constructed according to the present invention, the view thereof being directed toward the inner side of the door; Fig. 3 is a plan view of the door similar to that of Fig. 2, but the view thereof in this instance being directed toward the outer side of the inner sheets of the door whereby to illustrate the manner of connecting the inner sheets by the gasket and clips; Fig. 4 is an enlarged, fragmentary transverse section of the door, as viewed from line 4—4 in Fig. 3, and Fig. 5 is an enlarged, fragmentary section thereof, as viewed from line 5—5 in Fig. 3.

Referring to the drawing by suitable reference characters, there is shown a portion of a refrigerator cabinet, the cabinet structure including inner sheathing plates 10 and outer plates 11 which enclose suitable insulating material 12. The plates are connected at the cabinet opening 13 giving access to the cabinet chamber 14, by breaker strips 15 which may be of heat-insulating material. The cabinet is provided at the door opening 13, with a door or closure structure 16 suitably hinged thereto (not shown), the door being of the so-called "flat" type and comprised of an outer face sheathing or panel 17 of metallic sheet material, an inner face sheathing or panel 18 and a panel strip 19 around the inner edge portion of the door, the latter panels being formed from suitable sheet material. All of the panels may be enameled or similarly treated for the sake of appearance and also to facilitate surface cleaning thereof. It is to be noted that no part of the door projects within the cabinet opening 13, while only panel 18 is exposed to the cabinet chamber 14.

In the construction and assembly of the door, the peripheral end portion 20 of outer sheathing 17 is inturned as shown in Figs. 1 and 4, and further the marginal edge of the inturned portion is formed to provide a flange 21 which is directed inwardly of the door structure. The panel strip 19 is arranged so that its outer marginal portion 22 overlies in parallel adjacent, the flange 21. The edge of marginal portion 22 is formed to provide a flange 23 directed toward the flange 21. Seated between the flange 21 and marginal portion 22 is a flanged base 24 of a heat-insulating gasket 25 which may be formed from flexible rubber or other similar material. The gasket base 24 serves to maintain the described spacing of the panel strip margin 22 from the outer sheathing plate flange 21, in the assembly connection of these elements effected preferably by screws 26. Extending from the gasket base 24 and formed integrally therewith, is a bead 27 which overlaps the flanged edge 23 of facing strip 19 and is curved inwardly over the surface of the strip marginal portion 22. The gasket preferably is of one-piece construction, extending peripherally about the door as shown in Fig. 2, the curved bead 27 of which overlies the heads 28 of the panel fastening screws 26 so as to conceal them. The gasket base 24 interposed between the flange 21 of sheathing 17 and the marginal portion 22 of strip 19 serves to

maintain the spacing of these portions, and by reason of its heat-insulating characteristic, serves to preclude heat-conduction therebetween. The only metallic, heat-conductive contact of the flange 21 and marginal portion 22 is through the assembly screws 26, but the heat-conductive capacity thereof is small and hence for practical purposes, negligible. It is to be noted that by reason of the flanged portion of the gasket base 24 engaging the flange 23 on the edge of marginal portion 22, the gasket is effectively retained in assembly with the door structure.

The inner margin 30 of the strip 19 is formed to provide a flanged edge 31 which is turned inwardly of the door structure. The inner sheathing panel 18 is provided with a similarly inturned flange 32 adjacent the marginal edge portion 33 thereof, the marginal edge 34 of the flange being outturned to provide an additional flange which is disposed in a plane substantially parallel to the plane of the panel 18. In the assembly relation of the panels 18 and 19, the respective flanges 31 and 32 thereof are spaced as shown in Fig. 4, while the outturned flange 34 spans the space between the aforesaid flanges and is spaced from the edge of flange 31. The several flanges cooperate in forming a recess for the reception of a shank portion 35 of a resilient gasket 36, the bottom end 37 thereof resting on the flange 34 and extending through the space between flanges 34 and 31 (Fig. 4). The shank is formed to provide a recess 38 along one side thereof, which serves to receive the flange 31 in overlapped relation thereto. Formed as an integral part of the shank 35 is a hollow, resilient bead 39 which is of substantial lateral extent to provide shoulders 40 which engage the external surfaces of the margins 30 and 33 of the respective panels 19 and 18, as shown in Figs. 4 and 5. The gasket 36 which may be a one piece structure formed of rubber or other suitable resilient, heat-insulating material, extends peripherally about the door and inwardly adjacent the outer gasket 25, as appears in Fig. 2. It is to be noted here that in the assembly relation of the panels 18 and 19, the gasket shank 35 will be compressed to a desirable degree, between the panel flanges 31 and 32.

The panels 18 and 19 are connected together with the gasket shank 35 therebetween, by a plurality of metallic clips or clamp elements 41, each of an L shape initially, providing a foot portion 42 and an extended leg 43, the leg being shown in broken lines in Fig. 4. The foot 42 is secured in any suitable manner, as by welding, to the inner surface of the margin 30 of panel 19, and after assembly of the gasket to the flanges of the panels, the clamp leg is deformed or bent about the exposed portion of the gasket shank 35 and the flanges 32 and 34. To prevent metallic contact between the clamp leg and the flanges 32 and 34, an insulating element 44 of flexible material as rubber, is interposed therebetween. Thus the clamps serve to secure the door panels 18 and 19 in assembly and without metallic, heat conductive contact, as such is precluded by the insulating element 44 and gasket shank 35. Moreover, by reason of the resiliency of the gasket shank and the interposition of the shank between the panel flanges 31 and 32 in the door assembly, the shank serves to accommodate such slight irregularities in size or shape of the panel 18 and/or 19 as may occur in the manufacture thereof.

The door panels 18 and 19 are effectively held against relative displacement by reason of the improved assembly thereof through the gasket 36 and clamps 41, the clamps serving in addition to connecting the panels, to strengthen the structure against twisting and other stresses imposed upon the door in use. Moreover, it will be noted that the clamps 41 and associated insulating elements 44 serve to prevent inward displacement of panel 18 toward outer panel 17, while outward displacement of the panel 18 is precluded by the gasket bead 39. Also, seating of gasket 36 in the manner described, effectively retains it in assembly with the door structure.

As shown in Fig. 5, the exposed wall 45 of the gasket bead 39 is normally convex in external aspect when the door is open, but upon closure of the door, the wall 45 abuts the margins of the cabinet door opening and the breaker strips 15, being deformed thereby in the manner illustrated in Fig. 4, to effect an air-seal of the door at the cabinet opening. Moreover, the gasket shank 35 together with the insulating strip 44 at each clamp 43, serve effectively to heat-insulate the inner panel 18 which is directly exposed to the refrigerator chamber 14, from the panel strip 19, and from the outer panel 17 through the insulating gasket 25.

From the foregoing, it will appear that the door panels 17, 18 and 19 are assembled in a manner to prevent heat-conduction between them, thus effecting a heat insulated door structure, while the gasket 36 provides an effective air-seal of the door at the cabinet opening 13 when the door is in closed position. In the assembly of the door, the space enclosed by the panels is filled by a heat-insulating material 46 of any suitable type, which further heat-insulates the door.

Having described a preferred embodiment of the invention, the elements of which may be altered or modified within the scope of the invention, I now claim what I desire to secure by Letters Patent of the United States:

1. In a door structure of the type described, an outer metallic panel, inner metallic panels spaced from said outer panel, means for connecting said outer panel to one of said inner panels, a heat-insulating element interposed between said outer panel and said inner panel at said connection, the opposed margins of said inner panels being relatively spaced, a flange on each margin, a gasket of heat-insulating material interposed between said flanges and embracing one of said flanges, an element of heat-insulating material overlying the other of said flanges, and a member overlapping said gasket and said last named element, adapted to secure said inner panels and gasket in assembly.

2. In a door structure of the type described, comprising an outer metallic panel and a pair of inner metallic panels, means for securing said outer panel to the adjacent inner panel, a heat-insulating element interposed between adjacent edges of said outer panel and said inner panel, the opposed margins of said inner panels being relatively spaced and disposed substantially in a common plane, a flange formed on each of said margins, one of said flanges having a shoulder thereon, a gasket of heat-insulating material interposed between said flanges and engaging said shoulder, said gasket embracing one of the flanges, a heat-insulating member overlying the shouldered flange, and means embracing a portion of said gasket and said heat-insulating

member, for securing the gasket and inner panels in assembly.

3. In refrigerator cabinet construction, a door comprising an outer wall or panel and an inner wall of sheet metal spaced from said panel with insulation material therebetween, said inner wall comprising a door liner and a surrounding integral one-piece frame member which at its outer edge is connected to said panel, the contiguous edges of said liner and frame member being formed with inturned portions which are spaced from one another providing a recess therebetween, a gasket member having a web portion anchored in said recess, a series of clips connected to the frame member and engaging over the inturned edge portion of the door liner for supporting the liner from the frame member, and means thermally insulating said clips from said liner.

4. In refrigeration cabinet construction, a door having an outer wall or panel and an inner sheet metal wall spaced from said panel with insulation therebetween, said inner wall comprising a door liner and a frame member of one-piece construction, the outer edge of said frame member being secured to the adjacent edge of said panel, the contiguous edges of said liner and frame member being formed with inturned portions spaced from one another to provide a recess therebetween, a compression gasket having a web which lies in said recess and engages the inturned edge of the frame member, said gasket having a bead which overlies the said recess and is backed by the adjacent portions of the frame member and liner, a plurality of clips connected to said frame member and engaging over the adjacent inturned edge of the liner to support the liner from the frame member, and means thermally insulating the clips from said liner.

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