Nov. 5, 1940. H. D. WHITE 2,220,695

REFRIGERATION APPARATUS

Filed March 17, 1937 2 Sheets-Sheet 1

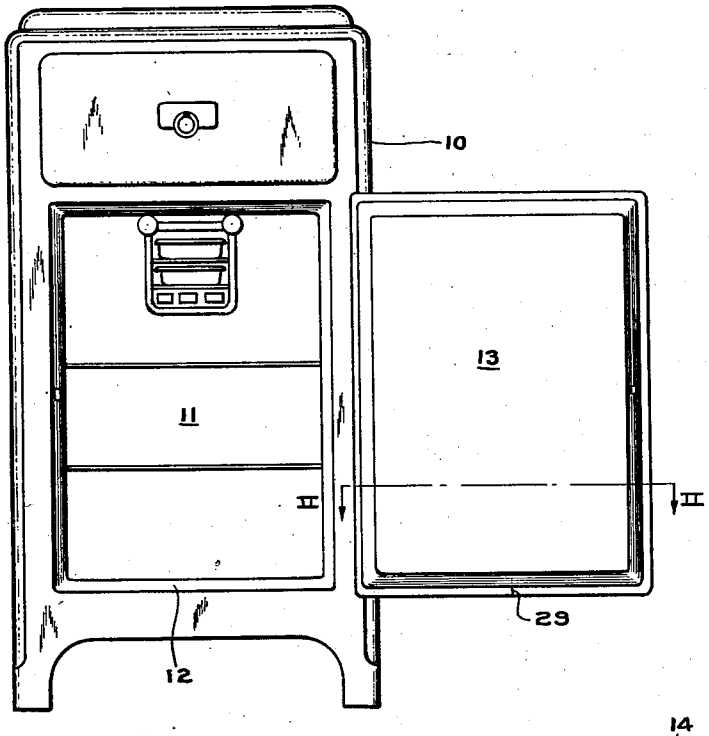


FIG. 1.

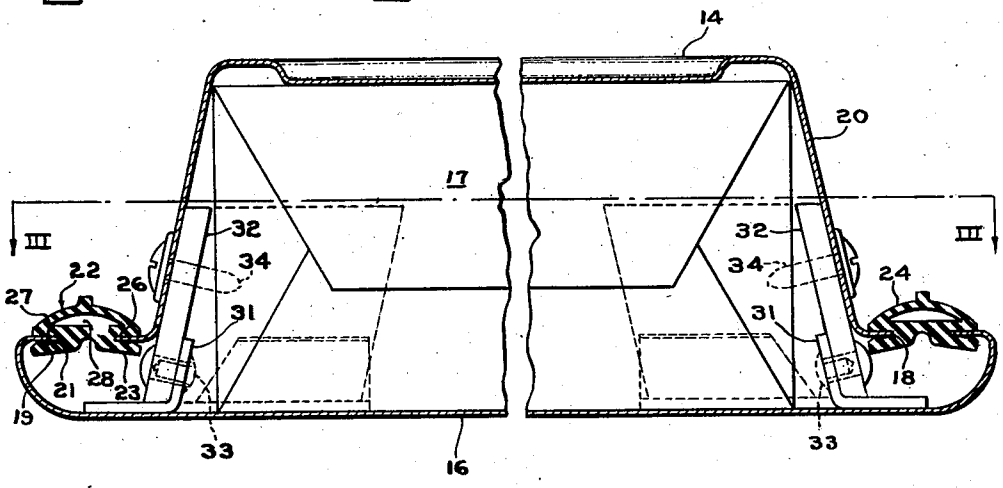


FIG. 2.

WITNESSES:
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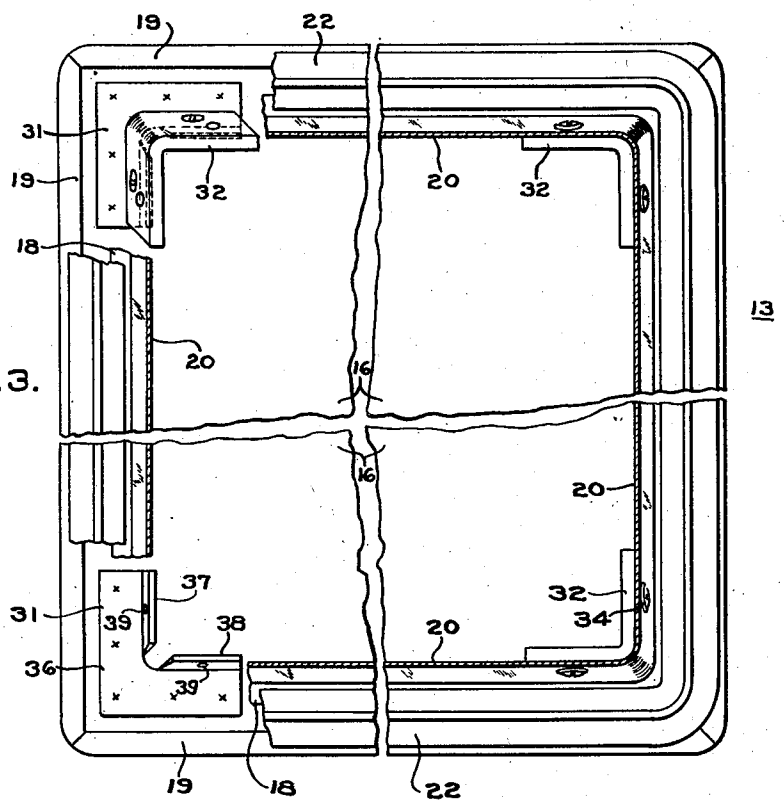
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FIG. 3.



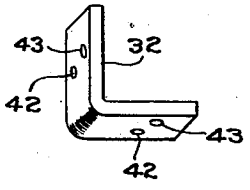


FIG. 4.

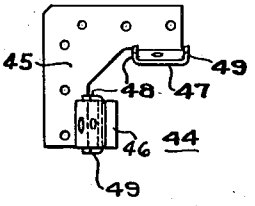


FIG. 5.

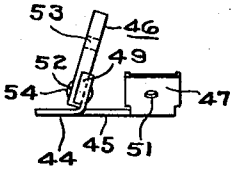


FIG. 6.

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Patented Nov. 5, 1940

2,220,695

UNITED STATES PATENT OFFICE

2,220,695

REFRIGERATION APPARATUS

Howard D. White, Springfield, Mass., assignor to Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., a corporation of Pennsylvania

Application March 17, 1937, Serial No. 131,288

9 Claims. (Cl. 20—35)

My invention relates to refrigerator cabinets and particularly to a door construction for such cabinets.

It is an object of my invention to provide a door for a refrigerator cabinet of improved design and of inexpensive construction.

It is a further object of my invention to provide a door construction for a refrigerator cabinet in which the desired rigidity is obtained without the use of a hygroscopic frame.

It is still a further object of my invention to provide a rigid door construction for a refrigerator cabinet, the thermal conductivity of which is relatively low.

It is another object of my invention to provide a door construction for a refrigerator cabinet in which non-metallic non-hygroscopic members are used to give rigidity to the door construction and also serve as heat breaks between the inner and outer metal shells of the door.

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 vertical view of a refrigerator cabinet embodying my invention;

Fig. 2 is a sectional view taken along the line II—II of Fig. 1;

Fig. 3 is a sectional view, partly broken away for clarity, taken along the line III—III of Fig. 2;

Fig. 4 is a view, in perspective, of a non-metallic, non-hygroscopic spacer used in a door constructed in accordance with my invention; and

Figs. 5 and 6 are horizontal and vertical views, respectively, of a modified form of corner angle support and non-metallic, non-hygroscopic spacer for use with a door constructed in accordance with my invention.

Referring to the drawings for a detailed description of my invention, numeral 10 designates, generally, a refrigerator cabinet having a food storage compartment 11 provided with an access opening 12 which is closed by a door 13.

The door 13 in Figs. 2 and 3, includes a substantially rectangular inner metal door pan 14 which is spaced from and maintained in fixed relation with respect to an outer metal door pan 16. Heat insulating material 17 is provided in the space between the two pans 14 and 16. The inner metal door pan 14 is relatively deep, having side portions 20 which are provided with outwardly extending edge portions 18. The outer metal door pan 16 overlaps the edge of the cabinet 10 at the access opening 12 and is bent back upon itself so as to form a flange 19. The metal of the flange extends inwardly and has edge portions 21 registering with and spaced from the edge portions 18 of the inner door pan 14.

In accordance with my invention, the inner metal door pan 14 and the outer metal door pan 16 are maintained in a fixed relative position and the desired rigidity obtained in the door construction without the use of a hygroscopic frame work or of metal supports between the two pans which would provide a path for the flow of heat therebetween. As is shown in Figs. 2 and 3, I secure a metal angle support 31 to the respective corners of the metal door pan 16, preferably by welding. A non-metallic, non-hygroscopic angle spacer 32 is then secured to each of the angle supports 31 and to the side walls 20 of the inner door pan 14, thus providing rigid connections between the two pans and additional heat breaks therebetween. The non-metallic, non-hygroscopic angle spacer 32 is secured to the metal angle support 31 by rivets 33 and to the sides 20 of the inner door pan 14 by self-tapping screws 34. As is best shown in Fig. 3, the metal angle support 31 comprises a substantially flat right angle portion 36, the inner edges of which are angularly displaced upwardly to provide flange portions 37 and 38 each of which is provided with a hole 39 therein. The non-metallic, non-hygroscopic angle spacer 32 shown in detail in Fig. 4 may be made, for example, from a phenolic resinous material. The angle spacer 32 is in the shape of a right angle and is provided with two holes 42 and 43, respectively, in each side of the angle as shown in Fig. 4. The holes 42 register with the holes 39 in the metal angle support 31 and the rivets 33 pass through these holes to rigidly secure the angle spacer 32 to the metal angle support 31. The self tapping screws 34 pass through the inner metal pan 14 and the holes 43 in the non-metallic angle spacer 32 thereby securing the angle spacer to the inner metal pan.

When the door 13 is closed, it is essential to seal the access opening 12 and at the same time to provide a heat break between the inner metal pan 14 and the outer metal pan 16. This is accomplished by applying to the door 13 a combined heat insulating breaker strip and sealing gasket 22 made of a flexible material such as, for example, relatively soft rubber which may be economically extruded into strips of any desired length and shape. The combined heat insulating breaker strip and sealing gasket 22 comprises a substantially flat retaining portion 23 and a gasket portion 24. The retaining portion 23 is

provided with grooves 26 and 27 at opposite marginal edges which engage the edge portions 18 and 21, respectively, when the combined heat insulating breaker strip and sealing gasket is in place, thus providing a heat insulating closure for the space between the edge portions 18 and 21. The gasket portion 24 is formed integral with the flat retaining portion 23 and comprises a semi-cylindrical hollow tube 28 which is deformed when the door 13 is closed to provide an air-tight seal between the inside and outside of the refrigerator. The combined breaker strip and sealing gasket 22 may be formed of one or more pieces but I prefer to form it in a single length coextensive with the perimeter of the door 13, the ends of which are brought together in abutting relation as shown at 29 in Fig. 1.

Referring now to Figs. 5 and 6, I show in detail a modification of my metal angle support and non-metallic, non-hygroscopic spacer. As is evident from the drawings, the metal angle support has been modified so as to make it possible to use a substantially flat rectangular spacer instead of the angle spacer 32 already described. The modified metal angle support is generally designated by numeral 44 while numeral 46 designates the modified spacer. The metal angle support 44 comprises a substantially flat right angle portion 45 having on the inner edge of each side of the right angle an upturned lug 47, each lug being provided with flanges 48 and 49 and a hole 51. The non-metallic, non-hygroscopic spacer 46 may be made from the same material as the angle spacer 32. It is substantially rectangular in shape and is provided with two holes 52 and 53 which are longitudinally spaced from each other. The hole 52 registers with the hole 51 of the angle support 44 and a rivet 54 passes through these holes to rigidly secure the spacer 46 to the angle support 44. The spacer 46 is secured to the inner metal door pan 14 in the same manner as already described in connection with the angle spacer 31.

It will be apparent from the foregoing that I have provided a door construction for a refrigerator cabinet in which the inner and outer metal door pans are rigidly maintained in fixed relation without the use of a hygroscopic frame work and in which the rigid support between the inner and outer metal pans provide heat breaks therebetween.

While I have shown my invention in two forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other 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. A refrigerator cabinet door construction comprising a substantially rectangular first metallic shell, a second metallic shell spaced from said first shell and having side wall portions extending toward said first shell, heat insulating material in the space between said shells and means wholly within said door to provide a heat insulating connection between said shells, said means comprising a metal supporting member disposed at each of the corners of said first shell attached to an inner portion thereof and non-metallic, non-hygroscopic members secured to said metal supporting members and to the inner portion of the side walls of said second shell.

2. A door construction for a refrigerator cabinet including a substantially rectangular inner metallic wall, a similarly-shaped outer metallic wall spaced from said inner wall, heat insulating material in the space between said walls and means disposed between said walls at the respective corners thereof for rigidly providing a connection of low thermal conductivity therebetween, said means comprising angle members having a flat L-shaped portion secured at the corners of one of said walls and flange portions extending toward the second of said walls and a non-metallic, non-hygroscopic angle spacer secured to said flange portions and to an inner portion of said second wall.

3. A door construction for a refrigerator cabinet including a substantially rectangular inner metallic shell, a similarly shaped outer metallic shell, heat insulating material between said shells, and means between said shells at their respective corners providing a heat insulating connection between said shells, said means comprising a metal angle member having a flat L-shaped portion attached to the one of said shells and two flange portions extending toward the other of said shells and two rectangular non-metallic, non-hygroscopic spacers attached to one of said shells and secured to said flange portions of the metal angle member.

4. A refrigerator cabinet door construction comprising a substantially rectangular outer metallic wall, a similarly shaped inner metallic wall spaced from said outer wall having side wall portions extending toward said outer wall and means disposed within said door providing a connection between said inner and outer walls having a higher resistance to the flow of heat therebetween, said means comprising a metal angle member disposed at each of the corners of said outer wall having a flat L-shaped portion attached to the inner side thereof and flange portions extending toward said inner wall and a non-metallic, non-hygroscopic angle spacer attached to said flange portions and to the inner side of said side wall portion of said inner wall.

5. A refrigerator cabinet door construction comprising a substantially rectangular outer metallic wall having inwardly extending edge portions, a rectangular inner metallic wall spaced from said outer wall, said inner wall having side wall portions extending toward said outer wall and edge portions spaced from and registering with the edge portions of said outer wall, heat insulating material in the space between the walls, a non-metallic, non-hygroscopic closure for the space between the registering edge portions of the inner and outer walls and means entirely within the door providing a connection of low thermal conductivity between said walls, said means comprising angle members disposed adjacent the respective corners of the outer wall having a flat L-shaped portion attached to the inner side thereof and lug portions extending toward the inner wall and non-metallic, non-hygroscopic spacers attached to said lug portions and to the inner side of said side wall portion of said inner wall.

6. In a refrigerator cabinet door, the combination of an outer metal wall, an inner metal wall spaced from the outer wall and formed in the shape of a rectangular pan with the concave side of the pan towards the outer wall, a gasket seal between the edges of said walls, and means on the interior of said door for holding said walls in spaced relationship, said means comprising thin strips of rigid heat insulating ma-

terial secured to the inner surface of the side walls of the pan-shaped inner wall and adjacent the corners thereof, said strips extending towards said outer wall, and means for securing the outer wall to said strips.

7. In a refrigerator cabinet door, the combination of an outer wall, an inner wall spaced from the outer wall and formed in the shape of a rectangular pan with the concave side of the pan towards the outer wall, a gasket seal between the edges of said walls, and means on the interior of said door for holding said walls in spaced relationship, said means comprising an angle element of thin insulating material secured in a corner edge of the rectangular pan with the arris of the element nesting in said edge, said angle element extending towards the outer wall, and means for securing the outer wall to said angle element.

8. In a refrigerator cabinet door, the combination of an outer wall having inwardly extending edge portions, an inner wall spaced from the outer wall and formed in the shape of a rectangular pan with the concave side of the pan towards the outer wall, outwardly extending edge portions on said inner wall cooperating with the inwardly extending portions of the outer wall to hold a sealing gasket therebetween, and means on the interior of said door for holding said walls in spaced relationship, said means comprising an angle element of thin insulating material secured in a corner edge of the rectangular pan with the arris of the element nesting in said edge, said angle element extending towards the outer wall, and means for securing the outer wall to said angle element.

9. In a refrigerator cabinet door, the combination of an outer metal wall having a central panel and inwardly-extending edge portions, an inner metal wall spaced from the outer wall and formed in the shape of a rectangular pan with the concave side of the pan towards the outer wall, outwardly-extending edge portions on said inner wall cooperating with the inwardly-extending portions of the outer wall to hold a sealing gasket therebetween, means on the interior of said door for holding said walls in spaced relationship, said means comprising thin strips of heat insulating material secured to the inner surface of the side walls of the pan-shaped inner wall and adjacent the corners thereof, said strips extending towards the central panel of said outer wall, and means for securing the central panel of said outer wall to said strips, the space between said outer and inner walls excluding that occupied by the holding means being substantially free for the insertion of non-rigid insulating material.

HOWARD D. WHITE.