

E. H. BODDY
REFRIGERATOR CABINET

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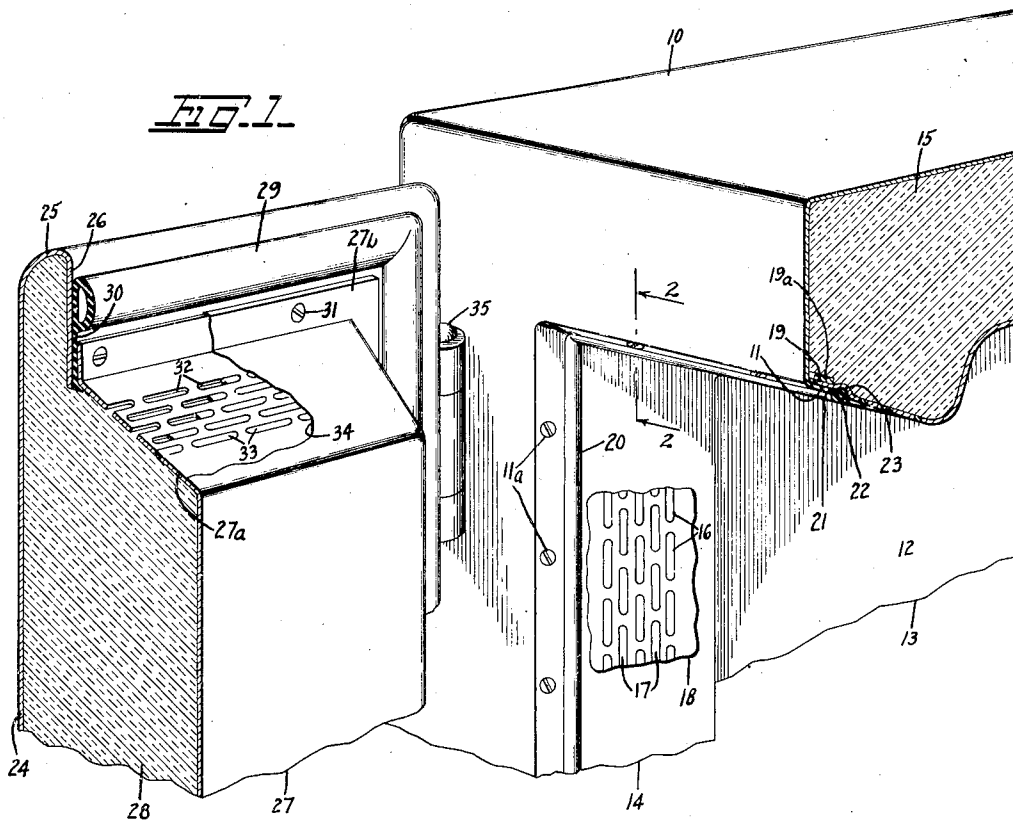
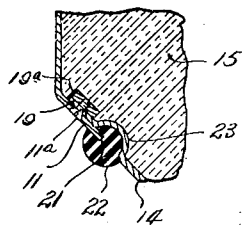


Fig. 2.



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UNITED STATES PATENT OFFICE

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REFRIGERATOR CABINET

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5 Claims. (Cl. 220—9)

My invention relates to refrigerator cabinet constructions, and more particularly to an improved and simplified arrangement for minimizing the leakage of heat from the exterior of the cabinet to the interior thereof between the marginal portions of the walls of the cabinet, such as the walls about the edges of the door or door opening.

Refrigerator cabinets, and particularly those designed for household use, are frequently provided with inner and outer sheet metal walls made of sheet steel or the like and the inner walls are coated with vitreous enamel or some similar substance, thus forming a strong smooth wall structure which may be easily cleaned and having a pleasing appearance. Since the interior of the cabinet is ordinarily maintained at a low temperature as compared to the temperature prevailing outside the cabinet, it is necessary to place a heat insulating barrier between the inner and outer heat-conductive walls of the cabinet. The inner and outer walls are ordinarily spaced apart and heat insulation placed therebetween. The edges of the walls about the edge of the door and the door opening should be joined in such manner as to provide a strong rugged construction which will at the same time conduct a minimum amount of heat between the walls.

It is an object of my invention to provide an arrangement for securing together the inner and outer walls of a refrigerator cabinet in such manner as to provide a strong rugged and economical construction in which the transfer of heat between the outer and inner walls is minimized.

Another object of my invention is to provide an arrangement including a perforated portion of sheet metal presenting a smooth outer surface of pleasing appearance for closing the space between the marginal portions of the inner and outer walls of a cabinet of the type described while at the same time minimizing the flow of heat therebetween.

Further objects and advantages of my invention will become apparent as the following description proceeds and the features of novelty which characterize my invention will be pointed out with particularity in the claims annexed to and forming a part of this specification.

For a better understanding of my invention, reference may be had to the accompanying drawing in which Fig. 1 is a perspective view, partly in section, of a portion of a refrigerator cabinet of the household type embodying my invention, and Fig. 2 is an enlarged fragmentary sectional view along the line 2—2 in Fig. 1 of the sealing

gasket and supporting structure therefor provided on the door opening of the cabinet shown in Fig. 1.

Referring to the drawing, I have shown in Fig. 1 a portion of a refrigerator cabinet of the household type, the outer walls of which are formed by a rectangular sheet metal shell 10 made of steel or the like having a rectangular opening in the front wall thereof forming a door opening. An inwardly extending peripheral flange 11 extends about the sides of the opening formed in the front wall of the shell 10. The inner walls of a food storage compartment 12 within the cabinet are formed by a rectangular sheet metal inner liner 13 made of steel or the like. The inner liner 13 is provided with a rectangular opening in the front wall thereof which registers with the somewhat larger rectangular opening formed in the outer shell 10. A portion of sheet metal 14 extends between the inner liner 13 and outer shell 10 about the marginal portions of the door opening formed by the registering openings therein. The sheet metal portion 14 is preferably formed as an integral peripheral portion of the inner liner 13 in order to minimize the number of parts required and the number of joints in the cabinet structure. Heat insulation 15 is arranged between the outer shell 10 and the inner liner 13, the walls of which are arranged in spaced relation.

In accordance with one aspect of my invention, the entire peripheral portion 14 of the inner liner 13 is provided with a series of closely spaced perforations 16 extending throughout the sheet metal portion 14 which surrounds the door opening. These perforations may be punched in the peripheral portion 14 before the inner liner 13 is bent into its rectangular shape. The perforations 16 are preferably arranged in a plurality of rows in staggered relation with respect to each other and are elongated in form. The elongated perforations 16 are also preferably arranged substantially at right angles to the direction of flow of heat from the exterior of the cabinet to the interior thereof, that is, from the outer shell 10 to the inner liner 13. Thus, any heat flowing through the peripheral portion 14 of the inner liner 13 from the exterior edge thereof to the interior edge must follow a tortuous and elongated path through metal of relatively narrow cross-section and, as a consequence, the thermal conductivity of the sheet metal portion 14 is minimized.

In accordance with another aspect of my invention, the perforations 16 in the sheet metal portion 14 are filled with a mobile material which

forms a heat insulating filler for the perforations upon hardening. This material may be paint, lacquer, vitreous enamel, or the like, or some thermal plastic material such as rubber. In the illustrative form of my invention, the perforations 16 are filled with vitreous enamel 17 which is also used to form an adherent coating 18 for the sheet metal portion 14 and the inner liner 13. Perforations 16 are thus sealed against the passage of moisture therethrough into the insulation 15 and the interior of the cabinet is given a smooth, pleasing appearance. It is particularly important to prevent the passage of moisture into the insulation between the walls of the cabinet since the insulation is usually a dry fibrous material, the insulating properties of which are radically reduced upon being saturated by moisture. Condensation of moisture occurs principally about the edges of the door and door opening of a refrigerator cabinet. Hence, it is advantageous that the arrangement which I have provided seals the marginal portions of the walls and is itself nonhygroscopic and impervious to moisture.

In accordance with another aspect of my invention, I have provided an arrangement for securing together the adjacent edges of the shell 10 and sheet metal portion 14 of the inner liner 13 in order to prevent the entrance of moisture to the space therebetween. The peripheral portion 14 of the inner liner 13 is provided with a peripheral flange 19 extending thereabout and overlapping the flange 11 formed on the shell 10. A gasket 20 made of rubber or other flexible heat insulating material extends about the doorway and is provided with a groove 21 extending about the same and receiving the edge of the flange 11. As best shown in Fig. 2 the gasket 20 is provided with a resilient sealing portion 22 which is round in cross-section and the inner part of which lies in a groove 23 formed in the peripheral portion 14 of the inner liner 13 at the base of the flange 19. The outer portion of the gasket 20 projects into the door opening and presses against the adjacent surface of the door when the latter is closed in order to prevent the passage of warm air into the cooling compartment 12. The flanges 11 and 19 are secured together by a series of screws 11a passing through holes formed in the flanges 11 and 19, the inner ends of the screws 11a being threaded in suitable tapped holes formed in a reinforcing strip 19a which extends entirely about the rear face of the flange 19.

The door opening formed in the front of the cabinet is closed by a heat insulated door also embodying my invention. The outer wall of the door is formed by a rectangular sheet of metal 24 having a peripheral U-shaped flange 25 provided with a flat inwardly extending seating portion 26. The inner wall of the door is formed by a rectangular sheet of metal 27, the inner and outer walls being arranged in spaced relation and separated by heat insulation 28. The marginal portions of the inner and outer door walls 24 and 27 are secured together by a portion of sheet metal 27a which, in the illustrative form of my invention, is an integral peripheral portion of the inner wall 27 of the door. The peripheral portion 27a is provided with a flat peripheral flange 27b which is arranged parallel to the seating portion 26 of the U-shaped flange 25 on the outer wall 24 of the door.

A sealing gasket 29 made of flexible heat insulating material, such as soft rubber, is mounted between the adjacent portions of the flanges 26 and 27b. The gasket 29 is b-shaped in cross-section,

the flat inwardly extending portion 30 thereof being arranged between the complementary faces of the flanges 26 and 27b. A series of machine screws 31 pass through the flange 27b and portion 30 of the gasket 29, the inner ends thereof being threaded in suitable tapped holes provided in a flange 26 of the outer wall 24 of the door. The hollow sealing or base portion of the gasket 29 extends about the edge of the inner wall 27 of the door and when the door is closed it is pressed firmly against the adjacent surface of the front wall of the cabinet. The entrance of warm air from the exterior of the cabinet into the cooling compartment 12 is thus prevented by the gaskets 22 and 29.

The peripheral portion 27a of the inner wall 27 of the door is provided with a series of closely spaced perforations 32 similar to the perforations 16 provided in the peripheral portion 14 of the inner liner 13. The perforations 32 are elongated in form and are preferably arranged in staggered relation with respect to each other in a plurality of rows about the entire peripheral portion 27a of the inner wall 27 of the door. The perforations 32 are filled with a mobile material, which upon hardening forms a heat insulating filler therefor. In the illustrative form of my invention, the perforations 32 are filled with a hardened vitreous enamel 33 which also forms an adherent coating 34 for the inner wall 27 and 27a of the door. The flow of heat from the exterior of the cabinet to the interior thereof, through the peripheral portion of the wall 27 of the door is thus minimized. The heat insulated door thus formed is pivotally supported adjacent the doorway formed in the front wall of the cabinet by suitable hinges 35.

Although I have shown a particular embodiment of my invention in connection with a refrigerator cabinet of the household type, I do not desire my invention to be limited to the particular construction shown and described and I intend, in the appended claims, to cover all modifications within the spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A refrigerator cabinet construction comprising inner and outer walls arranged in spaced relation, heat insulation arranged between said walls, and a portion of sheet metal extending about the marginal portions of said walls and forming a closure between said walls, said portion of sheet metal having a series of closely spaced perforations formed therein to minimize the heat conductivity thereof, said portion of sheet metal being covered with a hardened coating material which forms a heat-insulating filler for said perforations.

2. A refrigerator cabinet construction comprising inner and outer walls arranged in spaced relation, heat insulation arranged between said walls, and means including a portion of sheet metal extending between the marginal portions of said walls for securing said walls together, said portion of sheet metal having a series of closely spaced perforations formed therein to minimize the heat conductivity thereof, said perforations being filled with a hardened filler material forming a heat insulating filler for said perforations.

3. A refrigerator cabinet construction comprising inner and outer sheet metal walls arranged in spaced relation, heat insulation arranged between said walls, and means including a portion of sheet metal extending between the marginal portions of said walls, and means including a portion of sheet

portion of sheet metal having a series of closely spaced perforations formed therein to minimize the heat conductivity thereof, said portion of sheet metal being covered with hardened vitreous enamel which forms a heat insulating filler for said perforations.

4. A door for a refrigerator cabinet or the like comprising an outer sheet metal wall having an inwardly extending peripheral U-shaped flange provided with a flat inwardly presented seating portion, an inner sheet metal wall having an outwardly extending peripheral portion, said peripheral portion being provided with a peripheral flange extending in proximity to said seating portion of said U-shaped flange, a sealing gasket of resilient material extending between said seating portion of said U-shaped flange and said peripheral flange of said inner wall, means for securing said inner and outer walls and said gasket together, and heat insulation arranged between said inner and outer walls, said peripheral portion of said inner wall being provided with a plurality of rows of closely spaced elongated perforations arranged in staggered relation with respect to each other and substantially at right angles to the direction of flow of heat between said walls to minimize the flow of heat therethrough, said peripheral portion of said inner wall being

covered with hardened coating material which forms a heat insulating filler for said perforations.

5. A refrigerator cabinet comprising an outer sheet metal shell and a sheet metal inner liner forming a compartment within said cabinet, said outer shell and said inner liner being arranged in spaced relation and provided with registering apertures in the walls thereof forming a door opening for said compartment, said inner liner being provided with an outwardly extending peripheral portion extending about said opening in said inner liner having a series of rows of elongated perforations formed therein to minimize the heat conductivity thereof, said elongated perforations being arranged in staggered relation with respect to each other and substantially at right angles to the direction of flow of heat between said outer shell and said inner liner, said peripheral portion of said inner liner being covered with hardened coating material which forms a heat insulating filler for said perforations, a sealing gasket made of flexible material extending about said peripheral portion of said inner liner, and means for securing said outer shell said gasket and said inner liner together.

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CERTIFICATE OF CORRECTION.

Patent No. 2,068,532.

January 19, 1937

EDWIN H. BODDY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 75, claim 3, and page 3, first column, line 1, same claim, strike out the comma and words ", and means including a portion of sheet portion" and insert instead for securing said walls together, said portion; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 2nd day of March, A. D. 1937.

Henry Van Arsdale
Acting Commissioner of Patents.

Seal)

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