March 21, 1961 O. V. SAUNDERS 2,975,616

REFRIGERATING APPARATUS

Filed Oct. 24, 1958 2 Sheets-Sheet 1

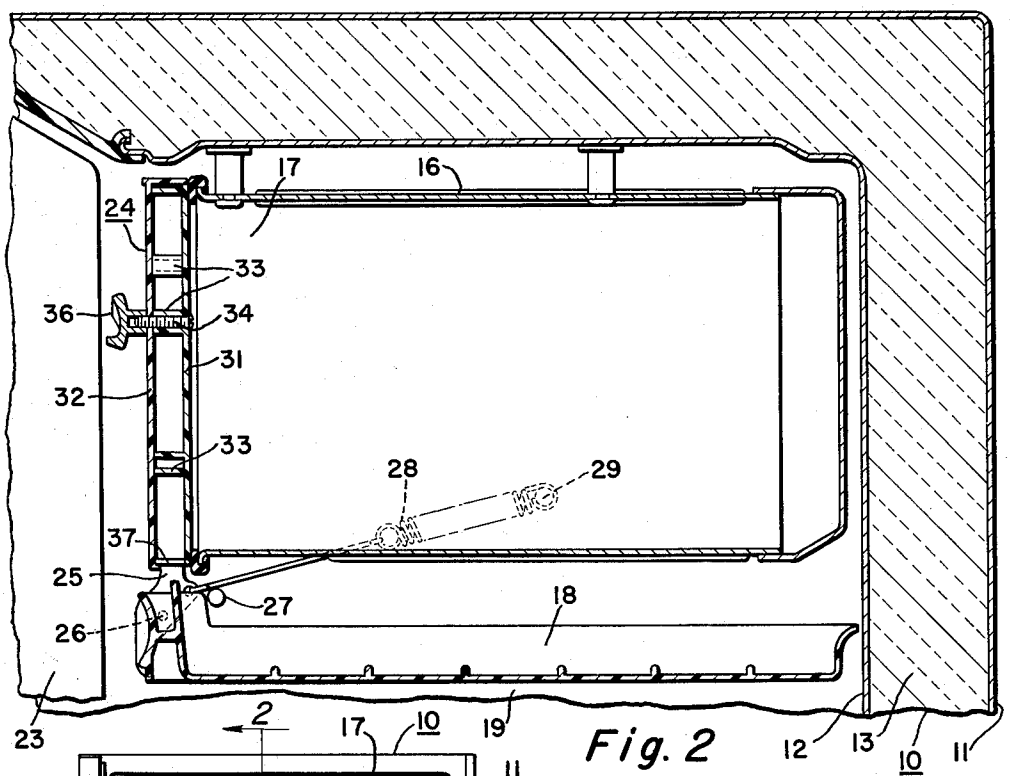


Fig. 2

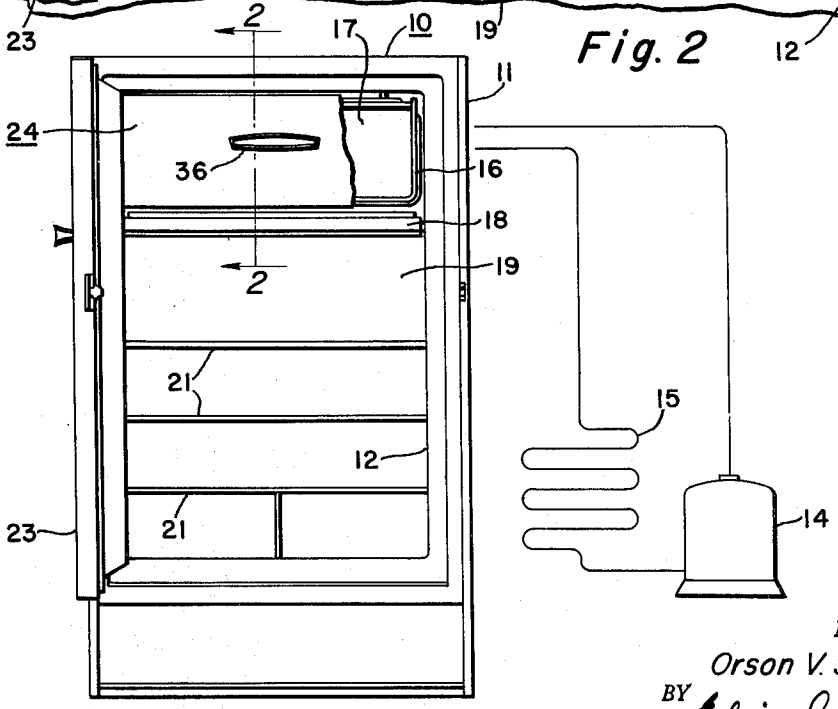


Fig. 1

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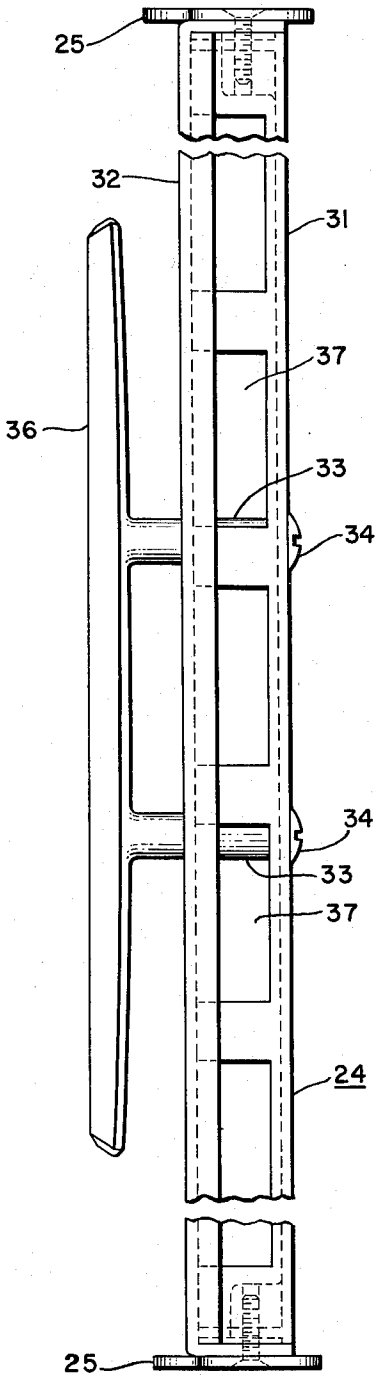


Fig. 4

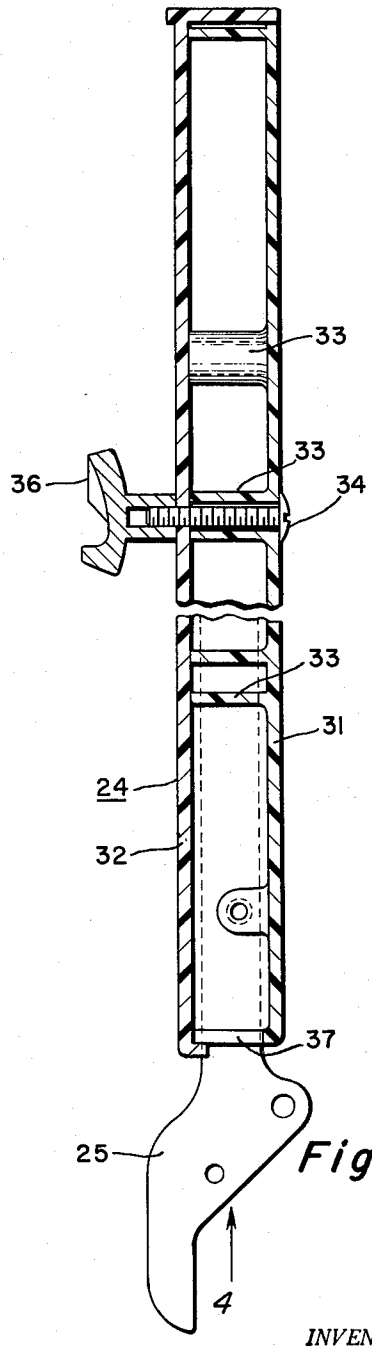


Fig. 3

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REFRIGERATING APPARATUS

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1 Claim. (Cl. 62—291)

This invention relates to refrigerating apparatus and particularly to an improvement in a closure member for a freezing compartment within a chamber of a household refrigerator cabinet.

A general object of my invention is to overcome objections present in the refrigeration art and more specifically to conceal elements of a refrigerating system disposed in a refrigerated chamber of a household refrigerator cabinet upon which moisture or frost collects or accumulates so as to enhance the appearance of the interior of the refrigerator when its outer main door is opened.

Another object of my invention is to provide a refrigerator cabinet with an inner door closing the open front of a freezing compartment formed by walls of an evaporator of a refrigerating system disposed in a refrigerated chamber of the cabinet which door in addition to concealing the evaporator also eliminates accumulation of moisture or frost on an outer surface thereof visible from the exterior of the chamber upon opening the cabinet door.

In order to accomplish the foregoing objects, it is a further object of my invention to provide a double-walled, hollow door for closing the open front of a freezing compartment within a refrigerated chamber of a refrigerator cabinet which door is provided with one open edge or openings in its bottom edge for flow of air from the chamber thereinto.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Figure 1 is a front view of a multiple compartmented household refrigerator cabinet with the cabinet door open showing an inner freezing compartment door in the chamber thereof having my invention incorporated therein;

Figure 2 is an enlarged vertical sectional view taken on the line 2—2 of Figure 1 of the upper portion of the refrigerator;

Figure 3 is a broken enlarged vertical sectional view of my improved hollow freezing compartment door;

Figure 4 is a view of the bottom edge of the hollow door taken in the direction of the arrow 4 in Figure 3 showing openings therein.

Referring to the drawings and particularly to Figure 1, there is shown a refrigerator cabinet 10 having outer metal panels or walls 11 and an inner metal liner 12 spaced therefrom by any suitable or desirable insulating material 13 (see Figure 2) to provide insulated walls of an open front chamber within the cabinet. A machine compartment within cabinet 10 below the insulated chamber thereof houses a sealed motor-compressor unit 14 and a refrigerant condenser 15, shown diagrammatically in Figure 1, of a refrigerating system associated with the refrigerator as is conventional in the art. This refrigerating system also includes a refrigerant evaporator 16 preferably of the sheet metal type having refrigerant expansion passages formed in imperforate walls thereof which walls are bent or shaped to provide an open front freezing compartment 17 in the upper portion of the cabinet chamber. Evaporator 16 is supported from the top portion of refrigerator cabinet 10 with its side walls spaced from liner 12 of the chamber therein. A partitioning means in the form of a one-piece molded plastic combined drip tray and partition 18 is slidably and removably mounted in the chamber of cabinet 10 in any suitable or conventional manner. The sides of partition 18 are spaced from liner 12 of this open front chamber providing for circulation of air therearound to and from a food storage compartment 19 therebelow over walls of the evaporator 16 to chill foods stored in the compartment 19 to a temperature above freezing. Thus compartment 19 below partitioning means 18 is an unfrozen food storage compartment and is provided with a plurality of vertically spaced apart food supporting shelves 21. Cabinet 10 is also provided with the usual insulated main door 23 hingedly mounted thereon for horizontal swinging movement relative thereto. Door 23 extends across the partitioning means 18 in spaced relation thereto and continuously across both of the compartments 17 and 19 to close the open front of the chamber within cabinet 10. A door 24, of special design and construction, separate from and operable independently of door 23, provides an auxiliary or individual closure for the open front of freezing compartment 17 to isolate air in this compartment from communication with air in the chamber of cabinet 10. The elements of a refrigerating apparatus as thus far described, except for door 24, are more or less conventional equipment therefor to provide a so-called standard type household refrigerator cabinet as is commonly referred to by those familiar with the art. The refrigerating effect produced by evaporator 16 reduces the temperature in compartment 17 below freezing for the storage of frozen meats or the like therein or for freezing water in trays into ice blocks for table use and walls of the evaporator cools and causes circulation of air in the cabinet chamber downwardly around partitioning means 18 into storage compartment 19 for chilling food products stored therein. Operation of the refrigerant translating device or motor-compressor unit 14 of the refrigerating system associated with cabinet 10 may be controlled by any suitable thermostatic means, as is conventional in the art, to insure maintenance of proper temperatures in the freezing compartment 17 and in the unfrozen food storage compartment 19.

In accordance with the foregoing objects, my invention is particularly directed to an improvement in the construction and arrangement of an inner door in a refrigerator cabinet which closes an open front of an evaporator exposed to a chamber thereof and forming a freezing compartment therein. In the present disclosure, door 24 carries a pair of metal brackets 25 at its lower opposite side edges each provided with a hole therein fitted over pivot studs 26 secured to opposed side walls of the cabinet chamber to hingedly mount the inner door on cabinet 10 for vertical swinging movement relative thereto. Door 24 extends continuously from one side to the other side of the open front chamber in cabinet 10 and is spaced from the top wall and side walls thereof to permit of its swinging movement. The extending part of at least one of the brackets 25 is adapted to engage a stop lug or peg 27 on a side wall of the cabinet chamber when door 24 is swung open to support the door in a substantially horizontal plane at the front of freezing compartment 17 whereby door 24 serves as a transfer ledge thereat while rearranging frozen food packages in the freezing compartment. The door 24 may be provided with any suitable or conventional biasing or counter-

balancing device such, for example, as a spring means **28** having its one end anchored to a stationary stud **29** and its other end fastened to an extension part on one of the mounting brackets **25**. Door **24** is of a double-walled construction and is hollow or devoid of insulating material between the walls thereof. The door **24** comprises inner and outer molded plastic pan-like members **31** and **32** respectively one of which has a plurality of hollow spacing bosses **33** formed integrally thereon. Two of the spaced apart bosses **33** receive screws **34** which are threaded into tapped openings in a handle **36** for door **24** and consequently these two bosses serve or form as a part of the mounting of the handle upon the door. These screws **34** together with screws that clamp brackets **25** to door **24** lock the door pan-like members to one another whereby the inner member **31** is engageable with a forward portion of evaporator **16** to close the open front of freezing compartment **17** and the outer member **32**, spaced from member **31**, is exposed to air in the chamber of cabinet **10**. Bosses **33** are located intermediate edges of the door and are abutted by door wall **32** to prevent collapsing of the molded plastic walls of door **24** toward one another. The two side edges and top edge of hollow door **24** are closed and one or the bottom side edge thereof is open or has openings **37** (see Figure 4) provided therein for flow of air from the cabinet chamber thereto. The one surface of inner pan-like wall or member **31** of hollow door **24** is exposed to the below freezing temperature within compartment **17** while its outer pan-like wall or member **32** is exposed to the higher temperature in the chamber of cabinet **10** and this provides a temperature differential between the wall members of the closure for the open front freezing compartment. Due to the construction and hollow character of door **24** and the temperature differential established or existing between its walls, moisture contained in air circulating in the chamber of cabinet **10** will be conveyed thereby and will enter the door, through openings **37**, whereupon the moisture condenses out of the air and collects on the surface of wall member **31** exposed to the interior of the door. Since both the inner and outer faces of wall **32** of door **24** remain at substantially the same temperature as the temperature of circulating air in the cabinet chamber, no moisture will accumulate thereon. Any moisture condensing or accumulating within door **24** on wall member **31** thereof is prevented from freezing and will flow downwardly therealong within the door and drip into the tray partitioning means **18**. The drip water received by partition **18** may be conveyed therefrom through a suitable drain or the partition may be removable from cabinet **10** to empty the drip water into a kitchen sink. By virtue of the unique evaporator or inner door structure as herein disclosed together with its concealment of the evaporator **16**, moisture or frost which accumulates on parts of the refrigerating apparatus within the refrigerated chamber of cabinet **10** is invisible at the front thereof and does not therefore present an unsightly appearance when the main cabinet door **23** is opened.

From the foregoing, it should be apparent that I have provided an improved closure member for an open front freezing compartment within a refrigerated chamber of a household refrigerator cabinet which is of low manufacturing cost and enhances the appearance of the interior of the cabinet when its main insulated door is swung open. The construction and cooperation of my improved evaporator or freezing compartment door with walls of a chamber of a standard type household refrigerator cabinet renders the internal arrangement of elements of such a refrigerator similar to or of the same general appearance as a more expensive refrigerator employing two or more evaporators of a refrigerating system associated therewith. Thus my improvement herein disclosed accomplishes a twofold purpose without in any way interfering with efficient refrigeration in a standard type refrigerator.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

A movable double-walled door structure formed of separate secured together imperforate inner and outer panels spaced from one another to provide a single hollow chamber therebetween extending continuously intermediate four opposed peripheral edges of the door, said inner imperforate door panel closing a low temperature compartment located within a relatively higher temperature compartment and preventing flow of air between said door chamber and said low temperature compartment, said peripheral edges of said door being closed at the top and sides thereof and open at its bottom edge for circulation of air from said higher temperature compartment into the hollow door chamber, moisture in the air circulating into said door chamber being condensable on said inner door panel, the condensate water in said door chamber gravitationally flowing out of the door structure through said open bottom edge thereof, and a removable receptacle in said higher temperature compartment beneath said door structure for receiving the condensate water therefrom.

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