May 11, 1943. L. W. ATCHISON 2,318,984

REFRIGERATOR CABINET

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Fig. 1.

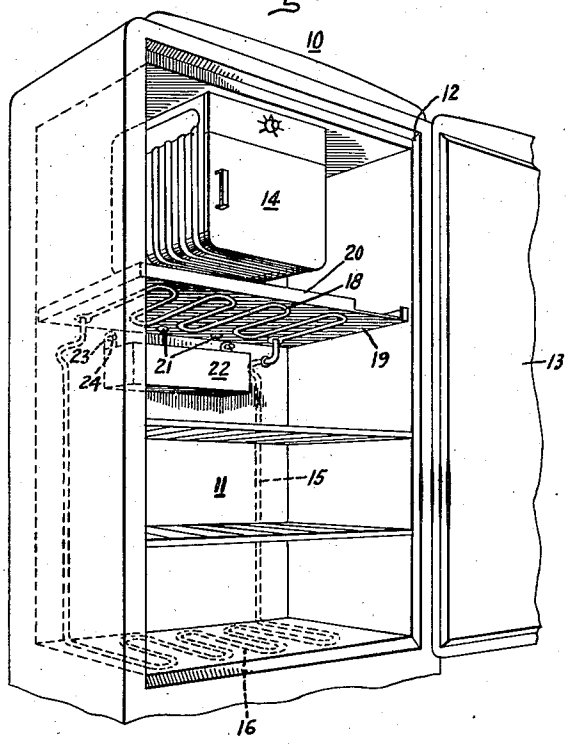
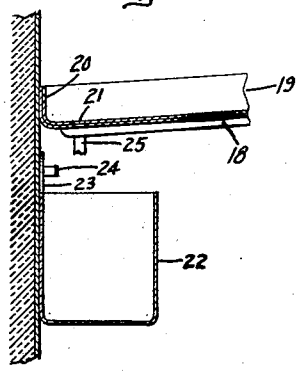


Fig. 2.



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REFRIGERATOR CABINET

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3 Claims. (Cl. 62—89)

My invention relates to refrigerator cabinets.

The air within the refrigerated compartment of a household refrigerator is usually maintained at a temperature of approximately 40° F. to 45° F. for general refrigeration purposes. This temperature is maintained by convection currents of air set up by the cooling unit or evaporator usually disposed in the upper portion of the refrigerated compartment. In order to obtain the aforementioned temperature it is necessary, in the conventional type of refrigerating system, to maintain the surface of the evaporator or cooling unit considerably below freezing, as approximately 20° F., for example. When the evaporator is operated at a temperature of this order of magnitude in moist air, the evaporator becomes covered by ice and frost. It has been customary to defrost the cooling unit when necessary as by halting operation of the refrigerating system until the temperature within the refrigerated compartment rises sufficiently to melt the ice and frost or by operating the evaporator on a comparatively long defrosting cycle.

It is an object of my invention to provide new and improved means for assisting in the disposal of water resulting from such melting and any particles of ice or frost which may drop from the cooling unit.

Closed containers have been used in household refrigerators for maintaining a relatively high humidity in order to prevent dehydration of certain foods, such as vegetables. Frequently such receptacles are placed adjacent the bottom wall of the food storage compartment. It will be obvious that only a limited circulation of air can take place around the receptacle placed in such a position and there is, therefore, less cooling capacity available to absorb heat entering the food compartment through the bottom wall thereof. Therefore, it is desirable to provide some arrangement for supplementing the cooling of such portions of the food storage compartment. Secondary refrigerant circulating systems for accomplishing supplementary cooling of the lower portion of the compartment have been proposed. It is another object of my invention to utilize a portion of the secondary system as a drip receiving means in conjunction with the primary system evaporator.

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 of a portion of a refrigerator cabinet of the household type illustrating an application of the principles of my invention and Fig. 2 is an enlarged partial view, in section, of a portion of the cabinet shown in Fig. 1.

In the drawing I have illustrated a refrigerator cabinet 10 including suitable thermally insulated walls defining a food storage compartment 11. In order to provide access to the compartment, there is provided an opening 12 and a suitable thermally insulated door 13 for closing the opening. In order to provide refrigeration for the interior of the compartment I have illustrated the use of an evaporator or cooling unit 14 preferably disposed in the upper portion or region of the compartment 11. Inasmuch as the details of the primary refrigerant system form no part of my present invention, the details thereof are not illustrated. Of course, any suitable refrigerant circulating apparatus may be employed. In order to provide supplementary cooling for a portion or region of the compartment 11, I have illustrated the use of a secondary system comprising a conduit 15 provided with a plurality of turns to form a cooling portion 16 suitably secured in heat exchange relationship as by soldering, for example, to a portion of the metallic inner liner of the cabinet, as the bottom wall for example. The container or conduit 15 is partially filled with a vaporizable liquid refrigerant so that the turns of the portion 16 are maintained flooded therewith. During the refrigerating cycle, liquid in the cooling portion will be vaporized and the vapor will rise through the upright portion of the conduit 15. In order to condense the vaporized refrigerant, I have provided the conduit 15 at the upper end thereof with a plurality of turns to provide a condensing portion 18 disposed adjacent to and below the evaporator 14 of the primary refrigerating system. In the portion 18, the refrigerant vapor will be cooled by the heat exchange with the primary system and will become liquefied, the liquid returning to the lower portion of the conduit.

In order to prevent the drip of liquid, ice, or the like, from the evaporator 14 to the articles of food stored in the food storage compartment 11, I have provided drip-receiving means, as a drip tray 19 below the evaporator 14. While I have illustrated the drip means or receiver 19 as extending substantially the full width and depth of the food storage compartment, it will be ob-

vious that the purposes of my invention will be accomplished if the drip receiving member is sufficiently large to make sure that material falling from the evaporator will be received thereon and not fall onto the articles stored in the cabinet. In the form of my invention illustrated therein, the drip receiver 18 is provided with an upstanding flange 20 extending around the marginal edge in order to provide a sufficiently deep receptacle to contain all of the water incident to defrosting.

In order to remove the water, etc. received in the receiver 18, I have provided a plurality of openings 21 adjacent the rear edge of the drip receiver 18 and have tilted the drip receiver so that liquid contained therein will drain to the rear of the receiver 18. A removable receptacle 22 is suitably and removably supported below the openings 21 as by means of lugs 23 and studs 24. The member 22 may be removed and emptied whenever it is filled. If desired, the drip receiver 18 may be provided with conduits 25 communicating between the openings 21 and the receptacle 22 in order to insure that the liquid will be conducted to the receiver 22.

The receiver 18 tends to assume a relatively low temperature because of its proximity to the cooling unit or evaporator 14, especially during defrosting periods when the ice on the cooling unit melts into the receptacle. As a result, air engaging the under surface of the receptacle 18 may be cooled below the dew point of the air in the storage compartment and, therefore, moisture condenses on the under-side of the receiver. This condensation may drip onto the articles stored into the refrigerator. In order to provide sufficient heat to maintain the surface above the dew point of the air, I form the receiver of relatively good heat conductive material and dispose the condensing portion of the secondary system in good heat exchange relationship with the drip receiver. Because of the heat supplied to the receiver by the condensing vapor, the temperature thereof will be maintained above the dew point of the compartment air under normal conditions of operation.

Modifications of my arrangement will be apparent to those skilled in the art. For instance, the condensing portion 18 may be so formed, as by means of complementary metal sheets providing refrigerant circulating passages therebetween, as to serve the dual function of condensing the secondary refrigerant and also to receive the drip from the primary evaporator 14.

While I have shown and described my invention as applied to a specific refrigerator construction, other modifications will readily be apparent to those skilled in the art. I do not therefore desire my invention to be limited to the specific arrangement 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. In a refrigerating cabinet comprising a food storage compartment, a primary refrigerating system including a cooling element located in one region of said compartment and a secondary refrigerating system including a cooling portion for cooling another region of said compartment and a condensing portion, means disposed below and adjacent to said element for receiving moisture and ice from said element, said means being formed of a relatively good heat conductive material, said condensing portion being disposed in heat exchange relation with said means, and means for removing any accumulated ice or liquid from said means.

2. In a refrigerating cabinet comprising a food storage compartment, a primary refrigerating system including a cooling element located in one region of said compartment, and a secondary refrigerating system including a cooling portion for cooling another region of said compartment, and a condensing portion, means disposed below and adjacent to said element for receiving moisture and ice from said element, said means being formed of a relatively good heat conductive material, said condensing portion being disposed in heat exchange relation with said means, additional removable means for receiving said drip water or ice from said first-mentioned means, said first-mentioned means being arranged to direct the drip water or ice towards said removable means.

3. In a refrigerator cabinet comprising a food storage compartment, a primary refrigerating system including a cooling element located in one region of said compartment, and a secondary refrigerating system including a cooling portion for cooling another region of said compartment, and a condensing portion, said condensing portion being disposed below and adjacent said cooling element, said condensing portion also being arranged to receive any drip water or ice falling from said element, and means for removing any drip water or ice from said condensing portion.

LEONARD W. ATCHISON.