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REFRIGERATING APPARATUS

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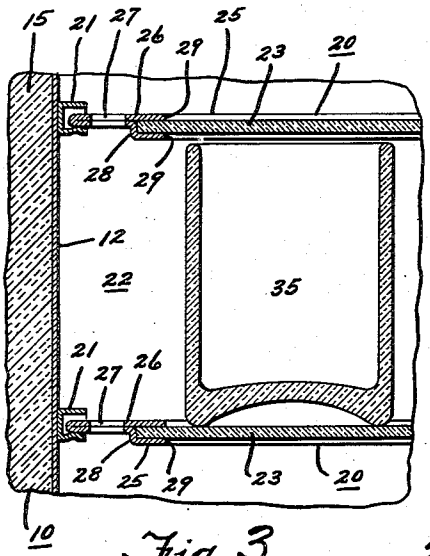



Fig. 3

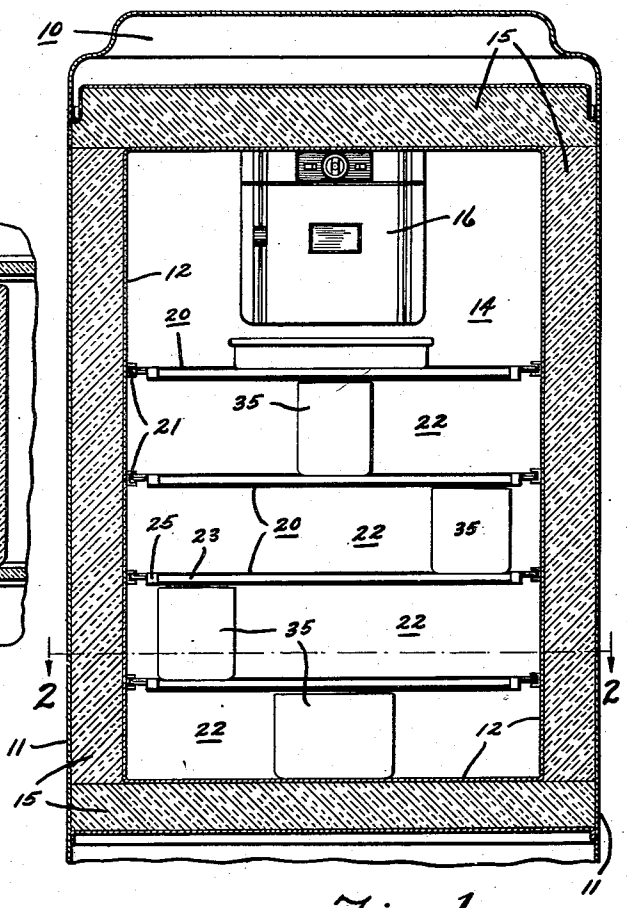



Fig. 1

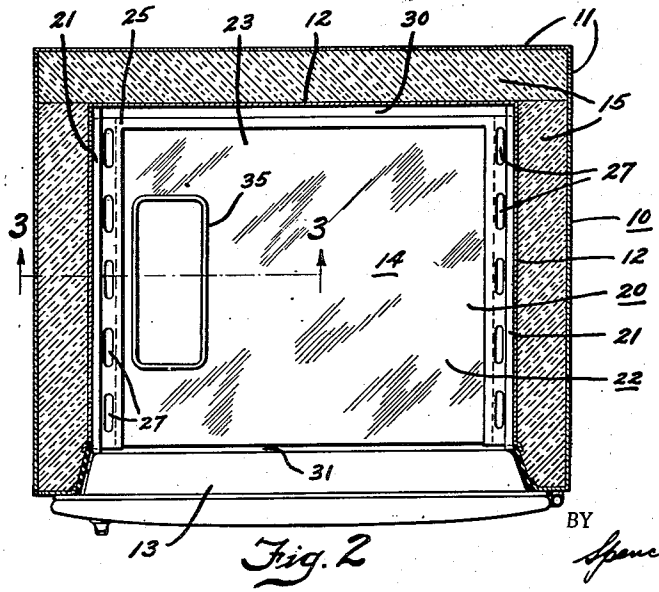



Fig. 2

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## REFRIGERATING APPARATUS

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7 Claims. (Cl. 62—89)

This invention relates to refrigerating apparatus and more particularly to a food storage arrangement in household refrigerator cabinets.

An object of my invention is to provide an improved household refrigerator cabinet for the storage and refrigeration of a variety of food products and particularly moisture laden or bearing foods such as left-overs from the table, vegetables and fruits.

Another object of my invention is to provide an improved apparatus of low manufacturing costs for refrigerating fruits and vegetables in a mechanically cooled refrigerator, for instance of the domestic type, so that the fruits and vegetables may be maintained in their original crispness for extended periods or restored to their original crispness.

A further object of my invention is to provide an improved household refrigerator cabinet wherein the shelf arrangement within the food storage chamber thereof, and normally open-topped receptacles adapted to contain certain foods are constructed and arranged to cooperate with one another in such a manner that only a limited or restricted circulation of air occurs between the interior of the receptacles and the evaporator of a refrigerating system mounted within the chamber of the cabinet.

A still further object of my invention is to provide the food storage chamber of a refrigerator cabinet with a plurality of shelves or partitions for dividing the chamber into compartments and which partitions or shelves are provided with an imperforate area cooperating with the tops of normally open-topped containers or receptacles to form a cover therefor which limits or restricts the circulation of air between the contents of the receptacles and air within the compartments.

In carrying out the foregoing objects it is a more specific object of my invention to form the imperforate area of the shelves or partitions of glass to provide for visibility of contents of the receptacles in the plurality of compartments formed by the shelves or partitions upon opening the cabinet door leading to the refrigerated food storage chamber of the refrigerator.

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

In the drawing:

Fig. 1 is a transverse vertical sectional view through a refrigerator cabinet having my invention embodied therein;

Fig. 2 is a transverse horizontal cross-section through the refrigerator cabinet disclosed in Fig. 1 and taken on the line 2—2 thereof showing a plan view of a receptacle supported upon a shelf employed in the refrigerator; and

Fig. 3 is an enlarged fragmentary vertical sectional view taken on the line 3—3 of Fig. 2 showing an upper shelf forming a cover for the open top of the receptacle.

Referring to the drawing, in order to illustrate my invention, I have shown in Fig. 1 thereof a refrigerating apparatus of the household type comprising a cabinet 10 having a metal exterior shell or panels 11 and an inner metal liner 12 spaced therefrom and forming walls of a chamber 14. In order to insulate the chamber 14 I place any suitable or desirable insulation material 15 between the outer walls 11 and the chamber walls 14. A door opening providing access to chamber 14 at the front of cabinet 10 (see Fig. 2) is normally closed by an insulated door structure 13. I mount an evaporator 16 of a closed refrigerating system within the chamber 14 by suitably supporting and suspending same from the top wall thereof. Evaporator 16 has conduit connections with a refrigerant condensing and liquefying unit (not shown) usually located in the lower part of the cabinet 10 below the insulated chamber 14 as is conventional in the art. The evaporator 16 may be formed to provide walls of a sharp freezing compartment for containing trays of liquid to be congealed or frozen and the exposed refrigerated walls of the evaporator cool and cause circulation of air within the cabinet chamber 14.

A plurality of partitions or shelves, generally represented by the reference character 20, are horizontally disposed and removably supported within chamber 14, in uniformly spaced apart vertical relation to one another, from supports or tracks 21 secured to the side walls of liner 12. These shelves 20 partition the chamber 14 into a plurality of superimposed food storage compartments 22. Each shelf or partition 20 includes an imperforate portion preferably in the form of a glass plate 23 which forms the major part of the area of the shelves. The glass plate 23 of each shelf or partition 20 is bounded on its side and back edges by a frame device 25 (see Fig. 2). The three-sided frame device 25 comprises a metal member bent over upon itself at the two sides of the shelf to provide a flat portion 26 which is perforated by the provision therein of a plurality of elongated openings 27. Openings 27 extend through the flat portions 26 of

frame 25 and provide for the communication or flow of air, circulated by evaporator 16 in the refrigerated chamber 14, between the food compartments 22. By bending the lower portion of the frame member downwardly as at 28 (see Fig. 3) its edges 29 are spaced apart and a groove is formed between the portions thereof adjacent the edges. This groove receives the glass plate 23 and the portions of frame 25 adjacent its edges 29 are pressed against and sealed to the plate 23 in any suitable manner such as by cement. It will be noted that the area of shelves or partitions 20 in a direction toward the rear of cabinet 10 is less than the actual depth of chamber 14 and therefore a space 30 exists between the rear edges of the partitions or shelves and the back wall 12 of chamber 14 and a space 31 also exists between the front edges of shelves or partitions 20 and the inner face of door 13. The two spaces 30 and 31 provide for the circulation of the circulating air around the front and back of partitions or shelves 20 and the openings 27 provide for the circulation of air through the partition at the two sides thereof. While I have disclosed the spaces 30 and 31 to provide ample circulation of air between the compartments 22 my invention may be carried out without such spacing and by merely utilizing the openings 27 in the partitions 20 for air circulation between the food storage compartments.

The partitions or shelves 20 are adapted to support different varieties of food products within the refrigerated chamber 14 and in accordance with the present invention the construction and arrangement of the partitions or shelves 20, which play an important part therein, are such as to removably receive and support open-topped glass containers or receptacles 35. These receptacles 35 may be of any desired shape or size in horizontal cross-section and are preferably of a uniform height relative to one another which height is slightly less than the distance between the top of the glass plate 23 of the partition or shelf upon which same is supported and the underside of the glass plate 23 of an upper or adjacent partition or shelf 20. The plate 23 of an upper partition or shelf 20 thus forms or provides a cover for the receptacle or receptacles 35 supported on a lower shelf or partition and the short space between the plate 23 and the top edge of the receptacle permits a limited air circulation between the contents of the receptacle and the air within the compartment 22. Therefore in the storage of food products in the refrigerator cabinet disclosed the ordinary or substantially dry foods may be distributed throughout the refrigerated chamber in the conventional manner. However, moisture laden or bearing foods such for example, as vegetables and fruits are placed in the containers or receptacles 35 so that when the containers are positioned on the partitions or shelves 20 their top edges are in close juxtaposition relative to a plate 23 of an upper partition or shelf to thereby restrict communication of their contents with the air within chamber 14. By extending the frame device around the three edges only of the glass plate 23 there is no obstruction at the front edge of the partitions 20 to the sliding of the receptacles outwardly of compartments 22 and therefore the receptacles may be readily removed from the refrigerated chamber.

In a refrigerating apparatus of the type disclosed the evaporator of the refrigerating system is maintained below 32° F. and air circulated thereby and thereover within chamber 14 is refrigerated below 32° F. The refrigerated air is then circulated over and in contact with the food receptacles 35 while still at a temperature below 50° F. The limited flow of cold air into the receptacles 35 containing vegetables or other moisture laden or bearing foods prevents rapid evaporation of moisture therefrom while at the same time providing sufficient evaporation to prevent the growth of molds. Thus a relatively moist condition of the air within the receptacles 35 is maintained and such condition insures that the cells of vegetables contain substantially the same amount of water which they originally contained in their fresh condition over long periods of time in contradiction to openly exposing the vegetables to the drawing effect produced by the evaporator 16. The general idea of restricting the passage of air between vegetables and other food products and the air cooled by an evaporator in a mechanically refrigerated refrigerator, while the products are being stored in cold storage, has been practiced prior to the present invention and proven to insure the prevention of rapid growth of molds, yeast or bacteria. My invention is therefore particularly directed to a refrigerating apparatus of novel construction and arrangement for carrying out one method of properly storing vegetables and other food products and for providing ample receptacle storage space with limited air circulation between the receptacles and air within the refrigerated chamber.

The refrigerator construction disclosed particularly the construction and arrangement of the shelves with the food receptacles and their cooperation with one another provides an efficient apparatus of low manufacturing cost. By constructing a major shelf area of a transparent material such as glass the contents of the various receptacles are readily visible through their covers upon opening the refrigerator cabinet door. My improved apparatus eliminates the provision within a refrigerated chamber of a refrigerator cabinet of only a few covered containers, commonly referred to as "hydrators," and permits the use of as many receptacles as desired for the cold storage of moisture laden or bearing food products in a novel manner and at various localities throughout the interior of the refrigerator. The improved construction offers all the advantages of a conventional refrigerating apparatus and has additional features that are advantageous to the user such, for example, as adjustability of the receptacles into any of the various compartments which are inherently of slightly different temperature relative to one another and adjustability of the receptacles into different positions within the same compartment with respect to the locality of the major circulation of air therein. The uniform height of the receptacles and the uniform spacing of the shelves or partitions permits the user of the refrigerating apparatus disclosed to employ a plurality of the receptacles and the user is thereby not limited to the use of one or two so-called "hydrator" space.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Refrigerating apparatus comprising in combination, a cabinet having an insulated chamber therein, a cooling element of a closed refrigerating system mounted within said cabinet for chilling

and causing circulation of air within said chamber, a plurality of vertically spaced apart partitions within said chamber dividing same into superimposed food storage compartments, said partitions having a reticulated portion for permitting flow of the circulating air between said compartments, one of said partitions having an imperforate area, an open top food storage receptacle adapted to be supported upon another of said partitions below said one partition and in vertical alignment with the imperforate area thereof, and said receptacle being of a height slightly less than the distance between the imperforate area of said one partition and the top of said another partition whereby said area of said one partition provides a cover for the receptacle, the said height and arrangement of the receptacle with respect to said partition cover forming area providing a limited space between said cover and the top of the receptacle to thereby restrict the passage of air between the interior of the receptacle and said chamber.

2. A structure in accordance with claim 1 wherein the imperforate area of the one partition is formed of transparent material permitting visibility of the contents of the receptacle through its cover.

3. Refrigerating apparatus comprising in combination, a cabinet having an insulated chamber therein, a cooling element of a closed refrigerating system mounted within said cabinet for chilling and causing circulation of air within said chamber, a plurality of vertically spaced apart partitions within said chamber dividing same into superimposed food storage compartments, said partitions having an imperforate portion and a portion spaced from a wall of said chamber for permitting flow of the circulating air between said compartments, an open top food storage receptacle adapted to be supported upon one of said partitions below and in vertical alignment with the imperforate portion of another partition, and said receptacle being of a height slightly less than the distance between said partitions whereby said imperforate portion of said another partition provides a cover for the receptacle, the said height and arrangement of the receptacle with respect to said imperforate portion of said another partition providing a limited space between said cover and the top of the receptacle to thereby restrict the passage of air between the interior of the receptacle and said chamber.

4. A structure in accordance with claim 2 wherein the imperforate portion of the partitions is formed of transparent material permitting visibility of the contents of the receptacle through its cover.

5. Refrigerating apparatus comprising in combination, a cabinet having an insulated chamber therein, a cooling element of a closed refrigerating system mounted within said cabinet for chilling and causing circulation of air within said chamber, a plurality of vertically spaced apart partitions within said chamber dividing same into superimposed food storage compartments, said partitions including a glass plate and a metal member extending along the sides and back thereof, said metal member having a plurality of openings therein permitting flow of the circulating air between said compartments, an open top food storage receptacle adapted to be supported upon one of said partitions below and in vertical alignment with the glass plate of another partition, and said receptacle being of a height slightly less than the distance between said partitions whereby said glass plate of said another partition provides a cover for the receptacle, the said height and arrangement of the receptacle with respect to said glass plate of said another partition providing a limited space between said cover and the top of the receptacle to thereby restrict the passage of air between the interior of the receptacle and said chamber.

6. Refrigerating apparatus comprising in combination, a cabinet having a plurality of insulated walls forming a food compartment therein, said compartment having an opening therein and a door for closing the opening, a cooling element of a closed refrigerating system mounted within said cabinet for chilling and causing circulation of air in said compartment, a horizontal partition within said compartment cooperating with the walls thereof and with the inner face of said door to divide the compartment into an upper and a lower food storage space, said upper and said lower food storage spaces being accessible by movement of said door, said partition having an imperforate area, an open-top food storage receptacle within said lower food storage space and mounted on a support below said partition in vertical alignment with the imperforate area thereof, said receptacle being of a height less than the distance between the imperforate area of said partition and the support whereby said imperforate area of said partition provides a cover for the receptacle, and the said height and arrangement of the receptacle with respect to said partition cover forming area providing a limited space between said cover and the top of the receptacle to thereby restrict the passage of air between the interior of the receptacle and said compartment.

7. A structure in accordance with claim 6 wherein the imperforate area of the partition is formed of transparent material permitting visibility of the contents of the receptacle through its cover when said door is moved into open position.

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