Aug. 7, 1945. W. P. JONES 2,381,598

REFRIGERATOR CABINET CONSTRUCTION

Filed March 18, 1944

FIG. 1.

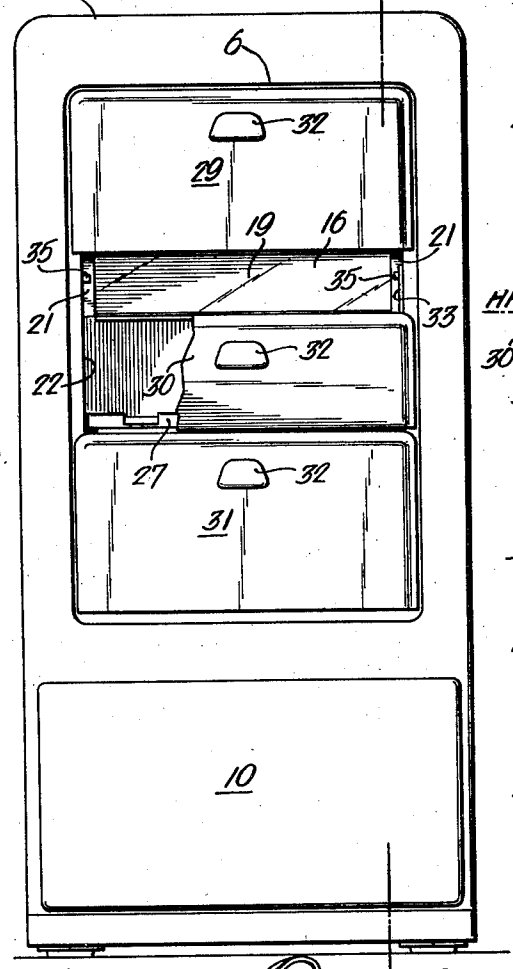


FIG. 2.

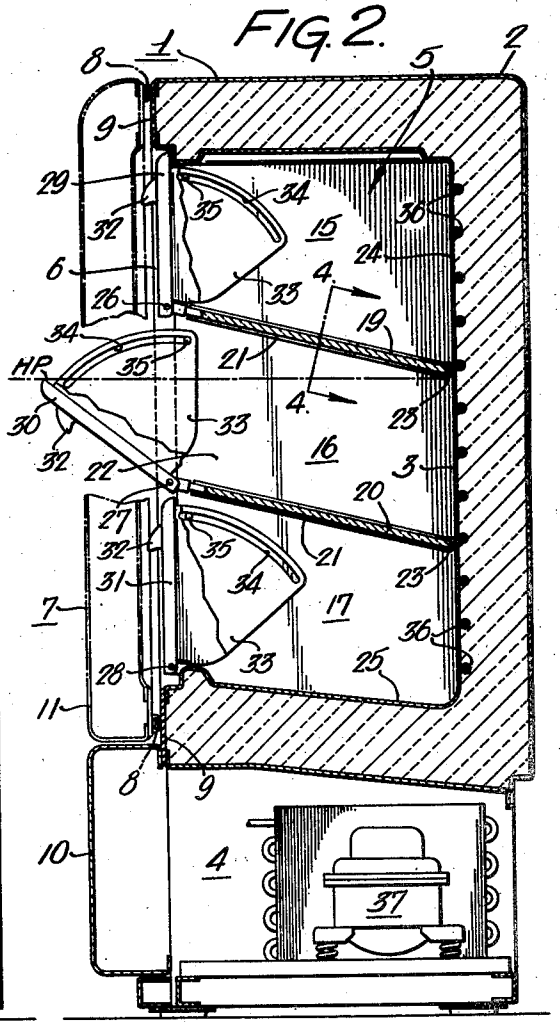


FIG. 3.

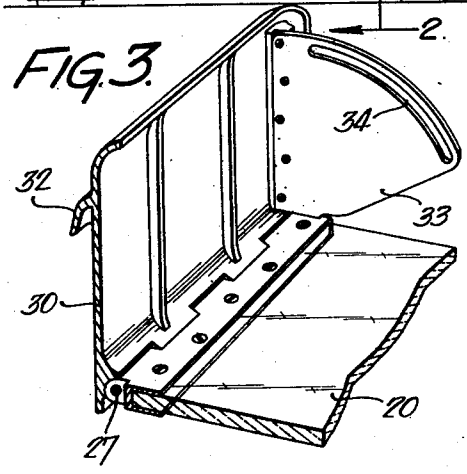
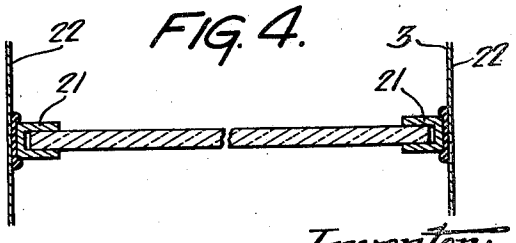


FIG. 4.



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REFRIGERATOR CABINET CONSTRUCTION

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6 Claims. (Cl. 62—89)

This invention relates to refrigerators, and while the invention has an application of particular utility to refrigerators of the low temperature type adapted for storage of frozen foods, it may be applied to advantage to the standard types of domestic refrigerator employed primarily for storage of fresh foodstuffs.

In order to avoid decay and spoilage, it is necessary that frozen foods be kept at low temperatures and since maintainance of these low temperatures in refrigerators places a heavy burden on the refrigerating systems, it is highly desirable to reduce to a minimum loss of cold air from the refrigerator. Heretofore refrigerated cabinets of the horizontal top-access type have been almost universally accepted as the best means for storage of frozen foods as there is no substantial spillage of cold air from such types when the lid is opened. However, top-access cabinets present disadvantages which make them relatively undesirable in some, and particularly "home" installations. It is an important object of the present invention to provide an efficient front-access refrigerator for the storage of frozen food.

More specifically, it is an object of the invention to provide a front-access refrigerator in which substantial spillage of refrigerated or cold air when the door is opened is prevented.

Another object is the provision of such a refrigerator affording easy access selectively to the various elements of stored foods without disturbance of the other and major bodies of the foodstuffs.

A further object is to provide a refrigerator of the stated character having shelf sections readily removable and replaceable for cleaning purposes.

In the accompanying drawing:

Figure 1 is a front elevational view of a refrigerator embodying the invention with the outer door removed;

Figure 2 is a sectional view taken on line 2—2 of Figure 1, said view including the outer door in closed position;

Figure 3 is a fragmentary detail view in perspective of a portion of the invention; and

Figure 4 is a fragmentary view taken along line 4—4 of Fig. 2.

Referring especially to Figures 1 and 2 of the drawing the numeral 1 designates a mechanical refrigerator including an outer shell 2 of conventional form, and an inner liner 3. The inner liner is positioned within the shell 2 so as to form a food storage compartment 5 insulated from the shell and having a front-access opening 6. A door 7 is suitably hinged to cabinet 2 along one side margin thereof and is provided with a sealing gasket 8 arranged for engagement with the door jamb 9 when the door is closed to seal and to maintain the compartment 5 in an air-tight condition. In addition to the storage compartment 5, the refrigerator structure includes a machine compartment 4. To improve the exterior appearance of the refrigerator the front closure 10 for the machine compartment may be extended to an extent bringing its outer surface flush with outer panel 11 of the door 7.

The food storage compartment 5 is divided into a plurality of smaller preferably substantially parallelepiped-shaped compartments 15, 16 and 17 by means of partitions or shelves 19 and 20 which, in accordance with this invention, are sloped downwardly toward the rear. These shelves may be secured to the inner liner by any suitable means but are herein illustrated as being slidably mounted in pairs of opposed channel members 21 fixed in an air-tight manner to the side walls 22 of liner 3, see Figure 4. Secured to the rear edge of each shelf is a gasket member 23 adapted to form a seal against the back wall 24 of liner 3 in a manner to prevent circulation of air between the compartments.

Pivotally mounted at the front edge of shelves 19 and 20 and at the front of bottom wall 25 of liner 3 by suitable substantially air-tight hinges 26, 27 and 28, are closures or doors 29, 30 and 31, respectively, adapted in conjunction with the liner and the shelves to completely enclose the individual food compartments 15, 16 and 17. Each of the doors is provided with a suitable handle 32 and with flexible side flanges 33, 33, which flanges are normally flexed outwardly to fit snugly against the side walls of the liner and which are provided with arcuate slots 34 concentric with the axis of the hinge. Through these slots extend pins 35, fixed to liner 3 which limit the opening movement of the door to a position in which the top edge of the door, as illustrated in Figure 2, is in or near a horizontal plane HP containing the rear edge of shelf 19. As may be seen with respect to this open position of the door, the side flanges 33 serve to close the areas between the side edges of the door and the liner, so that when the door is open the space embraced between the flanges 33 and the door element may constitute, in effect, an extension of the interior space of the compartment, for a purpose hereinafter described.

The bottom all 25 of liner 3 is sloped rearwardly at an angle conforming to the shelves 19

and 20 and to make compartment 17 similar in shape and function to compartments 16 and 16. The top wall of the liner may also be sloped in conformity with the shelves, but as illustrated, is horizontal to provide more storage space within compartment 15.

While the refrigerating system forms no special part of this invention there has been illustrated a conventional primary system employing evaporator tubing 36 bonded to the outside surface of liner 3, and a motor compressor unit 37 within the machine compartment 4.

Let it be assumed that the temperature in compartments 15, 16 and 17 is at a point, say about 0° F., suitable for storage of frozen foodstuffs, and assume further that access is desired to the compartment 16. After opening the door 7, the door 30 may be swung downwardly about its hinge 27 to the position shown in Fig. 2, the limit imposed by the pin 35 in slot 34. Access to the compartment may now be had over the top of door 30. Due to the stratification of the cold air in the compartment and the fact that the only opening to the compartment lies above the horizontal plane HP, loss of cold air by spillage through the access opening is reduced to a minimum. As the door 30 is opened the cold air normally above plane HP will tend to spill downwardly into the space between the flanges 33, which as previously stated constitutes an extension of the compartment, and will thereby be retained. Warm air will flow in above the plane HP, but this air, or a major part thereof, will be forced out again when the door is closed due to the upward pressure of the cold air which is returned to the compartment from the space between the said flanges.

In the aforedescribed manner the doors function cooperatively with the associated inclined shelves to preclude excessive loss of cold air from the compartments, and it is to be noted that this desired result is effected without material restriction of the dimensions of the access openings of the compartments when the doors are opened.

It should be understood that shelves 19 and 20 and doors 29 and 30 may be permanent fixtures in the cabinet, but as it is undesirable to defrost deep freeze refrigerators because of the necessity for maintaining frozen food continuously at a substantially constant low temperature they have been made removable for cleaning and defrosting. To remove the door and shelf assembly 30—20, for example, the door 30 is opened to the position illustrated in Figure 2, side flanges 33, 33 are then flexed inwardly toward each other until they clear the ends of pins 35 at which time the door is drawn outwardly sliding the shelf along opposed channels 21, 21 until it is completely detached from the cabinet. Door 7 is then closed to prevent loss of refrigeration and the door and shelf assembly may be taken to the sink and washed. Re-assembly is accomplished by reversing the above procedure. Door and shelf assembly 29—19 may be similarly removed. Door 31 of the lower compartment 17 may be made removable by a suitable demountable hinge structure (not shown). Obviously, this door may be washed, as may the shelf assemblies, without being removed from the refrigerator and without disturbing the other compartments.

From the foregoing description, it will be apparent that the invention, by virtue of the novel shelf and door construction, combines the advantageous features of both the front and the top-access types of cabinet in a manner to provide a refrigerator which affords ready access to stored foods and a minimum loss of cold air when the door is opened. It will be apparent also that by subdividing the interior of the cabinet access may be had to parts of the liner-defined food storage compartment without affecting the other parts thereof. It is evident too that easy and rapid cleaning of the storage compartment may be effected without undue loss of refrigeration in the compartment as a whole.

I claim:

1. A front-access refrigerator including an outer shell, an inner liner defining a food storage chamber and having an open front, a closure member adapted when closed to maintain said chamber in an air-tight condition, and removable means for dividing said chamber into a plurality of compartments, said means including a shelf slidably mounted upon the opposite sides of said liner and sloping downwardly from said open side and adapted to seat against the rear wall to substantially prevent circulation of air from one to another compartment, and a closure member hinged to the front edge of said shelf portion.

2. A front-access refrigerator including an outer shell, an inner liner defining a food storage chamber and having an open front, a closure member adapted when closed to maintain said chamber in air-tight condition, removable means for dividing said chamber into a plurality of compartments, said means including a shelf slidably mounted upon the opposite sides of said liner and sloping downwardly from said open side, said shelf being adapted to seat against the rear wall of said liner to substantially prevent circulation of air from one to another of said compartment, and a closure member hinged to the front edge of said shelf, said closure member including flanges adapted respectively to close the normally open spaces between the side edges of the member and the liner when said closure member is opened.

3. A front-access refrigerator including an outer shell, an inner liner defining a food storage chamber and having an open front, a closure member adapted when closed to maintain said chamber in air-tight condition, and removable means for dividing said chamber into a plurality of compartments, said means including a shelf slidably mounted upon the opposite sides of said liner and sloping downwardly from said open side, said shelf being adapted to seat against the rear wall of the liner to substantially prevent circulation of air from one to another of said compartments, and a closure member hinged to the front edge of said shelf portion, said closure member including side flanges adapted respectively to close the normally open spaces between the side edges of the door and the liner when said closure member is opened, and at least one of said flanges including means for limiting opening movement of said closure member.

4. A refrigerated compartment having a side opening, a bottom wall sloping away from said side, a retractable closure for said opening, and means for closing the spaces between the side and bottom edges of the closure and the corresponding walls of the compartment when the closure is retracted to thereby prevent escape of the cold air content of the compartment by way of said spaces.

5. A refrigerated compartment having a side opening and top and bottom walls sloping downwardly from said side, and a retractable closure

for said opening, said closure having flanges arranged to lap the walls of the compartment when the closure is in the operative position, and to close the gaps between the edges of the closure and the compartment walls when the closure is retracted, thereby to form in effect an open top receptacle constituting an extension of said sloping compartment.

6. A refrigerated compartment having a side opening and top and bottom walls sloping downwardly from said side, and a bottom hinged closure for said opening having flanges arranged to lap the side walls of the compartment when the closure is in operative position, and to close the gaps between the side edges of the closure and the said compartment side walls when the closure is retracted from said opening, and means for limiting the extent of the retractive movement of the closure so that at the limit of said movement the upper edge of the closure may lie in proximity to a horizontal plane through the rear edge of said inclined top wall.

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