Sept. 16, 1952 P. CHOVANEC 2,610,473

REFRIGERATOR DISPLAY CABINET

Filed Nov. 8, 1949 2 SHEETS—SHEET 1

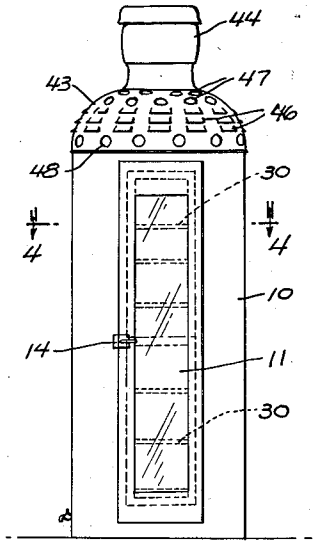


Fig. 1.

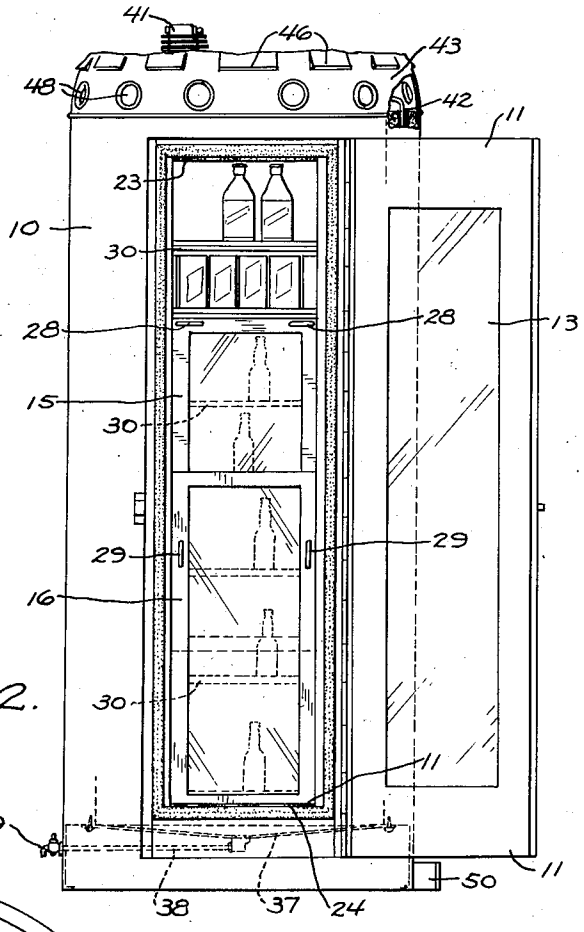


Fig. 2.

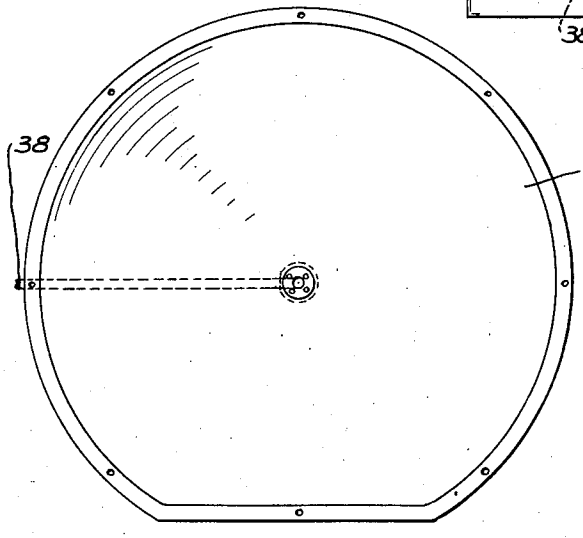


Fig. 3.

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REFRIGERATOR DISPLAY CABINET

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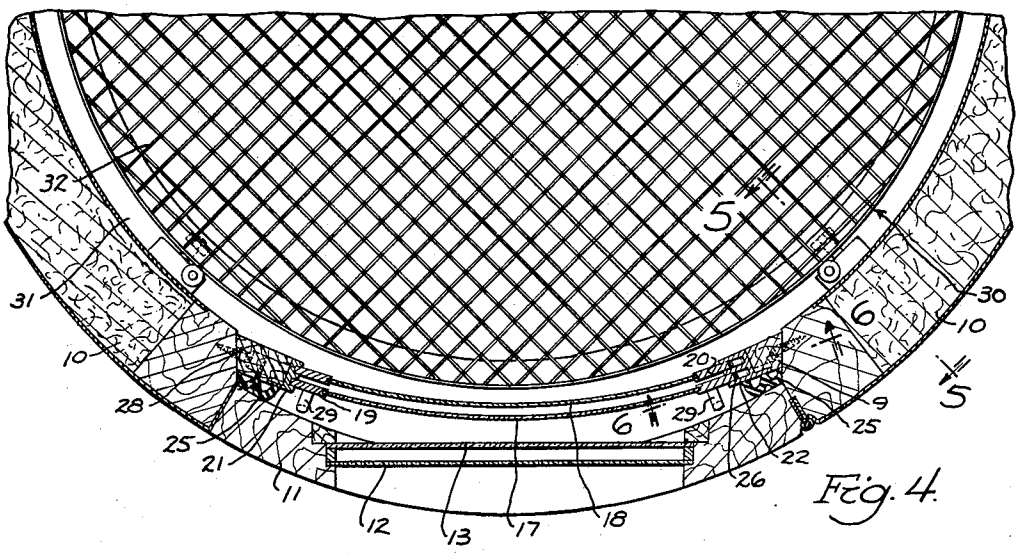


Fig. 4.

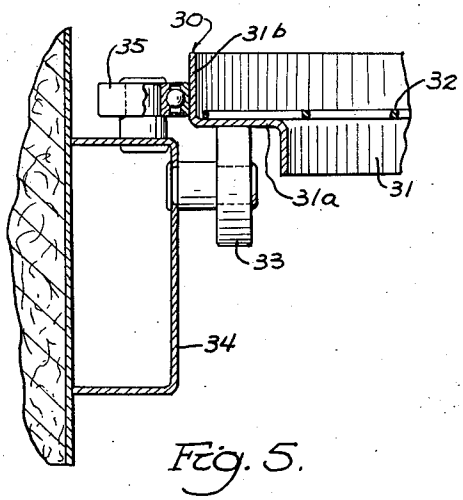


Fig. 5.

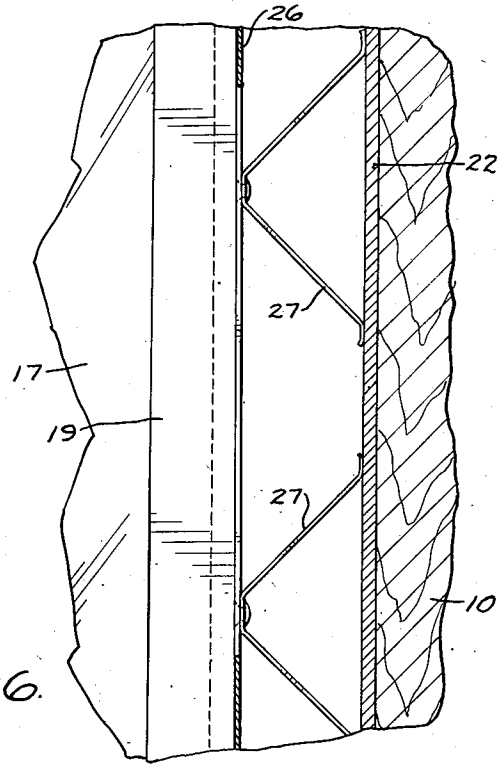


Fig. 6.

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REFRIGERATOR DISPLAY CABINET

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7 Claims. (Cl. 62—89.5)

1

This invention relates to refrigerators and more particularly to refrigerators of the portable type adapted for domestic or commercial use.

Considerable difficulties have been experienced with refrigerators of the above type, both in domestic and commercial uses, due to the necessity of opening their doors rather frequently for reaching their contents. In one of the most common commercial uses of such refrigerators, cooling and keeping bottled beer or other bottled drinks for retail sales, such difficulties have been particularly noticeable. It is commonly known that demand for such drinks is particularly heavy during hot weather and that it is then that in anticipation of immediate consumption the customers ask for cold bottles, usually in small numbers such as 3–6 bottles.

Under such conditions, the refrigerator has to be opened every few minutes or so. With each opening of the refrigerator doors, cold air rushes out enveloping the clerk, who may be wearing a shirt with rolled up sleeves and perspiring. Severe colds have thus been contracted with serious losses of working time and danger to health. In addition, constant onrush of the warm humid air into the refrigerator, causes excessive frosting of the cooling coils and other surfaces thereof, and imposes increased load on the refrigerator causing nearly constant operation of its compressor unit producing more heat and heating the room still further and thus aggravating the conditions. In addition the operating expense of the refrigerator is increased and its useful life is considerably decreased.

In domestic use, a conventional refrigerator often presents a serious threat of sickness to small children, who often get up during the night and go to the kitchen opening the refrigerator in search for some particular piece of food. Under such condition, a small child just out of a warm bed usually stands right between the front of the refrigerator shelves and the door which is only slightly opened, with the heavy cold air flowing out downwardly and enveloping the child.

One of the objects of the present invention is to provide an improved refrigerator whereby the above difficulties are decreased and in some instances completely eliminated.

Another object of the present invention is to provide an improved refrigerator by the use of which frequent opening of the doors for removing its contents by small portions and loading thereof does not result in appreciable losses of cold air, thereby eliminating the danger of catching cold, as well as imposing excessive load on the refrigeration apparatus and heating the room by the compressor.

2

A further object of the invention is to provide an improved refrigerator having transparent or glazed doors the sweating of which is greatly decreased.

A still further object of the present invention is to provide an improved refrigerator the contents of the separate shelves whereof can be removed in a simple, convenient manner and without reaching toward the rear of the shelves either for removing or reloading such shelves.

A still further object of the invention is to provide an improved refrigerator having improved means for cooling the compressor unit thereof and ventilating the unit compartment in such a manner as to dispose of the heated air without affecting noticeably the temperature of the room.

A still further object of the invention is to provide a refrigerator having a cooling cabinet and a compressor unit compartment disposed above said cabinet and having a cover, all of said parts adapting themselves very advantageously to form an object imitating the appearance of a large bottle of any desired shape, providing thereby a striking advertising display.

A still further object of the present invention is to provide a refrigerator having an outer swinging door and a plurality of vertically slidable inner door sections, which inner door sections can be selectively installed and removed by the refrigerator user in any easy and simple manner and without the use of any tools.

A still further object of the present invention is to provide an improved refrigerator of the foregoing character and having cylindrical shape and rotating circular shelves, improved means being provided for guiding said shelves in their rotary movements, whereby their interference with the operation of the inner doors is prevented without the necessity of providing additional clearance space.

A still further object of the invention is to provide an improved refrigerator having means for convenient draining of the cabinet in cases of breakage of bottles or in defrosting.

A still further object of the present invention is to provide a refrigerator of an improved construction whereby the operating cost of the refrigerator is greatly decreased, and its useful life is increased in a considerable measure.

It is an added object of the present invention to provide an improved refrigerator of the foregoing character, which is simple in construction,

dependable in operation, and is relatively inexpensive to manufacture.

In accordance with the invention, there is provided a refrigerator having a conventional insulating or outer door which may be of the swinging type, if desired. Immediately adjacent said outer door there is provided an inner door formed of a plurality of sections vertically slidable in suitable guides and adapted to be operated to open any desired portion of the refrigerator space, without opening its other portions and permitting the cold air to escape. The inner door sections are movable vertically in channel guides or slides and can be selectively removed therefrom without the use of any tools. The refrigerator is made of a cylindrical shape with a plurality of circular shelves rotating on supporting rollers, auxiliary rollers being provided to hold the shelves away from the sliding door sections. Means are provided to collect and lead away the drainage that may accumulate at the bottom of the cabinet. A cupola-shaped ventilated cover is provided for the cabinet, said cover being adapted to house the compressor unit and to impart to the refrigerator an appearance of a bottle, making it a very effective advertising display.

Further objects and advantages of the invention will be apparent from the following description, taken in connection with the appended drawings, in which:

Fig. 1 is a front view of a refrigerator embodying the present invention, and shown with all of its doors closed.

Fig. 2 is a view on an enlarged scale with the top of the refrigerator cover broken way, the outer door and one of the inner door sections of the refrigerator being shown opened.

Fig. 3 is a bottom view of the refrigerator.

Fig. 4 is a fragmentary sectional view taken on the line 4—4 of Fig. 1.

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 4 and illustrating the construction of shelf-guiding means.

Fig. 6 is a fragmentary sectional view taken on the line 6—6 of Fig. 4 and illustrating the spring means provided in the inner door slides.

It is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is shown by way of example a refrigerator embodying the present invention. Referring to the drawings, the refrigerator shown therein comprises a cylindrical cabinet 10 with heat insulating walls and having a frontal opening within which is swingingly fitted in a manner well known in the art an outer door 11. The door 11 is provided with an opening closed with two glass panels 12 and 13, and has any suitable latch or lock means, such as indicated at 14.

Within said frontal opening and immediately adjacent the swinging or outer door 11, there is operatively mounted an inner door composed of a plurality, in the present embodiment two, vertically sliding door sections 15 and 16. Each of said sections 15 and 16 comprises a curved glass panel 17 or 18, mounted in a metal frame 19 or 20 to form a unitary sliding panel, which is slidably fitted in the guiding channels 21 and 22, secured to side rails 8 and 9, which in turn are secured to the cabinet walls. Each of the guiding channels has two tracks for the reception of the frames 19 and 20. At the top and bottom of the opening closable by the slidable door sections 15 and 16 there are provided soft rubber abutting strips 23 and 24 insuring tight closing of the sliding sections at the top and bottom edges of the opening, and cushioning of impacts that would endanger the glass panels in inadvertent hard closing. Insulating soft rubber strips 25 of a curved E-shaped cross section are provided on the side rails 8 and 9.

The tracks of one of the guiding channels, in the present embodiment the right hand side channel 22, are made deeper than those in the other channel, and are thus adapted to hold spring-pressed racks 26 shown in Fig. 4 and having two-pronged springs 27 that may be flatted by the side pressure on the sliding panel to allow the opposite side edge of said panel to be forced out of the guiding channel 21 permitting selective removal of the panel. Suitable handles 28 and 29 are provided on sliding sections 15 and 16 for convenient operation.

Within the cylindrical refrigerated space there is provided any suitable number of rotatable circular shelves 30 for receiving the products to be cooled such as bottled drinks. Each of said shelves comprises a circular frame 31 of a double-angle cross section to provide a horizontal flange 31*a* and a vertical flange 31*b*, see Fig. 5. A wire screen disk 32 supported by the flange 31*a* provides the load supporting surface while permitting drainage and circulation of air through its orifices.

The under surface of the flange 31*a* forms a track adapted to run on rollers 33 supporting the shelf for rotation and operatively mounted on brackets 34 secured to the wall of the cabinet, see Fig. 4. Auxiliary rollers 35 mounted also on the brackets 34 engage the track formed by the outer surface of the vertical flange 31*b*, and operate to hold the shelf away from the sliding door sections.

A drainage sheet or pan 37 is provided within the cabinet at the bottom thereof. The pan 37 is made sloping toward its center in order to direct the drainage, such as may be due to breakage of bottles or defrosting of the cabinet, into the conduit or pipe 38 leading outwardly of the cabinet and provided at its end with a faucet 39.

The refrigerator is provided with a suitable refrigerating apparatus including a compressor unit 41 and expansion coils 42. In accordance with the invention, the compressor unit 41 and other connected parts of the apparatus with the exception of the expansion or cooling coils are mounted on the top of the cabinet, while the cooling coils are operatively arranged within the walls 10 of the cabinet, see Fig. 2, and are adapted to cool the inner surfaces thereof while being suitably insulated from the outer surfaces of said walls.

The top of the cabinet and the apparatus mounted thereon are covered by a housing or cover 43. The cover is of a dome shape and converges upwardly to provide a head 44 shaped into a form of a capped bottle neck. The outer cylindrical surfaces of the cabinet and of the cover appear as forming continuations of each other, and thus the entire refrigerator appears like a large capped bottle. By virtue of such construction the refrigerator forms an interesting and original advertising display for beer or any other

bottled drink. It will be understood that the cabinet and the cap therefor may be made of any desired proportions and appearance to imitate any type of a bottle.

In order to ventilate the space under the cover and thus to dissipate the heat produced by the compressor, the cover 43 is provided with suitable ventilation openings. It is preferable to provide thereon a number of downwardly opening louvres 46 at the lower portion of the cover 43, and a number of upwardly opening round apertures 47 at the upper portion of the cover, thereby inducing more rapid flow of cooling air through the housing or cover 43. A row of round apertures 48 may also be provided near the junction of the cabinet and cover. The edges of the cover at the apertures 47 and 48 may be beaded as shown in order to impart to the cover a more interesting appearance. The beads may be either integrally formed on the cover, or made as separate insertable rings. With the latter expedient any desired color or finish, such as nickel or chrome plating and the like, may be used.

It will now be seen in view of the foregoing that by virtue of the construction disclosed above there is provided an improved refrigerator which possesses a number of important advantages.

When the refrigerator is loaded with bottled drinks and is closed, it appears like a large bottle and thus forms a striking advertising display. The labels of the bottles can be seen through the transparent doors, which add to the advertising value of the display. Since in the fully closed position of both the outer door 11 and the inner sliding sections 15 and 16, there are four glass panels and three insulating layers of air between the cold interior of the cabinet and the warm outside air, sweating and running of the glass panels is greatly decreased and transparency of the doors is increased. Moreover the loss of heat through the glazed portion of the refrigerator is decreased also.

When it becomes necessary to open the refrigerator to reach, say, the upper shelf for removing some bottles therefrom or for loading it, a mere opening of the outer door, see Fig. 2, does not result in the escape of the heavy cold air from all of the shelves, so long as the slidable door sections 15 and 16 remain closed. When the upper door section 15 is slid down far enough to permit reaching the upper shelf, loss of the cold air occurs only in the opened portion of the refrigerator space. The same conditions prevail when the lower section 16 is slid up for reaching any of the lower shelves. Under no conditions is more than one half of the total area of the front opening of the refrigerator open at one time. Thus the loss of the cold air is greatly decreased, whereby the necessity of cooling the relatively large mass of warm air entering the refrigerator at each opening of the door is correspondingly decreased. This, in turn, greatly reduces the load on the refrigerating apparatus, effecting saving in operating expenses as well as increasing the useful life of the refrigerator.

It will be understood that while two inner door sections are shown in the drawing, any practical number thereof, such as three or more may also be used. With such a construction, it may be desirable to limit the vertical travel of each section to substantially its height.

Due to the construction of the shelves, they may be revolved as it becomes desirable to reach the back portions thereof. The roller means eliminate the friction which otherwise might be

rather high with fully loaded shelves, and insure their easy rotation. The auxiliary rollers prevent undesirable sidewise movements of the shelves, thereby eliminating rattling and breaking of the bottles, as well as interference of the shelves with the inner door. This construction also permits a rather small clearance between the shelves and the inner door section, which, in turn, may permit use of straight glass panels for the inner door sections.

Any liquid that would otherwise tend to collect at the bottom of the refrigerator and require frequent wiping, is very simply and easily disposed of in my improved refrigerator due to the provision of draining means disclosed above.

Under some conditions it may be desirable to utilize a refrigeration unit other than that mounted on the top of the refrigeration cabinet. In anticipation of such a contingency, there is provided at the bottom of the refrigerator a stamped housing 50 in which suitable electric wiring and the cooling coil outlets are provided for connecting the refrigerator to a separate refrigeration unit or a portion of such a unit.

There is thus provided an improved refrigerator whereby objects of the invention listed above and numerous additional advantages are attained.

I claim:

1. A refrigerator cabinet comprising cylindrical walls forming a heat-insulated vertically extending compartment, a door opening in said walls extending over substantially the entire height of said compartment, a swinging outer door closing said opening and hinged on the structure of said walls, vertically arranged guides mounted on the structure of said heat-insulating walls immediately behind said swinging door and having a plurality of parallel tracks, and a corresponding plurality of rigid inner door sections forming a portion of a cylinder and arranged within said guides to slide vertically in said tracks from a position wherein they completely close said opening into overlapping positions to open portions of said opening.

2. A refrigerator cabinet comprising cylindrical walls forming a heat-insulated vertically extending compartment, a door opening in said walls extending over substantially the entire height of said compartment, a swinging outer door closing said opening and hinged on the structure of said walls, vertically arranged guides mounted on the structure of said heat-insulating walls immediately behind said swinging door and having a plurality of parallel tracks, and a corresponding plurality of transparent rigid inner door sections forming a portion of a cylinder and arranged within said guides to slide vertically in said tracks from a position wherein they completely close said opening into overlapping positions to open portions of said opening.

3. A refrigerator cabinet comprising cylindrical walls forming a heat-insulated vertically extending compartment, a door opening in said walls extending over substantially the entire height of said compartment, a swinging outer door closing said opening and hinged on the structure of said walls, vertically arranged guides mounted on the structure of said heat-insulating walls immediately behind said swinging door and having a plurality of parallel tracks, a corresponding plurality of transparent rigid inner door sections arranged within said guides to slide vertically in said tracks from

a position wherein they completely close said opening into overlapping positions to open portions of said opening, said swinging door being provided with an opening substantially coextensive with the transparent vertically sliding door sections, and two transparent panels fitted into the last opening to close the same and to have a dead air space between them, and thus providing a transparent wall in the cabinet with two air spaces between the atmosphere and the heat insulated compartment.

4. A refrigerator cabinet comprising cylindrical walls forming a heat-insulated compartment, the height of the cylinder formed by said walls being approximately twice the diameter thereof, a door opening in said walls extending over substantially the entire height of said compartment, a swinging outer door closing said opening, two transparent rigid door sections having part-cylindrical surfaces and arranged immediately behind said swinging door and slidable vertically in two separate but parallel planes from a position wherein they completely close said opening into overlapping positions to open portions of said opening, said swinging door being provided with an opening substantially coextensive with the transparent vertically sliding door sections, and two transparent panels fitted into the last opening to close the same and to have a dead air space between them, and thus providing a transparent wall in the cabinet with two air spaces between the atmosphere and the heat insulated compartment.

5. The construction defined in the preceding claim 4 and including a plurality of circular rotatable shelves the contents of which is observable from the outside.

6. The construction defined in claim 4 and including a plurality of foraminous circular and rotatable shelves the contents of which is observable from the outside, a drainage pan under the lowermost of said shelves, and a drain pipe connected to the lowest point of said pan and leading to the outside of said cabinet.

7. A refrigerator cabinet comprising cylindrical

walls forming a heat-insulated compartment, the height of the cylinder formed by said walls being approximately twice the diameter thereof, a door opening in said walls extending over substantially the entire height of said compartment, a transparent swinging door closing said opening, a compressor unit mounted on the top of said cabinet, a convex dome-shaped cover for said unit having its lower edge merging with the outer surface of said cylindrical cabinet and its upper edges near the center thereof extending upwardly to form an extension adapted to receive a section resembling a bottle neck, a plurality of openings near said lower edge to admit cooling air, and a plurality of openings near said extension to exhaust the heated air, said exhaust openings being provided in the nearly horizontally extending portion of said cover.

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