G. B. ROBISON.

REFRIGERATOR.

APPLICATION FILED AUG. 30, 1918.

1,299,618.

Patented Apr. 8, 1919.

2 SHEETS—SHEET 1.

FIG. 1.

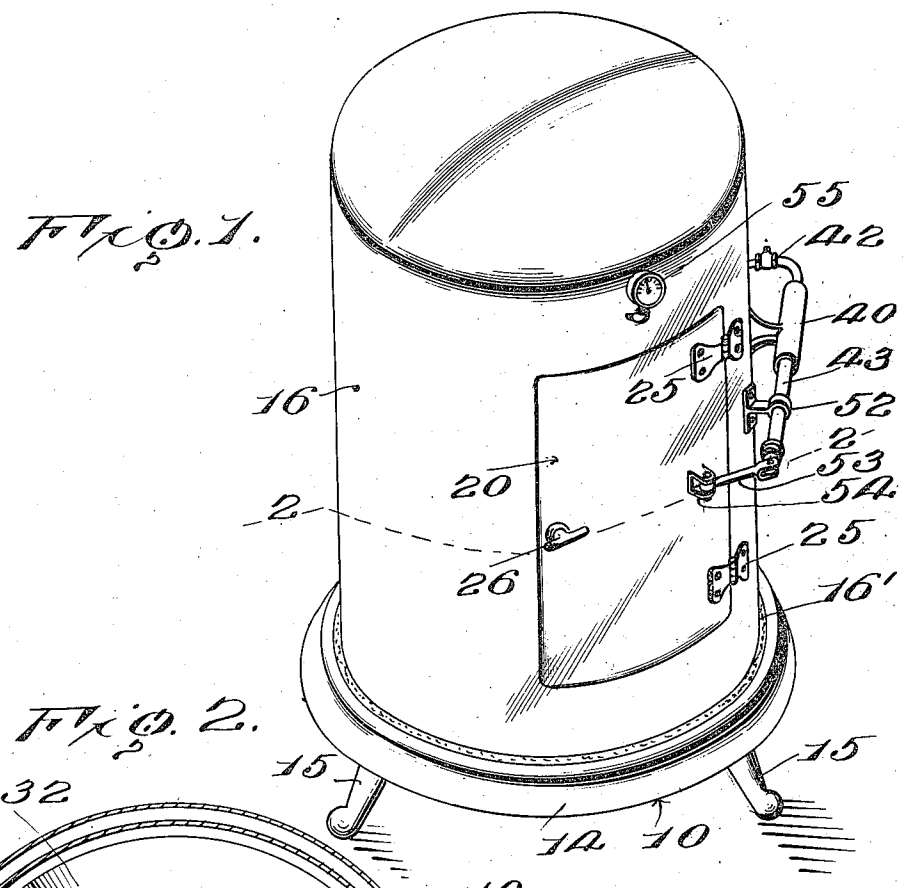
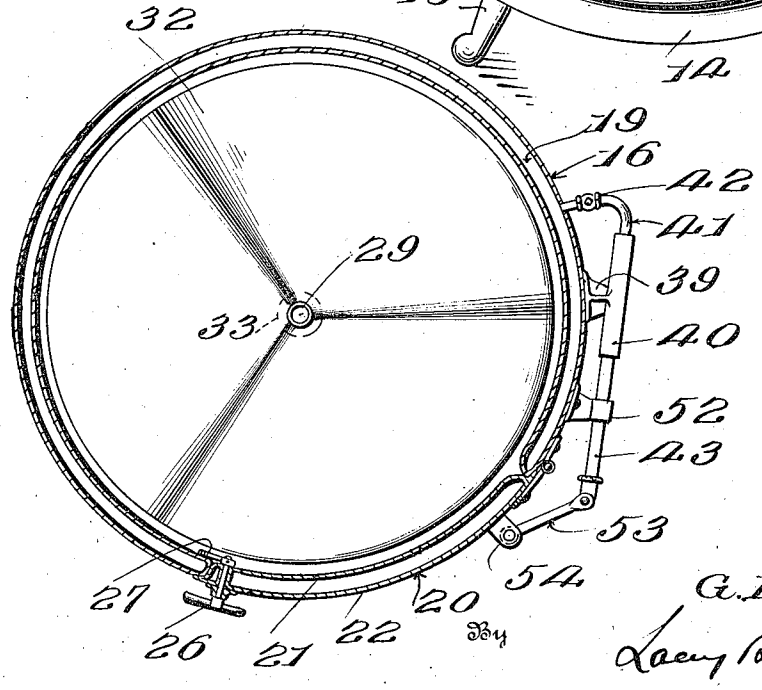


FIG. 2.



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2 SHEETS—SHEET 2.

FIG. 4.

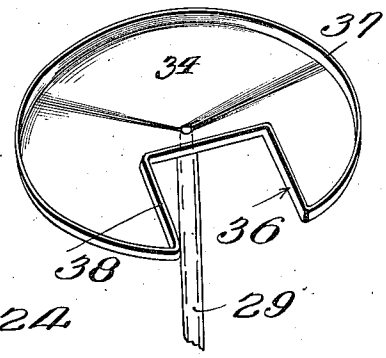


FIG. 3.

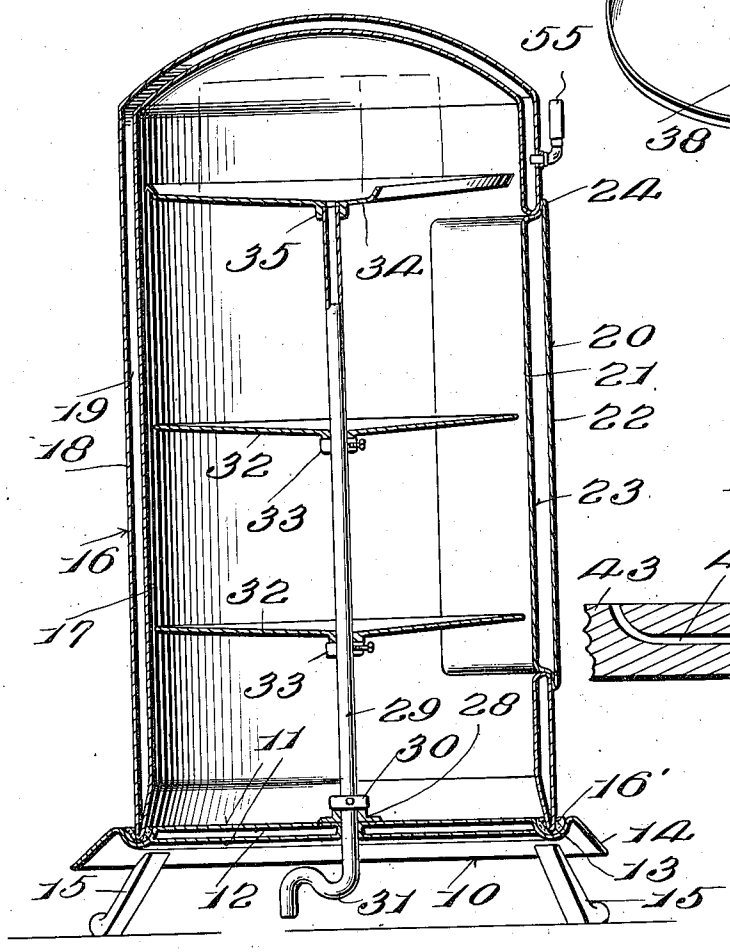
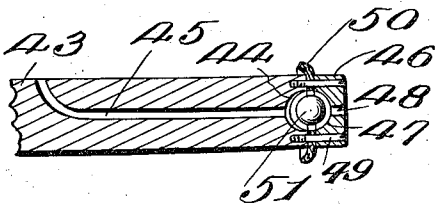


FIG. 5.



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UNITED STATES PATENT OFFICE.

GEORGE B. ROBISON, OF MOUNT VERNON, OHIO.

REFRIGERATOR.

1,299,618. Specification of Letters Patent. Patented Apr. 8, 1919.

Application filed August 30, 1918. Serial No. 252,083.

To all whom it may concern:

Be it known that I, GEORGE B. ROBISON, a citizen of the United States, residing at Mount Vernon, in the county of Knox and State of Ohio, have invented certain new and useful Improvements in Refrigerators, of which the following is a specification.

This invention relates to an improved refrigerator and has as its primary object to provide a construction wherein a vacuum chamber will be employed within the walls of the device to prevent the transmission of heat through the said walls to thus prevent, so far as possible, melting of the ice within the refrigerator and maintain its interior effectually chilled.

The invention has as a further object to provide a construction wherein the entire interior wall area of the refrigerator will be insulated with respect to the outer wall area of the device by an intervening vacuum space to thus reduce to a minimum the communication of heat to the interior of the refrigerator.

The invention has as a further object to provide a refrigerator wherein the door thereof will be equipped with means for exhausting air from the vacuum chamber in the body of the device and so arranged that when the door is opened and closed, in the normal use of the refrigerator, air will be exhausted from the said chamber to thus maintain the partial vacuum therein.

A further object of the invention in this connection is to provide a gage for indicating the vacuum existing in the body vacuum chamber of the device, so that should the partial vacuum in such chamber become destroyed, the door may be operated for re-establishing the partial vacuum in the said chamber.

And the invention has as a still further object to provide a structure wherein the drain pipe employed for the ice tray of the refrigerator will serve to support the said tray within the device, as well as also support the food trays employed and wherein the drain pipe will be trapped for thus trapping the air within the refrigerator therein.

Other and incidental objects will appear as the description proceeds. In the drawings wherein I have illustrated the preferred embodiment of the invention, and wherein similar reference characters designate corresponding parts throughout the several views:

Figure 1 is a perspective view of my improved refrigerator,

Fig. 2 is a transverse sectional view taken on the line 2—2 of Fig. 1 and looking in the direction of the arrows, this view particularly showing the mounting of the air pump of the device and its connection with the refrigerator door,

Fig. 3 is a fragmentary sectional view particularly illustrating the mounting of the trays within the refrigerator,

Fig. 4 is a fragmentary perspective view showing the ice tray in detail, and

Fig. 5 is a fragmentary sectional view showing the air pump in detail.

In carrying the invention into effect I employ a preferably annular base 10 having spaced parallel walls 11 defining an intermediate vacuum chamber 12 therebetween. At the outer edges of the walls 11 the base is formed upon its upper side with an annular channel 13 from which extends an outwardly and downwardly inclined flange 14. Supporting the base and connected in any approved manner with said flange is a plurality of legs 15. Rested upon the base is a cylindrical refrigerator body 16 closed at its upper end, which is preferably dome shaped, and open at its lower end to fit at its bottom edge within the channel 13 of the base. Seated within said channel is a suitable gasket 16′ receiving the bottom edge of the body and forming a sealed joint between the body and the base. If desired, a plastic filler may be employed in lieu of the gasket. The refrigerator body is preferably formed of sheet metal pressed out to define an inner wall or shell 17 and an outer wall or shell 18 uniformly spaced from the inner wall to define a body vacuum chamber 19 therebetween. Thus, it will be seen that this chamber will insulate the entire area of the inner wall with respect to the outer wall to thus reduce to a minimum the communication of heat to the interior of the body while the vacuum chamber 12 will minimize radiation of heat through the base 10 into the lower end of the body. At one side the body is formed with a preferably oblong door opening extending vertically of the body and normally closing this opening is a transversely curved door 20.

The door is also preferably formed of sheet metal pressed out to define an inner wall 21 and an outer wall 22 uniformly spaced from the inner wall to define an intermediate vacuum chamber 23 therebetween. This vacuum chamber will thus minimize transmission of heat through the door into the refrigerator body. At its edges the door is preferably formed with flanges 24 abutting the outer face of the body for limiting the door in its movement to closed position, and swingingly supporting the door are suitable hinges 25. A latch 26 of approved type is fitted through the door adjacent its free edge and, at its inner end is, as particularly shown in Fig. 2 of the drawings, equipped with an arm 27 adapted to engage the inner face of the refrigerator body for holding the door tightly closed.

Fitted upon the base 10 axially thereof is a sleeve 28 and fitted through this sleeve is a drain pipe 29 upstanding axially within the refrigerator body and terminating at its upper end in a plane above the door opening thereof. Adjustably supporting the drain pipe upon the sleeve is a collar 30 fixed to the said pipe by a suitable set screw and, as will now be observed upon reference to Fig. 3 of the drawings, the drain pipe is formed at its lower end with a U-shaped trap 31. As will be clear, water flowing through the drain pipe will stand within the trap to thus trap the chilled air within the refrigerator body when the door 20 is closed. Detachably mounted upon the drain pipe within the refrigerator body is a plurality of vertically spaced food trays 32. Two such trays have been shown although it will, of course, be understood that these trays may be varied in number as found most desirable. The trays 32 are preferably annular in shape and may be pressed out from suitable sheet metal, being slightly dished and having their dished faces presented upwardly. Axially thereof the trays are formed to slidably fit over the drain pipe 29 and are supported thereon for adjustment vertically of the pipe by collars 33 held by suitable set screws. As will be clear, the trays may be rotated. Rotatably mounted upon the drain pipe at its upper end is an annular ice tray 34. This tray is also preferably dished somewhat, as in the instance of the trays 32 and may also be formed of suitable sheet metal. Axially thereof said tray is provided with a socket 35 removably fitting over the upper end of the drain pipe and communicating therewith. Consequently, drippings from ice disposed upon the tray will be carried off through the drain pipe. Since the ice tray is, as shown in Fig. 3, mounted above the door opening of the refrigerator body, the tray is, at the side thereof adjacent the door opening, provided with a notch or opening 36 through which a block of ice may be inserted into the tray. Formed on the periphery of the tray is an upstanding flange 37 designed, of course, to retain the ice upon the tray and, as shown in Fig. 4 of the drawings, this flange extends around the opening 36, as illustrated at 38.

Suitably connected to the refrigerator body 16 adjacent the inner edge of the door 20 is a bracket 39 at the outer end of which is formed a pump cylinder 40. A pipe 41 connects the inner end of this cylinder with the vacuum chamber 19 and interposed in this pipe is a check valve 42. Reciprocable within the cylinder 40 is a pump piston 43 of a diameter substantially equal to that of the cylinder. At its inner end the piston is, as shown in detail in Fig. 5, provided with a semi-spherical valve chamber 44 from which leads a vent passage 45 extending for the major portion of its length axially of the piston and opening through one side thereof at a point beyond the outer end of the pump cylinder. Connected to the inner end of the piston is a valve cage 46 formed with a semi-spherical valve seat 47 mating with the chamber 44 and provided with a vent passage 48. The cage 46, as will be seen, is in the nature of a disk substantially equal in diameter to the diameter of the piston and forms a continuation thereof. Detachably connecting said disk with the piston is a plurality of screws or other suitable fastening devices 49 and clamped between the disk and the piston is a cupped packing washer 50 engaging the wall of the cylinder. Confined between the disk and the piston for free movement within the valve chamber 44, is a ball valve 51 movable to engage the seat 47 of the valve cage closing the vent passage 48 therethrough. Projecting from the refrigerator body in advance of the pump cylinder, is a guide bracket 52 slidably receiving the outer extremity of the piston 43 and swingingly connected at one end to the outer end of said piston is a link 53. The opposite end of this link is swingingly connected to a bracket 54 fixed to the door 20 adjacent the inner edge thereof. Thus, it will be seen that when the door is opened, the piston 43 will be moved inwardly within the pump cylinder 40 when the valve 51 will be shifted from its seat 47 so that the cylinder will be vented through the passages 45 and 48 of the piston and valve cage respectively. On the other hand, when the door is again closed, to accordingly shift the piston outwardly within the pump cylinder, the valve 51 will move to engage the seat 47 closing the passage 48 so that the said piston, in its outward movement within the pump cylinder, will create a suction therein tending to unseat the check valve 42 and exhaust air from the vacuum chamber 19. The valve 42 will, of course, normally act to prevent the entrance of air into the said chamber.

I accordingly provide an arrangement

wherein the operation of the refrigerator door, in the practical use of the device, will serve to exhaust from the vacuum chamber of the body of the refrigerator such air as may have found entrance into the said chamber so that a perfect vacuum may, as nearly as possible, be maintained in the chamber for thus effectually excluding heat from the interior of the refrigerator. If desired, the door may, of course, be opened and closed several times for the specific purpose of pumping the air from the vacuum chamber 19, and in order that a reading of the vacuum existing in the vacuum chamber may be easily had, a gage 55 is mounted upon the refrigerator body preferably above the door, to communicate with said chamber.

Having thus described the invention, what is claimed as new is:

1. A refrigerator including a base, a refrigerator body mounted thereon and formed with a door opening, a drain pipe upstanding within the refrigerator body, an ice tray mounted upon the said pipe above the door opening and communicating with the pipe, the bottom wall of the tray being formed with an opening adjacent the door opening for receiving ice into the tray, and a door normally closing the door opening.

2. A refrigerator including a body provided with a vacuum heat insulating chamber, a door normally closing the body, and means connected with the door and operable thereby for exhausting air from the said chamber.

3. A refrigerator including a body provided with a vacuum chamber, a door normally closing the body, and a pump operable by the door for exhausting air from the said chamber.

4. A refrigerator including a body provided with a vacuum chamber, a door normally closing the body, a pump cylinder mounted on the body and connected with said chamber, a check valve in the connection between the pump cylinder and the chamber, a piston reciprocable in the cylinder and provided with a vent passage, a valve carried by the piston and movable to close communication between the cylinder and said passage, and an operative connection between the piston and the door.

In testimony whereof I affix my signature.

GEORGE B. ROBISON. [L. S.]