No. 880,443. PATENTED FEB. 25, 1908.

F. V. DETWILER.

REFRIGERATOR.

APPLICATION FILED NOV. 30, 1906.

2 SHEETS—SHEET 1.

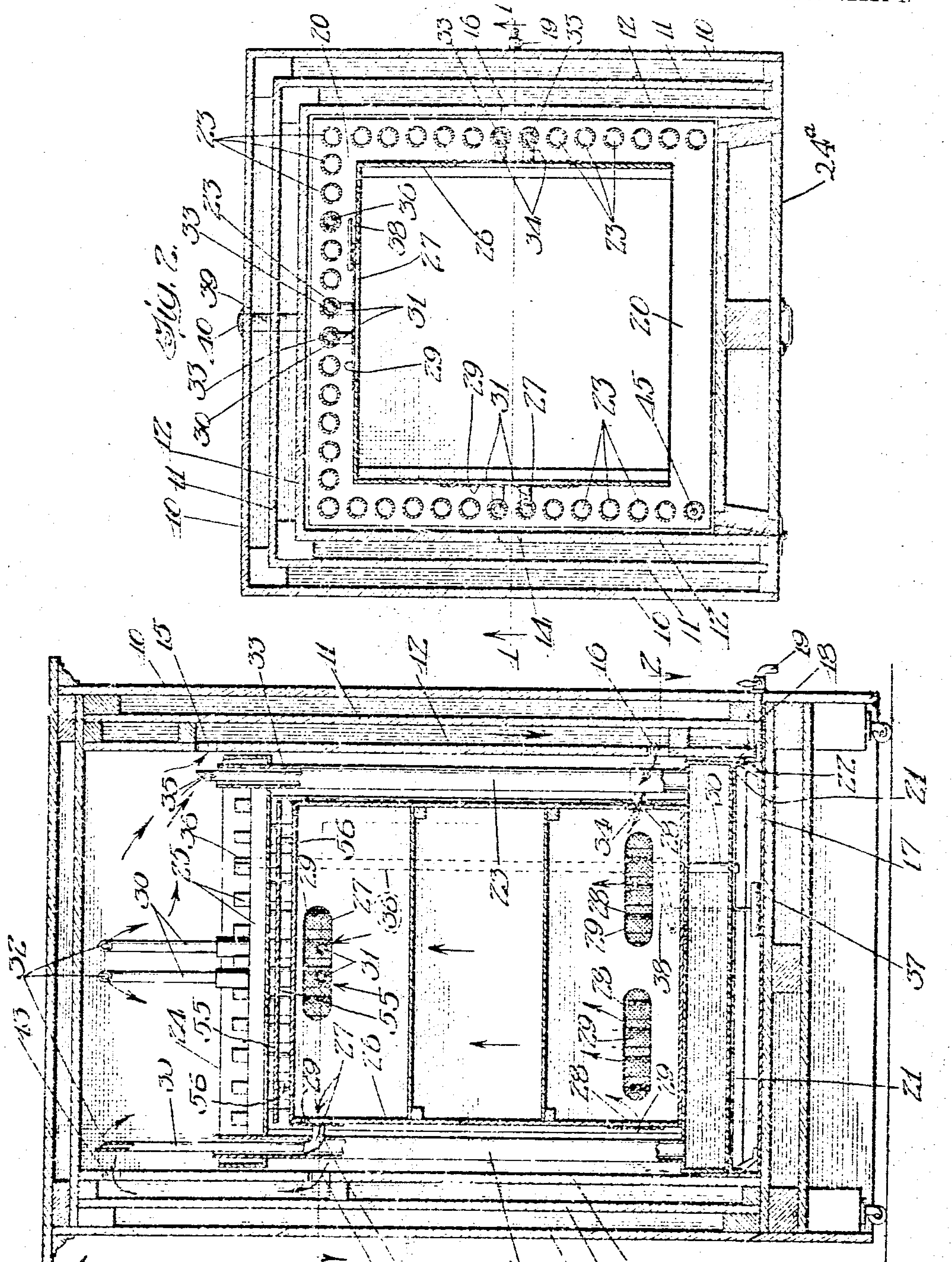

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Fig. 3.

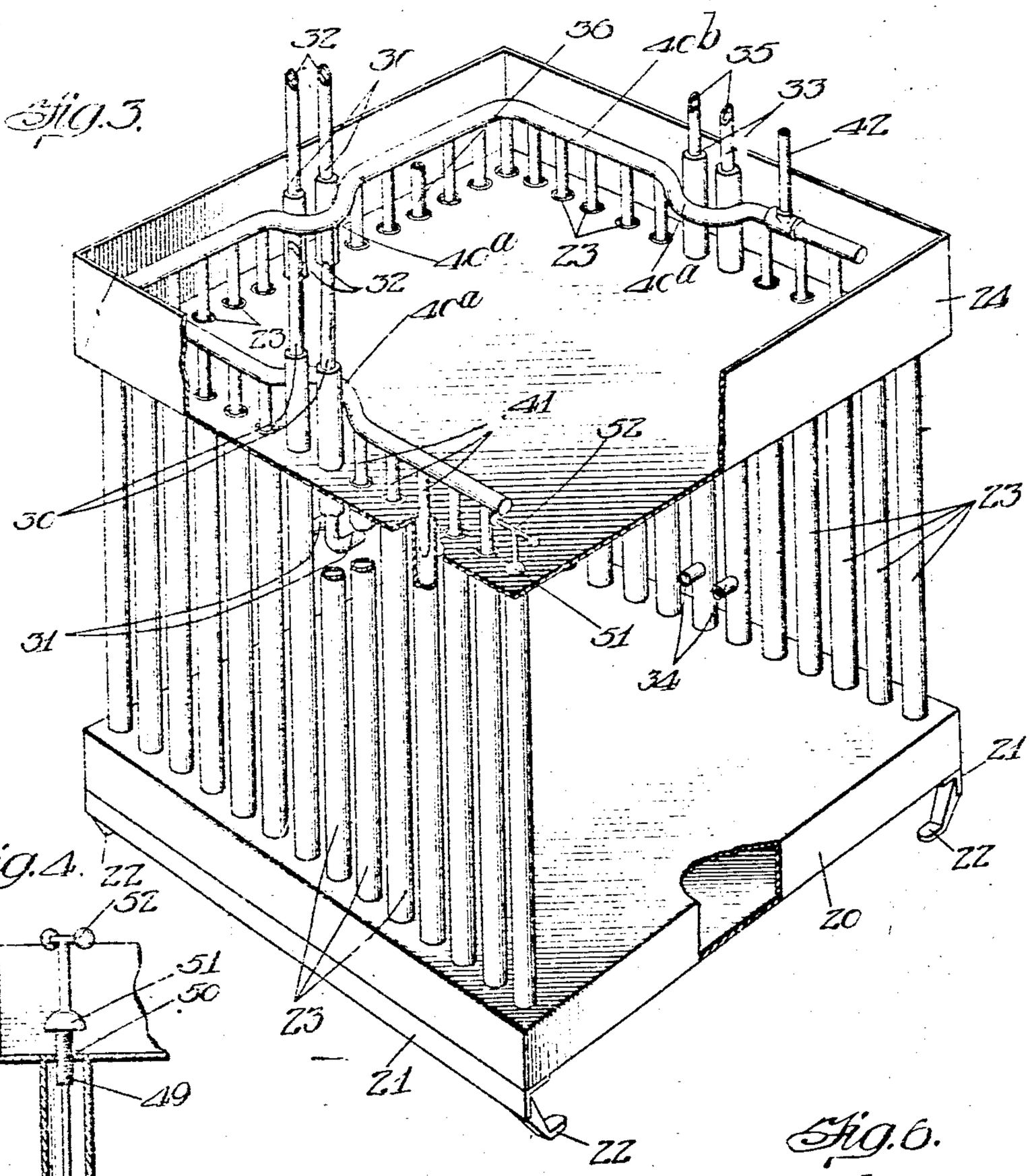


Fig. 4.

Fig. 5.

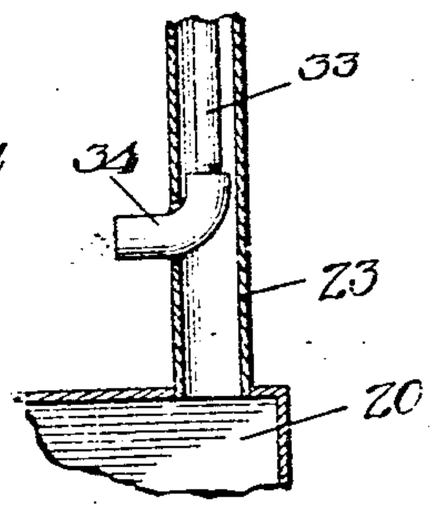
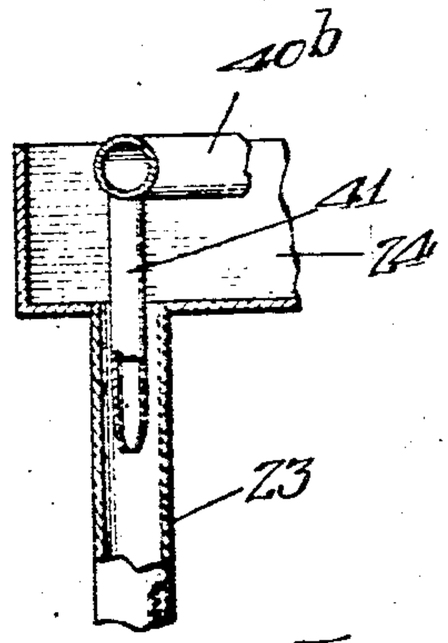


Fig. 6.



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UNITED STATES PATENT OFFICE.

FORREST V. DETWILER, OF CHICAGO, ILLINOIS.

REFRIGERATOR.

No. 880,443. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed November 30, 1906. Serial No. 345,709.

To all whom it may concern:

Be it known that I, FORREST V. DETWILER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Refrigerators, of which the following is a full, clear, and exact specification.

This invention relates to improvements in refrigerators, and the primary object of the same is to provide improved means whereby either the city supply of water, or ice may be used as a cooling medium.

A further object is to provide an improved device of this character containing a cooling casing which may be readily and bodily removed from the refrigerator.

A further object is to provide improved means for flushing or cleaning the cooling casing.

A further object is to provide an improved device of this character which will be simple, cheap, and durable in construction, and efficient in operation.

To the attainment of these ends, and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the various parts hereinafter more fully described and claimed, and shown in the accompanying drawings illustrating an exemplification of the invention, and in which—

Figure 1 is a longitudinal sectional view on line 1—1 of Fig. 2, with the fluid supply pipes removed for the purpose of a clearer illustration. Fig. 2 is a sectional view on line 2—2, of Fig. 1. Fig. 3 is a perspective view, partly in section, of the cooling casing with the flushing or cleaning means attached thereto, and with the ice supporting rack removed. Fig. 4 is a detail sectional view of the drain valve and its operating means. Fig. 5 is a detail view, partly in section, of the ventilating and cooling pipes. Fig. 6 is an enlarged detail sectional view of one of the cooling tubes and a portion of the flushing or cleaning mechanism.

Referring more particularly to the drawings, the same reference numerals designate similar parts throughout the several views, and in this exemplification of the invention the numeral 10 designates the outer casing or frame work of the refrigerator. This frame work or casing is preferably provided with an inner wall 11 spaced from the outer wall 10, and in said space may be arranged any suitable non-heat-conducting means, such as mineral wool or the like (not shown). A similar wall 12 is also arranged within the casing, and is spaced from the wall 11 in any suitable manner; and said wall is provided with a series of apertures or openings 13, 14, 15, 16, leading from the inside of the casing and communicating with the space between the walls 11 and 12, for a purpose to be hereinafter more fully set forth.

Arranged within the casing, in the usual manner, is a drip pan 17, leading from which is a suitable discharge pipe 18, which preferably passes through the walls of the casing and serves as a means for retaining the drip pan in position. If desired, a suitable faucet or discharge valve 19 may be secured to the end of the pipe 18 for discharging the liquid from the drip pan.

Arranged within the chamber formed by the inner walls 12 is a cooling casing which preferably comprises a hollow base 20, preferably in the form of a closed tank. Secured to the lower face of this base, preferably on opposite sides thereof, are suitable members 21, preferably in the shape of angle irons, which extend across the sides of said base; and secured to the extremities of these members 21, preferably at the corners of the base, are suitable feet or supports 22. The base 20 is of such a size and configuration as to fit within the drip pan 17, and when in position the feet or supports 22 rest upon the base of the pan, and said feet or supports are preferably of a height to hold the base 20 in such a position as to practically form a closure for the drip pan 17. Extending upwardly from the top of the base 20 and communicating therewith, are a plurality of tubes or pipes 23. These pipes may be of any desired size and configuration and supported by the upper ends thereof is a pan or tray 24 with which the pipes 23 communicate. Arranged within this pan or tray 24 is a suitable rack, preferably comprising a series of spaced cross-bars 25. This rack serves as a support for the ice. The pipes 23 are preferably arranged on three sides of the base 20, and form an open cooling casing. A suitable compartment or chamber 26 is adapted to be inserted into the casing through the open side or end thereof, and said compartment 26 is provided with a plurality of apertures 27, 28, arranged respectively adjacent the top and the bottom thereof, and said apertures

are preferably covered by suitable reticulated material 29, which serves to prevent the entrance of foreign matter into the compartment 26.

Within two of each row of tubes, 23, preferably adjacent tubes, centrally placed in the row, is arranged circulation air tubes 30. One end 31 of these tubes project through the tubes or pipes 23 and terminate adjacent the apertures 27, and preferably in close proximity to the reticulated material 29. The other end 32 of these tubes project through the top of the tubes or pipes 23 and preferably extend for some distance above the pan or tray 24, and terminate short of the top of the refrigerator casing.

Preferably arranged in the pipes 23, which are located adjacent the sides of the compartment 26, are tubes or pipes 33, the lower ends 34 of which project through the tubes or pipes 23 just above the top of the base 20 and terminate adjacent the apertures 28, and in close proximity to the reticulated material 29 which covers said apertures. The upper extremity 35 of the pipes 33 project above and terminate just beyond the pan or tray 24, and preferably terminate short of the extremity 32 of the tubes 30, and said tubes serve the purpose of determining the path of the air currents within the cooling chamber. A suitable over-flow pipe 36 is located in one of the tubes or pipes 23, and extends from a point within the pan or tray 24 above the end of the respective tube or pipe 23 and passes through the hollow base or tank 20, and projects into the drip pan 17. Within this drip pan is arranged a suitable float 37 connected to a suitable indicator 38, the end of which latter is adapted to be exposed through one of the apertures 28, and serves as a means for indicating the amount of water within the drip pan 17.

It is to be understood that the pan or tray 24 is located a suitable distance from the top of the refrigerator casing to provide a compartment for the ice, and that the refrigerator casing is provided with a suitable aperture closed by the door 24ª more clearly shown in Fig. 2, and through which the ice may be inserted and placed upon the rack 25.

It will be seen that when the ice melts, water will drop into the pan or tray 24, and from there will flow through the pipes or tubes 23 and into the hollow bottom or tank 24, and when the tubes, tank, and pan or tray 24 are filled with water, the excess or surplus water will pass through the over-flow pipe 36, shown more clearly in Fig. 3, and into the drip pan 17 from where it may be drawn off by means of the faucet 19. As the ice continues to melt, the cold temperature will work its way downward through the tubes 23, thereby chilling the tubes and reducing the temperature of the liquid in the tubes, and as the cold temperature is radiated from the tubes into the chamber, the warm air therein will be forced out through the tubes 30. When the water in the tank 20 and the pipes 23 becomes warm, it may be drawn off through the valve 44.

Passing through the walls of the casing preferably at a point below the pan or tray 24, is a tube 39, the exposed end of which is preferably covered by suitable reticulated material 40. The purpose of this tube is to admit the external air into the refrigerator for the purpose of ventilation. The air entering the refrigerator through this pipe will be chilled by coming in contact with the tubes or pipes 23, which latter are filled with cold water.

The circulation of the air within the refrigerator will be as follows: The warm air which is located within the compartment 26 will rise to the top thereof and pass into the tubes or pipes 30 through the open ends 31 thereof, and will be carried by said pipes to the top of the ice chamber or to a point above the ice, and will be discharged in said chamber. When the air enters the ice chamber its temperature will be greatly reduced. The incoming warm air will tend to force the cool air out of the ice chamber, a portion of the cool air entering the end 35 of the tube or pipe 33, and will be discharged through the open end 34 into the compartment 26. The other portion of the cool air will be forced through the aperture or opening 15 into the space between the walls 11 and 12 of the refrigerator, and will discharge through the aperture 16 back into the chamber in the space between the walls 12 and the tubes or pipes 23, and will circulate in said space and pass out of the aperture opening 14 into the space between the walls 11 and 12, adjacent the ice chamber, and will be discharged through the aperature or opening 13 back into the ice chamber. It will thus be seen that with this improved arrangement, a complete and perfect circulation of the air, as well as of the cooling medium, will be obtained.

In order to flush or clean out the pipes 23 a suitable pipe 40ᵇ may be provided which has a source of fluid supply outside of the refrigerator. This pipe 40ᵇ is preferably bent into suitable shape so as to fit within the pan or tray 24, and said pipe is deflected or off-set at the points 40ª, or wherever necessary, to permit the same to pass around the air tubes or pipes 30, 33. Depending from this pipe 40ᵇ are a plurality of pipes or nozzles 41, which may be of any desired length, and preferably of an exterior diameter slightly less than the interior diameter of the tubes or pipes 23. A suitable pipe 42 may be connected to the pipe 40ᵇ, and said pipe 22 leads to any source of supply (not shown). These tubes may be inserted in the tubes or pipes 23, and are supported preferably by means of the pipe 40ᵇ resting upon the bottom of the pan or tray

24. It will thus be seen that when the supply of running water is admitted into the pipe 40^b through the pipe 42, it will be discharged into the pipes or tubes 23 through the nozzles 41 for flushing or washing out the cooling casing, and in order to permit the water to pass out of the tank 20 without accumulating therein and in the pipes 23, a suitable discharge opening or aperture 42' may be provided, preferably directly under one of the tubes 23. Connected to this discharge opening is a suitable pipe 43, which may lead to any desired point of discharge.

Instead of employing ice as a supply for the cooling medium it may be desired to use running water for this purpose in which event a valve 44 is arranged to close the discharge opening 42. Any suitable means may be provided for seating and unseating the valve 44, but a simple and efficient means comprises a rod or bar 45, one end of which passes through the valve 44, and said rod is rotatively secured to the valve in any desired manner, preferably by means of a pin 46 which passes through the rod beneath the valve. A similar pin 47 passes through the rod at a point above the valve, and disposed between the pin 47 and the upper face of the valve 44 is a suitable flexible member 48, such as a coil spring, which surrounds the rod and has a bearing upon the pin 47 and the face of the valve 44.

The upper end of the rod 45 passes through the tube or pipe 23 and terminates in a threaded portion 49, which is adapted to engage a suitable threaded portion 50 in the bottom of the pan or tray 24, above the respective tube or pipe 23. The threaded portion 50 is provided with a suitable shoulder or collar 51, located at a point above the bottom of the pan or tray 24, and said rod terminates in a suitable operating handle 52.

A suitable gasket 53 is preferably arranged around the discharge opening 42, and said gasket is of such a size as to enter a coöperating groove or depression 54 in the lower face of the valve 44. It will be seen that when the operating handle 52 is rotated, the threaded portion 50 will feed the rod 45 downward when rotated in the proper direction to close the valve, and the pressure of the pin 47 upon the yielding member 48 will force the valve 44 against the gasket 53.

In seating the valve, the natural tendency of a careful operator is to forcibly seat the same to prevent any possible leaking. In ordinary constructions it often happens that the operator endeavors to seat the valve with too much force, that is, after the valve is properly seated further pressure upon the valve tends to strain the parts, and sometimes breaks the valve from its operating stem, if the operating stem is of any considerable length, as in the present instance. It will be noted that with this construction, no matter how forcibly the operator seats the valve, a continued rotation of the handle 52 will cause the rod or stem 45 to rotate independently of the valve, thereby obviating the danger of snapping or breaking the valve from the stem.

When the valve is seated, the water may be discharged into the pipes or tubes 23 through the nozzle 41 and will accumulate therein and fill the tank or bottom 20. When the tank or pipes are filled, the overflow from the pan or tray 24 will pass out of the overflow pipe 36 and be discharged into the drip pan 17.

In order to prevent the accumulation or formation of "sweat" between the top of the compartment 26 and the bottom of the pan or tray 24, a suitable plate or member 55 may be arranged between and equally spaced from the top of the compartment and the bottom of the pan or receptacle. This plate 55 may be supported in any suitable manner, such as by means of supports 56 extending above the top of the compartment 26. With such an arrangement the cold air will be permitted to circulate more freely and the plate will serve as a means for equally distributing or equalizing the temperature at the sides of the compartment, as well as at the top.

If desired the upper ends of the respective tubular members 23 may project through the bottom of the pan or tray 24 so as to surround and respectively protect the air or circulation pipes 30, 32, 33, as shown more clearly in Fig. 3 of the drawing. This arrangement prevents the pipes from being damaged by means of the ice, if ice is used as the cooling medium.

In order to take applicant's refrigerator apart, the pipe 40^b, if used, is first removed through the top of the outer casing, after which the hollow casing, together with the inside chamber, may be removed, and then the inside chamber may be removed through the open front of the hollow casing. And when it is desired to remove the tubes 30, and also the tube 33, they may be detached by unscrewing them from the elbows or members 31.

In order that the invention might be fully understood by those skilled in the art, the details of the foregoing embodiment thereof have been thus specifically described but

What I claim as new therein and desire to secure by Letters Patent is—

1. In combination, in a refrigerator, a casing comprising a hollow base, a hollow wall comprising spaced tubes supported by and communicating with the base, means whereby said casing may be supplied with a cooling fluid and air pipes within the wall, one end of said pipes projecting through the wall below the casing and the other end extending to a point above the casing.

2. In combination, in a refrigerator, a

casing comprising a hollow base, a plurality of tubular members supported by and communicating with the base, a receptacle supported by and communicating with the tubular members, said receptacle having a source of supply of cooling fluid, and air pipes located in some of said members, said pipes on one side of the refrigerator extending nearly to the top of the base and on the other side terminating just below the said receptacle, one end of the pipes projecting through the side of the respective members, the other ends passing through the tops of the members and the receptacle and terminating above the receptacle, the upper end of certain of said pipes terminating short of the remaining pipes.

3. In combination, in a refrigerator, a casing comprising a hollow base, a plurality of tubular members supported by and communicating with the base, a receptacle supported by and communicating with the tubular members, said receptacle having a source of supply of cooling fluid, and air pipes located in some of said members, the external diameter of said pipes being considerably smaller than the internal diameter of the members, one end of said pipes projecting through the side of the members below the receptacle, the projecting ends on one side being located adjacent the base and on the other side adjacent the receptacle and the other ends of the pipes projecting through the members and terminating above the receptacles.

4. In combination, in a refrigerator, a casing comprising a hollow base, a plurality of tubular members supported by and communicating with the base, a receptacle supported by and communicating with the members, said receptacle having a source of supply of cooling fluid, and air circulating pipes located within some of the tubular members, one end of said pipes projecting through the side of the members, the other ends projecting through and terminating above the receptacle, the projecting end of some of said pipes being located below and adjacent the receptacle and the projecting end of the remainder of the pipes being located above and in proximity to the hollow base.

5. In combination, in a refrigerator, a casing comprising a hollow base, a plurality of tubular members supported by and communicating with the base, a receptacle supported by and communicating with the members, said receptacle having a source of supply of cooling fluid, and air circulating pipes located within some of the tubular members, one end of said pipes projecting through the side of the respective members, the other ends projecting through and terminating above the receptacle, the projecting end of the pipes on one side being located below and adjacent the receptacle and the projecting end of the pipes on the other side being located above and in close proximity to the hollow base and the upper end of the last said pipe terminating short of the upper end of the remaining pipes whereby an air circulation is obtained through the pipes.

6. In combination, in a refrigerator, a casing comprising a hollow base, a plurality of tubular members supported by and extending partially around the periphery of said base, said members having communication with the base, a receptacle supported by and having communication with the members, said receptacle having a source of supply of cooling fluid, air pipes located within some of the members, the ends of said pipes projecting through the sides of the members, some of said projecting ends being located adjacent the base and the others adjacent the receptacle, the free ends of the pipes projecting through and terminating above the receptacle, and a removable chamber within the casing, said chamber being provided with apertures adapted to register with the ends of the pipes projecting through the sides of the members.

7. In a refrigerator, the combination of an outside casing, a drip pan within the casing having a discharge outlet, a removable casing within the first casing, and comprising a hollow base, tubular members supported by and extending partially around the periphery of the base, said members having communication with the base, a receptacle supported by and having communication with the tubular members, said receptacle having a source of supply of cooling fluid, means for supporting the base of the casing above the drip pan, an overflow pipe within one of the members and leading from the receptacle to the drip pan, a chamber removably seated in the casing and provided with apertures in the sides thereof, and air pipes projecting through some of the members and having communication with the chamber through the apertures, the free ends of said pipes projecting and terminating above the receptacle.

8. In a refrigerator, the combination of an outside casing, a hollow casing removably seated within the first said casing and having a source of liquid supply, a drip pan having a discharge outlet, an overflow pipe leading from the casing and discharging into the pan, a chamber removably seated in the second casing and having apertures in the walls thereof, air pipes one end of which project through the wall of the hollow casing and communicate with some of

the apertures, an indicator visible through one of the apertures, and a float in the drip pan for operating the indicator.

9. In a refrigerator, the combination of an outside casing provided with an air passage communicating with the interior of the casing, a hollow casing removably seated within the first said casing, and having a source of supply of cooling fluid, a chamber removably seated within the second said casing and provided with apertures in the walls thereof, air pipes one end of which project through the hollow casing and having communication with the chamber through the apertures, and with the inside of the outside casing, and means for admitting external air into the outside casing.

10. In combination, in a refrigerator, a hollow casing adapted to receive a cooling liquid, said casing comprising a hollow base and side walls, a receptacle supported by and communicating with the hollow walls, said base being provided with a discharge outlet, a valve within the base for closing the outlet, and means for operating the valve, said means being located within the wall of the casing with a portion thereof projecting above the said wall.

11. In combination, in a refrigerator, a casing comprising a hollow base, a plurality of tubular members supported by and communicating with the base, a pipe adapted to receive a supply of fluid, a plurality of discharge nozzles connected to the pipes, and one of which projects into each of the tubular members for directing the fluid into the members and the base, and an overflow for said casing.

12. In combination, in a refrigerator, a casing, comprising a hollow base, a plurality of tubular members supported by and communicating with the base, air pipes located within some of the members, said air pipes being of an external diameter less than the internal diameter of the tubular members, one end of said pipes projecting through the side of the members, the free ends extending and terminating above the casing, a pipe, a plurality of discharge nozzles secured to said pipe and projection into the remaining tubular members, said pipe being adapted to receive a liquid supply, and an overflow pipe leading from the casing.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 24th day of November A. D. 1906.

FORREST V. DETWILER.

Witnesses:
FRANCIS A. HOPKINS,
CHAS. H. SEEM.