(No Model.)

D. L. STAGE.

REFRIGERATOR.

No. 564,165. Patented July 14, 1896.

FIG. 1.

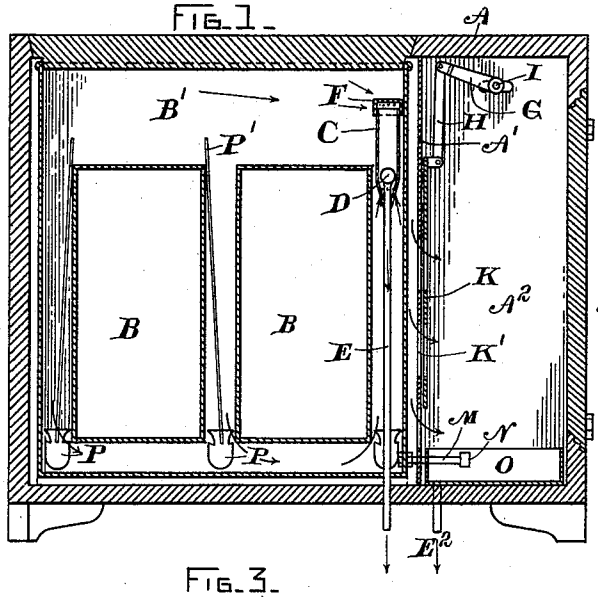


FIG. 3.

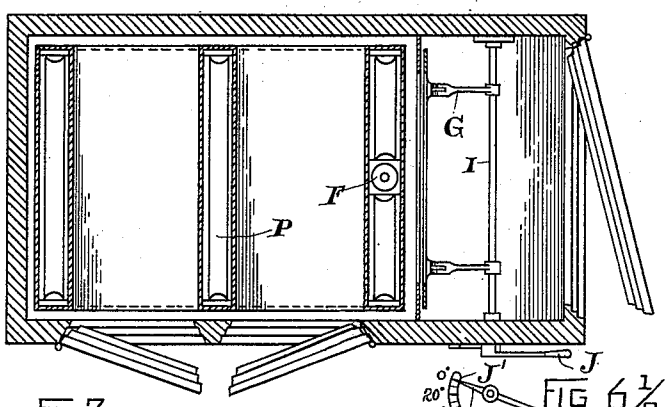


FIG. 6½

FIG. 2.

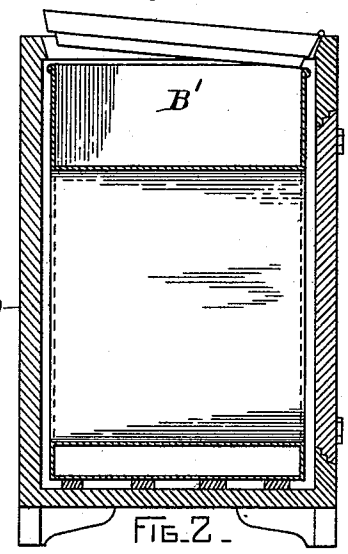
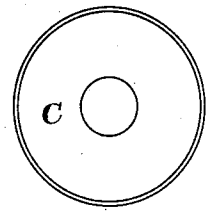


FIG. 5.



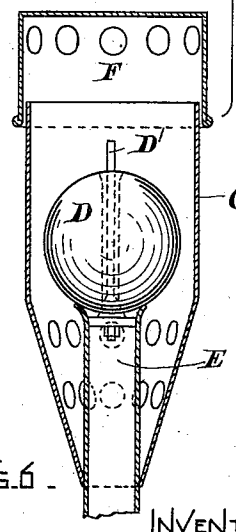
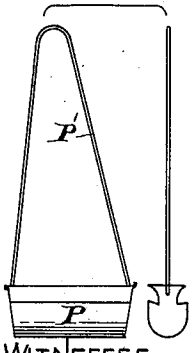


FIG. 6.

FIG. 7.



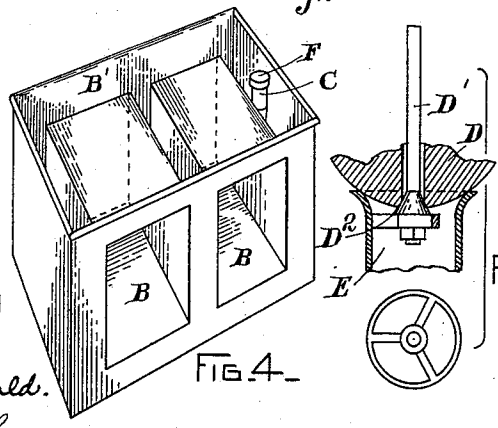


FIG. 4.

WITNESSES.

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UNITED STATES PATENT OFFICE.

DAVID L. STAGE, OF SCHENECTADY, NEW YORK.

REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 564,165, dated July 14, 1896.

Application filed September 24, 1894. Serial No. 524,008. (No model.)

To all whom it may concern:

Be it known that I, DAVID L. STAGE, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Refrigerators, of which the following is a specification.

This invention relates to refrigerators, and has for its object to provide a refrigerator which will rapidly and with great efficiency reduce the temperature therein to a low degree and maintain such low temperature under all conditions and circumstances.

The invention also has for its object to economize the means for producing and maintaining such low degree of temperature, thereby effecting a great saving in the consumption of the material employed for obtaining and maintaining said low degree of temperature, such as ice and salt, and also avoiding objections heretofore existing, such as the waste of the cold-producing material and the interruptions incident to removing such material and replenishing it, which injuriously interferes with and impedes the action of producing and maintaining such low temperature.

This invention consists in an apparatus for producing and maintaining a low degree of temperature in refrigerators, as hereinafter set forth and claimed.

Referring to the accompanying drawings, Figure 1 is a view in vertical section of a refrigerator constructed according to this invention. Fig. 2 is an end view of the same in vertical section. Fig. 3 is a plan view thereof with cover removed. Fig. 4 is a perspective view of the removable storage-receptacle removed from the refrigerator-casing. Fig. 5 represents detail and enlarged views, in plan and vertical section, of the upper portion of the air and water escape pipe and automatic valve. Fig. 6 represents details of the air and water discharge pipe and automatic valve in plan view and partly in section. Fig. 6½ also represents an indicator employed with a modification of the invention. Fig. 7 represents details of the invention, showing in end and side elevation a removable receptacle for catching the salt.

To illustrate the means for carrying out the invention, the following-described apparatus is shown: A indicates the casing of the refrigerator. Within the casing A is located any suitable arrangement of cold-storage receptacles, such as a metal tank B′, formed with the spaced cold-storage receptacles B B, in which are located the articles to be kept cold or frozen, and so disposed as to have surrounding passages or air-spaces to be filled with ice, or ice and salt, or other refrigerating material. To catch the salt that may drop down to the bottom of the tank, suitable receptacles, such as perforated receptacles P, are located at the bottom of the tank, between the receptacles B B, and are provided with the handles P′, which extend up between and above the receptacles B B, so that the salt-receptacles P may be readily lifted out of the tank.

A very low degree of temperature is obtained and maintained, in conjunction with the ice, or ice and salt, or other refrigerating material, by the following means: Within the metallic tank B′, containing the cold-storage receptacles B B, is located a tube E, having its lower end extending through the bottom of the metallic tank and casing A and its upper end projecting into a perforated enlargement or chamber preferably located approximately in the top of the tank B′ and somewhat above the receptacles B B. The top of the enlargement C is covered by a perforated cap F. Within the enlargement C is located a suitable automatic valve, as here shown, consisting of a ball-valve D, which rests on the upper flaring end of the tube E. To maintain the ball-valve D in position and direct it to its proper position when being seated on the tube E, a guide is preferably employed, as, for example, the spindle or projection D′, which is secured to the end of the tube E and extends through a passage-way or perforation D^2, extending through the ball D and of a size larger than the diameter of the spindle, so as to afford the downward passage and escape of air. The spindle serves to direct and seat the ball on the end of pipe E, and the passage-way D^2 permits the warm air from the chamber to escape into the pipe E when the valve is open.

It will be noticed that the base of the spindle D′ is cone-shaped and the lower end of the passage-way D^2 is correspondingly shaped

to fit over the base of the spindle D′, so that when the ball-valve D is seated on the upper end of the tube E the passage-way D^2 will be closed. When the ball-valve D is raised by the action of the rising water, the passage-way D^2 will be opened into communication with the tube E.

The purpose and operation of the device, in conjunction with the ice and salt or other refrigerating material, will now be explained. The spaces or passage-ways between the receptacles B B having been packed with ice, or ice and salt, or other refrigerating material, the ice melts until the water rises to the perforations in the enlargement C, and passing through the same reaches the level of the ball-valve D. The valve D is then lifted automatically by the rising water and the latter rushes down the tube E and escapes at its lower end into any suitable receptacle or drain-pipe with which the tube E may be connected. As the cold water escapes through tube E the warm air in the tank B′ will be drawn into the enlargement C through the perforations in the cap F and carried down the tube E. In this connection it will be observed that as the ball-valve D is lifted by the water the lower end of the passage-way D^2 will be opened and permit the warm air to be drawn down the passage-way D^2 and pipe E by the action of the cold water running into and down the pipe E. By this means when the valve is operated a circulation of the water takes place, as indicated by the arrows, and the warm air at the top of the refrigerator is removed.

The bottom of the removable tank is provided with a pipe M for discharging the water when the tank is not in use. The outer end of pipe M is closed by a cap N and may project into a pan O, having a discharge-pipe E^2, or the water may be discharged through pipe M into a drain-pipe or other suitable receptacle. The salt that drops to the bottom of the metal tank is caught in the receptacles P, and the latter are removed by means of the handle P′.

In connection with the apparatus heretofore described I may provide a cold-storage chamber A^2 in the casing A by means of the partition A′ extending across the interior of casing A and located adjacent to one of the walls of the removable tank. The cold air surrounding the removable tank B′ is admitted to the chamber A^2 by any suitable means, and, as here shown, by means of a slide or gate K, controlling openings K′ in the partition A′. The gate K is operated by means of the handle J on the outside of casing A^2, mounted on the shaft I, having the lever arms G, pivotally connected by the arms H with gate K. By this means the amount of cold air desired to be admitttd to the chamber A^2 may be regulated and can be determined by a gage or scale J′, over which the pointer J^2 on handle J may be moved.

By means of this invention different degrees of temperature may be obtained and maintained in separate chambers in the refrigerator, being below the freezing-point in one chamber and above in the other. The temperature in the main chamber may be obtained and maintained at a very low degree with a great saving in the consumption of ice and salt.

Having described my invention, I claim—

1. A refrigerator provided with a water and air discharge pipe having its upper end provided with a valve controlling the discharge of water and warm air from the refrigerator.

2. A refrigerator provided with a discharge-pipe, having its upper end provided with an automatic valve controlling the discharge of water and warm air from the refrigerator.

3. A refrigerator provided with a water-discharge pipe, having its upper end located approximately adjacent to the top of the refrigerator, substantially as herein described, and provided with an automatic valve controlling the discharge of the water and warm air as the valve is opened by the rising of the water.

4. A refrigerator provided with spaced cold-storage receptacles and a water-discharge pipe having its upper end provided with an automatic valve located approximately adjacent to the top of the spaced cold-storage receptacles and controlling the discharge of the water as it rises and the escape of warm air.

5. A refrigerator provided with a water-discharge pipe having its upper end projecting into a chamber mounted thereon and located approximately adjacent to the upper part of the refrigerator-chamber, and having perforations located above and below the upper end of the water-discharge pipe, in combination with a valve mounted on the upper end of the water-discharge pipe, for the purpose set forth.

6. In a refrigerator, a water-discharge pipe having a chamber mounted at its upper portion into which the water-discharge pipe projects, and perforations in the chamber below and above the end of the water-discharge pipe, a vertical spindle on the upper end of the water-discharge pipe, and a ball-valve seated on the upper end of the water-discharge pipe and movable vertically on the spindle, the ball-valve having a passage through which the spindle projects and affords an air-space surrounding the spindle and extending through the ball-valve.

7. In a refrigerator, a cold-storage receptacle provided with a water-discharge pipe having its upper end located approximately adjacent to the top of the cold-storage receptacle and provided with an automatic valve controlling the discharge of water and warm air as the water rises to the valve, in combination with a second cold-storage chamber provided with means, substantially as described, for regulating the admission of cold air from the first cold-storage chamber, as set forth.

8. In a refrigerator, a water and air discharge pipe provided with water and air in-

lets, in combination with an automatic valve controlling the simultaneous discharge of air and water.

9. In a refrigerator, an air and water discharge pipe, in combination with a ball-valve having an air-passage extending through the same, with means for closing the same when the ball-valve is seated, and a guide for seating the ball-valve.

10. In a refrigerator, an air and water discharge pipe having a perforated chamber surrounding its inner end, in combination with a ball-valve seated on the inner end of said air and water discharge pipe, and having an air-passage extending through the ball-valve, and a spindle mounted on the inner end of said air and water discharge pipe and projecting through the air-passage in the ball-valve, said air-passage affording an air-space above the spindle and having its lower end closed by the base of the spindle when the ball-valve is seated.

11. A refrigerator provided with a cold-storage compartment or compartments and a combined air and water discharge opening provided with a seal or valve normally closing the air-space in the refrigerator, said seal or valve being adapted to be temporarily opened by the accumulation of water from the melted ice, to permit the warm air and a portion of the water to escape, for the purpose set forth.

In witness whereof I have hereunto set my hand this 17th day of September, 1894.

DAVID L. STAGE.

Witnesses:
EVERETT SMITH,
JOHN D. MILLER.