J. C. KELLY.

REFRIGERATOR.

APPLICATION FILED JUNE 15, 1908.

930,190. Patented Aug. 3, 1909.

Fig. 1.

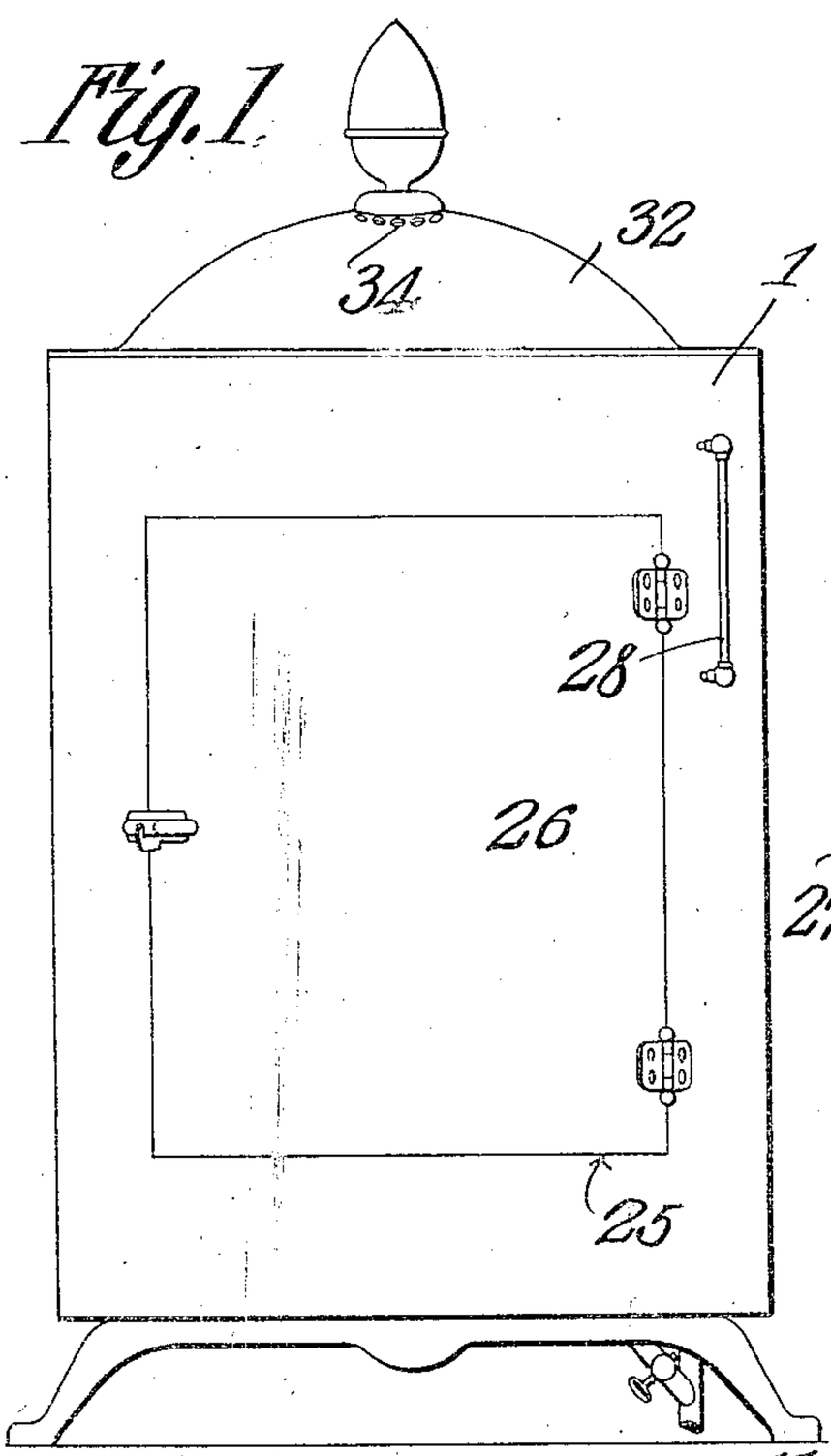


Fig. 2.

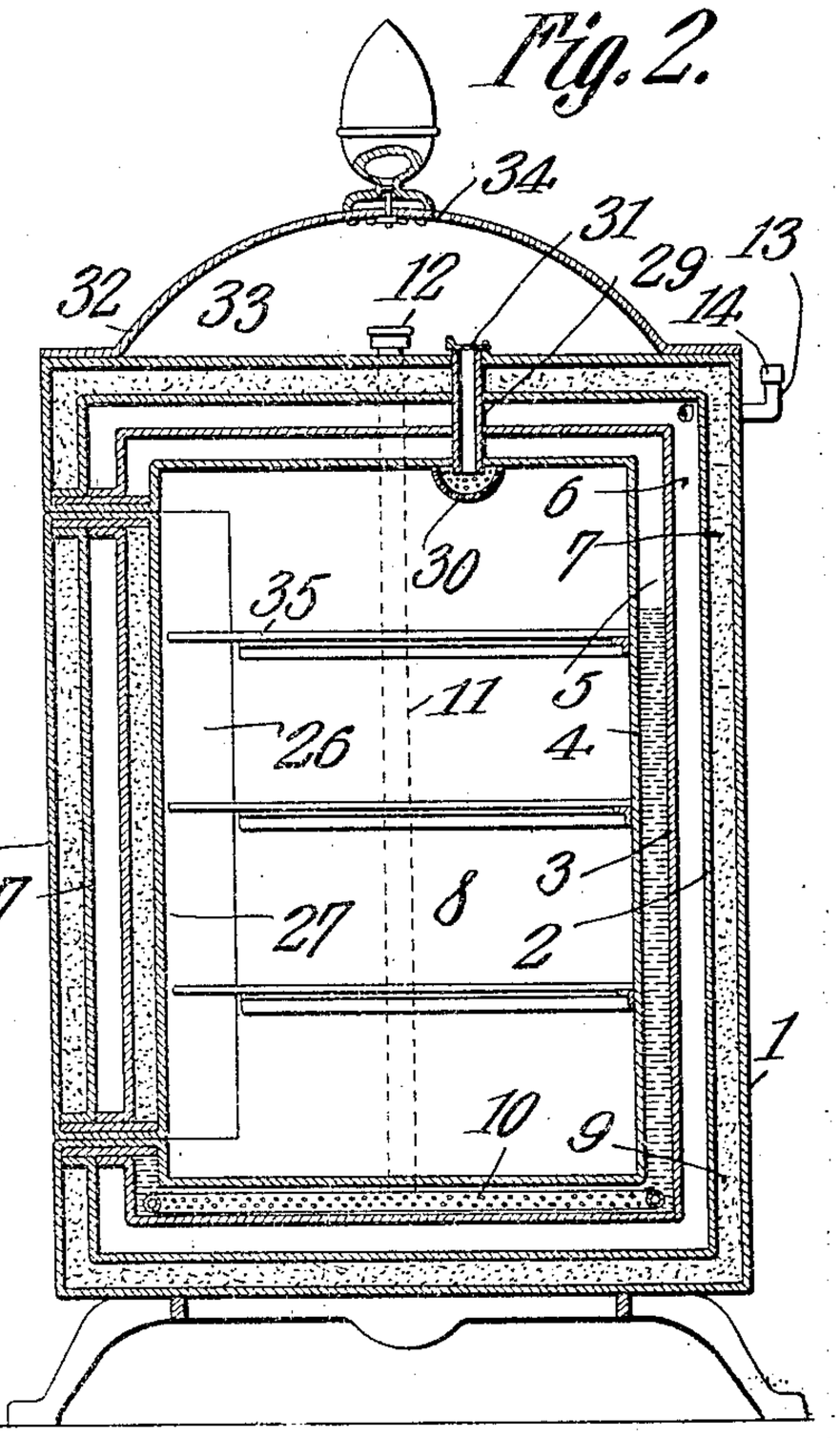
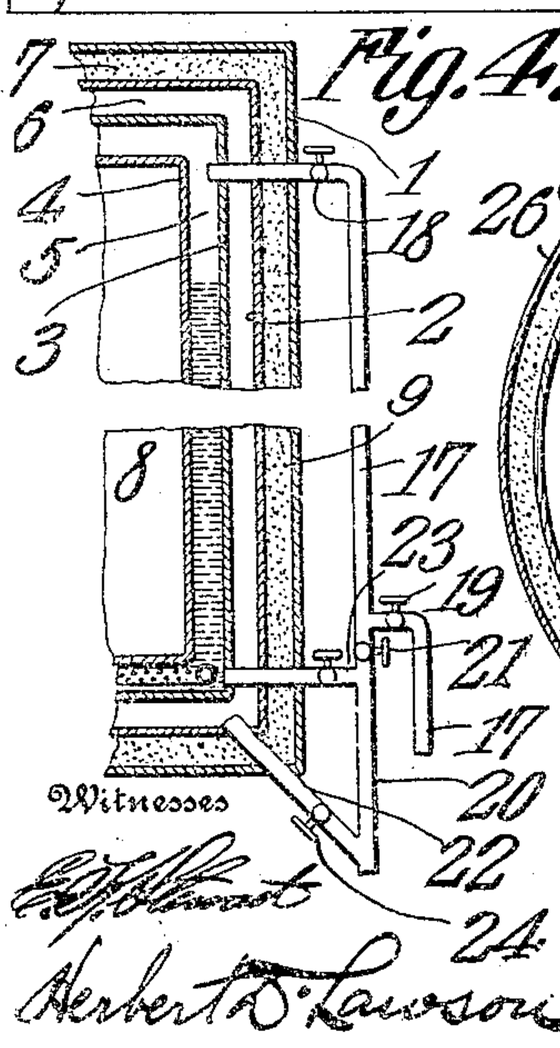


Fig. 4.



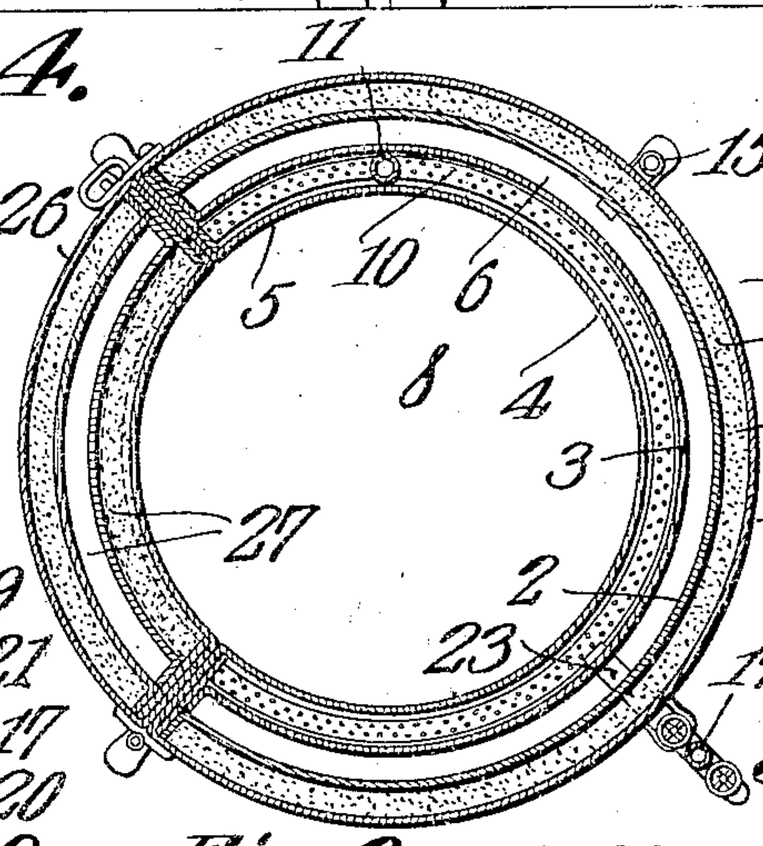
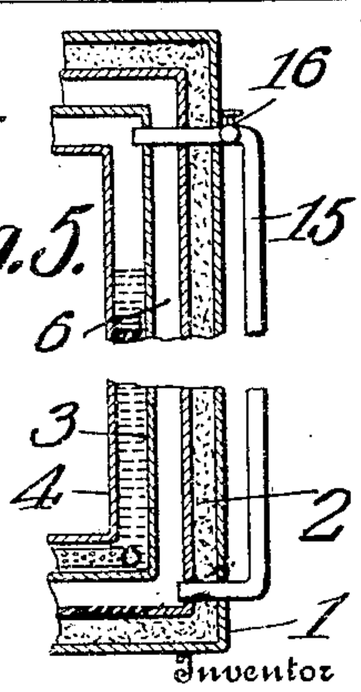


Fig. 5.



Witnesses

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Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES C. KELLY, OF DE KALB, ILLINOIS, ASSIGNOR OF SIX-TENTHS TO CHARLES F. SMITH, OF DE KALB, ILLINOIS.

REFRIGERATOR.

No. 930,190. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed June 15, 1908. Serial No. 438,643.

To all whom it may concern:

Be it known that I, JAMES C. KELLY, a citizen of the United States, residing at De Kalb, in the county of Dekalb and State of Illinois, have invented a new and useful Refrigerator, of which the following is a specification.

This invention relates to refrigerators of that type in which chemicals are used as a refrigerant, thus obviating the necessity of using ice, the refrigerator being so constructed that the cost of maintaining the interior thereof at a predetermined temperature is greatly reduced as compared with those types of refrigerators in which ice is utilized.

With these and other objects in view the invention consists of certain novel features of construction and combinations of parts which will be hereinafter more fully described and pointed out in the claims.

In the accompanying drawings is shown the preferred form of the invention.

In said drawings: Figure 1 is a front elevation of a refrigerator constructed in accordance with the present invention. Fig. 2 is a central vertical section therethrough. Fig. 3 is a central horizontal section. Fig. 4 is a vertical section through a portion of the refrigerator and showing the feed and drain pipe in elevation. Fig. 5 is a vertical section of a portion of a refrigerator and showing in elevation the pipe employed for establishing communication between the inner and outer refrigerating compartments.

Referring to the figures by characters of reference, 1 designates the outer cylindrical shell of the refrigerator and within this shell and spaced therefrom and from the top and bottom of said outer shell are inner cylindrical shells 2, 3 and 4, all of said shells being preferably formed of metal and forming a refrigerant compartment 5 and insulating compartments 6 and 7 therebetween. The inner compartment 5 is located between the two inner shells 3 and 4 while the insulating compartment 7 is located between the two outer shells 1 and 2. The inner insulating compartment 6 is disposed between the two shells 2 and 3. All of these compartments are continuous in that they extend around, over and under the inner or provision chamber 8 of the refrigerator. The compartment 7 is preferably packed with charcoal, sawdust, or any other suitable material such as indicated at 9 whereby atmospheric heat may be kept from the inner shell of the device.

A circular discharge pipe 10 having minute apertures is located between the bottom portions of the shells 3 and 4 and is fed from a stand pipe 11 extending upwardly between the two shells 3 and 4 and through the tops of the outer shells, the upper or accessible end of the stand pipe being preferably provided with a suitable valve 12 whereby the admission of air to the stand pipe can be readily controlled. A blow-off pipe 13 extends from the upper portion of the compartment 6 and through the outer shells 1 and 2, said pipe having a safety valve 14 thereon designed to open at a predetermined pressure. Another pipe 15 extends from the upper part of the inner compartment 5 to the lower portion of the inner insulating compartment 6, the intermediate portion of said pipe 15 being preferably positioned outside of the refrigerator and provided with a valve 16 whereby communication between the two compartments 5 and 6 through this pipe may be controlled. A water supply pipe 17 extends upwardly and opens into the upper portion of the refrigerant compartment 5, there being valves 18 and 19 in the upper and lower portions of this pipe for controlling the action of the water therein. A drain pipe 20 extends downward from pipe 17 and is valved as shown at 21, and branch pipes 22 and 23 extend from the lower portions of the compartments 6 and 5 respectively, each of said drains having a valve 24 for closing it.

A door opening 25 is formed within all of the shells, the compartments being closed where they surround the door opening. The hinged door 26 which is normally seated within the opening 25 is made up of spaced plates 27 corresponding with the shells 1, 2, 3 and 4, the spaces between the inner and outer pairs of plates being preferably filled with suitable insulating material such as that used in the compartment 7.

A gage glass 28 is located preferably upon the front portion of the refrigerator and opens at its ends into the inner compartment 5. A ventilating tube 29 extends through the top portions of the shells and opens at its

lower end into an apertured cap 30 secured upon the inner face of the top of the inner shell 4. The upper end of the tube, which extends through the top of the outer shell 1 is provided with a valve 31 designed to open outwardly under pressure from within the refrigerator. A concavo-convex cover 32 is arranged normally upon the top of the refrigerator there being a compartment 33 thereunder into which the pipe 11 and the tube 29 open. Ventilating openings 34 are preferably formed within the cover 32. It is of course to be understood that any desired arrangement of shelves 35 may be provided within the provision chamber 8.

When it is desired to use this refrigerator water is supplied in the inner compartment 5 from pipe 17 until a desired level has been reached within said compartment, said level being indicated in the glass 28. A suitable heat absorbing chemical is then supplied to the pipe 10 through stand pipe 11 and this chemical, which may be in the form of muriate of ammonia will flow directly through the minute openings within the pipe 10 and commingle with the water contained within compartment 5. Obviously, the discharge of the chemical through the openings can be more or less regulated by means of the valve 12 which can be shifted so as to control the admission of air to the stand pipe. As the chemical mixes with the water contained within compartment 5 the heat within the water will be absorbed thereby and the temperature within the compartment 5 and obviously within the chamber 8 will thus be reduced. Any gases, such as ammonia gas arising from the mixture in compartment 5 will be free to pass through the pipe 15 to the lower portion of the compartment 6, thus assisting in the insulation of the provision chamber against the action of the heat concontained within the surrounding atmosphere. By providing the tube 29 the provision chamber 8 is thoroughly ventilated at all times.

It will be found that by using a refrigerator such as herein described the cost of maintaining the provision chamber at a reduced temperature is considerably less than where ice is utilized for keeping cool a provision chamber of similar size.

What is claimed is:

1. A refrigerator comprising nested spaced concentric shells surrounding an inner provision chamber, said shells forming a refrigerant compartment and inner and outer insulating compartments therebetween, chemical distributing means within the refrigerant compartment, means for supplying water to said compartment, and means for directing gas from the upper portion of said compartment to the inner insulating compartment.

2. A refrigerator comprising nested spaced concentric shells surrounding an inner provision chamber, said shells forming a refrigerant compartment and inner and outer insulating compartments, insulating material within the outer insulating compartment, means for directing water into the refrigerant compartment, means for distributing a heat absorbing chemical within the water contained in the inner refrigerant compartment, and means for establishing communication between the upper portion of said refrigerant compartment and the inner insulating compartment.

3. A refrigerator comprising spaced nested concentric shells surrounding a provision chamber, said shells forming a refrigerant compartment and inner and outer insulating compartments, a circular apertured distributing pipe within the refrigerant compartment, a stand pipe opening thereinto and extending beyond the outer shell, means for supplying a liquid to the refrigerant compartment, and means for directing gas from said compartment to the inner insulating compartment.

4. A refrigerator comprising concentric nested spaced shells surrounding a provision chamber, said shells forming a refrigerant compartment, and inner and outer insulating compartments, a circular apertured distributing pipe within the bottom portion of the refrigerant compartment, a stand pipe extending therefrom and beyond the outer shell, means for directing water into the refrigerant compartment, means for conveying gas from said compartment to the inner insulating compartment, valved drains extending from said compartments, and a blow-off pipe extending from the inner insulating compartment.

5. A refrigerator comprising nested concentric shells surrounding a provision chamber and forming a refrigerant compartment and an insulating compartment, means for supplying a heat absorbing mixture to the refrigerant compartment, and means for directing gas from said compartment to the insulating compartment for insulating purposes.

6. A refrigerator comprising concentric nested shells surrounding a provision chamber, said shells forming compartments therebetween, means for supplying a heat absorbing mixture to one of said compartments, valved means for conveying gas from said compartment to the other compartment for insulating purposes, and an automatic blow-off extending from the gas receiving compartment.

7. A refrigerator comprising nested concentric shells surrounding a provision chamber and forming compartments therebetween, a ventilating tube extending from the provision chamber and through the shells, a cover removably mounted upon the shells, means below the closure and extending into

the shells for supplying a heat absorbing material to one of the compartments between the shells, means for supplying water to said compartment, and means for conveying gas from said compartment to the other compartment.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES C. KELLY.

Witnesses:
MARGARET PENNY,
JULIUS E. MATTESON.