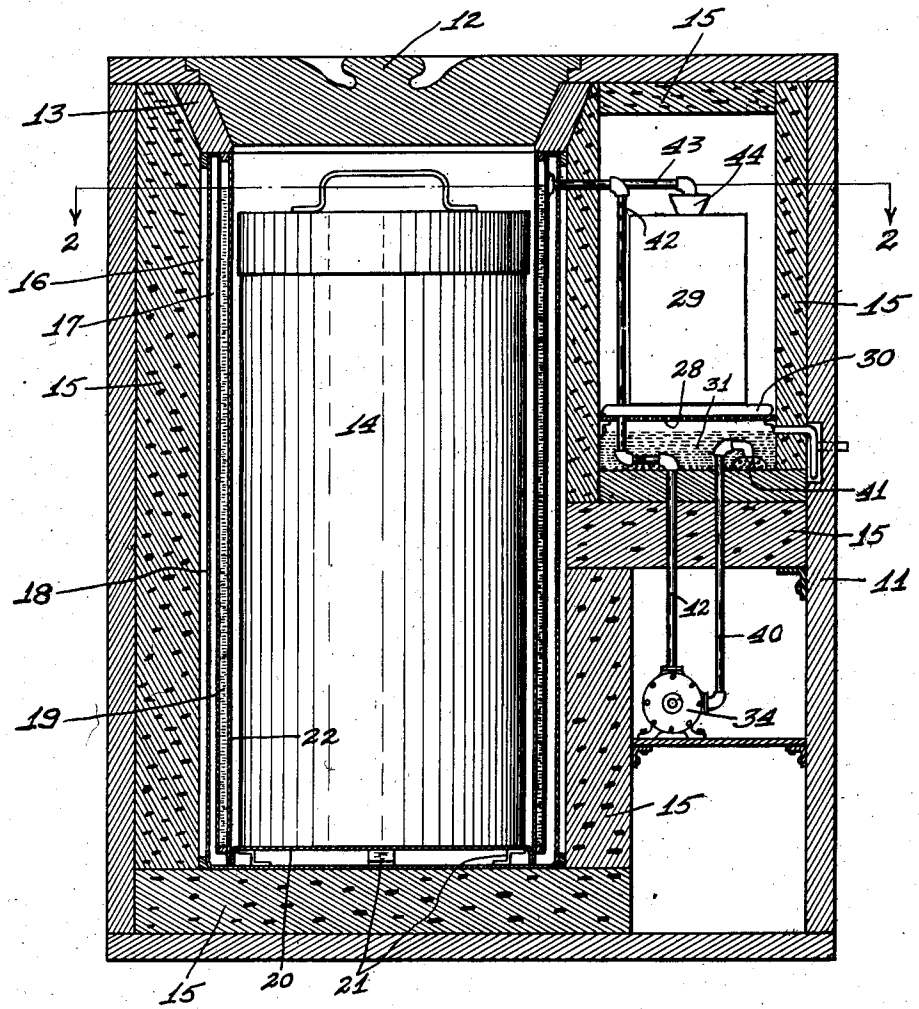
June 23, 1925. 1,542,993

J. E. DUNGAN

REFRIGERATING DEVICE AND CONTAINER

Filed Nov. 13, 1922 2 Sheets-Sheet 1

Fig. 1



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June 23, 1925. 1,542,993

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FIG. 2

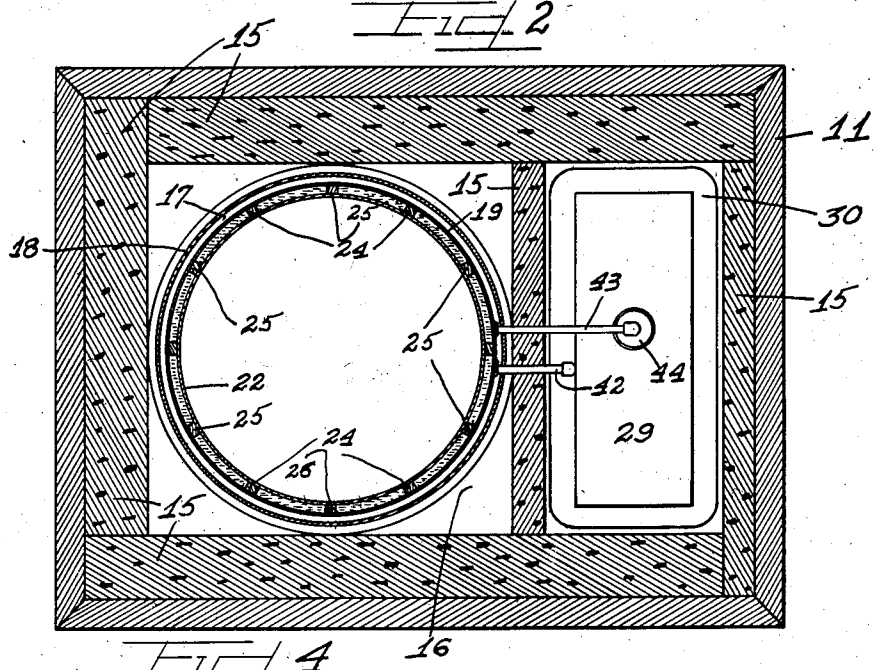


FIG. 4

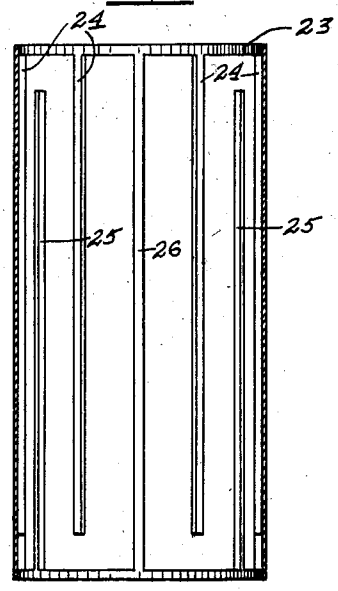


FIG. 3

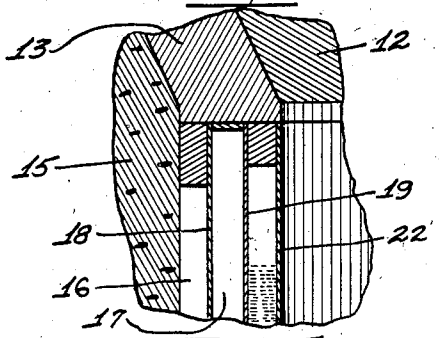
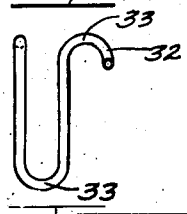


FIG. 5



Inventors

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By Clarence B. Lloyd Atty.

Patented June 23, 1925. 1,542,993

UNITED STATES PATENT OFFICE.

JOHN E. DUNGAN, OF MOUNDSVILLE, WEST VIRGINIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO A-B-C TRANSIT REFRIGERATION COMPANY, OF HELENA, MONTANA, A CORPORATION OF DELAWARE.

REFRIGERATING DEVICE AND CONTAINER.

Application filed November 13, 1922. Serial No. 600,758.

To all whom it may concern:

Be it known that I, JOHN E. DUNGAN, a citizen of the United States, residing at Moundsville, in the county of Marshall and State of West Virginia, have invented a new and useful Refrigerating Device and Container, of which the following is a specification.

The invention herein disclosed relates to refrigerating devices and refrigerated containers, and has particularly to do with refrigeration of brine solution.

Primarily, the object of the invention is to provide improved refrigeration by the provision of novel brine producing and circulating means; and secondarily, the object of the invention is to provide an improved refrigerated container adapted to be applied to all the uses to which refrigeration is put, and in which the refrigeration is conducted in a unique brine chamber.

These, and such other objects as may hereinafter appear, are obtained by the novel construction, combination, and arrangement of the parts of my device, all of which is made clear in the accompanying two sheets of drawings made a part of this specification.

In said drawings:

Fig. 1 is a vertical sectional view disclosing the refrigerating mechanism and showing its application to an ice cream cabinet;

Fig. 2 is a horizontal section along the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a detailed vertical section adjacent the top of the cabinet showing the insulation, dead air space, vacuum, and brine container;

Fig. 4 is an elevation of the frame of the refrigerating container;

Fig. 5 is a perspective detail of the sump discharge pipe.

Like reference characters are used to designate similar parts in the drawings and in the description of the device which follow:

The ordinal 11 is used to designate a wooden cabinet, having several compartments. Such cabinet has the usual vertical sides and horizontal bottom and outwardly has the character and appearance of a rectangular ice cream cabinet. 12 designates a removable cover resting upon and enclosing a corresponding orifice in the horizontal top thereof. About said orifice is a collar 13 of funnel-like character attached to and depending from the horizontal top portion of the cabinet 11 to form an extended seat for said removable cap 12.

The cabinet 11, as already indicated, is of a generally rectangular configuration, and for the purpose of this description will be called a compartment cabinet having a refrigerating chamber, an ice chamber and a motor housing. The largest of the compartments is the refrigerating chamber or compartment which encloses an ice cream can 14, such can being of the usual cylindrical type of approved capacity. The cover 12 and the orifice which it covers are sufficiently large to permit the ready removal of said ice cream can 14 from the refrigerating chamber or compartment. Said chamber or compartment is provided with the usual cork insulation 15 which insulation surrounds the entire compartment except the removable cover 12. Dead air space 16 is provided next adjacent the insulation 15 and surrounds a vacuum chamber 17 which encircles a brine chamber to be later described, and which latter immediately surrounds the ice cream can 14. The exterior portion or wall 18 of said vacuum chamber 17 comprises a cylindrical metal can or container having a closed bottom resting upon the insulation 15 at the bottom of the cabinet 11 and its interior wall is the exterior wall 19 of said brine chamber. The vacuum chamber 17 may be made to extend across the bottom of the refrigerating compartment, a circular disk-like member 20 with depending flanges being disposed upon the closed bottom of the vessel 18 forming the outer wall of the vacuum chamber 17 and forming a rest for the can 14 within the cabinet 11. By connecting the space beneath member 20 with the vacuum chamber 17, it may be exhausted with the latter; otherwise it serves as a dead air space. This disk-like member 20 is reinforced to support the can 14 by a plurality of metallic stays 21 spaced at intervals thereunder and engaging the wall 18 of the vacuum chamber at one end and the chamber 20 at the other.

A brine chamber immediately encircles the can 14, such brine chamber having for its exterior wall or shell the interior wall

19 of the vacuum chamber 17. The interior wall 22 of said brine chamber is immediately adjacent the can 14 and should fit fairly closely thereabout to prevent the formation of a blanket of insulating air. Intermediate the two walls 19 and 22 is a frame 23 of cylindrical form having rings or collars at each end, the upper ring or collar having projecting therefrom a number of ribs extending almost to the lower ring or collar, which ribs are designated by the numeral 24. The lower ring or collar of the frame 23 has a number of similar ribs 25 projecting upwardly and extending almost to the upper ring or collar. The downwardly extending and the upwardly extending ribs 24 and 25 are alternately arranged, and a single rib 26 extends from the top to the bottom ring or collar joining the two in fixed relation. The walls 19 and 22 are secured to said framework by welding or other suitable means so that a continuous passage intermediate said walls 19 and 22 is formed beginning at one side of rib 26, extending around the brine chamber, and terminating at the opposite side of said rib. Thus, liquid admitted on the left side of rib 26 adjacent the top of the frame 23 may be pumped alternately downwardly and upwardly until it circulates entirely around the brine chamber between the walls 19 and 22 and is finally discharged at any convenient point, preferably in the upper section of the brine chamber on the right side of said rib 26. Fig. 4 distinctly shows the direction of circulation of brine through the brine chamber and about the framework 23.

The second compartment or chamber of the cabinet to be described may be designated the "ice and salt" chamber. It is completely surrounded by the usual insulation 15. A grating or slatting support 28 for a cake of ice 29 is disposed transversely of said chamber and supported by a number of brackets. In Fig. 1, the cake of ice 29 is shown resting upon a salt bag, 30, which may be disposed upon the support 28, such bag being provided for purposes hereinafter disclosed. The salt bag 30 could also be disposed upon top of the ice 29. 31 is the sump reservoir where the ice water salt solution, generally known as brine, collects to be circulated through the brine chamber. A drain 32 from said sump reservoir 31 is arranged in order to provide a fixed level for the sump therein, and such drain 32, as shown in Fig. 5, is provided with elbows 33 in order that the discharge may be taken from the top of the sump and yet prevent air escaping into the sump reservoir 31 and the ice compartment or chamber. Ice and salt are placed in said compartment by removing the entire top of cabinet 11.

The third compartment of the cabinet houses the motor and pump 34, disposed upon a horizontal bracket or shelf extending the width of said section. Insulation 15 is provided intermediate said section and the ice compartment and the refrigerating chamber of the cabinet.

Refrigeration is obtained by circulating the sump from the sump reservoir 31 through the brine chamber. A pipe 40, extending from the sump reservoir 31 to the intake of the pump 34, is provided with an inverted trap 41 for clarifying the upwardly drawn sump. From the discharge of the pump 34, a second pipe 42 extends into the brine chamber, and empties the brine thereinto on the left hand side of the rib 26 as is indicated in Fig. 4. A discharge pipe 43, beginning at the right hand side of frame 23 of the brine chamber, permits of the return of the used brine solution to the ice compartment, where, through a spray 44, said brine is distributed over the ice 29 from above. Passing over the ice 29 the brine trickles downwardly through the salt bag 30, where reenergized, and collects in the sump reservoir 31 to be again used. The circulation described is of course continuous.

It will be readily understood from the drawings herein that the compartment of the cabinet 11 used for refrigeration may be made of a variety of shapes, and that the arrangement of the ice compartment and the circulatory apparatus may be modified without departing from the spirit of the invention.

It is equally manifest that said refrigerating compartment could be separated from the other compartments, and the contents thereof thoroughly chilled, allowing the brine to remain in the brine chamber (valves being provided therefor) and the cabinet substituted for the usual tub for storing ice cream which is packed with ice and salt. Such valves should permit the complete filling of the brine chamber thereof, after which the brine flow could be cut off, and the ice cream within the can preserved for an indefinite period, by experiment, showed to be about ninety-six hours.

The means which I employ for refrigerating produces small consumption of ice, the brine solution being used over and over again and absorbing but a small quantity of the ice as it is sprayed over the ice in the ice chamber. The scheme of operation can be adapted for use in refrigerating cars, refrigerating rooms in cold storage plants, hardening rooms in ice cream plants, and in refrigerators for general use in lieu of the present form of refrigeration. A brine circulation is decidedly colder than chilled air.

In the type of device here illustrated the apparatus has particular efficiency for keeping ice cream, as it is capable of maintaining a temperature below 27° F., above which

ice cream softens, with a remarkably small consumption of ice, and where the cabinet is used separate from the refrigerating device, the ice cream is preserved for a period longer than is possible with ice and salt.

It is quite manifest that the novel insulating means I have devised, i. e., the exterior insulation, the dead air space, the vacuum, and the chilling media container could be equally well applied to a scheme for heat distribution, and that the unique brine container could equally well be employed for the circulation of hot water to be employed in obtaining a concentrated heat of an unvarying temperature.

I claim:

A refrigerating apparatus comprising a casing having a partition extending from the top to the bottom thereof, a storage receptacle on one side of said partition, a passage for brine around said storage receptacle, a second partition on the opposite side of the partition from the storage receptacle said partition extending from the intermediate portion of said first mentioned partition to the side wall of the casing and forming upper and lower compartments, said upper compartment having a reservoir therein with means for producing a brine and maintaining the same at a predetermined liquid level, said lower compartment having a pump therein, said storage receptacle, brine reservoir and pump being connected to form a circulatory system whereby the lower stratum of briny solution will gravitate from the brine chamber into the pump and be forced through the circulatory system and returned to the brine chamber, substantially as set forth.

JOHN E. DUNGAN.