R. W. EMERSON & F. BISHOP.

REFRIGERATING APPLIANCE.

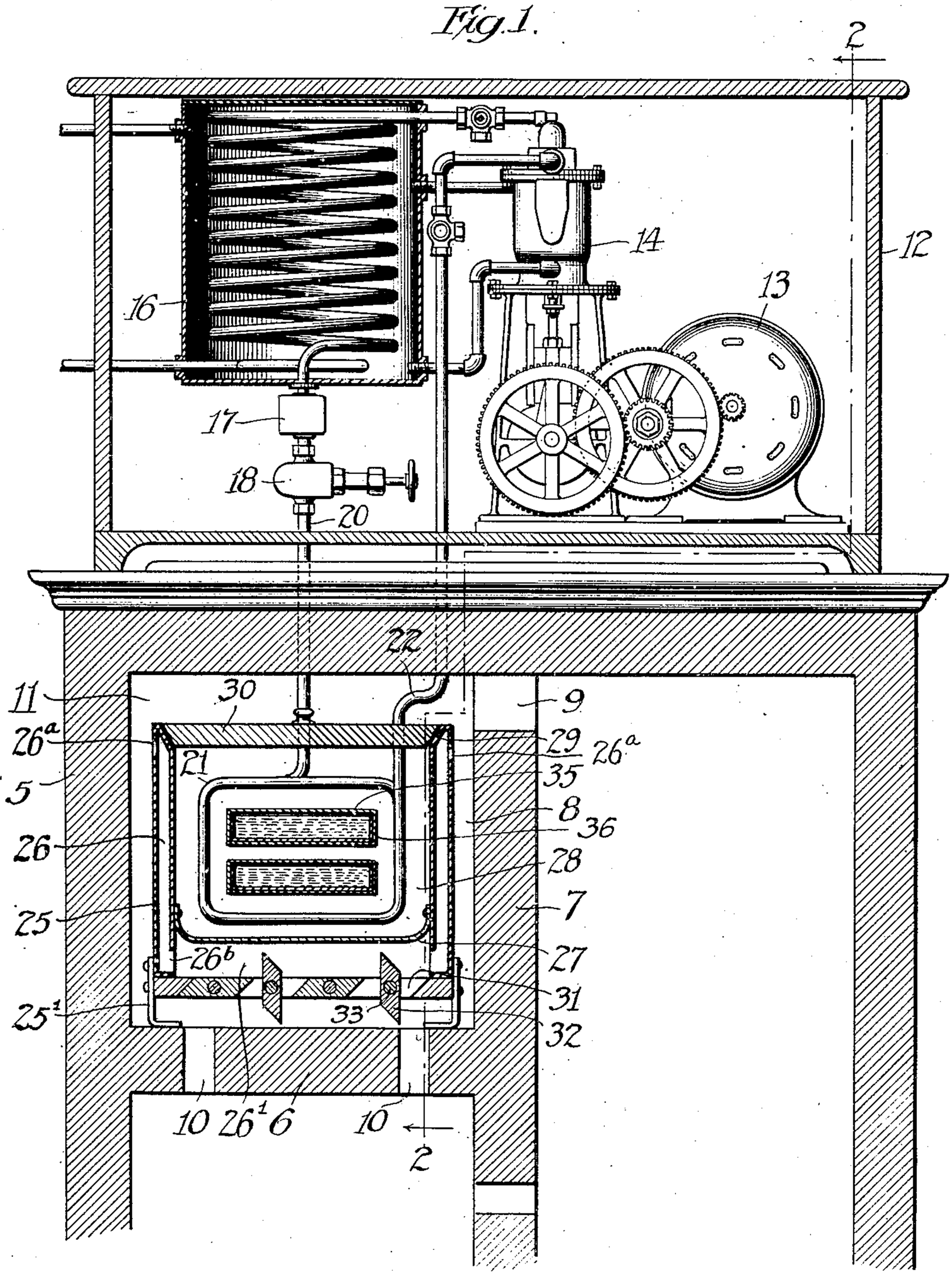
APPLICATION FILED OCT. 28, 1908.

962,704.

Patented June 28, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



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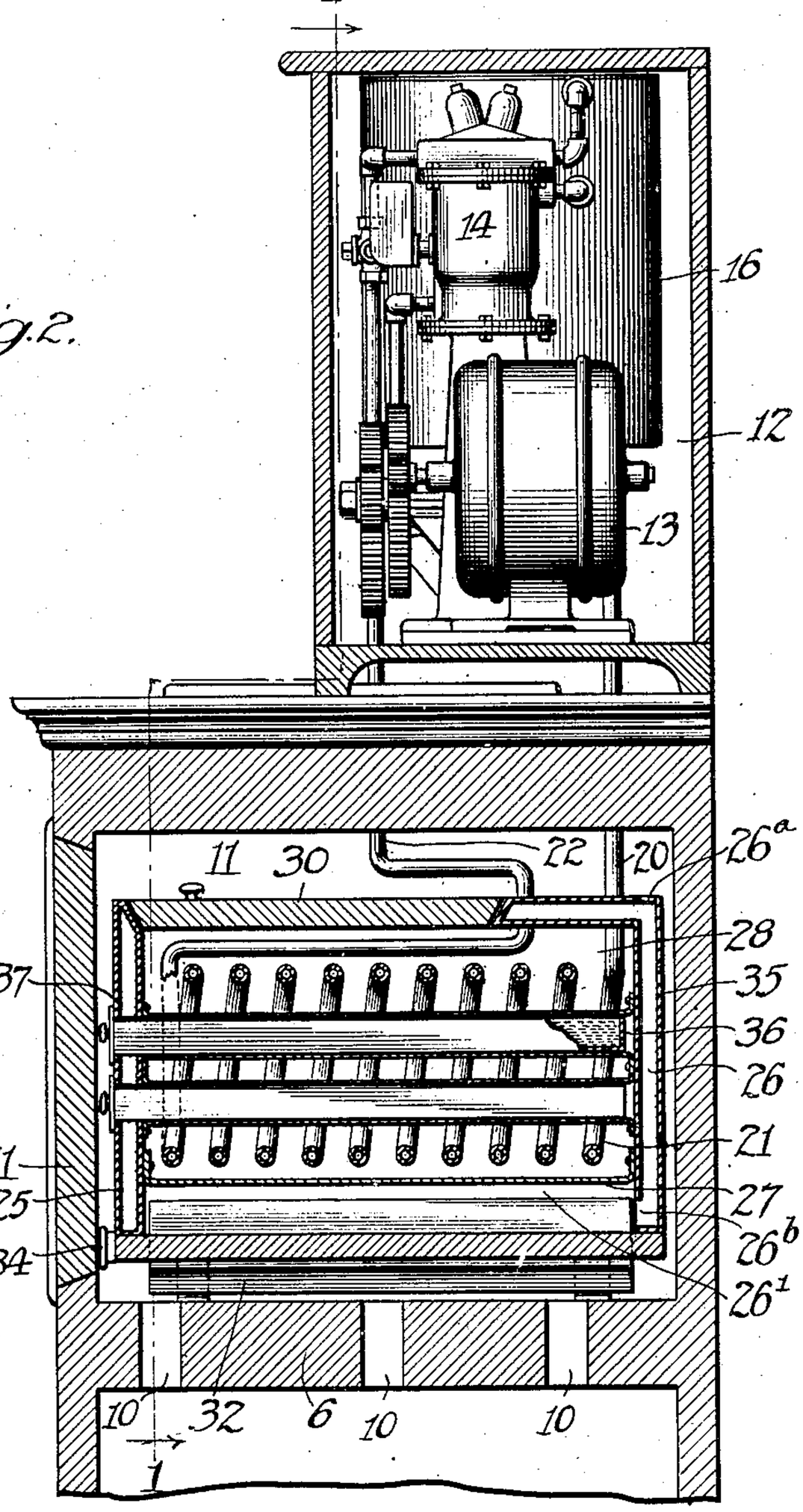
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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REFRIGERATING APPLIANCE.

962,704. Specification of Letters Patent. Patented June 28, 1910.

Application filed October 28, 1908. Serial No. 459,851.

To all whom it may concern:

Be it known that we, RALPH W. EMERSON and FRANK BISHOP, citizens of the United States, both residing at South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Refrigerating Appliances, of which the following is a specification.

Our invention relates to refrigerating appliances, and has for its object to provide a self-contained refrigerating system suitable to be embodied in a refrigerator for private homes, hotels, etc., which is simple in construction, relatively cheap in cost, and provides an advantageous arrangement for circulation of air, with respect to the cooling medium.

In the drawings; Figure 1 is a vertical section on line 1—1 of Fig. 2; and, Fig. 2 is a vertical section on line 2—2 of Fig. 1.

In the drawings 5 indicates in general a provision receptacle or suitable containing structure to be interiorly cooled, preferably having arranged near the top thereof horizontal and vertical partitions 6 and 7, dividing off from the body of the refrigerator a cooling chamber 8, having top and bottom openings 9 and 10 to the provision space, which is so constructed that air may freely circulate therethrough from the bottom openings 10 of the cooling chamber, back to the top apertures 9. An entrance door 11 is provided at one end of the cooling chamber 8. Upon the top of the receptacle 5 is mounted a casing 12, in which are installed suitable parts of a system for the circulation of a refrigerating medium, such installation being herein shown as comprising a motor 13 driving a compressor 14 piped in the usual manner to a condenser 16, the coil of which communicates through a receiver 17 with an expansion valve 18, from which extends a supply pipe 20 for the refrigerating coil 21, (to be hereafter more particularly described) which said coil has connection by a return pipe 22 with the compressor 14.

The structure within the cooling chamber 8 of the provision receptacle, comprises a casing 25 wholly located within the chamber 8 and spaced apart therefrom on all sides, said casing being supported on legs 25′, bearing upon the bottom partition 6 of the cooling chamber 8. The casing 25 is preferably made with hollow sides constituting air chambers 26, having top openings 26^a to the exterior of the casing, and interior openings 26^b adjacent the bottom. The casing is interiorly divided into two completely separated sections in superposed relation by a horizontal wall 27, of thin metal, for good and rapid heat conductivity, the upper area, 28, above such wall 27, constituting a brine tank having a top opening 29 normally closed by a cover 30, preferably of wood or hollow metal, and the area below the wall 27 constituting an air chamber 26′ to which the holes 26^b open. The bottom of the outer shell of the hollow wall is constructed with suitable closable openings, and is herein shown as a register, 31, composed of a series of slats, 32, mounted upon independent pivots 33 for oscillation to open or close the bottom of said chamber. When the register is open, circulation passages through the hollow walls are provided, but when such register is closed the walls become dead-air spaces making the whole exterior of the casing of low conductivity.

The refrigerating coil 21, preferably arranged in rectangular formation as viewed from the end of the chamber 25, as shown in Fig. 1, is disposed wholly within the brine tank 28, the axially open center of said coil affording a space in which are disposed a plurality of tubular guides 35, for ice pans, 36. Said tubular guides extend endwise through the entire length of the brine tank 28 and effect tight juncture with both end walls of said tank, the front end wall of the casing being provided with openings 37 directly in rear of the door 11 of the receptacle structure, to permit the introduction of ice pans 36, which, it will be obvious, may slide in and out of their tubular guides when the door 11 is opened.

In use the circulatory system for the refrigerant operates in the customary way, the ammonia or other refrigerant being compressed and condensed in the devices 14 and 16, and supplied through the expansion valve 18 to the coil 21 to produce the desired degree of cold in the brine tank thereby to freeze water contained in the ice pans 36. The brine tank, spaced apart throughout its entire extent from the walls of the receptacle, exerts only such relatively mild chilling influence as may be communicated by its walls of low conductivity to air in circulation through the provision space of the receptacle, when the register 31 in the outer shell of the casing is closed. When the reg-

ister is opened, however, air in circulation through the provision space passes through the openings 26ª, chamber 26, openings 26ᵇ, chamber 26′ and register 31, so intimately contacting with the thin inner shell of the brine tank and more effectively chilling the circulating air. Thus it will be seen that the air spaces contained within the wall of casing 25 may be opened to the normal path of circulation of the air within the provision space, thereby to enhance the refrigerating effect therein, or to close off the air spaces as dead insulating space for the brine tank, thereby to reduce the refrigerating effect in the provision space and more efficiently to concentrate the refrigerating effect upon the ice pans within the brine tank.

While we have herein described in some detail a particular embodiment of our invention, it will be understood by those skilled in the art that numerous changes might be made in the particular construction and arrangement of parts employed without departure from the spirit of our invention, within the scope of the appended claims.

Having described our invention, what we claim is;

1. In a refrigerating apparatus, a receptacle suitably subdivided to provide a top cooling chamber, a closable opening on one side of said cooling chamber, a brine tank within said cooling chamber spaced apart therefrom, a refrigerating coil within said tank presented end-wise to the door of the cooling chamber, tubular guides extending through said coil and open only at their ends proximate to the door of the cooling chamber, and ice pans in said guides, removable through said door.

2. In a refrigerating apparatus, a receptacle providing a cooling chamber and suitable chambers for provisions to be cooled, said cooling chamber having openings in the top and bottom thereof for passage of air therethrough, a brine tank within the cooling chamber, a coil in the brine tank, the walls of said brine tank being hollow to provide an air chamber surrounding said tank, the air chamber having top and bottom openings therein for passage of air therethrough, and said bottom openings having closures therefor operable partially or completely to prevent the passage of air through said air chamber.

3. In a refrigerating apparatus, a receptacle, a casing therein, positioned to afford air passageways around it and having an outer and an inner wall to provide between said walls an air chamber and within the inner wall a brine tank, said inner wall being of relatively high conductivity, and means for opening and closing the said air chamber to communicate with the adjacent air passages, or to constitute a dead insulating space.

4. In a refrigerating apparatus, a receptacle interiorly subdivided to provide a cooling chamber having circulation openings to the balance of the receptacle, a casing within said cooling chamber, spaced apart from the walls thereof to provide air circulation passages around the casing, said casing being divided into a brine tank and an air space, separated only by a thin metallic wall, means for opening said air space to or closing it from the air passages surrounding the casing, an axially open coil within the brine tank, tubular guides extending longitudinally through the open center of said coil forming free passages into the interior of the brine tank sealed against the ingress of brine, and ice pans longitudinally slidable into said guides.

5. For inclusion in the cooling chamber of a refrigerating apparatus, a sheet metal structure having a top and sides of two elements and an air chamber between said elements, a single sheet of metal closing the space between the inner elements of the sides near the bottom thereof and providing thereabove a brine tank, and a bottom below and spaced from said single sheet spanning the space between the outer elements of the sides and provided with apertures for circulation of air therethrough, there being apertures through the outer element of the structure near the top thereof.

In testimony whereof we hereunto set our hands.

RALPH W. EMERSON.
FRANK BISHOP.

In the presence of—
F. L. ALWARD,
CLAIR C. CALAHAN.