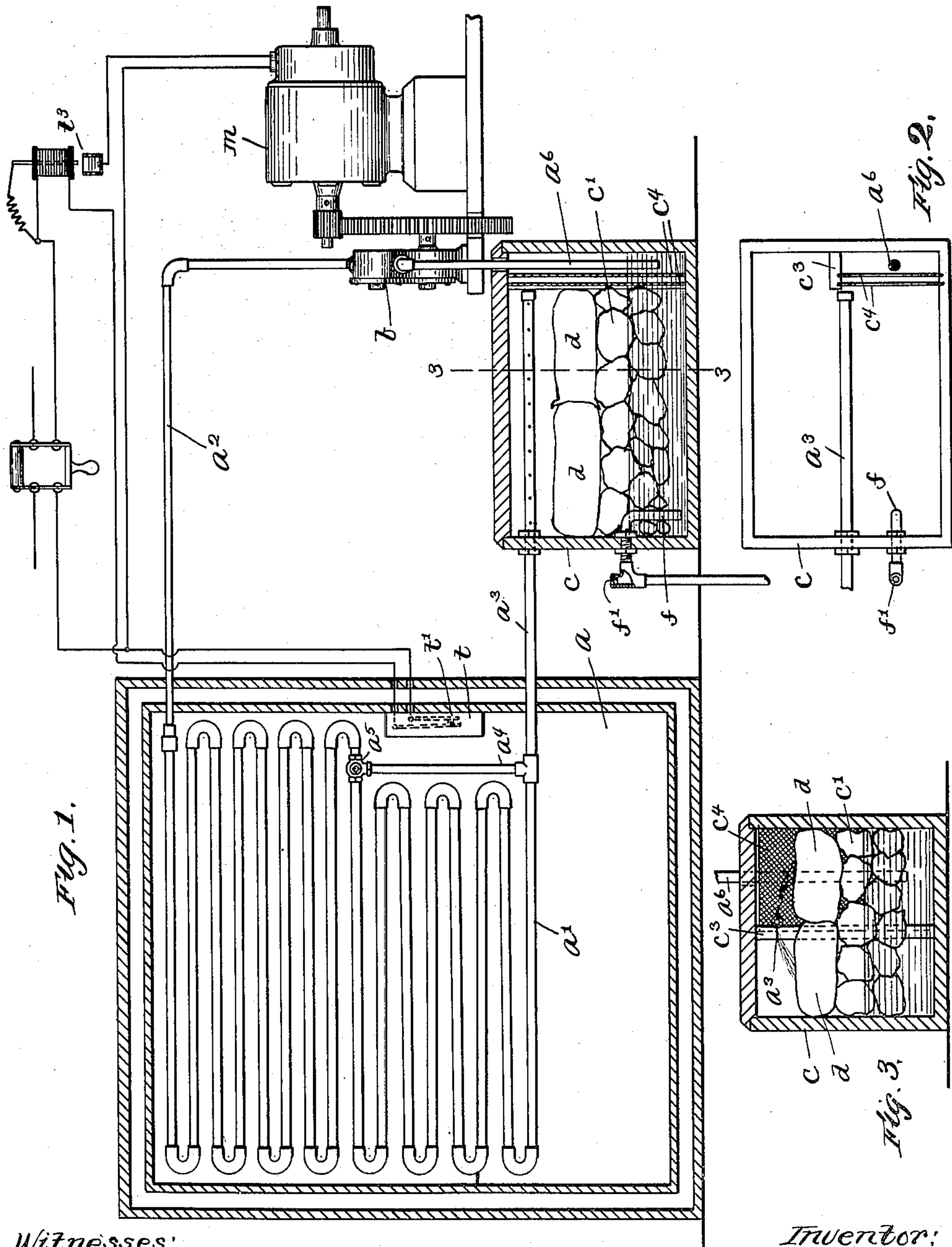


E. T. W. HALL.
REFRIGERATING APPARATUS.
APPLICATION FILED NOV. 8, 1909.

952,040.

Patented Mar. 15, 1910.



Witnesses:
H. B. Davis.
D. S. Peterson.

Inventor:
Edwin T. W. Hall
by Angus & Harrison
attys.

UNITED STATES PATENT OFFICE.

EDWIN T. W. HALL, OF CONCORD, NEW HAMPSHIRE.

REFRIGERATING APPARATUS.

952,040.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed November 8, 1909. Serial No. 526,720.

To all whom it may concern:

Be it known that I, EDWIN T. W. HALL, of Concord, county of Merrimack, State of New Hampshire, have invented an Improvement in Refrigerating Apparatus, of which the following is a specification.

This invention relates to a refrigerating-apparatus adapted for cooling compartments of considerable size and employing brine as a cooling medium, which is taken from a tank and forced through circulation pipes contained within the compartment to be cooled, the brine being cooled while in the tank by pieces of ice which are more or less submerged therein.

My invention comprehends the employment of an electric-motor for operating a pump, by which the brine is forced through the circulation pipes, and automatic means for starting and stopping said motor, controlled by a thermostat arranged in the cooling-compartment, whereby the temperature of the cooling-compartment may be maintained substantially constant.

My invention also comprehends the employment of means for accelerating the melting of the ice, which is more or less submerged in the brine in the tank, and to this end salt contained in bags of burlap, or equivalent material, is placed directly on the pieces of ice and the return pipe leading from the circulation pipes to the tank extends across the top part of the tank and is perforated, and the returning brine flows through the perforations of said pipe on to the bags of salt, in the form of small jets or spray, and then trickles from the bags on to the pieces of ice, which results in distributing the returning brine well over the pieces of ice as well as adding salt to the brine to compensate for the loss incident to the brine escaping from the overflow pipe of the tank. The overflow pipe is connected with the tank at a point to maintain a level therein sufficiently below the perforated pipe to provide for reposing the bags of salt on the pieces of more or less submerged ice, yet above the level of the brine, so that they will not become submerged unless it should happen that the ice-tank is not re-charged with ice when required. As it is sometimes necessary to draw all the brine from the tank, said overflow pipe is also constructed to serve as a siphon for the accomplishment of this result. The pipe leading to the pump extends down into the tank to a point near

the bottom thereof, but above the lower end of the overflow pipe, and said pipe is arranged in the compartment near the tank, which is separated from the main part thereof by a perforated partition wall, and, as the perforations of said wall oftentimes become choked with salt, in order to clean them, said wall is removable, and for the purpose of maintaining a separate compartment when said perforated wall is removed, a second perforated wall is provided; that is to say, two perforated walls are employed, arranged side by side, and independently removable.

Figure 1 is a partial elevation and vertical section of a refrigerating apparatus embodying this invention, the parts of said apparatus being represented in conventional form as a simple way of illustrating the same. Fig. 2 is a plan view of the brine-tank, the cover being removed. Fig. 3 is a vertical section of the brine-tank taken on the dotted line 3—3.

a represents the compartment which is being cooled, and which is herein referred to as the "cooling-compartment." It may be of any suitable construction, yet of considerable size.

a' represents the circulation-pipes contained within the cooling-compartment, which may be arranged as a bank in upright position near one wall thereof, the upper end of the said circulation-pipes having connected with it a pipe a^2 leading to a pump b , of any suitable construction, and the lower end of said circulation-pipes having connected with it a pipe a^3 extending into the brine-tank c , along the top part thereof, and which for a portion of its length, within the tank, is perforated. The perforations in said pipe are formed along the sides thereof, or may be otherwise arranged. If desired a branch pipe a^4 may connect the lower end of the circulation-pipes with one of the upper pipes and a valve a^5 provided at the point of connection whereby the circulation-pipes may be divided into two sets, an upper and a lower set, and the upper set employed to the exclusion of the lower set.

A pipe a^6 extends from the pump b to the brine-tank, passing through the top of the tank or entering it at some other point, and extending down to a point near but not to the bottom thereof, terminating below the level of the brine in the tank. As the pump is operated the brine is conducted up the

pipe a^6 and along the pipe a^2 to the circulation-pipes, and then is returned to the brine-tank through the perforated pipe a^3 . The pump is preferably of the rotary type, and is operated by an electric-motor m of any suitable construction, which is geared to the pump. Said motor is automatically controlled by thermostatic means contained in the cooling-compartment, and such automatic means for controlling the operation of the motor forms an important part of my invention, as by its employment practically a constant temperature can be maintained in the cooling-compartment.

Contained in the cooling-compartment is a thermostat, represented at t , of any suitable construction, which it is not deemed necessary to show here in detail, but which is designed to operate a circuit-closer t' to include an electro-magnetically operated switch t^3 , by which the motor is cut into and out of circuit, although said motor may be otherwise arranged to be cut into and out of circuit by thermostatic means arranged in the cooling compartment which comes within the spirit and scope of my invention. The brine-tank c may be made of suitable size to contain a quantity of brine and pieces of ice, represented at c' , which are more or less submerged in the brine.

The level of the brine in the tank is controlled by an overflow pipe f , which is herein shown as a siphon pipe having a vent-plug f' , which extends through the end wall of the tank and down very close to the bottom of the tank. Ordinarily said pipe is employed simply as an overflow pipe, and in such case the vent will be opened and the water level will be maintained at the top of the said pipe, but when desired it may be employed as a siphon pipe, and in such case the vent will be closed and then practically the entire contents of the tank may be withdrawn. The level of the brine is maintained low enough to leave sufficient space at the top of the tank to enable bags d of salt to be placed on the pieces of ice, said bags of salt being arranged directly beneath the perforated pipe a^3 , so that the brine returning to the tank flows through the perforations in said pipe a^3 down onto bags of salt and trickles therefrom onto the pieces of ice, thereby accelerating the melting of the ice as well as supplying the brine with additional salt to maintain the solution heavily saturated with salt. The bags, which may be made of burlap or equivalent material, hold the salt in large masses, and also serve to more or less evenly distribute the returning brine over the pieces of ice.

At one end of the tank a compartment c^2 is formed, down into which the pipe a^6 extends, and, as here shown, said compartment is formed by providing a short partition

wall c^3 extending inward from one end of the tank and arranged in parallel with one of the side walls thereof and forming two vertical grooves in said partition wall at one side thereof and two like grooves in the adjacent side wall, adapted to receive two upright perforated plates, c^4 , c^4 , arranged side by side. Said plates may be composed of wire gauze. They slide in the grooves and are independently removable, so that either one may be removed while the other remains in position. It is quite important to remove said plates as the salt collects thereon and chokes the openings, and the removal of the plates provides for cleaning them easily and quickly.

I claim:

1. In a refrigerating apparatus, the combination of a brine-tank adapted to contain brine and means for cooling the brine, circulation-pipes connected with said tank, a pump and motor for operating it, an overflow pipe connected with the brine-tank for maintaining a predetermined level of brine therein and arranged to leave a sufficient space at the top of the tank for bags of salt placed on pieces of ice which are more or less submerged in the brine, substantially as described.

2. In a refrigerating apparatus, the combination with a brine-tank, circulation-pipes contained in a cooling-compartment, means for forcing the brine from the tank to the circulation-pipes, a return pipe leading from the circulation-pipes to the tank, which, along that portion thereof within the tank, is perforated, means for maintaining a low level of brine in the tank, and bags containing salt adapted to be placed on the ice which is more or less submerged in the brine, beneath the perforated pipe, substantially as described.

3. In a refrigerating apparatus, the combination of a brine-tank, circulation-pipes connected with said tank which are contained in a cooling-compartment, an overflow pipe connected to the tank for maintaining a low level of brine therein, and bags adapted to contain salt and be supported on pieces of partially submerged ice, above the overflow pipe, substantially as described.

4. In a refrigerating apparatus, the combination of a brine-tank adapted to contain brine and means for cooling the brine and having a compartment for the outlet pipe leading from it provided with two perforated partition walls arranged side by side and independently removable, substantially as described.

5. In a refrigerating apparatus, a tank adapted to contain brine and pieces of ice, circulation-pipes contained in a cooling compartment and connected with said tank by go and return pipes, a pump connected

with the go-pipe and a receptacle adapted
to contain salt arranged beneath the outlet
of the return pipe and above the pieces of
ice, whereby the returning brine passes
5 through the salt receptacle on its way to
the pieces of ice, substantially as described.
In testimony whereof, I have signed my

name to this specification, in the presence of
two subscribing witnesses.

EDWIN T. W. HALL.

Witnesses:

ELWIN L. PAGE,
E. GRACE GILES.