Nov. 18, 1924.

D. P. HEATH

1,515,736

BRINE TANK

Filed May 3, 1922

2 Sheets-Sheet 1

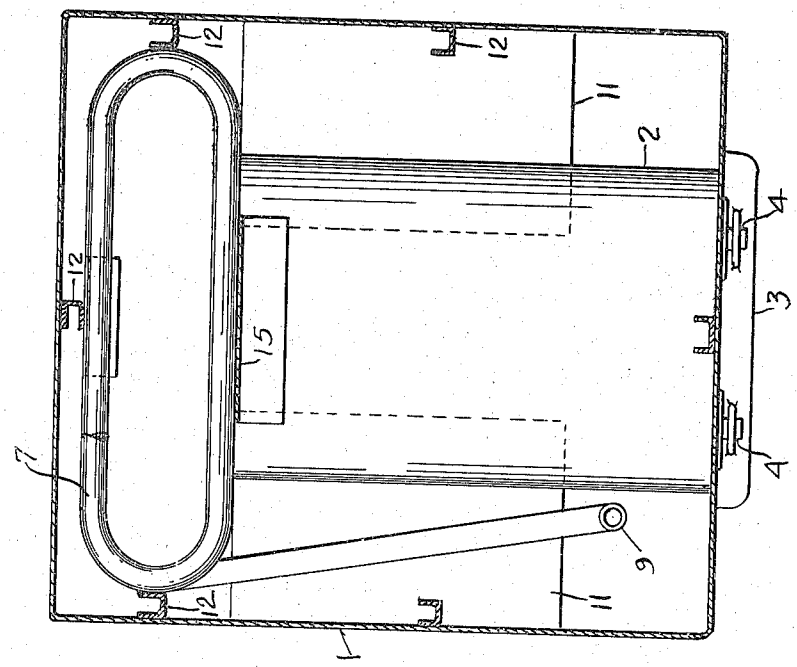

Fig. 2.

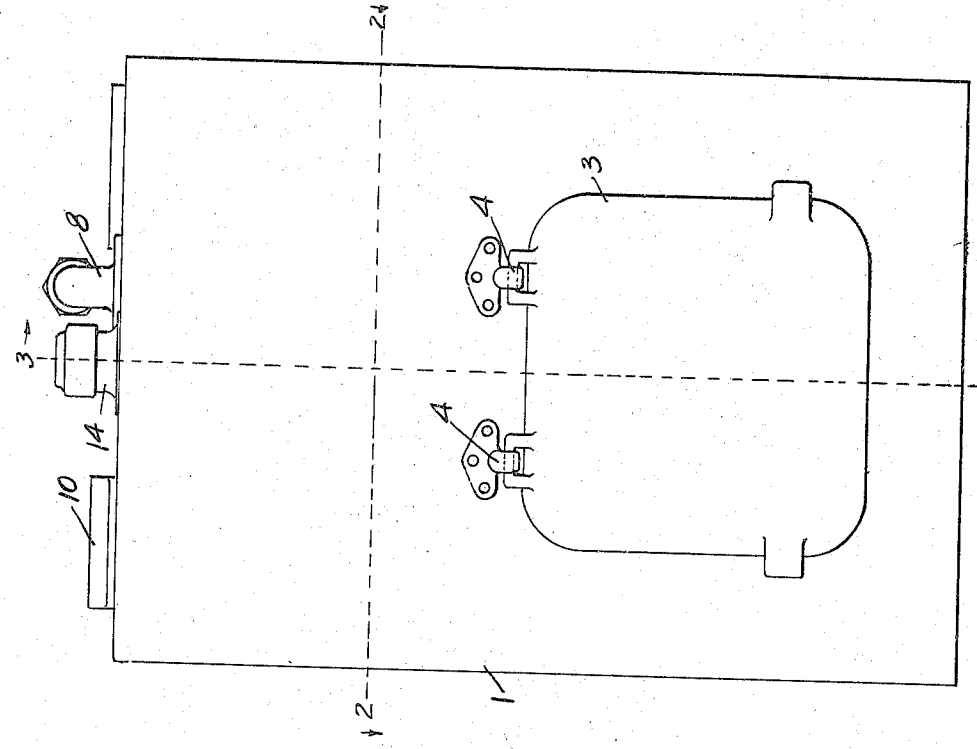

Fig. 1.

Inventor

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Nov. 18, 1924.

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2 Sheets-Sheet 2

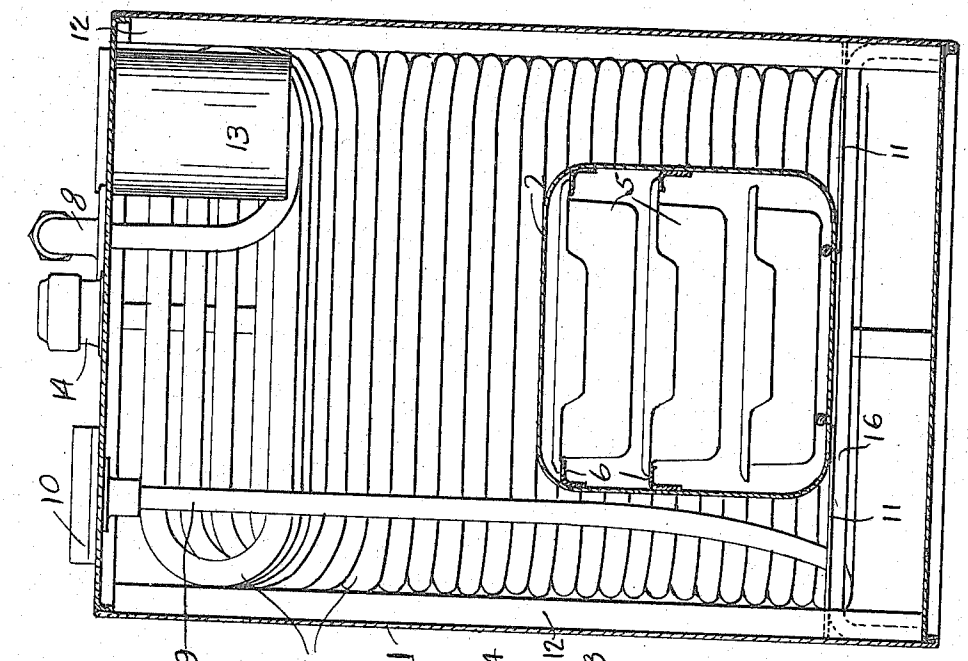

Fig. 4.

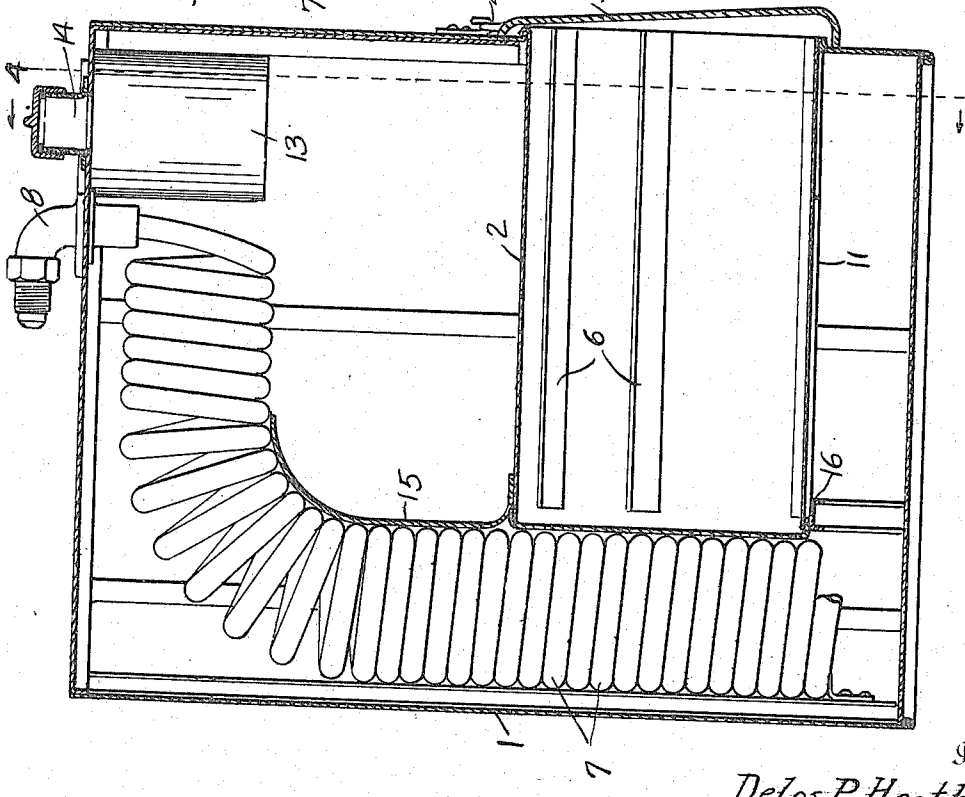

Fig. 3.

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Patented Nov. 18, 1924. 1,515,736

UNITED STATES PATENT OFFICE.

DELOS P. HEATH, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO COPELAND PRODUCTS, INC., OF FLINT, MICHIGAN, A CORPORATION OF MICHIGAN.

BRINE TANK.

Application filed May 3, 1922. Serial No. 558,295.

To all whom it may concern:

Be it known that I, DELOS P. HEATH, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Brine Tank, of which the following is a specification.

This invention relates to refrigerators, and more particularly to such refrigerators as are cooled by circulation of a cooling medium through coils immersed in brine or other liquid having a relatively low freezing point.

It is the object of the invention to insure a positive circulation of the brine or like liquid, so that the heat absorbed by said liquid from the surrounding atmosphere through the walls of the tank will be more rapidly transferred to the refrigerant coils and thus maintain said liquid at a more uniformly low temperature.

In attaining this object the invention contemplates producing a descending current region in one portion of the brine tank by locating the refrigerant coils in said portion, and producing an ascending current region spaced somewhat from said coils through the use of baffles in the bottom portion of the tank to compel a lateral flow of the relatively cool current.

Furthermore, the invention contemplates employing the refrigerant coils to form an approximately closed passage way for the descending current of brine or the like, so as to isolate said current from the warmer portions of the liquid and thus render it most effective in maintaining the desired circulation.

A preferred embodiment of the invention is illustrated in the accompanying drawings, wherein,

Fig. 1 is a front view of the improved tank.

Fig. 2 is a horizontal sectional view of the same taken on line 2—2 of Fig. 1.

Fig. 3 is a vertical cross-section taken on line 3—3 of Fig. 1.

Fig. 4 is a vertical section transverse to that of Fig. 3, and taken on line 4—4 of the latter figure.

In these views the reference character 1 designates a rectangular tank formed preferably of sheet metal. In the lower portion of said tank there is provided a low temperature chamber 2, opening through the front wall of the tank but spaced from the sides, bottom and back thereof. 3 is a door hinged at 4 upon the front wall of the tank and normally closing the chamber 2. Said chamber is adapted to receive any comestible or other article which it is desired to maintain at a low temperature. Figure 4 shows a utilization of said chamber for forming ice, the water or other liquid for producing the same (not shown) being contained by a number of vessels 5 removably supported by angle bars 6 secured to the sides of the chamber 2. 7 designates the coils of pipe through which the refrigerating medium flows, the expansion of said medium within said coils exercising a cooling effect, as is well known to those familiar with the art. The major portions of said coils are in vertical registration in proximity to the rear wall of the tank 1, the rear wall of the chamber 2 being close adjacent said portions. In the top portion of the tank, the coils form a bend (see Fig. 3) and extend forwardly in arcuate registration to connect finally with an outlet fitting 8 which projects through the top of the tank. The lower or inlet end of the coils is connected as indicated at 9 to a discharge fitting 10 which is also mounted in the top of the tank. Said coils are relatively elongated transversely of the tank, occupying in this direction nearly the full width of the tank. As the consecutive coils are substantially contiguous, excepting where the bend is formed, it is evident that an approximately closed passage is formed within which the cold descending current may be to a considerable extent isolated from the major portion of the brine. At the bottom of the tank this cold current is compelled to flow, before rising, to the front region of the tank by a pair of baffle plates 11, extending to each side wall of the tank from the bottom of the chamber 2. Channel bars 12, as best seen in Fig. 2, maintain the coils 7 spaced somewhat from the rear and side walls of the tank so as to maintain a suitable volume of brine between said walls and the coils, said bars furthermore functioning as reinforcements for the tank. 13 is a receptacle arranged in the upper portion of the tank to receive thermostatic control mechanism, not shown, and forming no feature of the present invention. 14 is a filler neck through which the brine or other liquid in the tank may be replenished when neces-

sary. 15 is a sheet metal plate mounted upon the rear end of the chamber 2, rising adjacent the coils 7 and curving with the bend of the same to form a support and also a baffle to assist in isolating the volume of liquid within the coils. 16 is an arched channel bar providing a support for the rear end of the chamber 2.

In the use of the described tank, when the same is filled with brine (or a liquid of similar low freezing point) and a suitable refrigerating medium is circulated through the coils 7, the rear portion of the tank becomes a descending or cold current region and a rising or relatively warm current region is established at the front of the tank, the latter region being bisected in its lower portion by the chamber 2. At the top of the tank the rising current turns rearwardly and enters the passage formed by the coils 7, giving up its heat to said coils as it descends through the same. The positive circulation thus maintained has the effect of expediting the extraction of heat from the brine by the coils so as to derive a maximum efficiency from the latter.

What I claim is:

1. The combination with a tank for receiving a liquid to be cooled, of a pipe for circulation of a cooling medium having coils within said tank arranged substantially in successive vertical registration to form within said coils a descending current region, a low temperature air chamber in the lower portion of said tank, and a substantially horizontal baffle member carried by said chamber within said tank and extending adjacent the lowermost of said coils for compelling a lateral flow from the region of said coils to a rising current region within said tank.

2. The combination with a tank for receiving a liquid to be cooled, of a pipe for circulation of a cooling medium forming coils within said tank adjacent the rear wall thereof, in substantially vertical registration and in close proximity, producing a passage for a descending current of the liquid in the tank, a low temperature air chamber opening into the lower portion of said tank through the front wall thereof, and extending adjacent said coils, and baffle members extending from said chamber to the side walls of the tank, compelling a horizontal flow of the liquid in the tank from the bottom of the coil to a rising current region adjacent said front wall.

3. The combination with a tank for receiving a liquid to be cooled, of a pipe for circulation of a cooling medium having its major portion forming coils within said tank in close proximity and in substantially vertical registration, producing a descending current passage, and also having horizontally registering close adjacent coils in the top portion of the tank forming an inlet to said passage.

4. The combination with a tank for receiving a liquid to be cooled, of a pipe for circulation of a cooling medium having coils within said tank arranged substantially in successive vertical registration to form within said coils a descending current region and a low temperature air chamber opening into the lower portion of said tank and extending into close proximity to said coils, said coils extending to a higher level inside said tank than said air chamber.

5. In combination, a casing provided with a recess extending there into from one side thereof and adapted to receive material to be frozen, a heat conducting liquid in said casing, and an upright expansion coil located in said casing at one side of said recess and having a height greater than that of said recess, said coil having its convolutions located closely together and forming a channel for the downward convection currents produced in said liquid, the interior of said coil being unobstructed.

In testimony whereof I sign this specification.

DELOS P. HEATH.