No. 644,965. Patented Mar. 6, 1900.

C. W. BLAGG.

REFRIGERATING APPARATUS FOR COLD STORAGE CHAMBERS.

(Application filed Apr. 10, 1899.)

(No Model.)

Fig. 1.

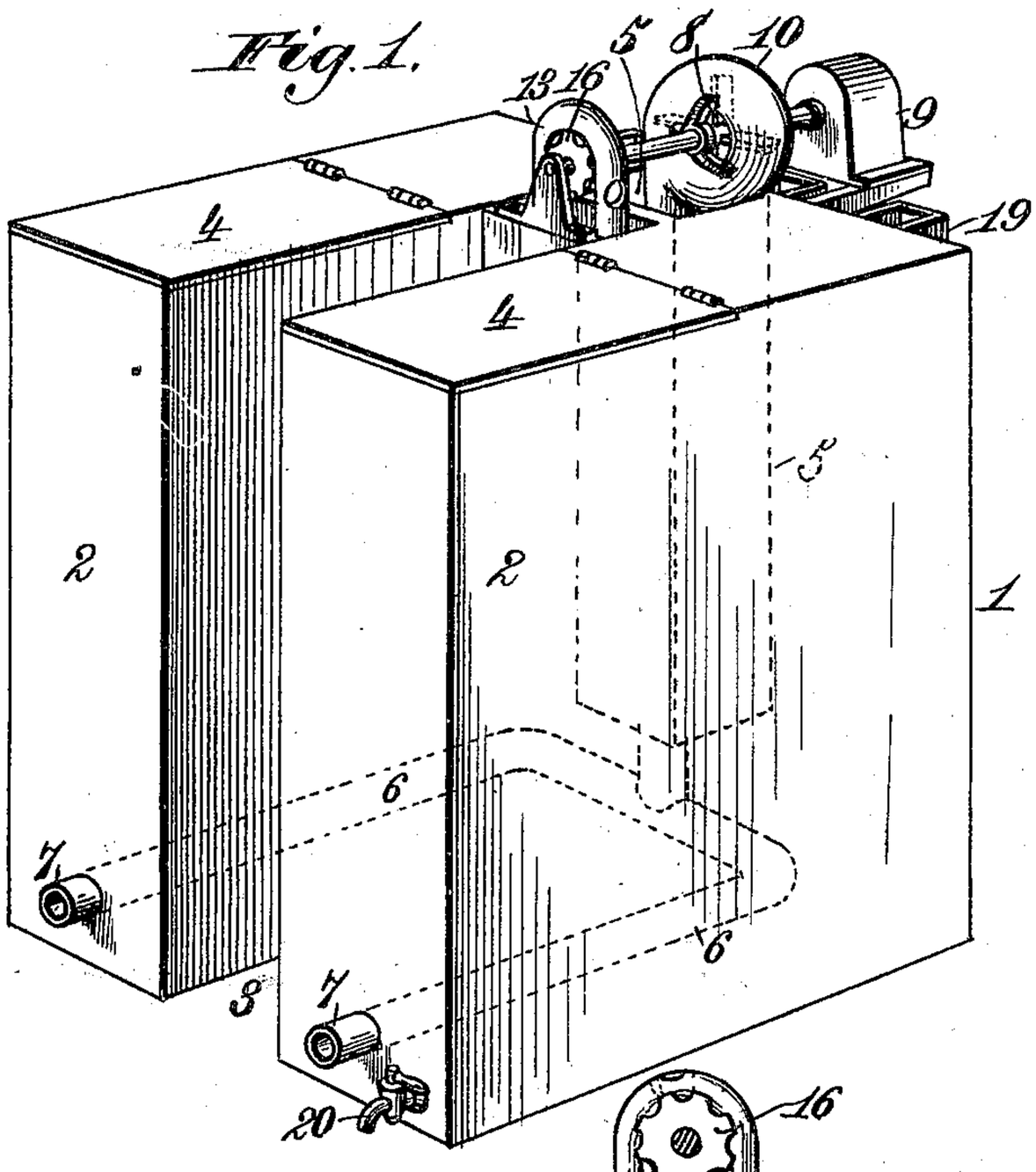


Fig. 3.

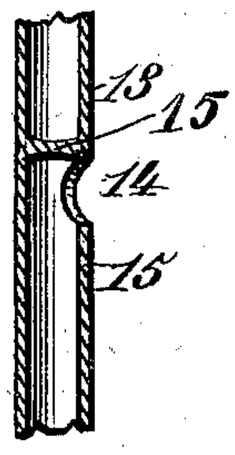
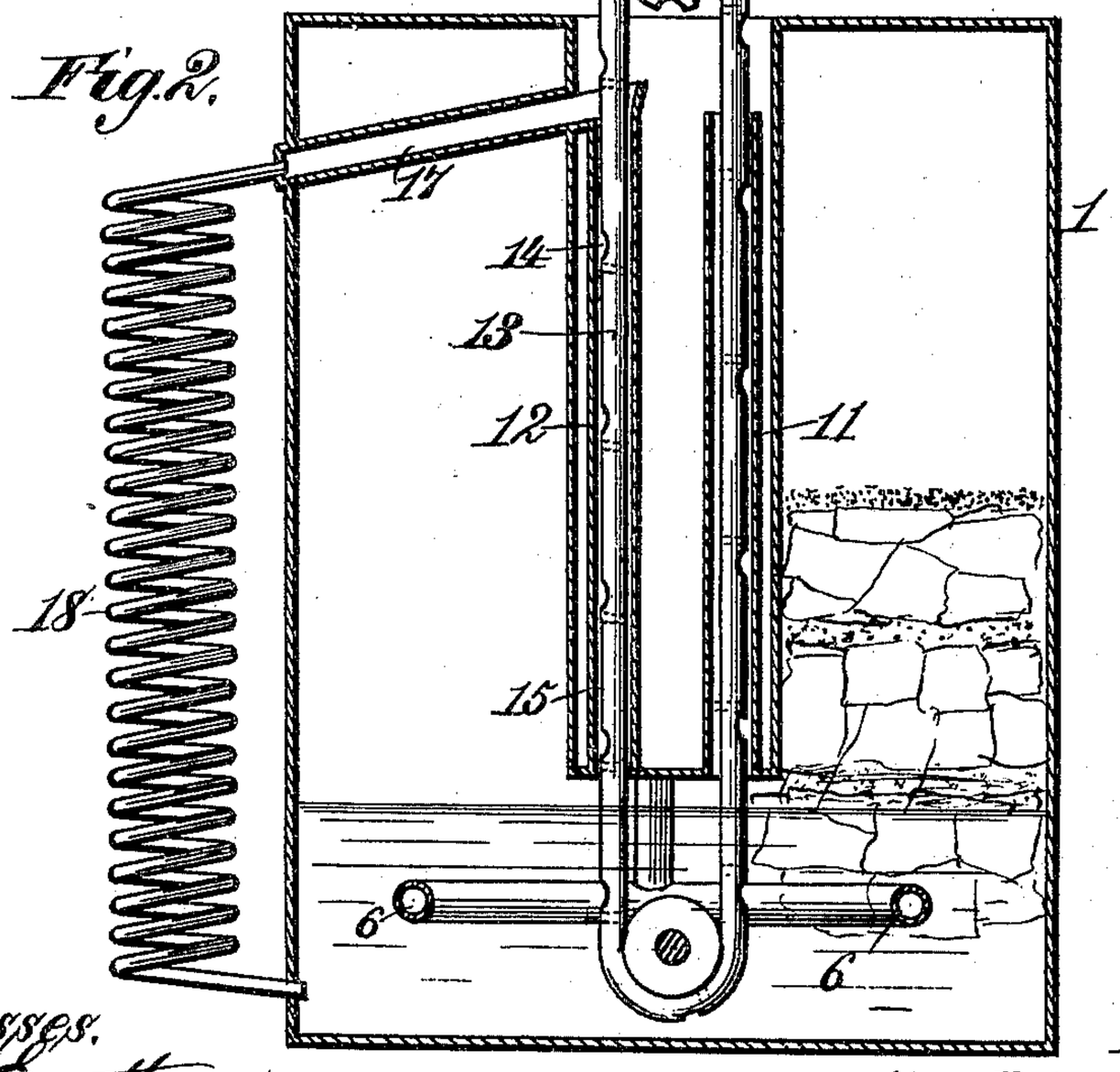


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

CHARLES W. BLAGG, OF SIOUX CITY, IOWA, ASSIGNOR TO HIMSELF, LOUIS BECKER, CHARLES WISE, AND WILLIAM FRANCIS BLAGG, OF SAME PLACE.

REFRIGERATING APPARATUS FOR COLD-STORAGE CHAMBERS.

SPECIFICATION forming part of Letters Patent No. 644,965, dated March 6, 1900.

Application filed April 10, 1899. Serial No. 712,438. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BLAGG, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented new and useful Improvements in Refrigerating Apparatus for Cold-Storage Chambers, of which the following is a specification.

This invention relates to refrigerating apparatus for cold-storage chambers, and has for its object to provide a simple and inexpensive apparatus of the type referred to which will effect a great economy in the quantity of ice employed and which will operate to produce a very low temperature in the cold-storage box or chamber in a very short time and will effectually maintain said temperature.

To this end my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a perspective view of the refrigerating-tank. Fig. 2 is a vertical sectional view thereof, and Fig. 3 is a detail sectional view of a portion of the brine-elevating mechanism.

Referring to the drawings, the numeral 1 indicates a sheet-metal tank provided at the front with two forwardly-projecting extensions 2, separated from each other by a vertical air-space 3. The tops of the extensions are closed air-tight by lids or covers 4. Arranged in the rear portion of the tank 1 is a sheet-metal box or well 5, open at its upper end, and leading from the bottom of said well are air-pipes 6, which pass down to the bottom of the tank 1, thence along the bottom of said tank and the bottoms of the extensions 2, and out through the front walls of said extension, as at 7, where they communicate with the atmosphere of the storage box or chamber. Arranged over the upper open end of the well 5 is a rotary fan 8, which may be driven by any suitable power, preferably by a spring-motor 9. In practice the fan 8 is inclosed at the top by a casing 10. The fan operates to force the warmer air from the upper part of the storage box or chamber down through the well and air-pipes 6 and out into the lower part of the storage-chamber, the air in its passage through said well and pipes being cooled, as will more fully hereinafter appear.

The tank 1 and its extensions 2 are partially filled with the refrigerating material, as follows: In the bottom is first placed about ten inches of ice, and over the ice is deposited a refrigerating compound composed of four parts of rock-salt to one part of alum. The ice and refrigerating compound are alternately arranged in this manner to a suitable height in the tanks 1 and 2. Arranged in the tank 1 immediately in front of the well 5 are two pipes 11 and 12, which extend from near the bottom of the tank to near the top thereof and are each open at the opposite ends. Arranged to travel in said pipes is an endless rubber tube 13, provided at suitable intervals with openings 14, and fixed in said tube beneath each opening is a disk or diaphragm 15. A series of buckets is thus formed in the tube 13. The tube 13 passes about a wheel 16, rotatably mounted above the upper ends of the pipes 11 and 12 and preferably rotated by the spring-motor employed for driving the fan. The lower portion of the tube dips into the brine at the bottom of the tank. The wheel 16 rotates in the direction indicated by the arrow, and hence the tube ascends the pipe 11 and descends through the pipe 12. Arranged to one side of and above the upper end of the pipe 12 is an inclined trough or catch-basin 17, connected at its lower and outermost end to the upper end of a coil 18, which is arranged on the exterior of the tank and at its lower end leads back into the bottom of the tank. In the passage of the tube through the brine the buckets take up the brine and lift it up until the buckets pass over the wheel 16, whereupon they discharge the brine into the catch-basin 17, and from the latter it passes into the coil 18, down through which it passes and is conveyed back into the bottom of the tank.

Arranged on the outside of the tank are pipes or flues 19, open at both top and bottom. Said pipes or flues are preferably rectangular in cross-section in order to obtain a greater exposed surface and are formed of sheet metal. The air in the tubes is cooled by the refrigerating-tank and descends to the lower portion of the cold-storage chamber, its place being supplied with warmer air taken from the upper part of said chamber. A constant circulation of air is thus maintained through the tubes. I have shown said pipes or flues arranged on the back only of the tank, but it is manifest that they might also be arranged on the front and sides also.

In practice the tank is placed in the cold-storage box or chamber and is supported at a suitable distance above the floor of the latter by any suitable means. The ice and refrigerating compound are introduced into the tank through the covered apertures 4 and are disposed in alternate layers in the manner described and the fan and pump are put into operation. The fan operates to draw the relatively-warm air from the upper portion of the storage-chamber and forces it down through the well and air-tubes and out the front of the tanks 2 into the lower portion of the chamber. In its passage through the well and tubes the air is cooled by the refrigerating medium in the tank, and as the fan is continuously driven a constant circulation of the air is maintained in the chamber, the warmer air being withdrawn from the top and forced down through the tank and discharged into the lower portion of the chamber. Furthermore, the cold brine is being constantly elevated by the pump and fed down through the coil on the exterior of the tank into the bottom of the latter, and the air of the chamber is thus brought into contact with a long length of cold pipe and is thereby chilled, the cold air sinking by gravity to the lower portion of the chamber and the warm air being constantly brought into contact with the coil. In addition to these means for creating a circulation of the air in the chamber and refrigerating it such circulation and cooling action are aided by the extensions 2 of the tank, the air circulating about the tank and down through the space 3 between the extensions. It will be noted that the ice and refrigerating compound are inclosed air-tight in the tank, and hence the air of the storage-chamber never comes in contact with the refrigerating medium, whereby it is maintained sweet and pure.

A faucet 20 is fixed in the lower portion of the tank for the purpose of drawing off the waste brine.

Having described my invention, what I claim is—

1. The combination with a tank constructed for the reception of a refrigerating medium, and provided with two extensions separated by an air-space, of a well disposed in the main portion of the tank and communicating with the atmosphere through the top of the latter, air-pipes leading from the bottom of the well along the bottom of the extensions through the refrigerant and to the exterior of the tank, and a fan for forcing air through said well and pipes, substantially as described.

2. The combination with a tank constructed for the reception of a refrigerating medium and provided with two extensions separated by an air-space, of a well disposed in the rear portion of the main tank and communicating with the atmosphere through the top of the latter, air-pipes leading from the bottom of the well along the rear wall of the tank and over the bottom of the latter and over the bottoms of the extensions and projecting through the front walls of the latter, and a fan for forcing air through said well and pipes, substantially as described, and for the purposes specified.

3. The combination with a tank provided with extensions separated by an air-space, of a well disposed vertically in said tank and open at its upper end, air-pipes leading from the bottom of the well along the rear wall of the tank and over the bottom of the latter and over the bottoms of the extensions, and a rotary fan disposed over the upper open end of the well, substantially as described.

In testimony whereof I have hereunto set my hand in presence of the two subscribing witnesses.

CHARLES W. BLAGG.

Witnesses:
M. W. MANSE,
A. H. WISE.