E. H. ALTHOFF.

APPARATUS FOR AGITATING FREEZING WATER.

APPLICATION FILED AUG. 10, 1914.

1,219,897.

Patented Mar. 20, 1917.

2 SHEETS—SHEET 1.

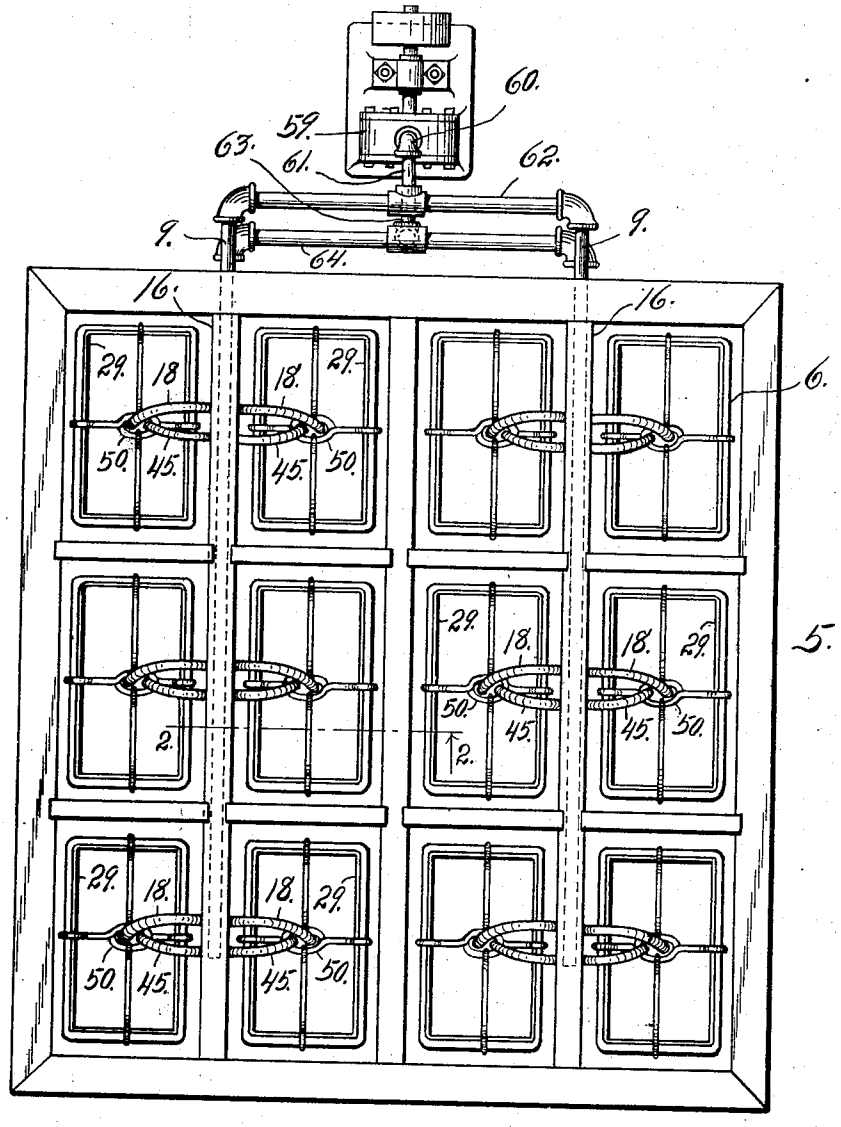


Fig. 1.

Witnesses

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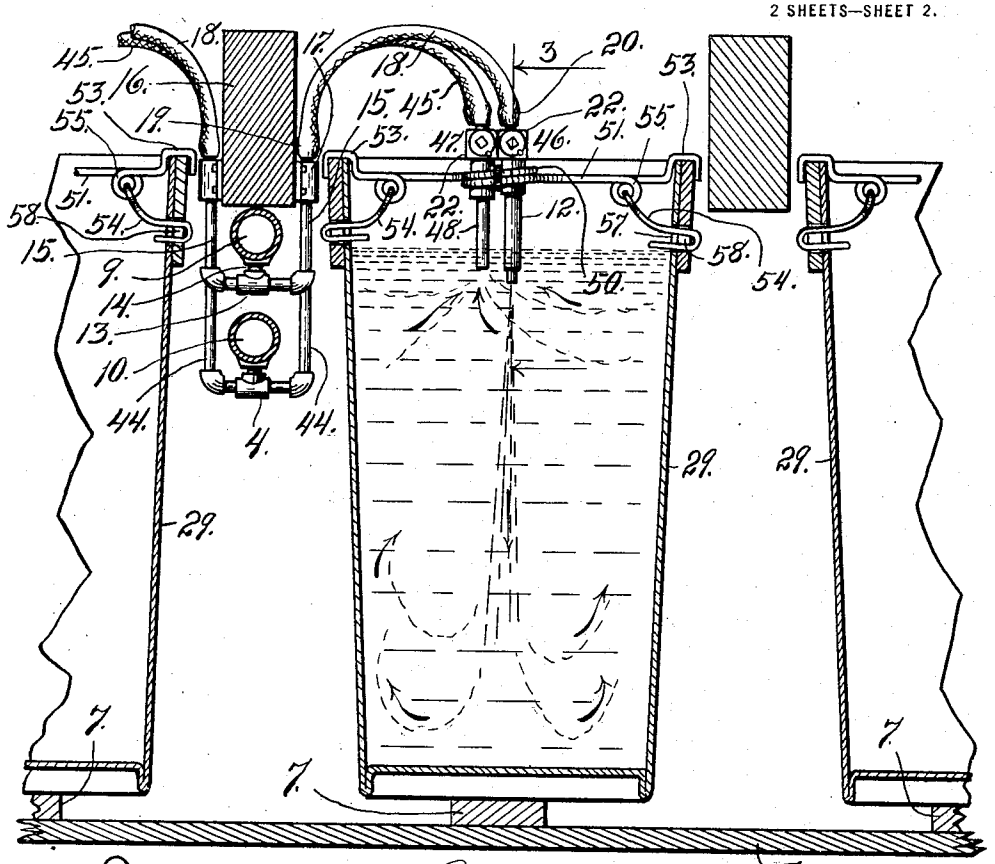


Fig. 2.

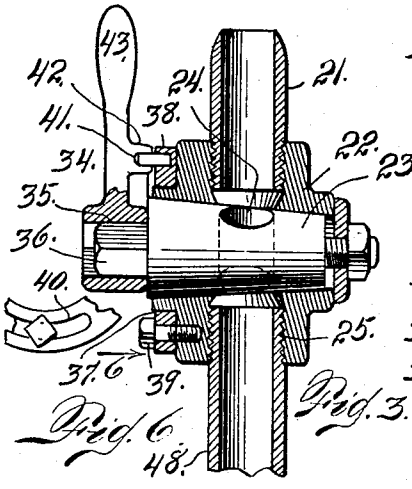


Fig. 6.

Fig. 3.

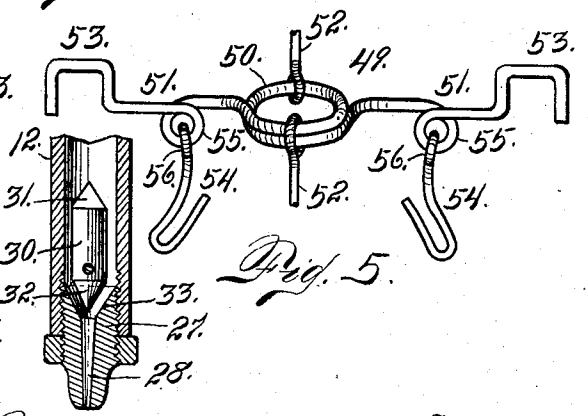


Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR AGITATING FREEZING WATER.

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Application filed August 10, 1914. Serial No. 856,016.

To all whom it may concern:

Be it known that I, EDWARD H. ALTHOFF, a citizen of the United States, residing at Salt Lake City, county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Apparatus for Agitating Freezing Water; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in apparatus for agitating freezing water. This invention is adapted for use in artificial ice plants, and its object is to make it practicable to freeze ice in a perfectly clear state, thus preventing the white ice which results from air bubbles in the water. Furthermore, by virtue of this agitation of the water, all impurities of a solid character are eliminated during the freezing operation, and gradually brought to the top of the can, where they may be separated from the ice cake.

By use of my improved apparatus continuous circulation of the water through the can is effected, by the discharge of water into the can with sufficient force to drive it to the bottom or to the bottom of the unfrozen portion of the water; while through the medium of a suction pipe or conduit, a corresponding quantity of water is removed from the can. In this way, the quantity of water in the can is maintained at all times, but the circulation is continuous and uninterrupted, thus producing results superior to those attained through the instrumentality of an intermittent discharge and removal, as heretofore employed.

With reference to the apparatus, I may employ a pump of any suitable character. A centrifugal pump, for instance, may be employed to advantage. In this case, the discharge conduit is connected with the outlet extremity of the pump, while the suction conduit is connected with the suction chamber. In this way, as the pump is operated, the water is circulated through the medium of the pump and two conduits, the one conduit continuously discharging water into the can with sufficient force to result in the necessary agitation, while the other conduit is continuously removing a corresponding amount of water from the can, the circulation being through the pump, as will be readily understood.

As illustrated in the drawing, special apparatus is employed for supporting the discharge and the suction nozzles, which are connected with the two conduits, this apparatus being readily removable from the frame work surrounding the top of the can, when it becomes necessary to remove the cans after the freezing operation is complete. A battery of any desired number of cans may be connected with a single pump, provision being made for retarding the discharge of water into the cans which are nearest the pump. In this way, the supply of water to and its removal from the various cans may be equalized throughout the entire battery of cans.

Having briefly outlined my improved construction, I will proceed to describe the same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof. In this drawing,—

Figure 1 is a top plan view of a battery of cans connected with a single pump.

Fig. 2 is a fragmentary sectional view cutting three cans of the battery, the one can being shown complete, while the cans on opposite sides are partly broken away.

Fig. 3 is a sectional detailed view of one of the controlling valves for regulating the volume of water passing through the discharge and suction nozzles connected with each can, the parts being shown on a larger scale.

Fig. 4 is a fragmentary section of one of the discharge nozzles connected with any can.

Fig. 5 is a perspective view of the apparatus for supporting the discharge and suction nozzles of any can of the battery.

Fig. 6 is a fragmentary view looking in the direction of arrow 6, Fig. 3.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a battery of cans in an ice freezing plant, the usual frame work or supporting structure being employed. As is well understood, this is a skeleton structure, the top being a rectangular frame 6, into which the top of each can fits, whereby the can is properly centered,

its lower extremity resting upon a support 7, in the bottom 8 of the brine tank. This support spaces the can from the bottom of the tank, whereby the brine is allowed to come in contact with all parts of its surface.

In my improvement as illustrated in the drawing, I employ an induction or discharge conduit 9, which extends the entire length of the battery of cans and between two rows of cans; and a suction conduit 10 also extending the entire length of the battery between the two rows of cans. This discharge pipe is connected in operative relation with a discharge nozzle 12 of each can of the two rows of cans between which a discharge or supply conduit is located. There is a short pipe 13 located below and connected with the conduit 9, as shown at 14, whereby the water passes freely from said conduit to the short pipe. From each extremity of this short pipe a branch pipe 15 leads upwardly and is secured to a beam 16 by means of a bracket 17, the branch pipe extending far enough above the bracket to permit the connection of a flexible pipe 18 therewith, as shown at 19, the opposite extremity of the flexible pipe being connected as shown at 20 with a nipple 21 threaded into a casing 22 of a valve 46, in which casing is rotatably mounted a valve piece 23, the valve having a perforation 24 which registers with the nipple 21 when the valve is in the desired position. Threaded into the lower part of the casing 22 as shown at 25, is the depending nozzle 12, whose discharge extremity is equipped with a screw plug 27 having a reduced passage 28, whereby the discharge of water downwardly through the nozzle is retarded, as it enters a tank 29, thus increasing the force with which the water is discharged into the can, and causing the water to pass downwardly to the bottom of the can or to the bottom of the water in the can. In this nozzle 12 is located a fixed valve 30 having pointed upper and lower extremities 31 and 32. The water as it passes through the nozzle flows around this valve and passes thence downwardly through the duct 28. By the proper adjustment of the plug 27, the nozzle may be closed, since the upper part of the plug has a cone-shaped seat 33 adapted to fit the extremity 32 of the valve which is of counterpart shape.

This valve is an important feature, since it makes it practicable to accurately regulate the discharge of water into the series of cans, whereby the discharge to all of the cans shall be equal. For this reason, the discharge valves mounted on the tanks nearer the source of supply or the pump, are adjusted to reduce the available opening through the corresponding valves, since the tendency would be for the water to take the shortest course and therefore enter the nearer cans in preference to those farther away. However, by retarding the flow to the nearer cans and properly graduating the retarding influence by the proper adjustment of the various valves 23, the discharge into each can of the entire battery may be equalized. For the purpose of regulating each of these valves a removable key 34 may be employed. This key is provided with a socket 35 adapted to fit the exposed extremity 36 of the valve piece 23, said valve piece extremity being polygonal in cross section and the key socket of corresponding shape. Surrounding a collar 37 formed in the valve casing 22 is an adjustable collar 38, which is secured in the desired position of adjustment by a set bolt 39 passing through a curved slot 40 formed in the collar. This collar is provided with a stop pin 41 located in the path of a projection 42 formed on the handle 43 of the key. The object of the stop pin 41 and the adjustable collar 38 carrying the said pin, is to make it practicable to set the construction so that when the key is actuated to bring its lock 42 into engagement with the stop pin 41, the person in charge will know that the valve piece 23 is properly adjusted for the corresponding can, having reference to the location of the latter or its distance from the source of supply. When it is desired to manipulate the valve with reference to this adjustment, it is only necessary to reverse the position of the handle from that shown in Fig. 3, whereby the projection 42 extends away from the valve casing, in which event, the key may be manipulated without engaging the stop pin. It will be noted by reference to Fig. 3, that the key is reversible as the socket extends entirely through the head of the key.

Arranged below the suction conduit 10 is a short pipe 4 from each extremity of which a branch pipe 44 extends upwardly and is connected with one extremity of a flexible pipe 45 whose opposite extremity is connected with the nipple of a valve 47. Within this casing is located a valve piece 23 which is substantially of the same construction as that heretofore described when speaking of the valve 46. In other words, the mechanism of the valves 46 and 47 are substantially the same, both as regards their construction and the manner of their adjustment, the reference character 46 being employed to designate the valve mechanism in its entirety, which is connected with the discharge pipe 18, while the reference character 47 is employed to designate in its entirety the valve mechanism connected with the suction pipe 45. The suction nozzle will be designated by the numeral 48 in Fig. 3, since this nozzle is slightly different in construction from the discharge nozzle 12, as the latter is provided with the retarding plug 27, while this feature is absent in the suction nozzle. With this exception, the en-

tire discharge and suction features employed in connection with each tank, are of the same construction and the description heretofore given when speaking of the parts of the valve 46 is equally applicable to the same parts of the valve 47, the construction being shown in detail in Fig. 3.

In order to properly support the discharge and the suction nozzles, I employ a spider device 49 which consists of a circular member 50 centrally arranged at the top of the can and having arms 51 and 52 connected therewith and leading outwardly therefrom, their outer extremities being hook-shaped as shown at 53, to engage the can and the surrounding frame work 6 on opposite sides. In this manner, the circular device is rigidly supported at the top of each can, but is at the same time, readily detachable therefrom. In order to further maintain each spider device 49 in coöperative relation with its corresponding can, I employ spring hooks 54 which are connected with the arms 51 on each side of the circular device 50, the arms 51 being bent to form eyes 55 with which the eye extremities 56 of the hooks are interlocked. These hooks are inserted in openings 57 formed in the can and the registering openings 58 formed in the frame 6. These hooks are placed under sufficient tension as they are crowded into the openings, to cause them to remain in position until removed by design.

While I have now described the suction and the discharge apparatus connected with a single can, it must be understood that the apparatus for each can is substantially the same. In other words, referring to Fig. 1, there are two conduits 9 and 10 arranged between each of the two rows of cans, (three in each row), on the right of Fig. 1, and also a pair of conduits 9 and 10 between the two rows of cans at the left, in the same battery. Each can of the six cans of each set, is connected for discharge and suction purposes with the two corresponding conduits 9 and 10, in the same manner as heretofore described, the parts being shown in detail in Figs. 2 and 6, inclusive. Hence, when the invention is in use, there is a continuous and equable discharge to each can of the battery and a continuous and equable exhaust from each can of the battery, this being brought about through the instrumentality of the valve mechanism 46 and 47.

As illustrated in the drawing (see Fig. 1), a pump 59 is employed, its discharge opening 60 being in communication through a pipe 61 with a branch pipe 62 whose opposite extremities are connected with the two conduits 9 of the battery 5; while the suction opening of the pump is connected by means of a pipe 63 and a branch pipe 64 with the two suction conduits 10 of the battery 5.

By virtue of this construction, it will be understood that, if the cans are filled for freezing purposes, the water may be agitated by a continuous circulation thereof through the medium of the discharge and suction apparatus during the entire time necessary for the freezing of the battery of cans. Whenever it is desired to remove a can, the spider device 49 employed in connection with each can may be readily detached therefrom, thus leaving no impediment or obstruction to the removal of the can in the same manner as if my improvement were not employed.

Having thus described my invention, what I claim is,—

1. Water agitating apparatus comprising a pump, a battery of water-containing cans, discharge and suction conduits in communication with the pump at one extremity, their body portions extending between two rows of cans of the battery, and a pair of discharge and suction nozzles for each can of the two rows, the nozzles of each pair for each can being respectively in communication with the discharge and suction conduits, and means for controlling the supply and removal of water from each of the several cans in order that the supply to and the removal from each can of the battery may be equal.

2. Water agitating apparatus comprising a pump, a battery of water-containing cans, discharge and suction conduits in communication with the pump in one extremity, their body portions extending between two rows of cans of the battery, and a pair of discharge and suction nozzles for each can of the two rows, the nozzles of each pair for each can being respectively in communication with the discharge and suction conduits, and means for reducing the quantity of water delivered to and removed from any can during the freezing operation.

In testimony whereof I affix my signature in presence of two witnesses.

EDWARD H. ALTHOFF.

Witnesses:
MAZE KIRBY,
A. EBERT O'BRIEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."