No. 609,999. Patented Aug. 30, 1898.

R. F. SCHROEDER.

PRELIMINARY COOLER FOR ICE MACHINES.

(Application filed Dec. 3, 1897.)

(No Model.)

Fig. 1.

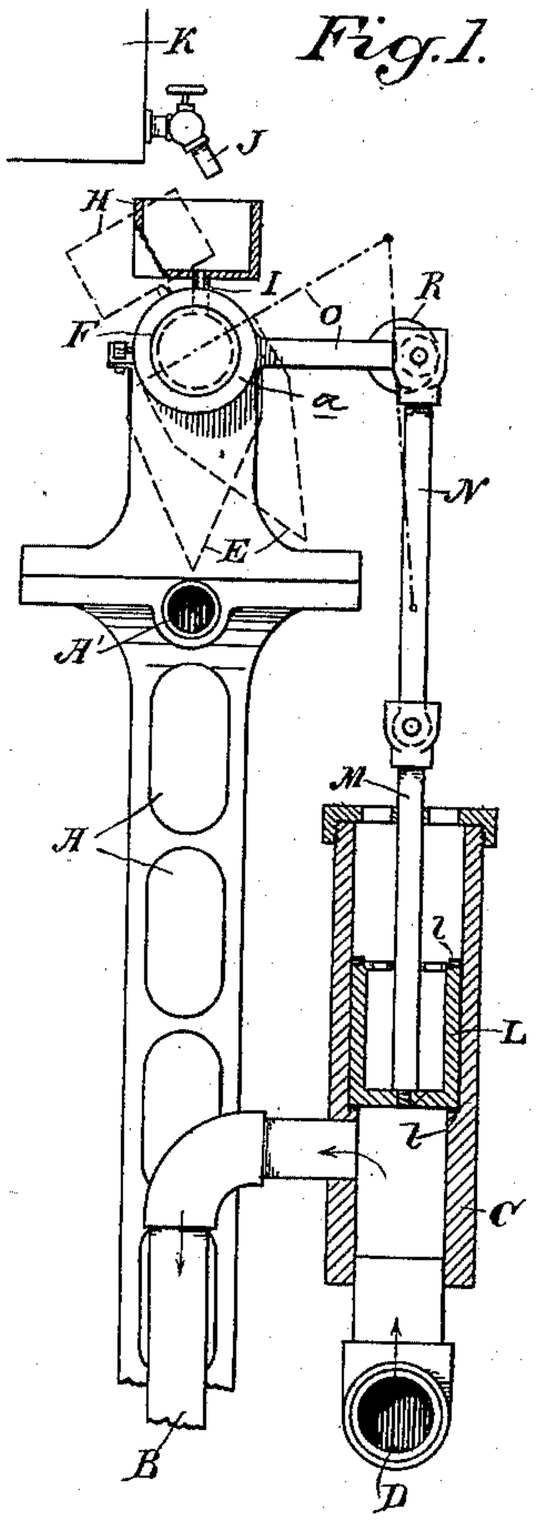


Fig. 2.

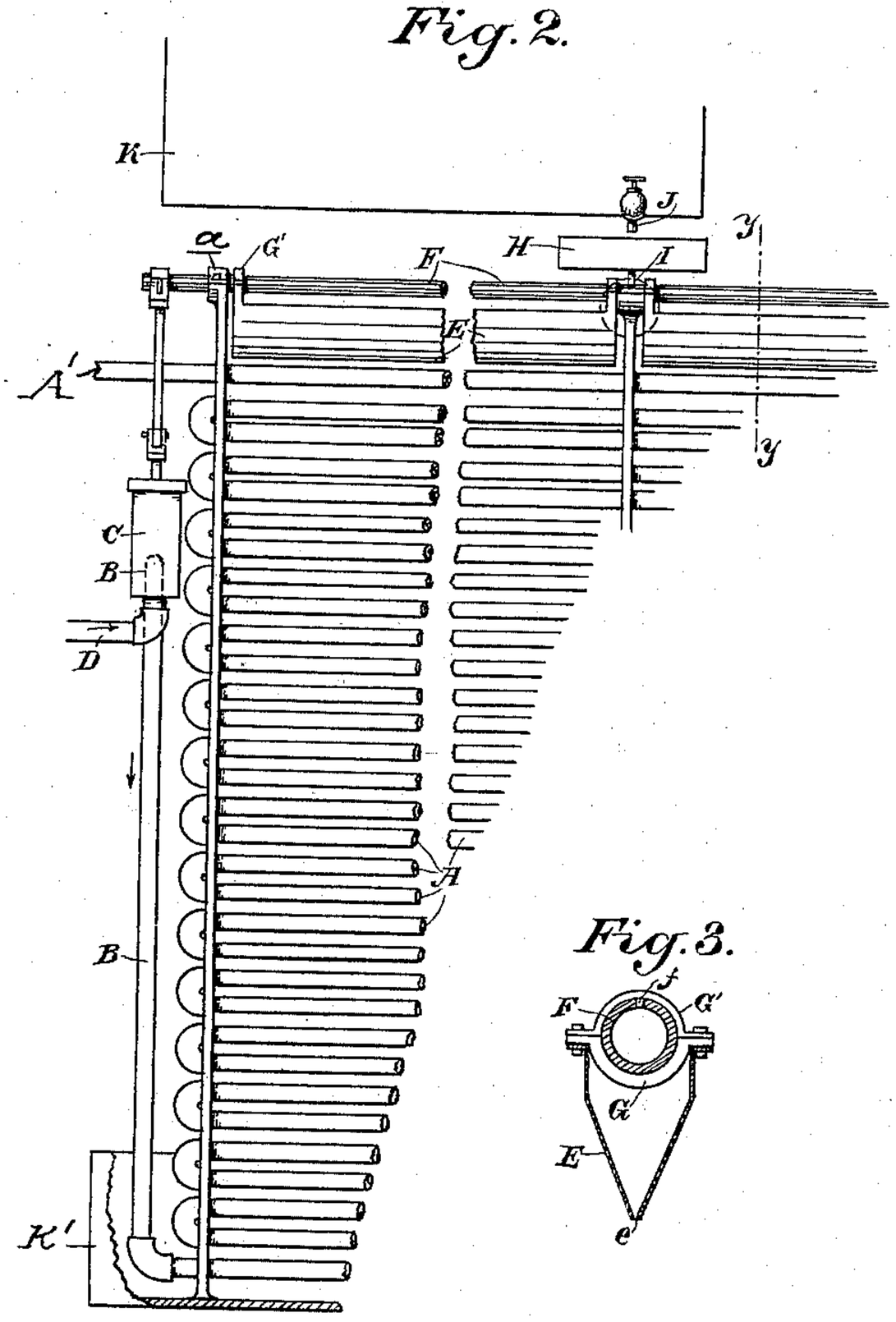
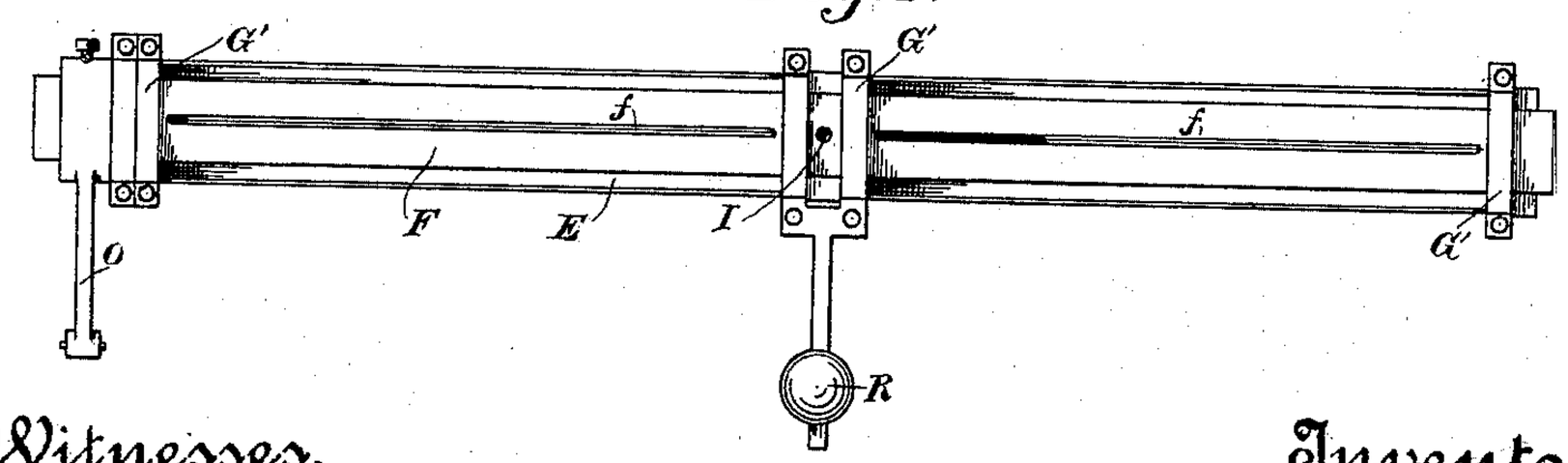


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

RICHARD F. SCHROEDER, OF SACRAMENTO, CALIFORNIA.

PRELIMINARY COOLER FOR ICE-MACHINES.

SPECIFICATION forming part of Letters Patent No. 609,999, dated August 30, 1898.

Application filed December 3, 1897. Serial No. 660,681. (No model.)

To all whom it may concern:

Be it known that I, RICHARD F. SCHROEDER, a citizen of the United States, residing at Sacramento, county of Sacramento, State of California, have invented an Improvement in Preliminary Coolers for Ice-Machines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to an apparatus for cooling water previous to its being introduced into the freezing-cans of ice-machines, in which it is finally frozen into blocks.

It consists of the parts and the constructions and combinations of parts hereinafter described and claimed.

Figure 1 is an end view and section of a part of the apparatus. Fig. 2 is a side elevation and partial section of the cooling-pipes and connected mechanism. Fig. 3 is a transverse section of the distributing-trough of the cooler. Fig. 4 is a plan view of the same.

The objects of my present invention are to simplify the mechanical construction of the apparatus, to increase the rapidity with which the operations can be carried on, and correspondingly improve the quality of the product.

In the manufacture of ice it is first necessary to expel all the air from the water before it is frozen in order to produce a clearer and more solid ice, and after this is done and before the water thus prepared is introduced into the freezing-cans I have found a very important part of the operation of manufacturing the ice is to cool the water to a temperature so near to freezing that it will commence to freeze at once as soon as it is introduced into the cans. In order to effect this, I have shown a series of coils of pipe A superposed in such a manner that they stand essentially in a vertical plane, one coil above the other, and the pipes composing said coils extend horizontally backward and forward, being united at opposite ends by curved couplings, so that water introduced into one end of the coil under pressure may pass to the other end before being discharged. In the present case I have shown the water as being introduced into the bottom of the coil by means of a pipe B, which opens out from a cylinder C, fixed with suitable relation to the coils and having a supply or inlet pipe D opening into the lower end, as shown plainly in Figs. 1 and 2. Water thus admitted through the pipe D passes through the cylinder C into the pipe B, thence into the coils A at the bottom. Passing backward and forward through said coils to the top, it is discharged at A′ to pass into the freezing-cans. While the water is thus flowing through the pipes, I discharge cold brine or other medium upon the upper part of the line of pipes, so that it will trickle down over the pipes A, and thus cool the water which is passing through them. In order to effect this, I have shown a trough E, which has a pipe F extending from end to end through the upper part. The pipe is secured to the trough by means of brackets and clamping-straps G and G′ at intervals from end to end of the pipe and trough, so that the pipe and trough may tilt together about the common center, this center being the axis of the pipe, which may be suitably journaled and turnable in bearings or boxes *a* upon a support in line above the pipes A.

This device is supplied with brine by means of a small box or tank H, which is fixed approximately centrally to the pipe F, and brine from the box flows through a hole I into the central portion of the pipe F, thus filling the pipe, and when the pipe is filled the water overflows through a slot or channel *f* made in the upper side of the pipe F. This brine overflowing from the pipe is delivered into the trough E and discharges through a slot *e*, extending along the lower edge of the trough, falling thence upon the pipes, as before described.

The box H is supplied with brine by means of a cock and inclined faucet J from a supply-tank K.

As soon as the water is temporarily cut off in the cooling-pipes A, it is necessary to divert the cold brine from the outside of the pipes to prevent the water becoming solidified in the pipes, and in order to do this the trough E is tilted upon the trunnions at the instant when the water stops flowing, so that the discharge *e* at the lower edge will be carried out of line with the pipes A, as shown in dotted lines in Fig. 1. This operation is effected by means of a plunger L, fitting and movable in the upper part of the cylinder C, having a piston-rod M and a connecting-rod N, which unites it with the lever-arm O, pro-

jecting to one side from the journaled tube F or the trough, so that by the moving of the lever-arm O the parts may be tilted as before described.

The part of the cylinder in which the plunger L moves is of somewhat larger diameter than the lower end into which the water is received from the pipe D, and the plunger has gaskets at the upper and lower end, as shown at *l*.

A seat or shoulder is formed in the cylinder C at the junction of the smaller and larger diameters, and upon this seat the piston closes when it is at its lowest point, thus preventing any passage of water through the joint.

When the piston is forced to the upper end of its stroke, it correspondingly closes against a seat formed by the cover of the cylinder and in the same manner prevents any leakage from that direction.

The operation of the device will then be as follows: As long as the water flows freely through the pipes D and B and the cans are being filled the piston L will remain at its lowest point, being carried there by gravitation, and the trough E will stand in such position that the brine therefrom will trickle down over the coils A. As soon as the water is shut off in the pipe A′ by reason of the can being filled the pressure from the pipe D will be transferred to the piston L, will push the piston up to the top of the cylinder C, and acting through the piston and connecting-rods L and M and the arm O it will tilt the tube F and the trough E until the discharge apex of the trough has been carried to one side of the pipes A, and it will then discharge the cold brine away from the pipes A, thus temporarily arresting the cooling process within those pipes. The tilting of the trough and the pipe F also carries the box H out of the line of the faucet and supply-pipe J, as shown by dotted lines, Fig. 1, the said pipe being shown inclined at an angle to cause the brine running from the tank K to be discharged to one side of the trough and the pipes.

R is a weight fixed upon an arm projecting to one side of the tube F, and this weight, lying upon the same side of the trough with the piston and its connections, will act by gravitation to force the piston down to its lowest point and return the trough to a position where it will again discharge upon the pipes A as soon as the water is allowed to again flow freely through the pipes D, B, and A. The operation will thus be automatic, and the discharge of the cooling liquid upon the pipes containing the water to be frozen will be continued while the water is flowing and arrested when the water is not flowing.

By my present arrangement I am enabled to introduce the water into the freezing-cans with the least possible delay, and therefore no opportunity is given for air to again get into the water after it has once been expelled. The pressure is constant, the water flows rapidly and with little or no variation in its speed, and where the plant is large and the expense of running it considerable the saving thus effected is of very material value in the production of ice.

The brine after passing over the pipes is received in a tank K′ below, from which it is pumped in any well-known manner into the upper end of the tank K and there recooled to be used again.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A preliminary cooler for water to be frozen, consisting of channels for conveying the water to the freezing-cans, a cold-brine supply above the same, a directing apparatus between and in line with the channels and the brine-supply for discharging cold brine upon the channels, while the can is being filled, and means automatically controlled by the flow in the channels for throwing the directing apparatus out of line therewith and with the brine-supply whereby the discharge is diverted from the directing apparatus while the flow in channels is arrested.

2. A preliminary cooler for water to be frozen consisting of channels for conveying the water to the freezing-cans, a cold-brine supply above the same, a directing apparatus comprising a trough between and in line with the channels and the brine-supply, having openings in its bottom adapted to discharge cold brine upon the channels, while the can is being filled, and a pipe within the upper part of the trough and turnable in unison therewith, and having an open slot in its top, means for supplying brine through said open top and means automatically controlled by the flow in the channels for throwing the directing apparatus out of line with the channels and with the brine-supply whereby the discharge is diverted from the directing apparatus while the flow in the channels is arrested.

3. A preliminary cooler for ice-machines consisting of channels interposed between the source of supply and the freezing-can, a trough having discharge-openings in the bottom, a pipe fixed longitudinally within the upper part of the trough, the ends forming journals about which both pipe and trough are turnable, a central box fixed to the pipe and connecting with its interior, means for supplying the cold brine to said box, and thence to the interior of the pipe, means for tilting the mechanism, automatically controlled by the flow in the channels whereby the trough is alternately tilted to discharge the brine upon the channels while water is flowing therethrough and to divert the flow of brine when the flow of water through the pipe ceases.

4. A preliminary cooler for water to be frozen in ice-machines consisting of channels interposed between the water-supply and freezing-cans, through which the water flows, a trough having a pipe extending longitudinally through the upper part forming journals

about which the pipe and trough are turnable, discharge-openings in the bottom of the trough in line with the channels through which the water flows, a box fixed to the pipe in the upper part of the trough, a supply-pipe delivering brine into said box and thence into the interior of the pipe, a slotted opening in the top of the pipe through which the brine overflows into the trough, and mechanism for automatically tilting the trough so as to discharge to one side of the channels when water is not flowing therethrough, said tilting also carrying the supply-box out of the line of the supply-pipe and allowing the latter to discharge to one side of the trough and water-conducting channels.

5. A preliminary cooler for water to be frozen in ice-machines, consisting of channels interposed between the water-supply and the freezing-cans through which the water flows, a pivoted tilting trough having openings in the bottom, means comprising a box and a slotted turnable pipe whereby the trough is supplied with cold brine, said trough being movable so that the openings stand above the channels, or are moved to one side thereof, mechanism for automatically tilting the trough and its connections consisting of a plunger fitting in the enlarged upper part of a cylinder, a supply-pipe entering the bottom of the cylinder, a pipe leading from the cylinder to the cooling-channels, a lever-arm fixed to the tilting trough, connecting-rods between the plunger and lever-arm whereby it is turned to discharge the brine away from the channels when the piston is moved upwardly in the cylinder.

6. A preliminary cooler for water to be frozen in ice-machines, consisting of channels interposed between the water-supply and the freezing-cans through which the water flows, a pivoted tilting trough having openings in the bottom, means comprising a slotted turnable pipe and a connected box having an outlet whereby the trough is supplied with cold brine, said trough being movable so that the openings stand above the channels, or are moved to one side thereof, mechanism for automatically tilting the trough and its connections consisting of a plunger fitting in the enlarged upper part of a cylinder, a supply-pipe entering the bottom of the cylinder, a pipe leading from the cylinder to the cooling-channels, a lever-arm fixed to the tilting trough, connecting-rods between the plunger and lever-arm whereby it is turned to discharge the brine away from the channels when the piston is moved upwardly in the cylinder, and a weight supported from the same side of the trough whereby the piston is depressed and the trough returned to its normal position when the flow through the pipes is again commenced.

In witness whereof I have hereunto set my hand.

RICHARD F. SCHROEDER.

Witnesses:
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