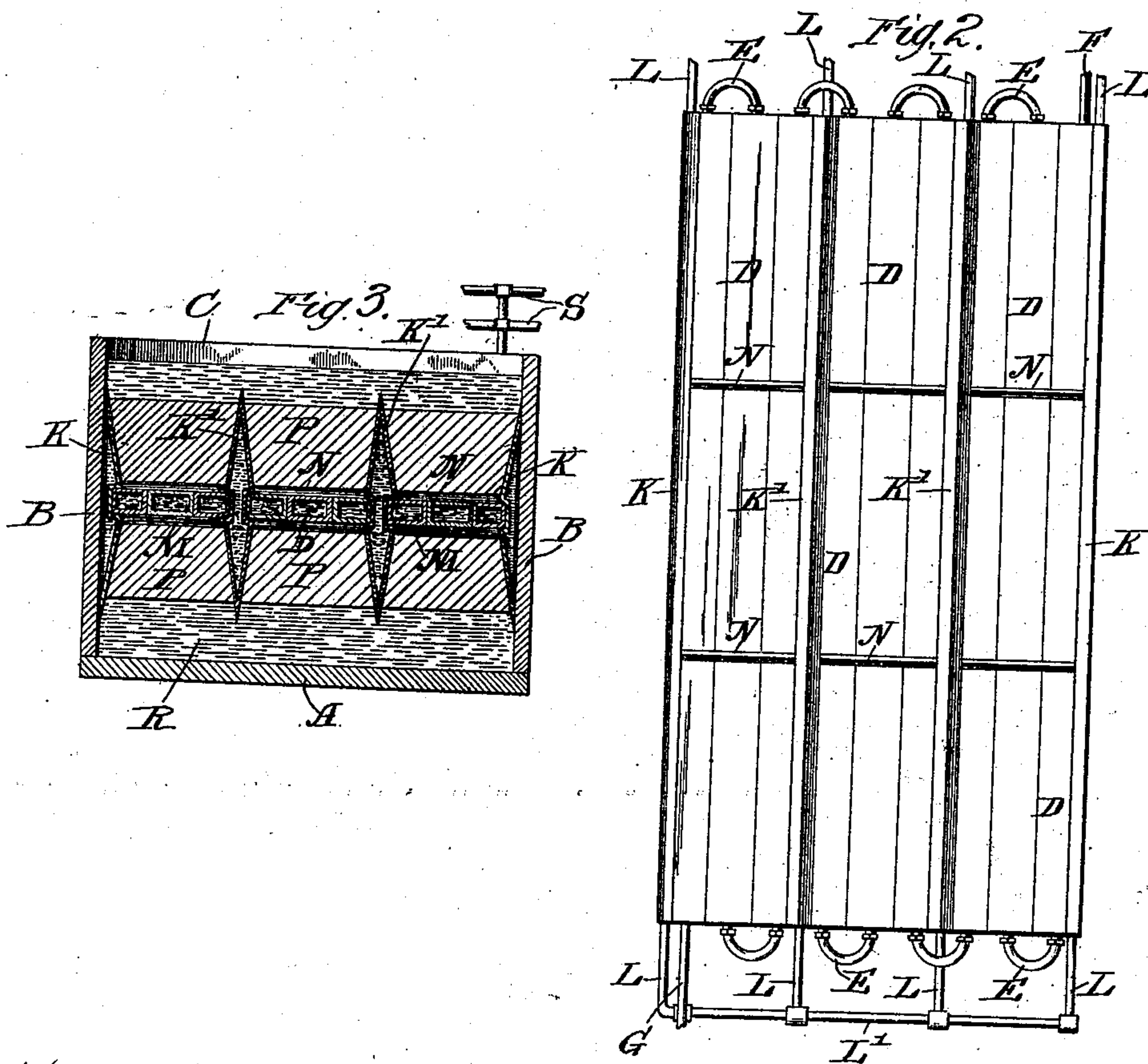
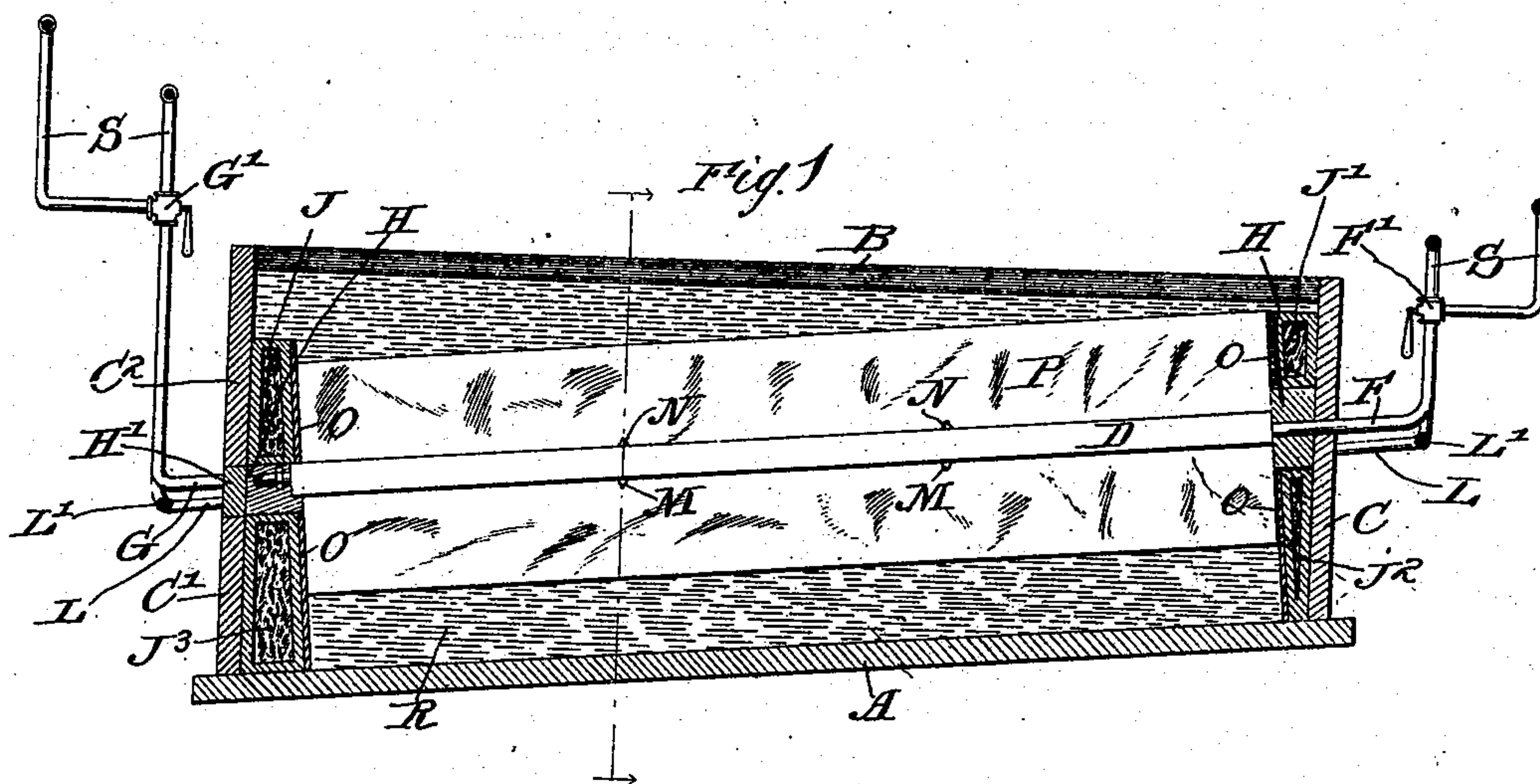


(No Model.)

G. F. KNOX.
ICE MACHINE.

No. 501,045.

Patented July 4, 1893.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE F. KNOX, OF CHICAGO, ILLINOIS.

ICE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 501,045, dated July 4, 1893.

Application filed August 22, 1892. Serial No. 443,768. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. KNOX, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented a new and useful Improvement in Ice-Machines, of which the following is a specification.

My invention relates to machines for manufacturing ice, and particularly for the manufacturing of cake ice. It is illustrated in the accompanying drawings, wherein—

Figure 1, is a side longitudinal section. Fig. 2 is a plan view. Fig. 3, is a cross section.

I have not shown the details of the various parts connected with my invention since all are well known to persons familiar with the art of ice manufacturing, but I only show enough to illustrate fully my invention proper.

A is the bottom of the tank, having the sides B B and the end C, and the two-part end C' C². The bottom is preferably inclined, as shown.

D D are a series of flat surfaced tubes, connected at their ends by the couplings E E so as to form through the series of tubes a continuous passage-way from the pipe F at one end to the pipe G at the other. The pipe F leads to the two-way valve F' and the pipe G to the two-way valve G'. These tubes are suitably secured together and supported in the tank, by means of the end cross pieces H H into which such tubes may project and in which the connecting pipes E E are embedded. These cross-connecting pieces H H are of insulating material, as for example, wood. The two end pieces C' C² are removable and are separated by a part H', which is a continuation of, or in close proximity to, one of the supporting cross-pieces H. Across the ends above and below the cross-bars H H are disposed the low boxes J, J', J², and J³. Longitudinally disposed and placed along the sides and between adjacent tubes are the hollow ribs K K and K' K', substantially as shown. They are indented at their sides to receive, and thus support, the tubes adjacent to them. From each end of each one of these ribs projects a pipe L and these pipes are suitably connected, for example, at one end

by the cross-pipe L' so that the current of brine or other fluid may be sent through all the ribs when and as desired.

M M are fixed cross-ribs between the hollow ridge adapted to indent the ice at intervals as it forms upon the tubes between the hollow ribs. N N are similar cross ribs, but loosely and removably placed on the upper sides of the tubes.

O is a metallic lining, placed, if desired, in front of the boxes J, J', J² and J³.

P P are cakes of ice and R the water in which they are immersed.

S S are the supply pipes connecting with the two-way valves F' G' and adapted to supply warm or cold brine or fluid, as the case may require. The tubes are downwardly inclined or they are placed substantially parallel to the bottom of the tank.

I have shown no means for supplying or withdrawing water from the tank, A, as this may be accomplished in any one of many familiar ways. Nor have I shown any means for circulating fluid through the boxes J, J', J² and J³, though, if desired, this of course is an obvious use of such boxes.

The use and operation of my invention are as follows: It is desirable in preparing ice, to freeze the same in the natural method so nearly as may be possible. For this reason the plate system is preferred. My plate in this case consists of a series of rectangular tubes placed side by side so that the cooling coil and the plates are as it were condensed into a single element. Through these plates by the arrangement of pipes and valves shown, any desired current can be passed to freeze the ice, and then subsequently to melt it from the plates. The ice when frozen in the form of plates must be cut into suitable cakes for handling, and in the case of a large cake of ice, this is a difficult thing to do. I therefore use the hollow longitudinal ribs between which the ice forms on the plates and thus the ice is formed in the shape of long strips. When the ice is to be removed a warming current is sent through these hollow ribs so that the ice is entirely detached. The hollow end boxes serve so far as insulation to pre-

vent the adhering of the ice to such boxes, or their associated plates. They may, if necessary, be kept warm in any desired manner, either by the character of their contents or
 5 by currents which may be sent through them. The ice thus produced in strips must be broken into shorter lengths, and to make this convenient and practicable, and to avoid shattering or breaking the strips, I indent them
 10 by means of the short indenting ribs placed above and below the tubes, and which leave marks across the surface of such strips, whereby they may be easily cut into pieces of uniform length. When the ice is to be removed, a
 15 portion of the water is drawn from the tank and the cakes of ice are melted free from their surrounding parts. The end piece C² is removed and the upper ice strips are permitted to slide out along the inclined surface of
 20 the tubes into whatever receptacle may be provided for that purpose. As they slide out in the trough formed between the hollow longitudinal ribs, the strips carry with them the cross indenting ribs which are loose and free
 25 to move, but they are dropped from such strips and are restored to their positions for the next operation. The remainder of the water is then withdrawn, and as it passes out the lower cakes of ice settle down on to the
 30 lower surface of the tank freeing themselves from their fixed indenting ribs. When the lower box J³ and end piece C' are removed, these strips may in like manner be allowed to

escape, sliding down the bottom of the tank to any desired position.

I claim—

1. In an ice machine the combination of a freezing plate with a series of hollow longitudinal ribs therealong tapering toward their edges between which the ice strips are frozen, with connecting pipes whereby the cooling or warming fluid may be passed into such hollow ribs to make or free the ice from the sides of its grooves. 35 40

2. In an ice machine the combination of a tank, with an inclined bottom, an inclined freezing plate therein adapted to form ice above and below, and removable end pieces so that both cakes of ice may slide by gravity on inclines of the tank. 45 50

3. In an ice machine the combination of a freezing plate with longitudinal ribs above and below, and cross indenting ribs above and below, the lower ones fixed, the upper ones removable. 55

4. In an ice machine the combination of a freezing plate with a tank and insulation cross bars in the ends of the tank in which the ends of the freezing plate or pipes are embedded and insulation end blocks or boxes above and below the ends of the freezing plate and within the tank. 60

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Witnesses:

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