

No. 703,353

Patented June 24, 1902.

S. N. SMITH.
APPARATUS FOR MANUFACTURING ICE.

(Application filed Aug. 5, 1901.)

(No Model.)

2 Sheets—Sheet 1.

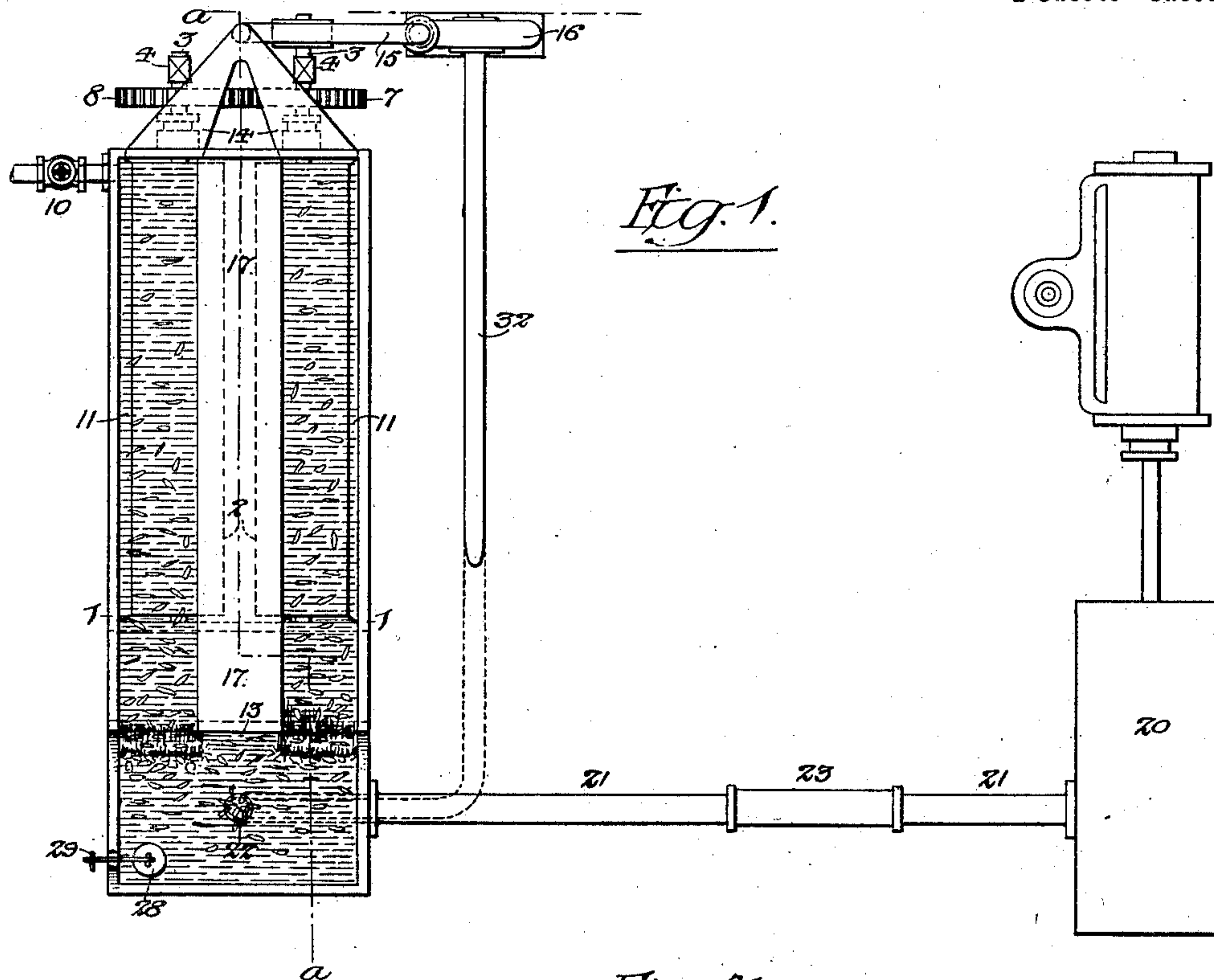
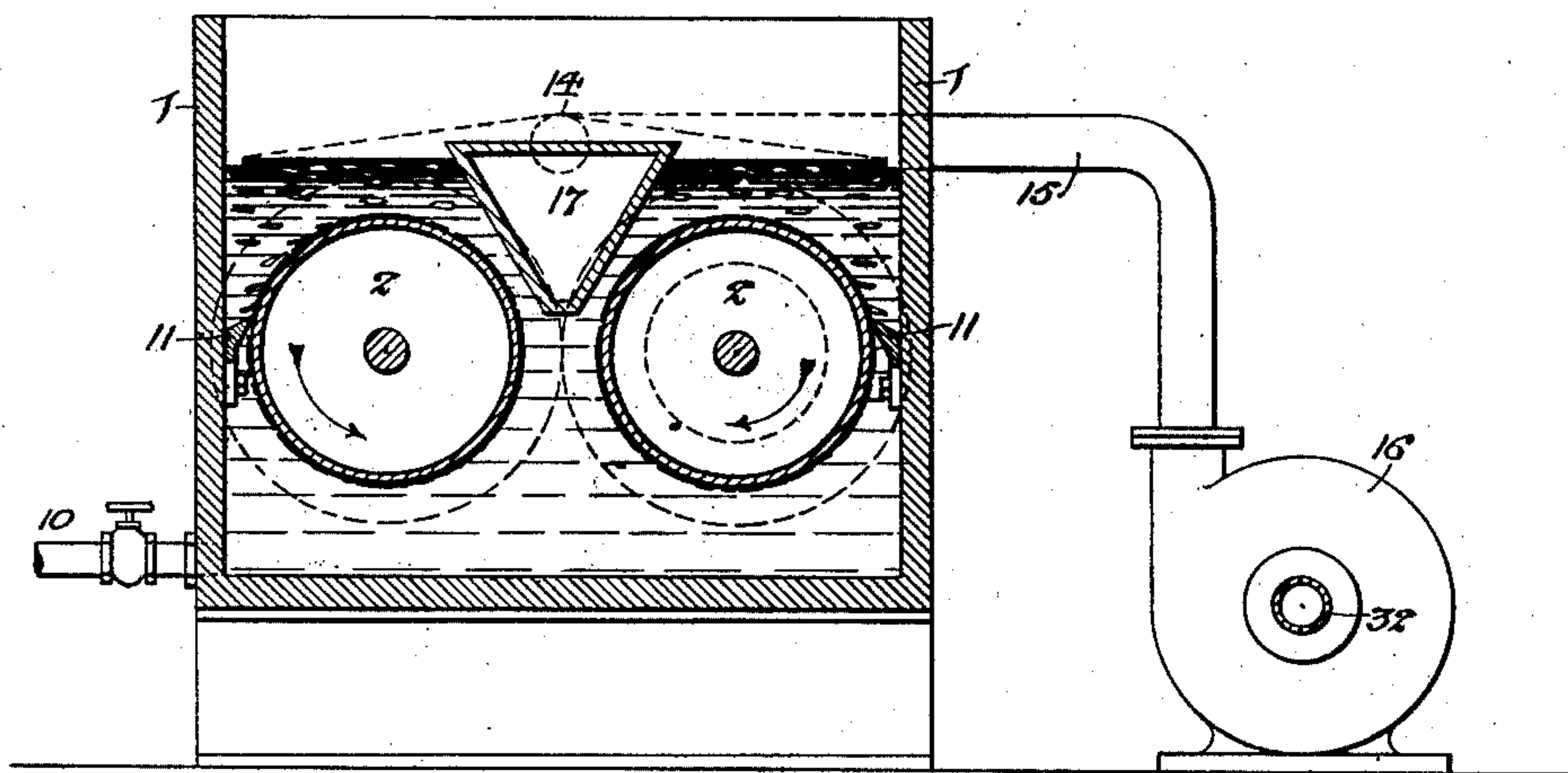


Fig. 3.



Witnesses:

Esaias P. Lundahl.
Louis H. F. Whithead

Inventor:

Sommers N. Smith
by his Attorneys:
Howson & Howson

No. 703,353.

Patented June 24, 1902.

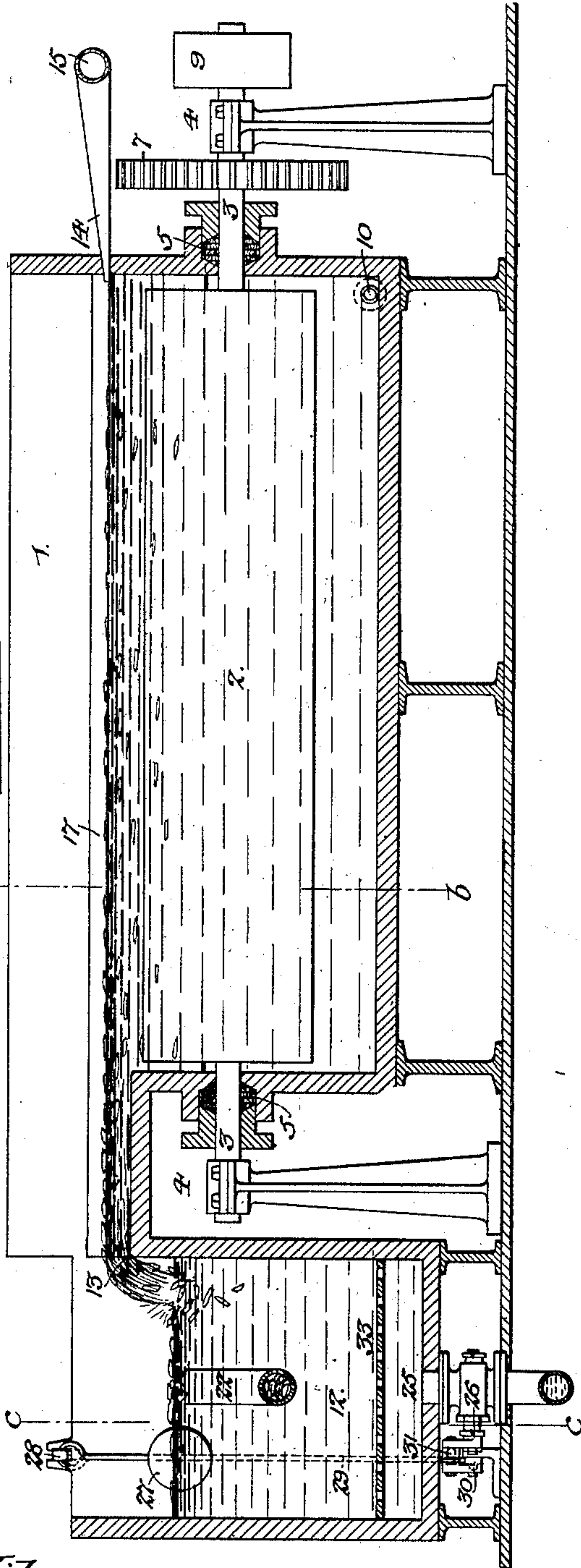
S. N. SMITH.
APPARATUS FOR MANUFACTURING ICE.

(Application filed Aug. 5, 1901.)

(No Model.)

2 Sheets—Sheet 2.

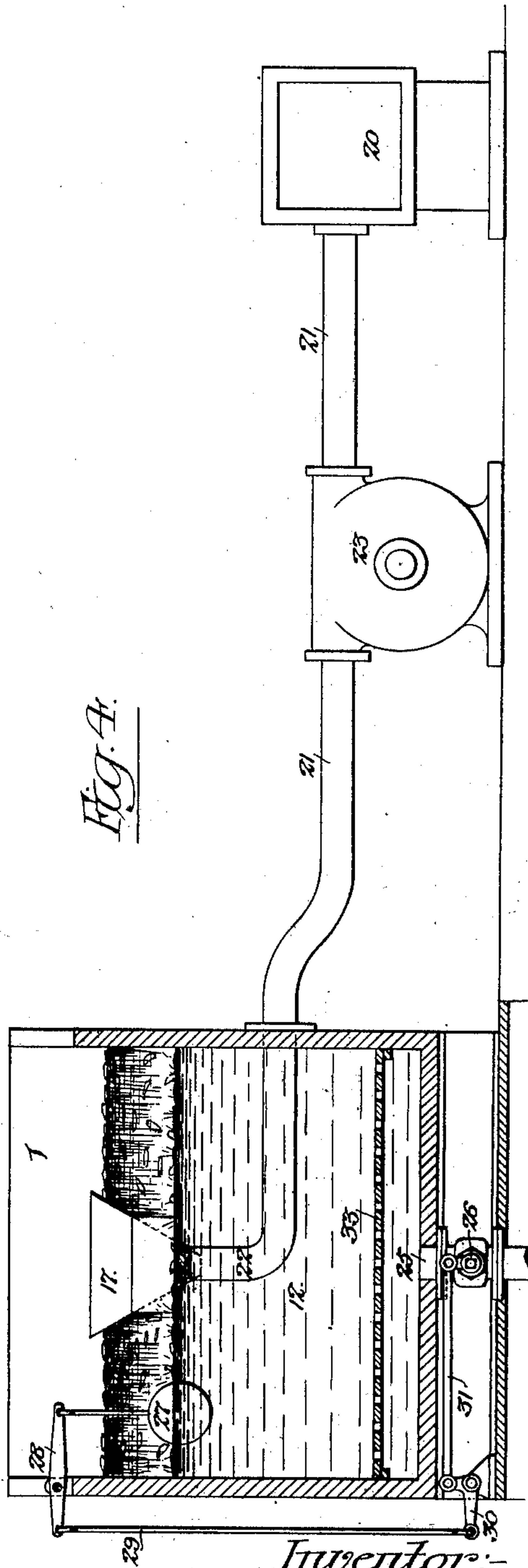
Fig. 2.



Witnesses:-

Esaias T. Lundahl.
Chris M. Whitehead.

Fig. 4.



Inventor:-
Somner N. Smith
by his Attorneys:-
Howson & Howson

UNITED STATES PATENT OFFICE.

SOMMERS N. SMITH, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
OF FORTY-NINE ONE-HUNDREDTHS TO FRANCIS B. MATTHEWS,
OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR MANUFACTURING ICE.

SPECIFICATION forming part of Letters Patent No. 703,353, dated June 24, 1902.

Application filed August 5, 1901. Serial No. 71,001. (No model.)

To all whom it may concern:

Be it known that I, SOMMERS N. SMITH, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain
5 Improvements in Apparatus for Manufacturing Ice, of which the following is a specification.

My invention relates to the manufacture of ice by that class of machines in which the
10 freezing takes place on the outer surface of a revolving cylinder or any other convenient form of vessel submerged in water, which ice is removed from such cylinder or other vessel by means of a series of knives, cutters, or
15 other approved devices, the object being to shave off the ice in small pieces, so that it can be readily and more perfectly regealed in suitable compressing-chambers. In machines of this character the great difficulty
20 heretofore has been the conveying of the shaved ice from the tanks in which the freezing-cylinders are submerged to the compressors.

The object of my invention is to provide a
25 natural method of effecting the transfer of the particles of shaved ice to the compression-chamber.

In a companion application filed August 5, 1901, Serial No. 71,002, I have described and
30 claimed the process of conveying or transferring the ice particles from the freezing-tank to the compressor. My present invention relates to a form of apparatus for carrying this process into effect.

35 My invention is fully illustrated in the accompanying drawings, in which—

Figure 1 is a diagram view illustrating the plan of my improved apparatus for the manufacture of ice. Fig. 2 is a longitudinal sectional view of the freezing-tank, taken on the
40 line *a a*, Fig. 1. Fig. 3 is a cross-sectional view of the freezing-tank, taken on the line *b b*, Fig. 2; and Fig. 4 is a cross-sectional view of the receiving-tank, taken on the line *c c*,
45 Fig. 2.

As clearly set forth in my process application, the object of my invention is to effect the transfer of the ice particles from the freezing-tank to the compressor by causing a sur-
50 face current to flow through said freezing-

tank and overflow such ice particles over a suitable weir into a receiving-tank.

In the drawings herewith, 1 represents the freezing-tank, suitably mounted and containing one or more cylinders 2. These cylinders are mounted upon suitable shafts or
55 spindles 3, journaled in bearings 4 outside the tank, which shafts are provided with stuffing-boxes 5, so that no leakage may occur. As noted, the cylinders 2 are rotated
60 within the tank 1, and for this purpose I provide the gear-wheels 7 and 8, whereby both cylinders may be driven in unison, motion being imparted by means of the pulley 9, mounted on one of the shafts 3. Water is intro-
65 duced through the pipe 10, entering the freezing-tank at the bottom. Located within the tank and adapted to engage each of the rotating cylinders are fixed knives or scrapers
70 11 for cutting or shaving off the ice formed upon the said rotating cylinders.

At the end of the freezing-tank I locate the receiving-tank 12, adapted to receive the water flowing over the weir 13, which carries
75 with it the ice particles shaved off of the cylinders 2. The water for causing the surface current in the tank to carry off the ice particles is discharged through nozzles 14 of the
80 pipe 15, which leads from the pump 16. These nozzles are flattened and extend substantially the full width of each compartment of the freezing-tank 1, such compartments being
formed by the diaphragm or partition 17.

For the purpose of pressing the ice particles into blocks I provide the compressor 20,
85 located adjacent to the freezing-tank.

To convey the shaved particles of ice from the receiving-tank 12, I provide a pipe 21, leading from said tank to the compressor. This pipe has an upwardly-projecting nozzle
90 22, the open end of which is near the surface of water in the tank 12, and to effect the transfer of said ice particles from this tank to the compressor I employ the pump 23, which is arranged in the line of pipe 21.
95

The constant discharge of ice and water into the tank 12 necessarily raises the height of the liquid therein, and for the purpose of controlling this height I arrange an outlet at
25, having a valve 26, which is controlled by
100

a ball-float 27, located within the tank 12. This float is carried by a lever 28, pivoted on the edge of the tank, the opposite end of which lever is connected, by means of a rod 29, with a bell-crank lever 30 at the bottom of the tank, the latter being connected to the valve 26 by means of a rod 31. The discharge-outlet 25 is connected with the pump 16 by means of a pipe 32, and by this means the surplus water entering the tank 12 may be conveyed back into the freezing-tank 1 and form the surface current induced therein to float off the particles of shaved ice. In order that no particles of ice may be carried off through the discharge-opening 25, I provide a perforated plate 33 in the bottom of the tank 12, which plate is located just above the outlet 25. As the surplus water entering the tank 12 is conveyed back to the freezing-tank 1, as just described, the quantity of water entering the pipe 10 will be just sufficient to compensate for the amount of ice particles discharged from said tank.

If desired, the conveying of the particles of ice from the freezing-tank to the receiving-tank may be followed by the transfer of such particles to the compressing chamber or chambers by the action of gravity alone without the use of a pump. To carry this operation into effect, the freezing-tank and receiving-tank should be located some distance above the compressing-chambers. As the ice particles will be carried into the compressing chamber or chambers by the simple pressure exerted by the head of water between the receiving-tank and said compressing-chamber and as such pressure is considerably less than that which could be obtained by the use of a pump to force the particles of ice into such compression-chamber, a large quantity of water will be present. In order that this excessive quantity of water accompanying the ice particles may be accommodated, these chambers should be longer than usual, in order that they may contain in addition to the water a sufficient accumulation of the ice particles to be pressed into blocks of normal or usual size.

In the form of gravity-transfer just proposed the superfluous water that is carried over with the shaved ice will be returned to the freezing-tank by a separate elevating-pump.

It is well known that all accumulations of loose ice or other floating substances on the surfaces of rivers are naturally removed by means of surface currents, and my improved process of handling the particles of ice follows this natural method, the apparatus forming the subject of this present invention being designed to take advantage of the same.

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

1. The combination in an apparatus of the character described, of the freezing-tank, ice-forming means located within said tank, cutting means for removing the ice in small

pieces which rise to the surface of the water within the freezing-tank, means for discharging a body of water into the freezing-tank at, and parallel to, the surface of liquid therein and means opposite said discharging means for permitting the overflow or withdrawal of water from the surface of the liquid in the tank whereby a surface current may be created and maintained that will pass over the entire surface of the liquid in the freezing-tank to cause the ice particles to overflow, and a compressor arranged to receive said overflowing ice particles.

2. The combination in an apparatus of the character described, of the freezing-tank, ice-forming means located within said tank, cutting means for removing the ice in small pieces which rise to the surface of the water within the freezing-tank, means for discharging a body of water into the freezing-tank at, and parallel to, the surface of liquid therein and means opposite said discharging means for permitting the overflow or withdrawal of water from the surface of the liquid in the tank whereby a surface current may be created and maintained that will pass over the entire surface of the liquid in the freezing-tank to cause the ice particles to overflow, a compressor, and means for conveying the particles of ice to said compressor.

3. The combination in an apparatus of the character described, of the freezing-tank, ice-forming means located within said tank, cutting means for removing the ice in small pieces which rise to the surface of the water within the freezing-tank, a receiving-tank, means for discharging a body of water into the freezing-tank at, and parallel to the surface of liquid therein and means opposite said discharging means for permitting the overflow or withdrawal of water from the surface of the liquid in the tank whereby a surface current may be created and maintained that will pass over the entire surface of the liquid in the freezing-tank to cause the ice particles to overflow into the receiving-tank, a compressor, and means for conveying the particles of ice from the receiving-tank to said compressor.

4. The combination in an apparatus of the character described, of the freezing-tank, ice-forming means located within said tank, cutting means for removing the ice in small pieces so that it may rise to the surface of the water in the tank in which it is formed, a receiving-tank, means for discharging a body of water into the freezing-tank at, and parallel to, the surface of the liquid carrying the layer of ice particles and means opposite said discharging means for permitting the overflow or withdrawal of the water carrying the layer of ice particles whereby a surface current may be created and maintained, said current passing over the entire surface of the liquid in the tank to float off the ice particles contained therein and cause them to overflow into the receiving-tank, a compressor, and means for

conveying the ice from the receiving-tank to the compressor whereby the surplus water may be eliminated and the particles of ice pressed into solid blocks.

5 5. The combination in an apparatus of the character described, of the freezing-tank, ice-forming means carried therein comprising a rotatable cylinder, means for dislodging the coating of ice formed on said cylinder there-
10 by permitting it to rise to the top of the water contained within the freezing-tank, a receiving-tank, a pump for discharging a supply of water into said freezing-tank, where-
15 by a surface current extending the full width of said tank may be created and maintained to move the upper portion of the water carry-
20 ing the ice particles and cause them to overflow into the receiving-tank, a pump for carrying the particles of ice from the receiving-tank to the compressor, and a connection be-
25 tween the pump for creating a surface current and the receiving-tank whereby the surplus water discharged into the latter may be utilized to create the surface current within the freezing-tank.

6. In an apparatus of the character described, the combination of the freezing-tank, ice-forming means located therein, means for introducing a surface current of water into
30 said tank to carry off the particles of ice floating on the surface of the water in the tank, a receiving-tank into which said ice is discharged, a pump for creating the current in the freezing-tank, a pipe for carrying off the
35 surplus water from the receiving-tank lead-

ing to said pump, a valved outlet leading to said pipe, and means for controlling said valved outlet by the height of water within the receiving-tank.

7. The combination in an apparatus of the character described, of the freezing-tank, ro-
tating cylinders within said tank upon which a coating of ice is formed, means for rotating
said cylinders, scraping means carried in
45 said tank for shaving the coating of ice from said cylinders, a receiving-tank, a pump for creating a surface current of water in the
freezing-tank to carry off the particles of ice
formed therein, a pipe leading from said
50 pump having flattened discharge-nozzles leading to said tank, a compressor, a pipe lead-
ing from the receiving-tank to said compres-
sor, a pump for carrying the particles of ice
through said pipe to the compressor, a pipe
55 leading from the receiving-tank to the current-producing pump, a valved outlet leading
to said pipe, means regulated by the amount
of water in the receiving-tank for controlling
the valve of said outlet, and a perforated
60 plate located within said receiving-tank and
serving to prevent the carrying off of any ice
particles with the surplus water discharged
from said receiving-tank.

In testimony whereof I have signed my name to this specification in the presence of
65 two subscribing witnesses.

SOMMERS N. SMITH.

Witnesses:

MURRAY C. BOYER,
JOS. H. KLEIN.