

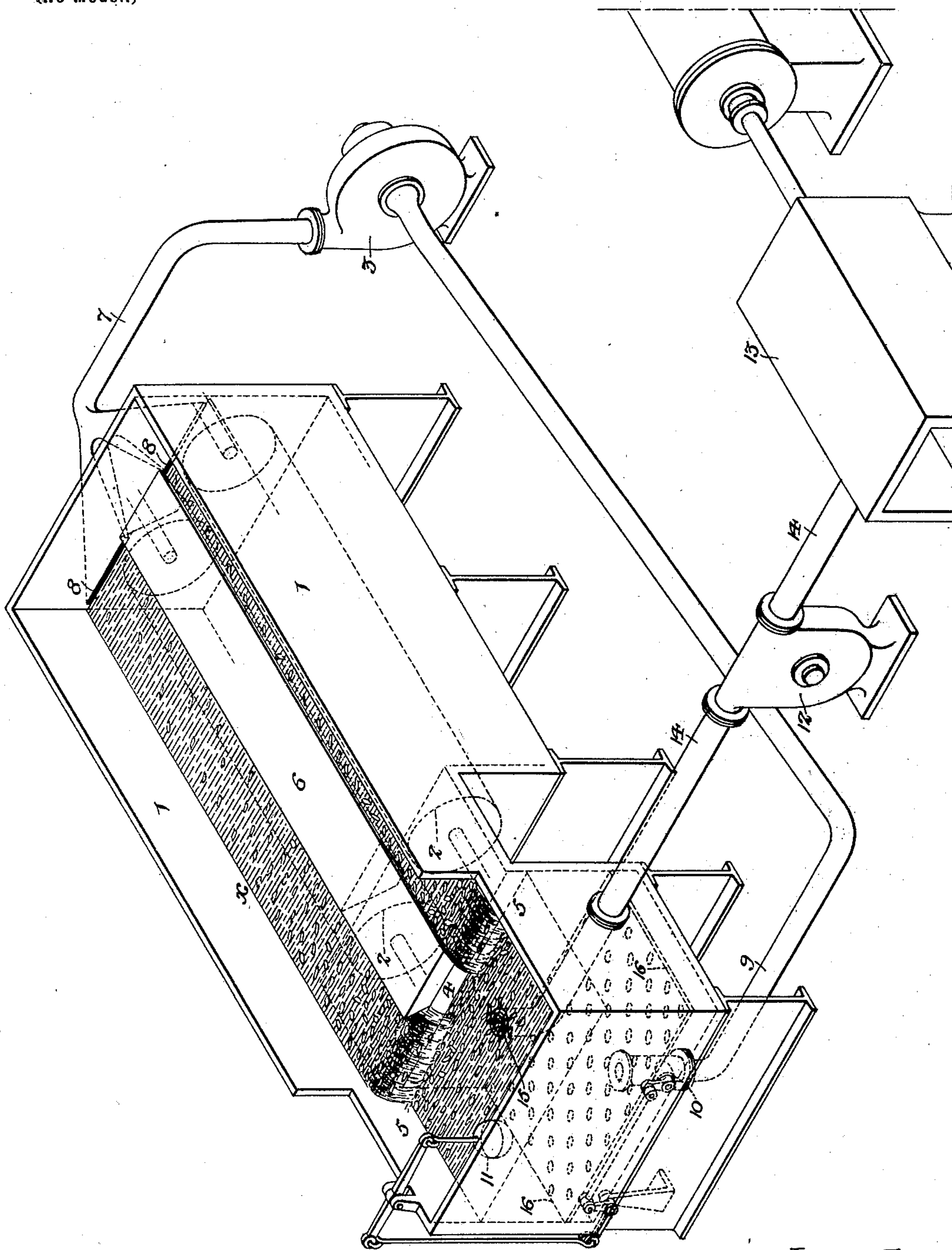
No. 703,314.

Patented June 24, 1902.

S. N. SMITH.
PROCESS OF MANUFACTURING ICE.

(Application filed Aug. 5, 1901.)

(No Model.)



Witnesses:-
Louis H. F. Whitehead.
M. A. Miles.

Inventor:-
Somners N. Smith
by His Attorneys:-
Howson & Howson

UNITED STATES PATENT OFFICE.

SOMMERS N. SMITH, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF MANUFACTURING ICE.

SPECIFICATION forming part of Letters Patent No. 703,314, dated June 24, 1902.

Application filed August 5, 1901. Serial No. 71,002. (No specimens.)

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 the Process of 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 reciprocating knives,
15 revolving cutters, or 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
20 difficulty 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 carrying out my invention I have devised a form of apparatus a diagram of which
30 in perspective is shown in the accompanying drawing.

In all ice-machines of the character above referred to mechanical means—such as screw-conveyers, paddles, and devices of like nature—have been employed to remove the
35 shaved ice as it rises to the surface of the water in the freezing-tank. In actual practice all such mechanical devices have failed to properly remove the shaved ice, and as a result the freezing-tank, together with all parts
40 of the conveying apparatus, rapidly becomes clogged with a mush of floating ice, and the continuous operation of the machine is thereby prevented.

My invention consists in employing a system of pumping apparatus to produce a surface current in the freezing-tank, and thereby
45 wash off the floating shaved ice as it rises to the top of the water in said tank. A weir of suitable width and depth is arranged at the
50 end of the freezing-tank, leading into a convenient receiving-tank, from which the shaved

ice may be removed by other pumps and conveyed to the compressor. The surplus water passing into the receiving-tank is withdrawn
55 from the bottom of the same and conveyed by pumping apparatus, above referred to, to the upper end of the freezing-tank, so as to create the current just described.

In the figure of drawing accompanying this
60 specification, 1 is the freezing-tank, filled with water to the level x and having one or more freezing-cylinders 2. The ice, which is shaved off said cylinders 2 by any suitable means, rises to the surface of the water in said tank
65 and is washed or skimmed off by the current from the pump 3 as rapidly as it gets to the surface, passing over the weir 4 into the receiving-tank 5.

The freezing-tank 1 is subdivided, especially where there is more than one freezing-cylinder, by a suitable diaphragm or partition 6. The discharge-pipe 7, leading from the pump 3, is bifurcated, forming two discharge-nozzles 8. These nozzles are flattened,
75 as shown, and are preferably the full width or nearly the full width of the separate chambers of the freezing-tank 1, in order that the current from the same may sweep the surface of such tank clear of all floating ice. 80

The ice, as noted above, passes into the receiving-tank 5. Leading from the bottom of this tank is a pipe 9, connected at its opposite end to the pump 3. This pipe is provided with a valve 10, and the position of this valve
85 is controlled by a float 11 in the tank 5, such float being connected to the said valve by a series of suitable links and levers.

12 is a pump for conveying the particles of shaved ice from the receiving-tank 5 to the
90 compression-chamber 13. A pipe 14 leads from this tank to said pump 12, and this pipe has an upwardly-projecting suction-nozzle 15, which serves to remove the shaved ice from the surface of the water. Any surplus water
95 carried by this pump is carried off from the compression-chamber by any suitable means.

At the bottom of the tank 5 a perforated plate 16 is arranged in order that the suction
100 of the pipe 9 may be distributed over the entire area of the receptacle, thereby avoiding any danger of inducing a strong local downward current, which might carry the shaved ice with it.

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 the 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 being washed off by means of surface-currents, and my improved process of handling the particles of ice follows this natural method.

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

1. The process of manufacturing ice which consists in forming a thin coating of ice upon a vessel submerged in a body of water, removing the coating of ice in small pieces which rise to the surface of the water, delivering a current of water at, and parallel to, the surface of the body of water, and causing

said current to pass over the entire surface of said body of water and carry off said pieces of ice from said body of water. 50

2. The process of manufacturing ice which consists in forming a thin coating of ice upon a moving vessel submerged in a body of water, removing the coating of ice in small pieces which rise to the surface of the water, delivering a current of water at, and parallel to, the surface of the body of water and causing said current to pass over the entire surface of said body of water and carry off said pieces of ice, and then compressing said ice particles into blocks. 55 60

3. The process of manufacturing ice which consists in forming a thin coating of ice upon a vessel submerged in a body of water, removing the coating of ice in small pieces which rise to the surface of the water, delivering a current of water at, and parallel to, the surface of the body of water and causing said current to pass over the entire surface of said body of water and carry off said pieces of ice therefrom, eliminating the water from said ice particles, and finally compressing the latter into solid blocks. 65 70

4. The process of manufacturing ice which consists in forming a thin coating of ice upon a moving vessel submerged in a body of water, removing the coating of ice so formed in small pieces which rise to the surface of the water, delivering a current of water at, and parallel to, the surface of the body of water and causing said current to pass over the entire surface of said body of water and carry off said pieces of ice therefrom, conveying said particles of ice to a point where the surplus water may be separated and removed, and finally compressing the ice particles into solid blocks. 75 80 85

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

SOMMERS N. SMITH.

Witnesses:

MURRAY C. BOYER,
JOS. H. KLEIN.