

No. 753,081.

PATENTED FEB. 23, 1904.

R. F. LEARNED.
ICE MAKING MACHINE.
APPLICATION FILED APR. 21, 1902.

NO MODEL.

2 SHEETS—SHEET 1.

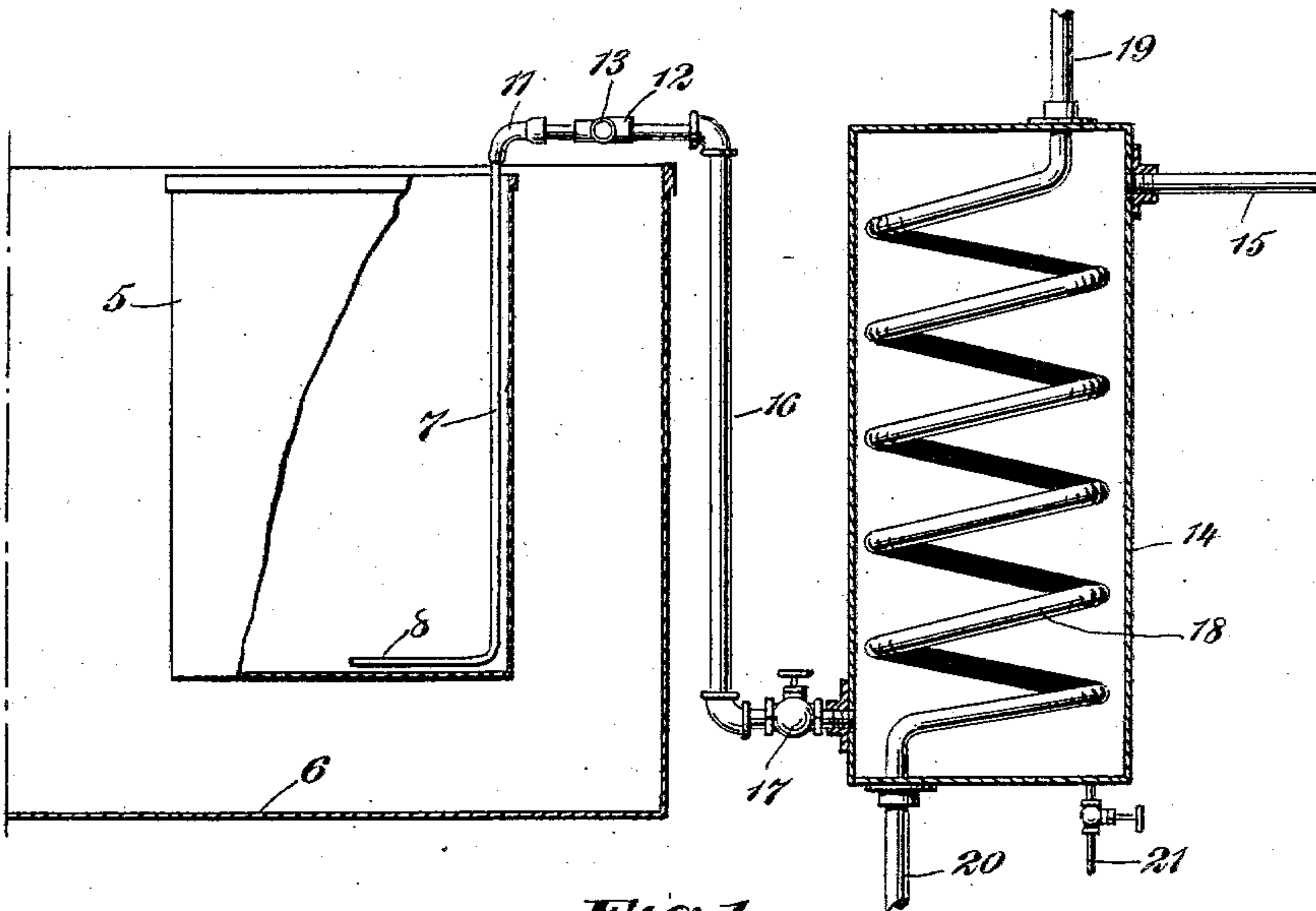


Fig. 1

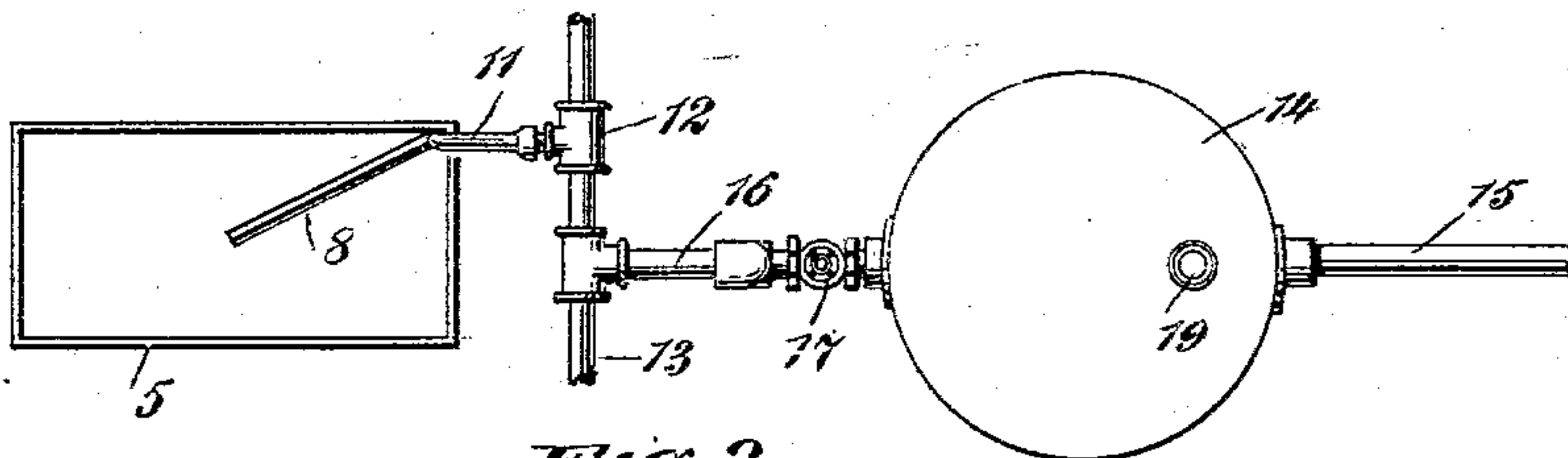


Fig. 2

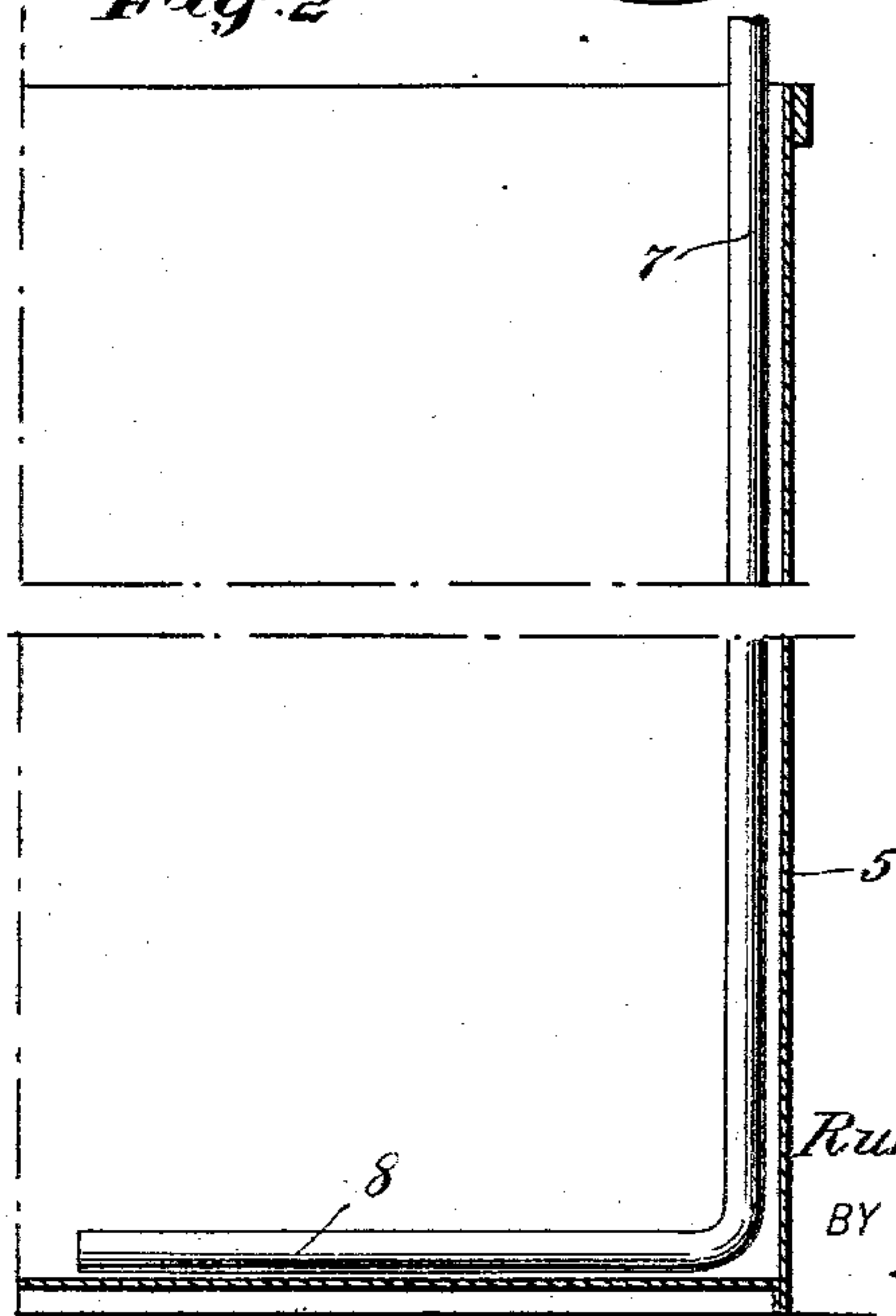


Fig. 3

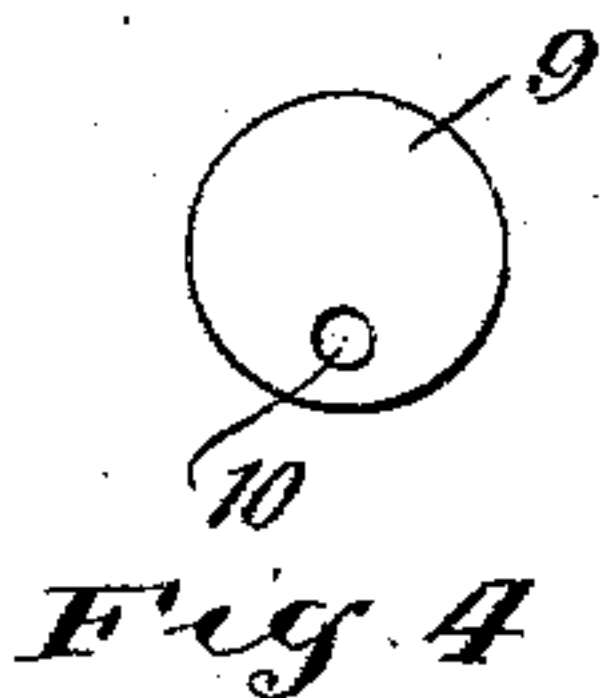


Fig. 4

WITNESSES:

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ATTORNEYS.

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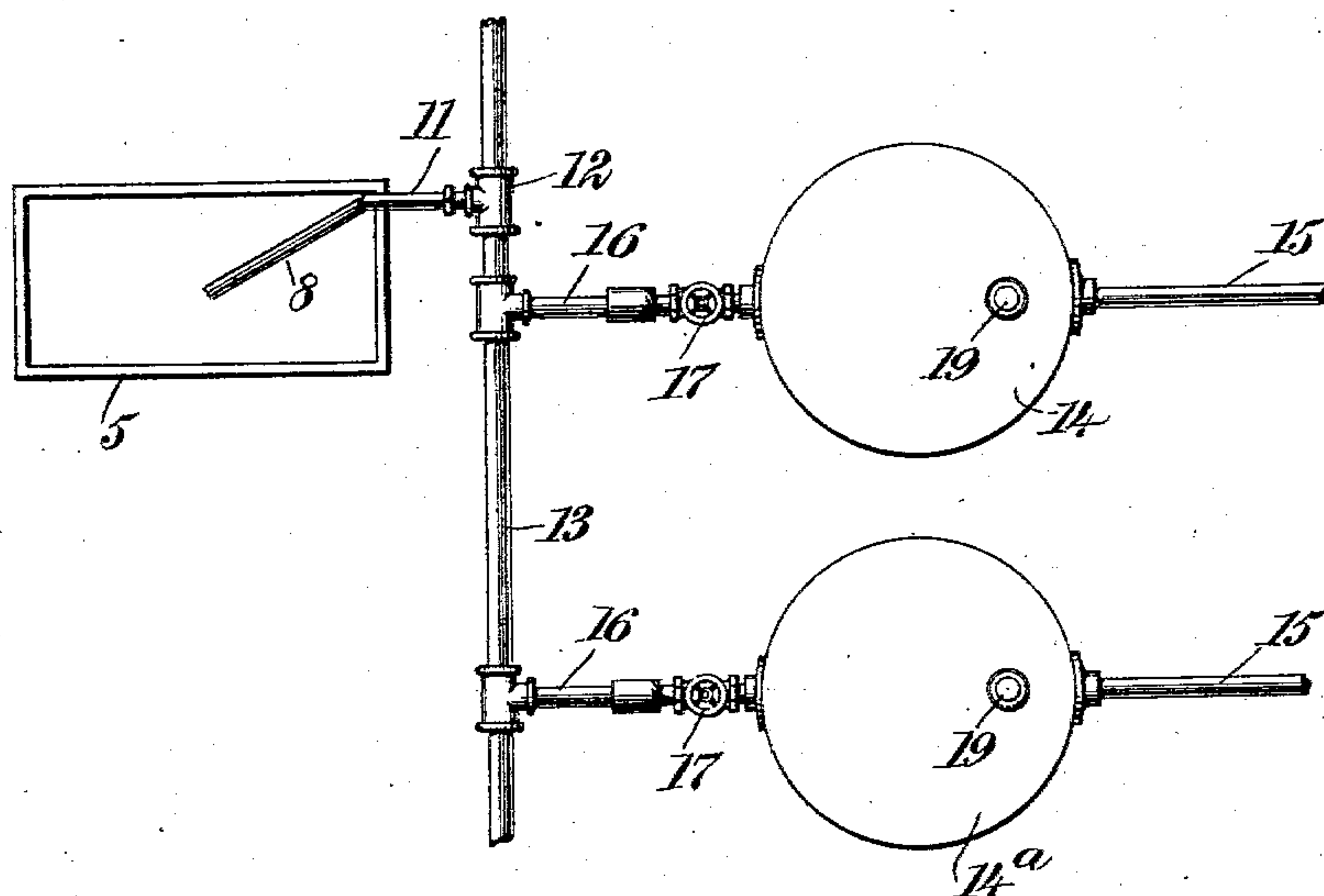


Fig. 5

WITNESSES:

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H. J. Bingham

INVENTOR

Rufus F. Learned

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UNITED STATES PATENT OFFICE.

RUFUS F. LEARNED, OF NATCHEZ, MISSISSIPPI.

ICE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 753,081, dated February 23, 1904.

Application filed April 21, 1902. Serial No. 103,935. (No model.)

To all whom it may concern:

Be it known that I, RUFUS F. LEARNED, a citizen of the United States, residing at Natchez, in the county of Adams and State of Mississippi, have invented a new and useful Ice-Making Machine, of which the following is a full, clear, and exact description.

My invention relates to improvements in ice-making machines, and the same is more particularly directed to that system of ice-making in which the ice is frozen in cans.

One object that I have in view is the provision of means in a freezing-can which will establish and maintain a circulation through the water in order to obviate the formation of a core in the center of a commercial cake of ice.

A further object of the invention is to overcome clogging or closing of the air or gas supply pipe associated with the can, thereby insuring proper and continuous operation of the apparatus when it is desired to maintain the same in service.

Further objects and advantages of the invention will appear in the course of the subjoined description, and the actual scope of the invention will be defined by the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional elevation illustrating my improved freezing-can in operative relation to a freezing-tank and a means for refrigerating air or gas previous to admitting the same to the freezing-can. Fig. 2 is a plan view of the parts shown by Fig. 1, omitting the freezing-tank. Fig. 3 is an enlarged fragmentary sectional elevation through a portion of the freezing-can and the air or gas supply pipe; and Fig. 4 is a detail view, on a still larger scale, representing the end portion of the air or gas supply pipe and the contracted outlet-orifice therein. Fig. 5 is a plan view showing a plurality of closed vessels for supplying a refrigerant vapor to the ice-cans.

5 designates an ordinary ice-can, and 6 is a portion or section of a freezing-tank. The can 5 is equipped with a small metallic tube, which is disposed in the corner of said can in compact relation thereto, said metallic tube

being bent at a point intermediate of its length and having sections or lengths (indicated at 7 8) which are disposed in vertical and horizontal positions, respectively. This metallic tube may be firmly attached in any suitable way to the side or corner and to the bottom of the can. The lower length 8 of the metallic tube is secured approximately at the center of the bottom of said can, while the upper extremity of the vertical length 7 of the tube extends a short distance above the top edge of the can, as more particularly shown by Figs. 1 and 3. The angular or bent portion of the metallic tube lies in the angle formed by the bottom and side of the can, whereby the entire tube occupies an exceedingly compact relation to the inner surface of the freezing-can. The extremity of the horizontal length 8, forming a part of the metallic tube, is closed by any suitable means—as, for example, by means of a head 9—and this head is provided with a contracted discharge-orifice or a small opening 10, the diameter of the opening being considerably smaller than the diameter of the pipe or either of the lengths 7 8 thereof. This contracted discharge-orifice 10 occupies an eccentric relation to the pipe and the head 9, said opening being situated at the lower part or edge of the head, so that it will lie well down toward the bottom of the freezing-can. The upper end of the vertical length 7, forming a part of the metallic tube, is open in order that a short rubber tube or other flexible connector 11 may be detachably connected to said metallic pipe or tube, said connector serving to establish communication between the metallic pipe and a coupling or union 12. This coupling or union constitutes one of a series on the line of pipe 13, adapted to deliver compressed air or gas to a series of the freezing-cans employed in the ice-making machine. It will be understood that this line of pipe 13 may be equipped with any suitable number of unions, couplings, or branches 12, the same to be arranged any suitable distance along the pipe 13 and equipped individually with the flexible tubes or connectors 11, whereby the single pipe 13 may convey compressed air or gas to a number of the freezing-cans,

although I have only shown one can 5 and the means for establishing communication between its metallic tube and the line of pipe 13.

One of the important features of my invention consists in the provision of means by which air or gas in a dry and refrigerated or cold condition may be supplied to the distributing pipe or tube within the freezing-can. The object of refrigerating the air or gas is twofold: First, in order that the air or gas will not impart its latent heat to the water in the can, so as to have a tendency to retard freezing of the water into the commercial cake of ice. The other and principal object of refrigerating the air or gas is to eliminate the moisture therefrom by condensing and precipitating the moisture before the air or gas passes into the metallic tube within the freezing-can, whereby the excess moisture is prevented from depositing in the metallic tube and freezing within the same, so as to obstruct the continuous passage of air or gas through said metallic tube during the ice-making operation. I have illustrated one embodiment of means by which this desirable condensation and refrigeration of the air or gas may be secured, and in Figs. 1 and 2 the numeral 14 designates a suitable closed receiver which is equipped with means adapted to provide for the circulation of a refrigerating medium therethrough as well as to allow for the reception and passage of the compressed air or gas, the latter adapted to traverse the receiver on its way from the compressing mechanism to the line of distributing-pipe 13. It will be understood, however, that I do not restrict myself to this specific embodiment of means for refrigerating the air or gas and condensing the moisture therein, because I am aware that various other forms of apparatus may be used for attaining the same end. The receiver 14 is shown as having a feed-pipe 15 coupled to the upper portion thereof, said feed-pipe leading from the compressing-machine. (Not shown.) A pipe 16 is disposed in vertical position, the upper portion of said pipe being attached to the line of pipe 13, while the lower part of the pipe 16 has a horizontal branch which is united in a suitable way to the lower part of the receiver 14. If desired, this branch at the lower end of the vertical pipe 16 may be equipped with a stop-cock or valve 17, thus making provision for cutting off the communication between the distributing-pipe 13 and the receiver 14. As the means for establishing circulation of the refrigerating medium through the receiver I have shown the coil or worm 18, which is provided at its end portions with the branches 19 20, that are carried or extended through the heads of the receiver, one of said branches constituting the inlet for the brine or

other refrigerating medium, while the other branch is the outlet from the coil or worm to a suitable off-bearing pipe. (Not shown.)

In practice I employ a pair of receivers 14^a, similar to the receiver 14, as shown by Fig. 5, in order that one receiver 14 may be put out of service after a certain amount of moisture shall have accumulated therein. This may be accomplished by adjusting the valve or stop-cock 17 of the receiver 14, so as to throw it out of service, and the similar valve of the other receiver 14^a should be opened in order to bring it into service, thus insuring a continuous supply of the refrigerated air or gas to the pipe 13 for distribution to the metallic pipes of the freezing-cans. Each receiver should be equipped with a drainage-valve 21, through which the moisture which has accumulated in the receiver may be thawed out by passing warm air or steam into said receiver or by any other suitable means.

The object of locating the contracted discharge-orifice 10 at the lowest point in the head of the metallic pipe within the freezing-can is that any water that may in any manner have gotten into the metallic tube, if not frozen, will be displaced and expelled from the tube by the compressed air or gas, which is supplied thereto by the means herein described.

In the service of the freezing-can the compressed and refrigerated air or gas is delivered into the body of water to be frozen in the can at the bottom thereof, and the escape of this air or gas sets up a circulation of the water, which causes it to freeze free of the core hereinbefore referred to, thus attaining the freezing in an economical manner of water into commercial cakes of ice.

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

The combination with a freezing-can, of a bent metallic tube internally attached thereto, extending down the side and across the bottom toward the center of said can, said tube being provided with a single vapor-port of small area in the extremity of the lower part of said tube, said vapor-port opening horizontally and located in eccentric relation to the tube and close to the bottom side thereof, and a refrigerant vapor-pipe for delivering a current of compressed refrigerant vapor to said tube.

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

RUFUS F. LEARNED.

Witnesses:

LEMUEL P. CONNER,
A. B. LEARNED.