

No. 735,673.

PATENTED AUG. 4, 1903.

R. F. LEARNED.
ICE MAKING MACHINE.
APPLICATION FILED APR. 12, 1902.

NO MODEL.

Fig. 1.

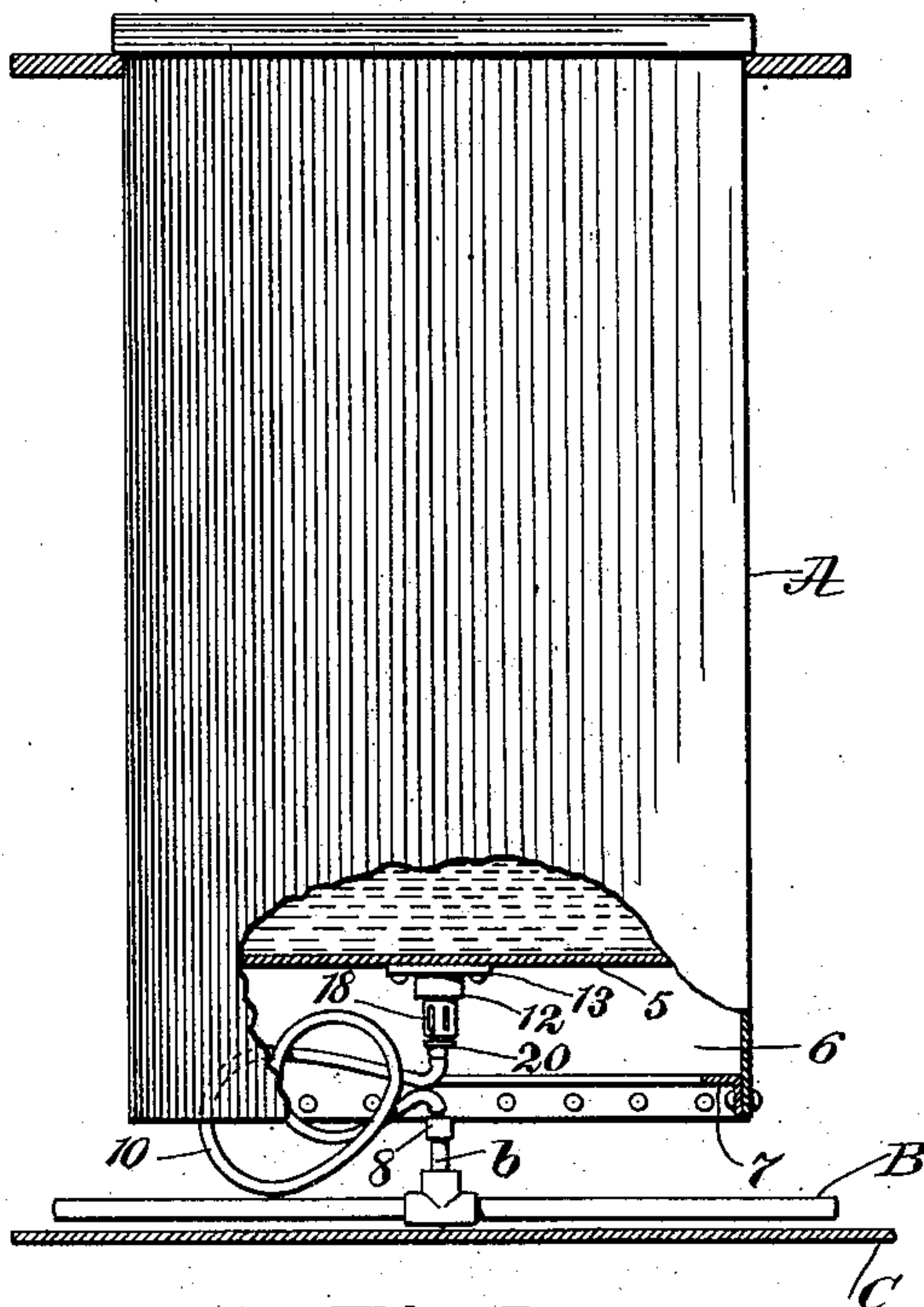
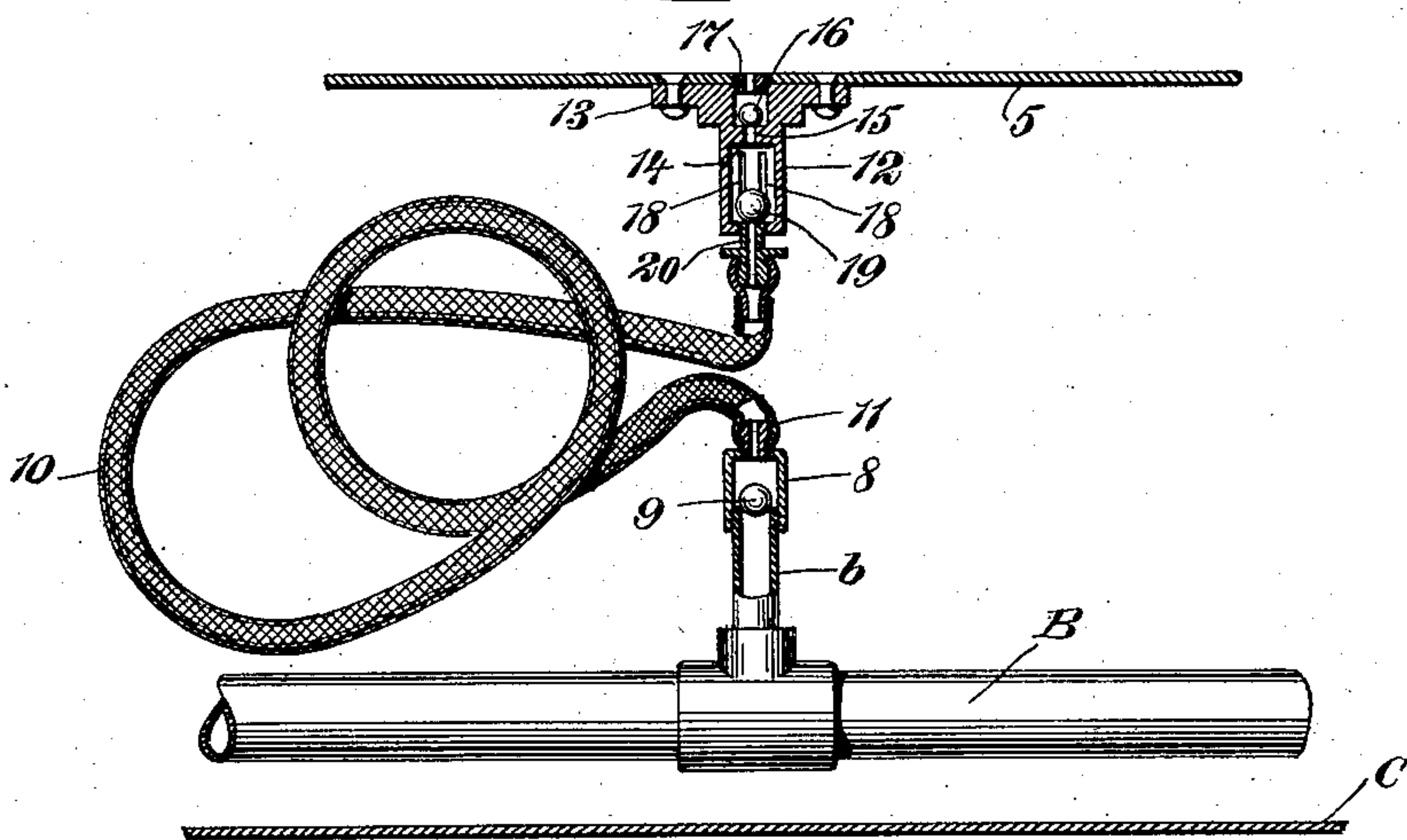


Fig. 2.



WITNESSES:

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RUFUS F. LEARNED, OF NATCHEZ, MISSISSIPPI.

ICE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 735,673, dated August 4, 1903.

Original application filed January 3, 1902, Serial No. 88,296. Divided and this application filed April 12, 1902. Serial No. 102,560. (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 certain new and useful Improvements in Ice-Making Machines, of which the following is a full, clear, and exact description.

My invention relates to ice-making machines of that class wherein water is frozen into blocks of ice in suitable cans; and the invention relates more particularly to apparatus wherein air or gas is admitted to the water during the freezing operation in order to deaerate the water and to produce a solid and practically coreless block of commercial ice. Such an apparatus is disclosed by a prior application for Letters Patent of the United States filed by me on the 3d day of January, 1902, Serial No. 88,296, of which the present application is a division.

The object of the present invention is to provide a means for conveying compressed air or gas from a subjacent pressure-pipe to the bottom of a freezing-can in order to deaerate the water contained therein, such conveying means being readily attached to or disconnected from one of said parts and adapted in its disconnected or inactive state to prevent brine from passing into the pressure-pipe. Such conveying means and the can are used in connection with a novel type of valve mechanism which is adapted to permit a small quantity of air or gas to escape under the recessed bottom of the can, thus making provision for the air or gas to displace brine from the bottom of the can, and to thereby prevent said brine from surrounding the air or gas inlet connection and to exclude ammonia-gas or other vapors present in the brine from entering the water-chamber of the can, so as to contaminate the water therein.

With these ends in view the invention consists in the novel arrangement, construction, and adaptation of parts which will be hereinafter full described, and the actual scope of the invention will be defined by the claims.

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 both figures.

Figure 1 is a side elevation, partly in section, of a freezing-can connected operatively with a pressure-supply pipe by improvements forming the subject-matter of this present invention; and Fig. 2 is a sectional elevation, on a large scale, of a portion of the can-bottom and of the pressure-supply pipe, showing the valve in section and the connecting hose or tube in elevation.

A designates an ordinary freezing-can which is similar in construction to the cans used in ice-making apparatus of the can system. The bottom 5 of the can is not secured to the extreme lower end of the can-body; but it is recessed upward some distance from the extreme lower end, as shown in Fig. 1. The bottom is fastened to the can in any suitable way to form a water-tight joint, and the described arrangement of the bottom forms a recess 6 in the lower end of said can. Said recess is open from below and may fill with brine as the can is lowered into the freezing-tank. A weight in the form a metallic rim 7 may be attached in any suitable manner to the lower end of the can as a counterweight to overcome the buoyant effect of the air or gas in the recessed bottom.

B designates the fluid-pressure pipe, which is adapted to be contained or immersed in the brine or other circulating liquid contained in the usual freezing-tank, a portion of which is indicated at C. This fluid-pressure pipe is adapted to convey compressed air or gas to the series of freezing-cans, and said pipe is provided at suitable intervals with upstanding branches, one of which is indicated at b. These branches are provided at their upper ends with the caps 8, each adapted to contain or house the automatic check-valve 9, the latter being seated upon the upper end of the branch b, when the pressure fluid is prevented from passing through said branch.

The flexible tube or hose 10 has one end thereof attached to the cap 8 by fitting said end of the tube or hose upon or to a nipple 11, thereby permanently connecting the tube or hose to the branch of the pressure-pipe.

The can A is provided with an air-inlet at its bottom, and with this air-inlet communicates one chamber of a divided valve, the latter being similar to the valve disclosed by my

prior application, hereinbefore referred to. This valve consists of a cage 12, which is provided at its upper end with a flange 13, adapted to be fastened by rivets or other means to the bottom of the can 5. The valve-cage is provided with an intermediate diaphragm or partition 14, which divides said cage into upper and lower chambers that have communication through an intermediate passage 15, the latter being formed in the partition 14. In the upper chamber of the valve-cage is an automatic check-valve 16, which is adapted to be closed by pressure of the water within the can and is intended to be forced upon the seat formed by the partition 14 in order to close passage 15. This valve 16 is adapted to be raised by air or gas pressure from below, and the upward movement of the valve is arrested or limited by the perforated plug 17. The lower part of the cage is provided with a series of slots or openings 18, which open into or have communication with the recessed space under the bottom of the can, and in this lower valve-chamber is loosely arranged a floatable or buoyant valve 19. Said valve 19 is adapted to float on the surface of the brine, so as to be raised against the under side of the partition 14 and to close the passage 15 therein, thus excluding brine from the upper chamber of the valve-cage and from the water-chamber of the can A during the operation of placing the can in position for service.

At its extreme lower end the valve-cage is provided with a female-threaded opening, into which is adapted to be screwed the union or coupling 20, which is attached to the free end of the hose or tube 10, thus making provision for the ready attachment of the hose or tube to the cage of the double valve on the under side of the can-bottom. This valve-cage is contained within the recessed space 6 at the bottom of the freezing-can, and said valve-cage conveys air or gas from the hose or tube 10 or from the recessed space 6 into the water stored in the chamber of said can, whereby the upward-flowing gas or air causes a circulation of the water in said can, which causes it to become deaerated and comparatively free from core in freezing. The hose or tube 10 is of such length that it may be raised or drawn a desired distance above the brine which is contained in the freezing-tank C, and when the can A is removed from said freezing-tank the end of said hose equipped with said coupling or union 20 is intended to be raised or drawn out of the liquid of said freezing-tank. The coupling or union of the hose should be attached to the lower extremity of the valve-cage prior to lowering the freezing-can into the tank, and at the proper time the air or gas is allowed to flow through the pipe B and its branch b into the hose or tube 10, the valve 9 being unseated by the pressure. The air or gas passes from the hose and coupling 20 into the lower chamber of the valve-cage 12, from which it passes by the slots or openings 18 into the recess

under the bottom of the freezing-can 6. The accumulation of the gas or compressed air serves to displace the brine from the space under the can caused by the recessed bottom and the brine is gradually forced out, and any ammonia-gas or other vapor that may happen to have gotten into the brine is thus prevented from getting into the valve-cage and thence into the water to be frozen that is contained in the can A. A large portion of the air or gas supplied to the valve-cage by the tube 10 passes through the lower chamber thereof and the passage 15, thus unseating the valve 16 and permitting the air to pass into the water-chamber of the can.

The valve 19 is made of any material lighter than salt water or brine, and its buoyancy will cause it to float on the surface of the brine should the latter rise in the recess 6 of the can, whereby the valve will be carried upwardly and caused to seat itself against the partition 14, thus closing the passage 15 and preventing the brine from passing into the can. The slots 18 in the valve-cage allow the air or gas to pass into the lower chamber of the cage and to have access to the upper surface of said buoyant valve 19, thus preventing said valve from becoming lodged or "stuck" or held in a raised position by the air or gas pressure from below. The air or gas pressure is thus allowed to have access to all parts of the valve except that part which covers the small passage 15, and thus the air or gas pressure on any part of the valve is balanced by the corresponding pressure on the opposite side, except the small part hereinbefore referred to, which covers the aperture 15.

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

1. The combination with a freezing-tank, a can removable from said tank and having an inlet at its bottom, and a pressure-pipe submerged permanently in said tank, of a flexible tube or hose attached to one of said parts and separably coupled to the other part, the length of said tube or hose exceeding the space between the pressure-pipe and the inlet to the can in the lowered operative position of the latter.

2. The combination with a freezing-tank, of a removable can provided with a recessed bottom, a permanently-submerged pressure-pipe, a pliable tube or hose attached to one of said parts and separably coupled to the other part, and means whereby air or gas pressure from the tube or hose may pass into the recessed space under the bottom of the can and serve to displace brine or other fluid therefrom.

3. The combination of a recessed-bottom can forming an open chamber, a pressure-pipe, a valve-shell attached to the bottom of said can and provided with ports which normally communicate with said chamber of the can and permit air to pass into said chamber, a valve in said shell, a check-valve controlling the outlet of water from said can, and means

for coupling said valve-shell to the pressure-pipe.

4. The combination with a freezing-tank, of a removable can, a permanently-submerged
5 pressure-pipe, a pliable tube or hose attached to said pressure-pipe, a check-valve in the line of the tube or hose and adapted to exclude brine from said pressure-pipe, and a
10 pressure-controlled valve attached to the bottom of the can and having means for the attachment of the free end of said hose or tube thereto.

5. The combination of a freezing-can provided with a recessed bottom, a valve cage or
15 shell attached to the bottom of said can and divided into chambers, one of said chambers having slots or openings adapted for the passage of a pressure-fluid into the recess under
20 bottom of the can, separate valves in the chambers of the valve-cage, a fluid-pressure

pipe, and means of connecting said fluid-pressure pipe with said valve-cage.

6. The combination with a freezing-tank, a pressure-pipe submerged permanently therein, and a removable freezing-can, of a hose
25 attached to said pressure-pipe, and a nipple attached to the bottom of the can and having means for the attachment of the free or unconfined end of the hose thereto, the length of said
30 hose exceeding the space between the pressure-pipe and the nipple in the lowered operative position of the can.

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

RUFUS F. LEARNED.

Witnesses:

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ERNEST BENNETT.