No. 667,897. Patented Feb. 12, 1901.

E. J. ULLRICH.

APPARATUS FOR DEAERATING WATER IN ICE MANUFACTURE.

(Application filed July 2, 1900.)

(No Model.) 2 Sheets—Sheet 1.

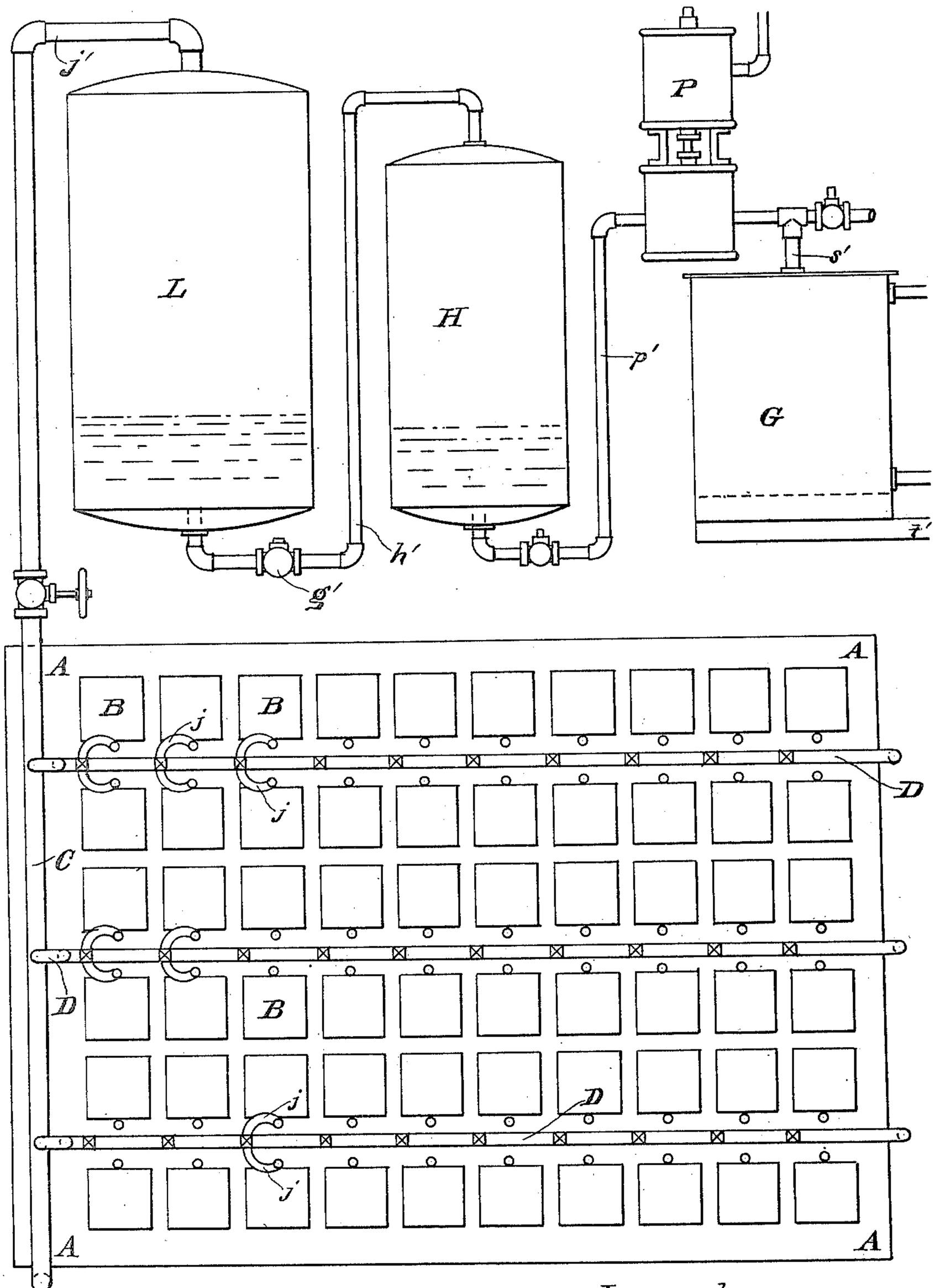


Fig. 1.

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Fig. 2.

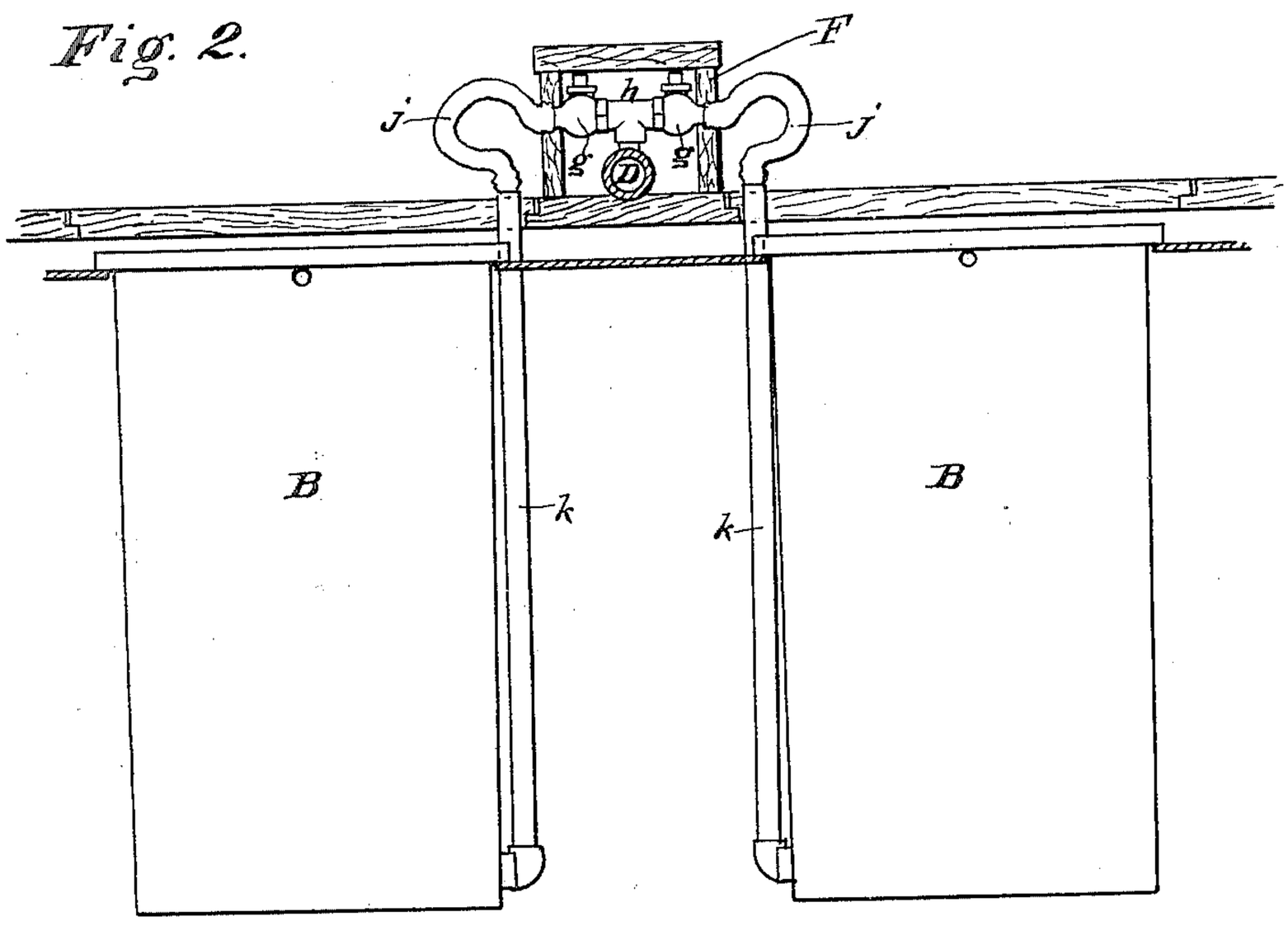
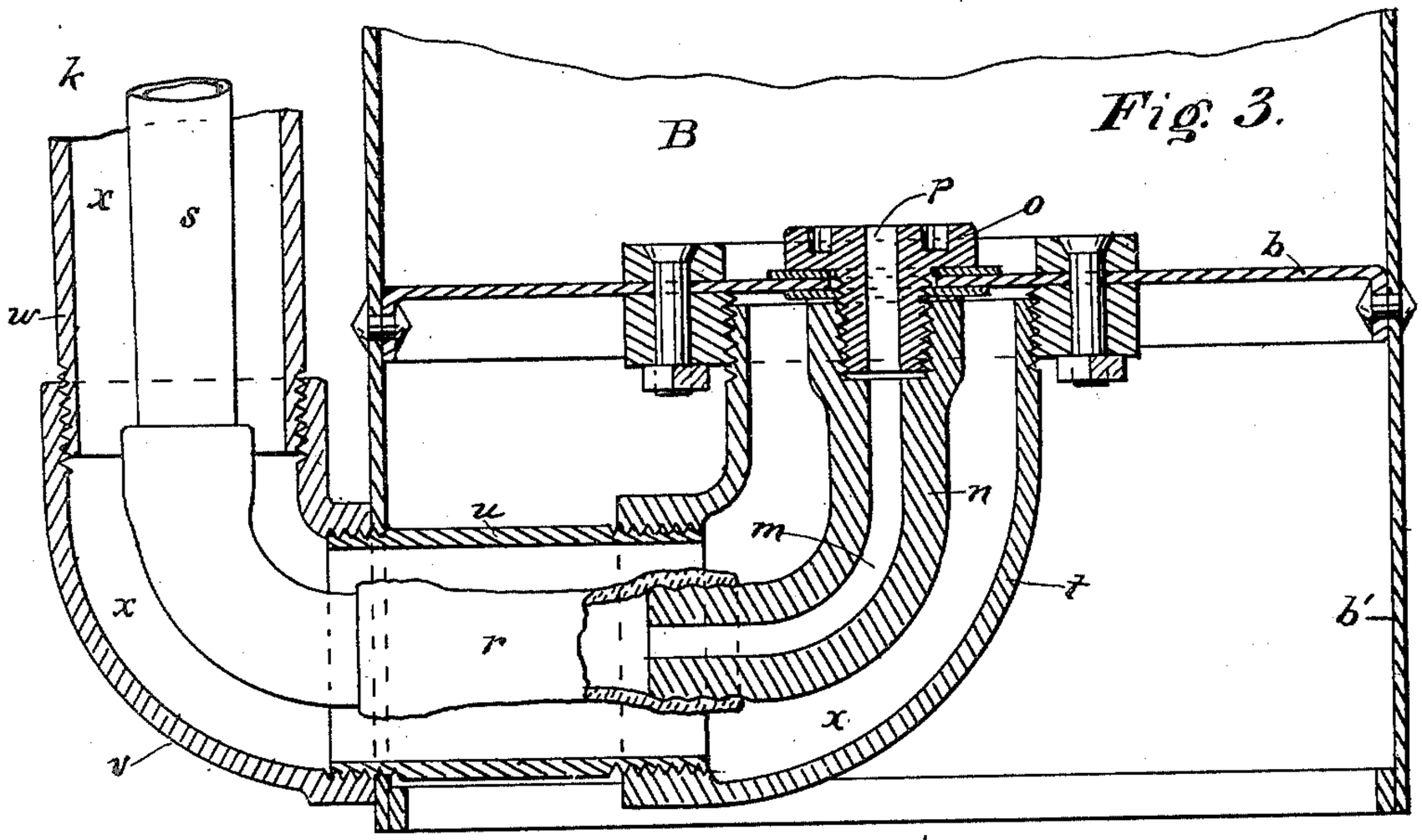



Fig. 3.

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## APPARATUS FOR DEAERATING WATER IN ICE MANUFACTURE.

SPECIFICATION forming part of Letters Patent No. 667,897, dated February 12, 1901.

Application filed July 2, 1900. Serial No. 22,279. (No model.)

*To all whom it may concern:*

Be it known that I, EDGAR J. ULLRICH, a citizen of the United States, residing at Colorado Springs, in the county of El Paso and State of Colorado, have invented a new and useful Apparatus for Deaerating Water for Ice Manufacture, of which the following is a specification.

This invention relates to improvements in apparatus for deaerating water in the manufacture of ice by what is known as the "can" system, and has for its object the production of a comparatively simple and inexpensively-constructed appliance possessing advantages in point of practicability and high efficiency, coupled with an increased capacity and an improved product.

The nature of my invention will be readily comprehended, reference being had to the following detailed description and to the accompanying drawings, in which—

Figure 1 is a top plan view of a deaerating apparatus embodying my invention. Fig. 2 is an enlarged view in elevation of two of my improved cans with connections. Fig. 3 is a further enlarged sectional view of the lower portion of one of the cans.

Referring to the drawings, in Sheet 1, A A A A represent a floor plan of the brine-room of an artificial-ice plant, the small squares B B B B being the tops of the freezing-cans. Under this floor and immersing these cans is the brine or other refrigerating element which causes the water in the cans to freeze into ice blocks. While this freezing process is proceeding I desire to keep the water in the freezing-cans in a state of agitation by means of air-jets passing up through it, and these air-jets I wish to introduce at the very bottom of the cans. A main pipe-line or header C, extending across the brine-room, has branch lines of pipes D D D leading therefrom at right angles and extending in parallel lines between consecutive rows of cans, as shown in plan view of floor. From these branch lines are led off at appropriate intervals flexible tubes *j j j*, connecting with vertical tubes leading to the bottoms of the cans, as shown in Fig. 2, Sheet 2. This figure illustrates a vertical cross-section through the conduit F, carrying one of the branch lines D, showing two adjoining cans B B and the piping connections leading into their bottoms, through which the compressed air is carried from the branch pipe-line D. This horizontal pipe D is provided at intervals with T's *h*, tapped into it and carrying the stop-valves *g g*. The pipe-line D, T's *h*, and stop-valves *g g* are incased within the conduit F to prevent freezing. From the stop-cocks *g g* lead the flexible tubes *j j*, which connect with the upper ends of the vertical tubes *k k*, which are permanently fastened to the cans B B and upon the flexible tubes *j j* being disconnected are drawn up with the cans B B when the latter are withdrawn from the brine-well.

Fig. 3 shows an enlarged view taken as a vertical section through the bottom of one of the cans B. The true bottom of the can is at *b*. A gooseneck *n*, containing a small air-channel *m*, is fastened under the bottom *b* by means of the top nut *o*, also provided with air-channel *p*. To the lower end of this gooseneck is fastened the flexible tube *r*, which connects it with the vertical tube *s*, the upper end of which connects by a detachable coupling with the upper flexible tube *j*, already referred to. These parts, it will be seen, form a continuous air-passage from the horizontal branch-line pipe D to the bottom of each freezing-can. Since these cans are immersed in the cold brine, it is necessary to afford some protection to the air-pipes, just described, in order to prevent the condensed moisture contained in the air from freezing. For this purpose I inclose these air-pipes and tubes within the necks *t u v* and pipe *w*, the inclosing series being rigidly fastened from the bottom of the can and forming a dead-air space *x*, as shown in Fig. 3.

The prolongation of the walls of the can B to *b'* is to afford a base for the can to stand on when out of the brine-tank. A further function of the prolongation or extension of the can-walls is to provide during the freezing operation a closed chamber around the delivery or discharge end of the air-pipe to prevent the circulation of the brine around said end and at the can-bottom, and thereby retard the freezing of the lower portion of the body of water in the can and prolong the period of admission of the air.

The reservoir system consists of pressure-pump, reservoirs, &c., necessary to supply

air to the above-described distributing system. It comprises a pressure-pump P, by which the air is compressed and forced through pipe $p'$ to a high-pressure reservoir H, thence through pipe $h'$ and reducing-valve $g'$ to the low-pressure reservoir L, and thence by pipe $j'$ to the main or header pipe C, whence it becomes distributed to the various cans, as already explained. The air upon entering both reservoirs H and L is caused to pass up through water contained in the bottom of each to rid it of dust or oil which might be brought over from the pump.

Since it is desirable to introduce the air into the pump cold, I attach to the suction-pipe $s'$, to be used in hot weather or in hot climates, a cooling-chamber G. This chamber is practically a cylinder closed at the top, except the pipe connection $s'$ to the pump, and having a perforated bottom connecting with an outside air-inlet $t'$, the interior of the cylinder being occupied by coils of pipe in which circulates some cooling medium. The air in passing through the cylinder is cooled by contact with these coils before it enters the pump P.

The various connecting-pipes $s'$ $p'$ $h'$ $j'$ are provided with the necessary regulating or shut-off valves.

All horizontal pipes in the distributing system have a slight fall, terminating in a trap and draw-off cock to prevent the accumulation of moisture in them.

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

1. In combination with a compressed-air or gas supply pipe, a series of ice-making cans, and a compressed-air or gas delivery pipe carried exteriorly by each can out of contact therewith, the upper end of the delivery-pipe being detachably connected with the supply-pipe and the lower end being connected with and terminating at the can-bottom to discharge compressed air or gas into the body of freezing water contained in the can.

2. In combination with an ice-making can having a tubular extension below the can-bottom forming the can-support, a compressed-air or gas delivery pipe carried exteriorly by the can the upper end of the pipe being detachably connected with a compressed-air or gas supply pipe, and the lower end thereof being passed through the cylindrical extension and connected with and terminating at the can-bottom to discharge compressed air or gas into the body of freezing water contained in the can, and a pipe or casing enveloping the delivery-pipe.

3. In combination, an air-compressor receiving refrigerated air, pressure-tanks receiving refrigerated compressed air from the air-compressor, a supply-pipe leading from the pressure-tanks and provided with lateral branches, a series of ice-making cans, an air-delivery pipe carried exteriorly by each can and detachably connected at its upper end with one of the branches, and at its lower end with the can-bottom where it terminates, and a pipe or casing enveloping each delivery-pipe.

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