No. 680,087. Patented Aug. 6, 1901.

E. J. ULLRICH.

ICE MAKING APPARATUS.

(Application filed Feb. 16, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

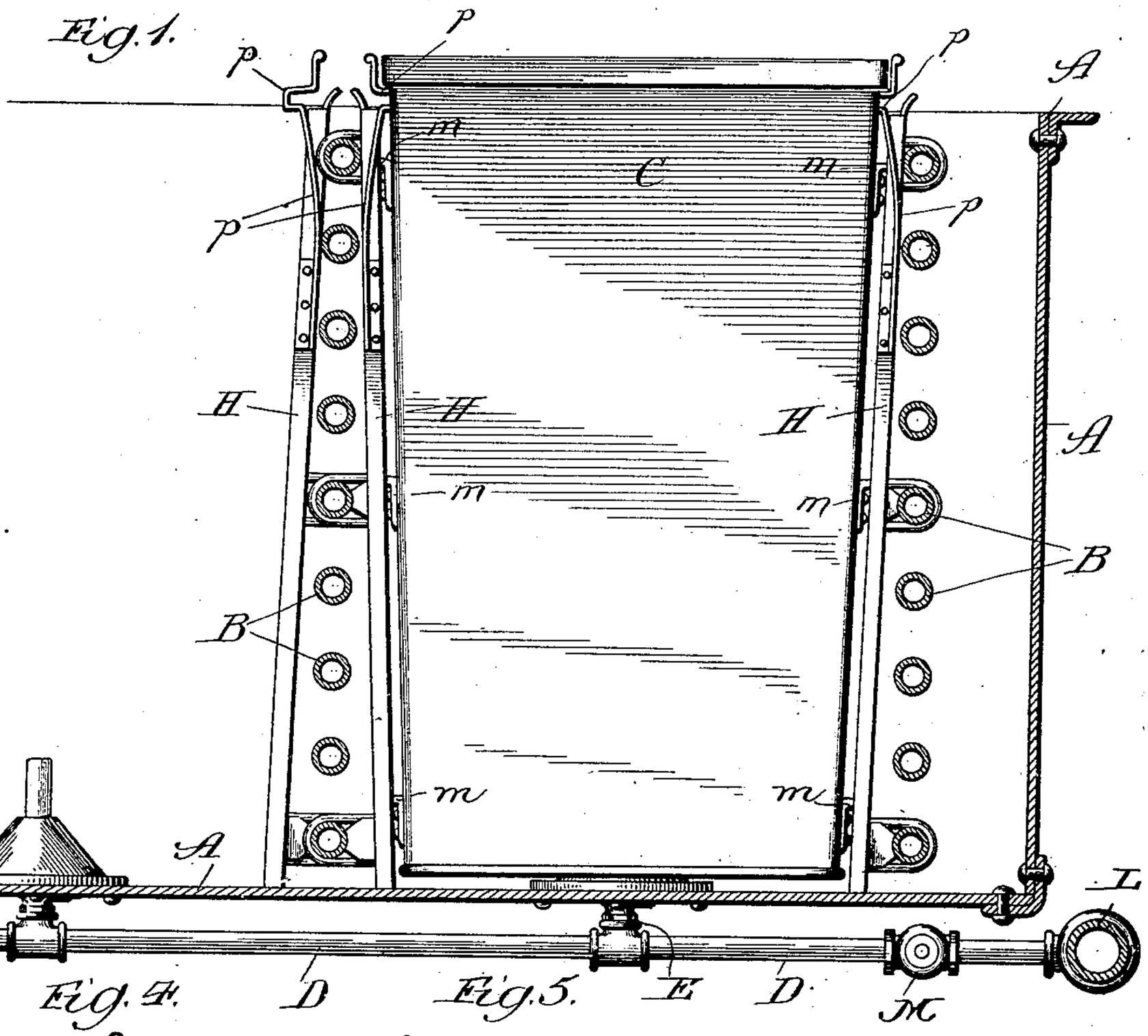
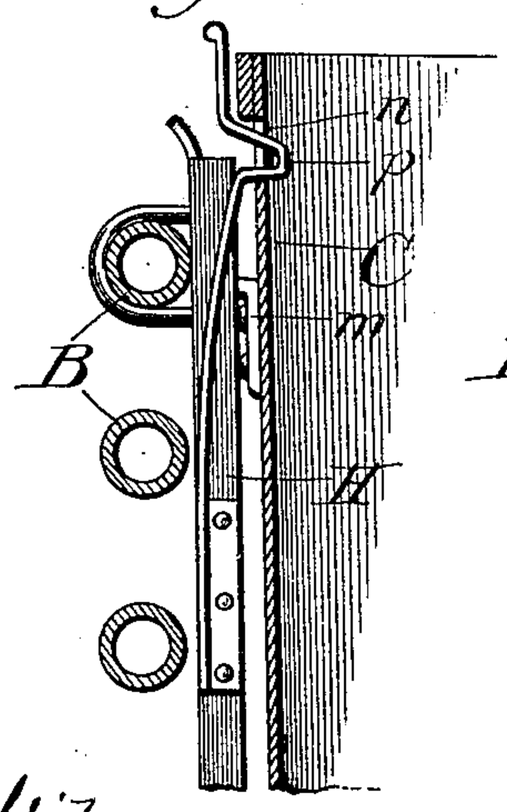


Fig. 4. Fig. 5.



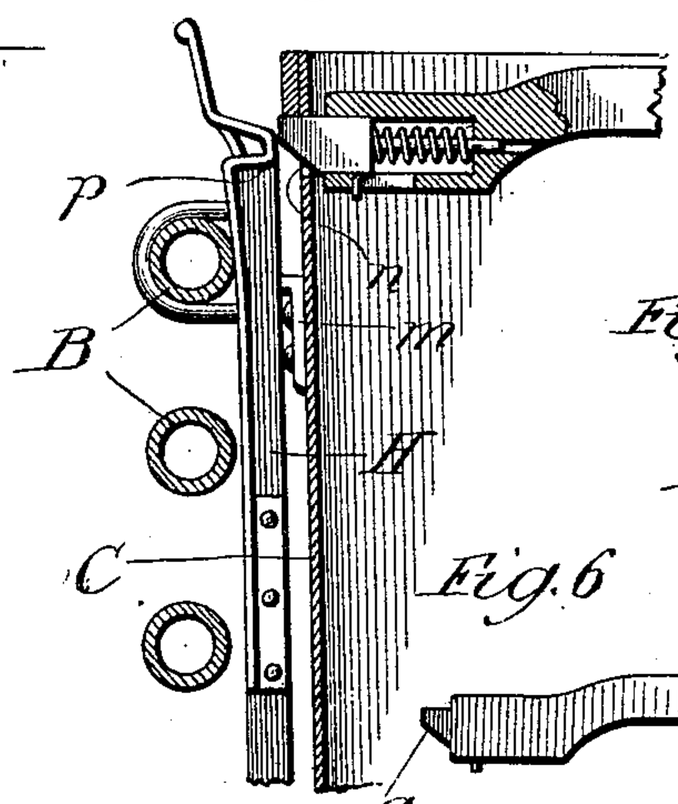


Fig. 6

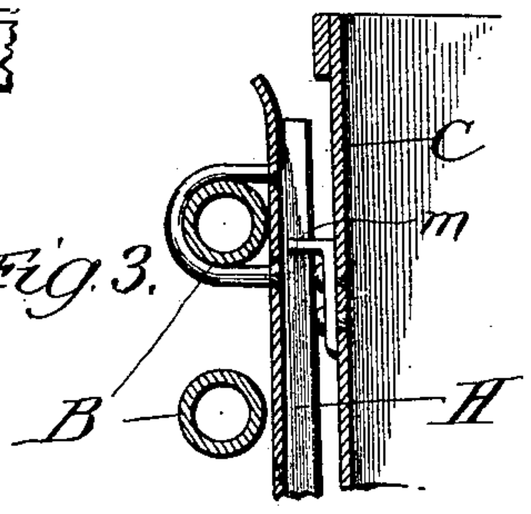
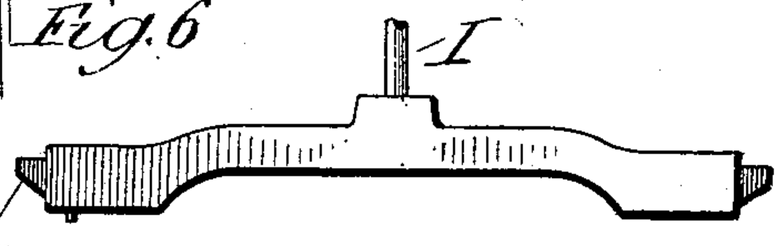


Fig. 3.



Witnesses:
Chas. E. Gaylord.
John Enders Jr.

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Attys

No. 680,087. Patented Aug. 6, 1901.

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ICE MAKING APPARATUS.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 2.

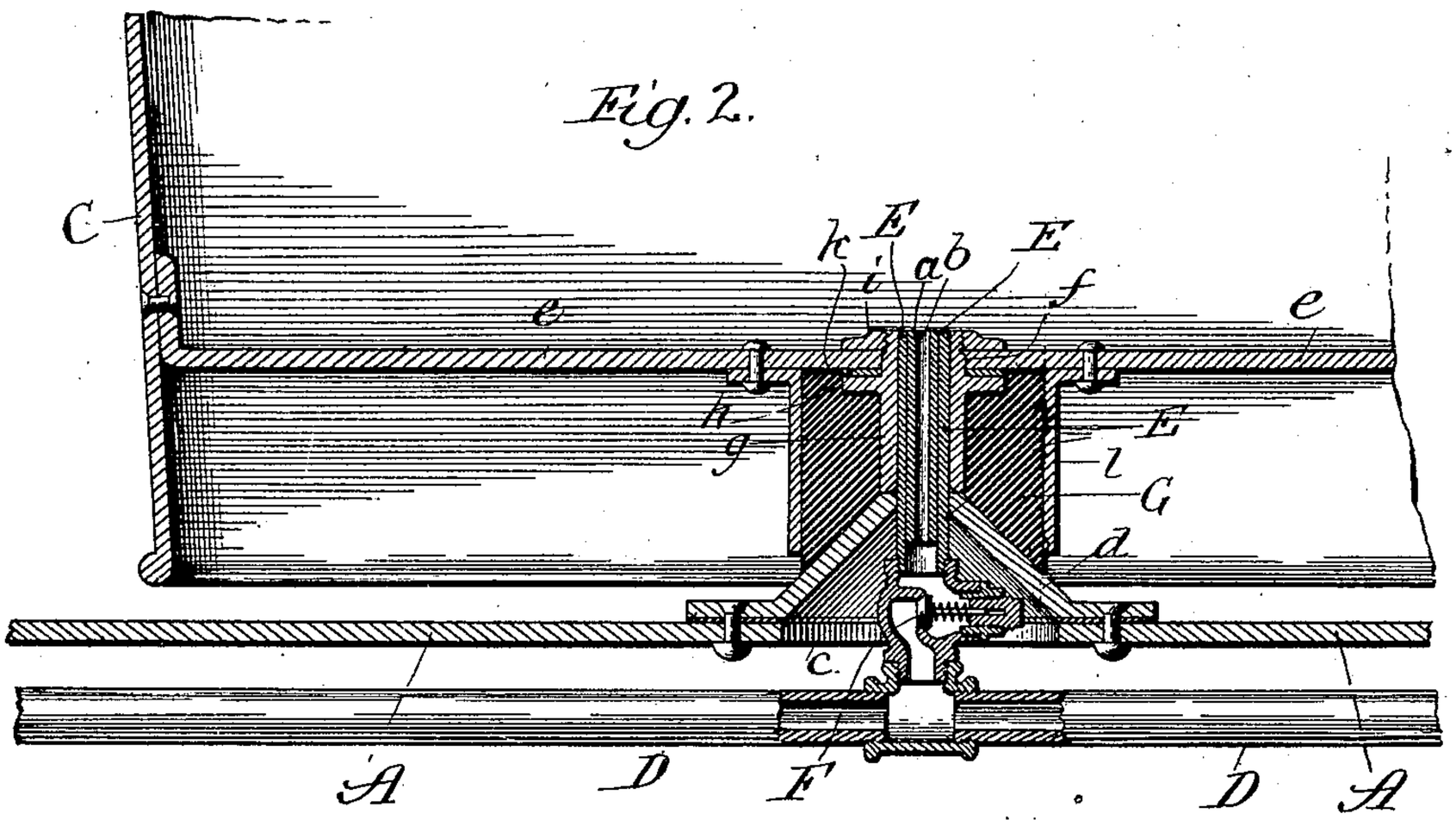

Fig. 7.

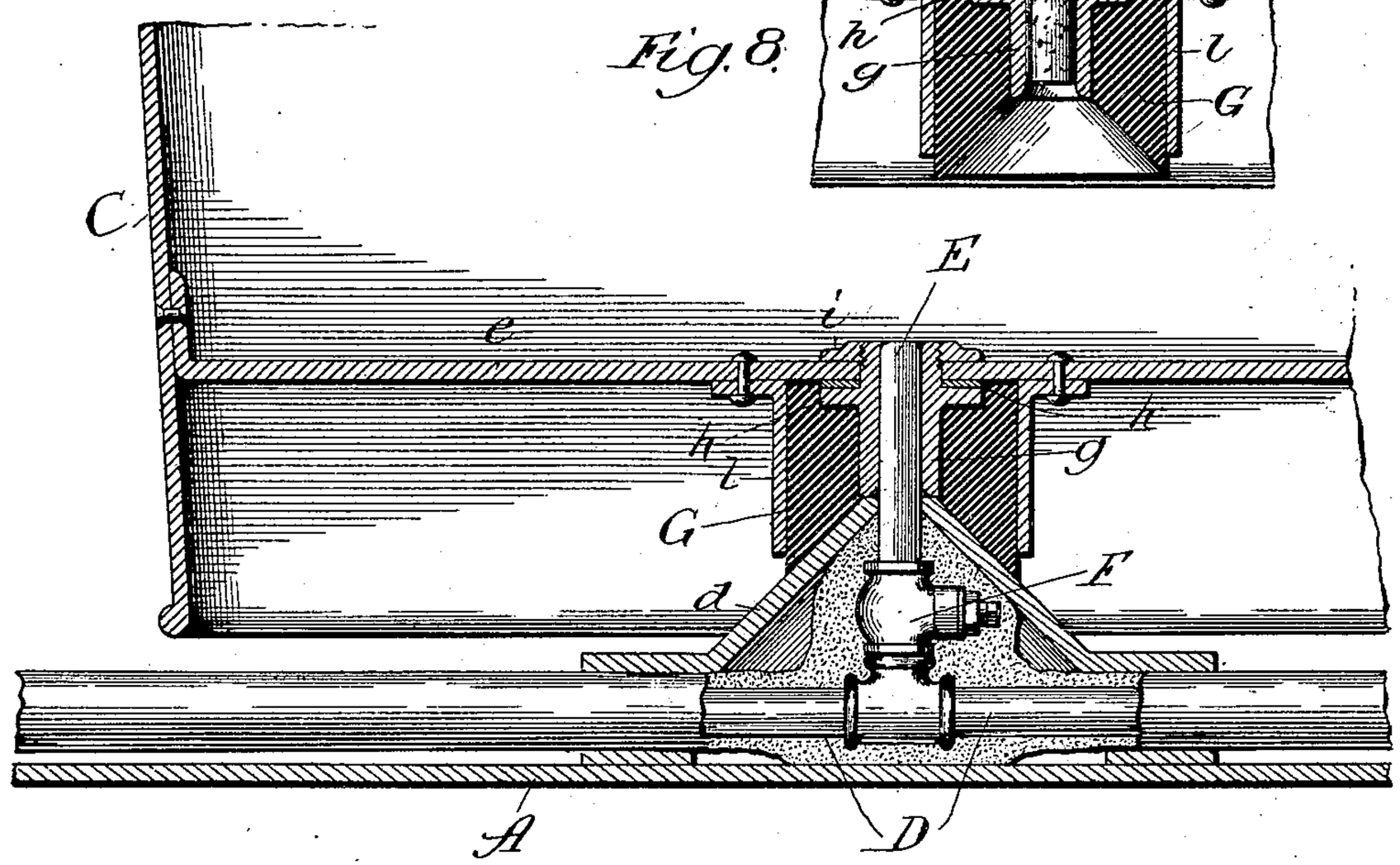

Fig. 8.

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UNITED STATES PATENT OFFICE.

EDGAR J. ULLRICH, OF COLORADO SPRINGS, COLORADO.

ICE-MAKING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 680,087, dated August 6, 1901.

Application filed February 16, 1901. Serial No. 47,575. (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 Improvement in Ice-Making Apparatus, of which the following is a specification.

My invention relates to improvements in the construction of apparatus for use in the manufacture of ice by what is known as the "can" system. In carrying out this system of ice-manufacture cans containing the water to be frozen are usually immersed in tanks containing a refrigerating liquid, usually brine, the low temperature of the refrigerating liquid being maintained by refrigerating-coils in a common manner.

My present invention deals more especially with apparatus for deaerating the water to be frozen in the cans with a view to eliminating the impurities therein and producing clear ice.

In Letters Patent of the United States No. 667,897, granted to me the 12th day of February, 1901, I have shown, described, and claimed one form of apparatus for deaerating water in ice-manufacture wherein the compressed air or gas enters the bottom of the can through a pipe connected with the can and removable therewith from the brine-tank.

My present object is more especially to provide other improved and desirable means for accomplishing the same purpose, but without having the air or gas conducting pipes upon the cans and removable therewith.

In the drawings, Figure 1 is a broken sectional view of a brine-tank and its refrigerating-coils, showing one can therein removably coupled at its lower end to an air or gas supplier in accordance with my present invention; Fig. 2, an enlarged broken sectional view of the brine-tank, air or gas supply pipe below the tank, and can in place, showing a preferred construction of coupling between the can and the air or gas supply pipe; Fig. 3, a broken sectional view of the upper end portion of one side of the can and adjacent refrigerating-coil and can-guiding means; Fig. 4, a view of the same character as Fig. 3 and showing means for locking a can down in the brine-tank; Fig. 5, a view the same as Fig. 4 and illustrating means for unlocking and raising the can out of the brine-tank; Fig. 6, a broken view showing a form of can engaging, unlocking, and raising device; Fig. 7, a view of the same character as Fig. 2 and illustrating a construction wherein the air or gas supply pipe is within instead of below the brine-tank; and Fig. 8, a broken section of the lower end of the can at the inlet, showing a removable plug or cork in place.

A is the base of a brine-tank or can-refrigerating receptacle, which may be of any desired construction, and B B series of refrigerating-coils, between which the refrigerating-cans C are placed when immersing them in the brine contained in the tank. The spaces between the coils form longitudinally-extending pockets in which a series of cans may be placed side by side. Below the base A of the brine-tank, in the construction shown in Figs. 1 and 2, is an air-supply pipe D. The pipe D may be one of a series of such pipes extending from a main pipe L, communicating with an air or gas compressor. (Not shown.) Centrally beneath the location of each can C the pipes D are provided with short vertical tubes or branch pipes E, each provided with an interposed valve F, which may be a regulating as well as a check valve. That part of the pipe E above the valve F may be thickened or provided with a lining *a*, if desired, to produce a comparatively small air-outlet channel *b*. The pipe E extends through an opening *c* in the base of the tank, the opening being surrounded on the upper side of the base with a ring or flange-piece *d*, which may be frusto-conical in shape and which should be securely fastened to the base A in some such manner as shown. The central part of the ring or flange *d* fits water-tight around the pipe E. In the base plate *e* of each can, preferably at the center, is an opening *f*, in which is fitted and fastened a short downwardly-extending pipe or tube *g*. The tube *g* may be formed, as shown in Fig. 2, with a flange *h* below the base *e* and a fastening-nut *i* screwed upon the upper end of the pipe to clamp the surface of the base *e* around the opening *f* and produce a water-tight joint. A rubber gasket *k* may be interposed between the flange *h* and the base *e* and a similar gasket may be provided between the ring *d*

and the base A. About the pipe E is a downwardly-extending tubular wall *l*, forming with the tube or wall *g* an annular chamber to receive and hold a rubber gasket G, which at its lower end is flaring to fit closely the surface of the frusto-conical seat formed by the flange *d*. It will be understood that the flange *d* and pipe E *a* are virtually fixed parts of the tank-base A, while the tubes *g l*, with the gasket G, are fixtures of the can C and removable therewith.

When the can C is removed from the tank, the brine contained in the tank may enter the channel *b*, but will be checked by the valve F against flowing into the pipe D. It will be understood that between each pipe D and the air or gas main a shut-off valve M should be located. As the cans are inserted into the tank they should be guided so that their tubes *g* will naturally pass over the pipes E. For this purpose I provide guides H H, which may be lengths of channel-iron fastened to the coils B at opposite sides of each can. Near the upper and lower ends of each can and, if desired, at a point between said ends I provide fixed guide-lugs *m m* in vertical line at about midway between opposite sides thereof. As the can is lowered into position the guide-lugs *m* pass along the channels of the guides H, which operate to direct the tube *g* over the end of the pipe E. Before the can is lowered into the tank the tube *g* is plugged, preferably by means of a cork *x*, which may be long enough, as shown by dotted lines in Fig. 2, to fit the tube throughout the full length thereof and tight enough to prevent water from passing through the tube in either direction. It is usual to pass the can, with the cork or plug in place at its lowermost guide-lugs *m*, into the tops of the channel-guides and there let the can float. The water to be frozen is then poured into the can, and as the can fills it sinks down into the brine. Thus there is no material pressure against the cork in either direction. When the can is filled to the desired level, it is pressed down, causing its tube *g* to pass over the pipe E and causing the latter, while the can is descending, to force the plug or cork *x* upward into the can. Before pressing the can down the compressed air or gas may be turned into the pipe D and passed through the valve F to force out any brine that may be in the pipe E. This air-blast blowing against the under side of the cork while the can is descending forces the brine outward from the pipe E until the gasket G seats upon the surface of the seat *d*. The pipe E should be of a length to reach to the end of the tube *g* when the can is seated, and the tube *g* should be of a length to seat, or nearly seat, upon the upper end of the flange *d*. The pipe E should fit closely the tube *g*, and the lower surface of the gasket G should fit in the same way the flange *d*. Thus the parts form a water-tight readily-separable coupling between the can and the air or gas supply pipe. It is desirable to lock the can down when in place. At opposite sides of the upper end portion of the can I provide openings *n*, which are a trifle to one side of the guide-lugs *m*, and, on the guides H, I provide spring-catches *p* in the path of the openings *n*, at opposite sides of the can, whereby when the can is pressed down the catches *p* spring into the openings *n* and lock the can firmly in place.

While the water in the can is subjected to the freezing influence of the brine, air under desired pressure and in a more or less fine jet is forced upward through the channel *b* to agitate the water, free the contained air, and carry the impurities of the water in the can C upward to the upper central portion of the can. When the freezing is completed, all impurities will be concentrated in a pocket in the upper central part of the cake of ice and may be readily removed to leave the cake clear and pure. When the freezing operation is completed and it is desired to remove the can, a device I may be employed, the same being suspended from a trolley and raised and lowered by means of chains and pulleys or otherwise. The device I is provided at one or opposite ends with spring-catches *q*, which, as the device is pressed down upon the can, are sprung inward by the sides of the can until they reach the openings *n*. They then spring outward with sufficient force to thrust the spring-catches *p* outward out of engagement with the openings *n* and themselves engage the openings, whereby as the device I is raised it will draw the can upward out of the brine.

In the modification shown in Fig. 7 the pipe D is above or upon the base A and should in practice be well insulated from the brine to prevent the freezing of any moisture therein. The seat *d* extends from the base A to a point some distance above the upper side of the pipe D, which is preferably formed to house the valve F. In other respects the main features shown in Fig. 7 are substantially the same as those before described.

My improved construction of can and readily-separable coupling members may also be employed by dispensing with the valve F in the manufacture of can-ice by the known process of causing water to be moved in and out of the base of the can to agitate the body of freezing-water in the can. In such a case the fluid-pressure passing through the channel *a* would be water instead of air or gas.

While I have shown my improvements in the form I now prefer to provide them, they may be changed in the matter of details without departing from the spirit of my invention as defined by the claims.

A material part of my invention lies in providing an ice-making can which may be readily inserted into the brine-tank or equivalent can-refrigerating receptacle and readily removed therefrom when the freezing operation is accomplished, and which when thus inserted is brought into communication by

means of coupling members with an aeriform fluid-supply for the purpose set forth. The coupling members should, naturally, when in contact produce a sufficiently tight joint, and they should be so constructed that the can may be easily separated from said supplier and removed when filled or partly filled with ice. For this purpose the coupling members should be unprovided with any connecting means which would materially interfere with their being readily separable when it is desired to remove the can and its contained block of ice from the refrigerating receptacle.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can adapted to be inserted into said receptacle and to be removed therefrom when filled with ice and having an opening in its lower end portion, a relatively stationary fluid-pressure supplier having an outlet-opening toward the base of said receptacle, and readily-separable interfitting coupling members about said can and supplier openings.

2. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can adapted to be inserted into said receptacle and removed therefrom when filled with ice, and having an air or gas inlet opening in its base, a relatively stationary compressed air or gas supplier adjacent to the lower part of the receptacle having an outlet-opening below the base of the can, and readily-separable interfitting coupling members about said can and supplier openings.

3. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can adapted to be inserted into said receptacle and removed therefrom when filled with ice, and having an air or gas inlet opening in its lower end portion, a relatively stationary air or gas supply pipe adjacent to the lower part of the receptacle and having an outlet-opening provided with a check-valve near the base of the can, and readily-separable interfitting coupling members about said can and supplier openings.

4. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can adapted to be inserted into said receptacle and removed therefrom when filled with ice, and having a fluid-pressure inlet-opening at its lower end portion, a relatively stationary fluid-pressure supplier adjacent to the lower part of the receptacle and having an outlet-opening near the base of the can, and readily-separable insulated interfitting coupling members between said can and supplier.

5. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can adapted to be inserted into said receptacle and having an opening in its lower end portion, a fluid-pressure supplier having an outlet-opening near the base of said receptacle, separable interfitting coupling members secured respectively to the said supplier and can openings, and guides in said receptacles for directing the coupling members into engagement when the can is inserted into place.

6. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can adapted to be inserted into said receptacle and removed therefrom when filled with ice and having an opening in its lower end portion, a fluid-pressure supplier having an outlet-opening toward the base of said receptacle, readily-separable interfitting coupling members about said can and supplier openings, and means for locking down the can when said members are coupled together.

7. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of an ice-making can adapted to be inserted into said receptacle and having an opening in its lower end portion, a fluid-pressure supplier having an outlet-opening toward the base of said receptacle, separable interfitting coupling members about said can and supplier openings, automatic locking means for engaging said can and holding it down when the said members are coupled together, and means for engaging, automatically unlocking and raising said can.

8. In an ice-making apparatus, the combination with a can-refrigerating receptacle of a fluid-pressure supplier extending adjacent to the base of the receptacle, a tube projecting vertically from said supplier, within the receptacle, a removable ice-making can having an opening in its base, and a downward-extending tube around said opening and carried by the can, said tubes telescoping together when the can is placed in position, substantially as described.

9. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of a fluid-pressure supplier extending adjacent to the base of the receptacle, an air or gas conducting tube projecting from said supplier, within the receptacle, a seating-surface around said tube, a removable ice-making can having an opening in its base, a tube fastened to the can at said opening adapted to receive said conducting-tube, a seating-face around said conduit and carried by the can, said seating-faces operating, when the can is placed in position, to produce an approximately water-tight joint between the supplier and can.

10. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of a fluid-pressure supplier extending adjacent to the base of the receptacle, an air or gas tube projecting vertically from said supplier, within the receptacle, a seating-surface at the tube in the receptacle, a removable ice-making can having an opening in its base, a downward-extending tube, a seating-face

around said opening and carried by the can, said tubes and seating-faces operating, when the can is placed in position, to produce an approximately water-tight coupling between the supplier and can.

11. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of a compressed air or gas supplier extending adjacent to the base of the receptacle, a valved air or gas tube projecting vertically from said supplier, within the receptacle, a removable ice-making can having an opening in its base, a seating-face at said opening in the can, said valved tube and seating-faces operating as readily-separable coupling members to produce an approximately water-tight joint between the supplier and can when the can is placed in position.

12. In an ice-making apparatus, the combination with a can-refrigerating receptacle of a fluid-pressure supplier extending adjacent to the base of the receptacle, a tube projecting vertically from said supplier, within the receptacle, a seating-face about the tube within the receptacle, a removable ice-making can having an opening in its base, a downward-extending tube around said opening and carried by the can, a gasket forming a seating-face around said tube carried by the can, said tubes and seating-faces operating, when the can is placed in position, to produce an approximately water-tight joint between the supplier and can.

13. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of an ice-making can movable into and out of said receptacle, a compressed air or gas supplier terminating at its discharge end at an opening in the lower part of the can, and an adjustable spring-actuated check and pressure-reducing valve in the discharge end portion of said supplier.

14. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of an ice-making can movable into and out of said receptacle and having an opening in its lower end portion, a removable plug in said opening operating when in place to close the same, a fluid-pressure supplier having an outlet-opening near the base of said receptacle, and separable interfitting coupling members between said can and supplier openings.

15. In an ice-making apparatus, the combination with a can-refrigerating receptacle of an ice-making can movable into and out of said receptacle and having an opening in its lower end portion, a removable plug in said opening, a fluid-pressure supplier having an outlet-opening near the base of said receptacle, separable interfitting coupling members between said can and supplier openings, and means operating as the coupling members are moved into engagement to discharge said plug from the opening in the can.

16. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of an ice-making can movable into and out of said receptacle and having an opening in its lower end portion, a removable plug in said opening operating when in place to close the same and of less specific gravity than water, a fluid-pressure supplier having an outlet-pipe opening near the base of said receptacle, and separable interfitting coupling members about said can and pipe openings.

17. In an ice-making apparatus, the combination with a can-refrigerating receptacle, of a fluid-pressure supplier extending adjacent to the base of the receptacle, an air or gas tube projecting vertically from said supplier, within the receptacle, a removable ice-making can having an extended opening in its base, and a removable plug in said can-opening, said tube operating, when the can is placed in position, to enter said can-opening, force out the plug and produce an approximately water-tight coupling between the supplier and the can.

EDGAR J. ULLRICH.

In presence of—
J. H. LEE,
ALBERT D. BACCI.