

No. 696,133.

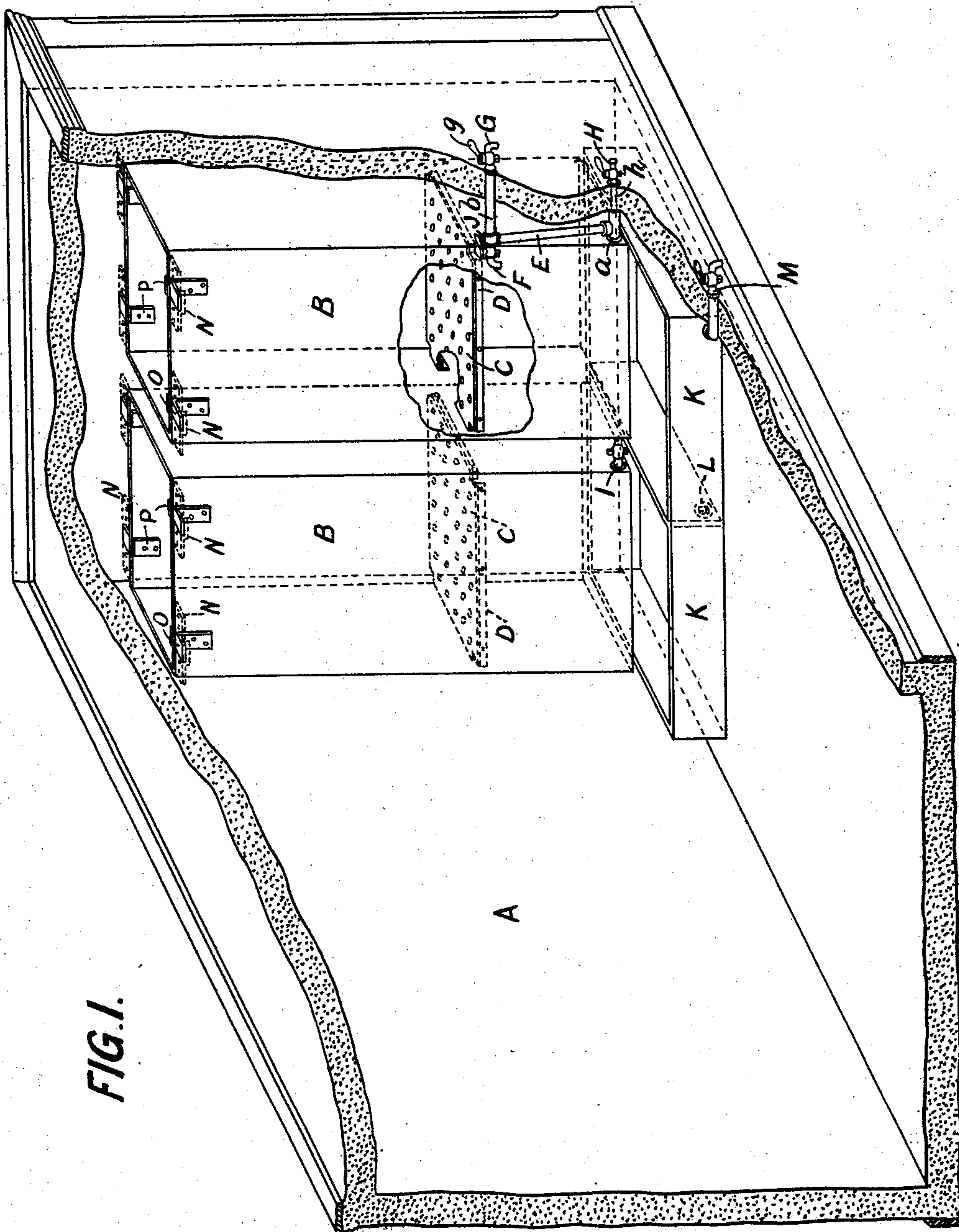
Patented Mar. 25, 1902.

J. CRABTREE.  
REFRIGERATING CHAMBER.

(Application filed Sept. 30, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES

*F. J. Stearns*  
*W. R. Kennel*

INVENTOR

*Geo. Crabtree*  
*By P. J. Dodge*  
*Atty*

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2 Sheets—Sheet 2.

FIG. 2.

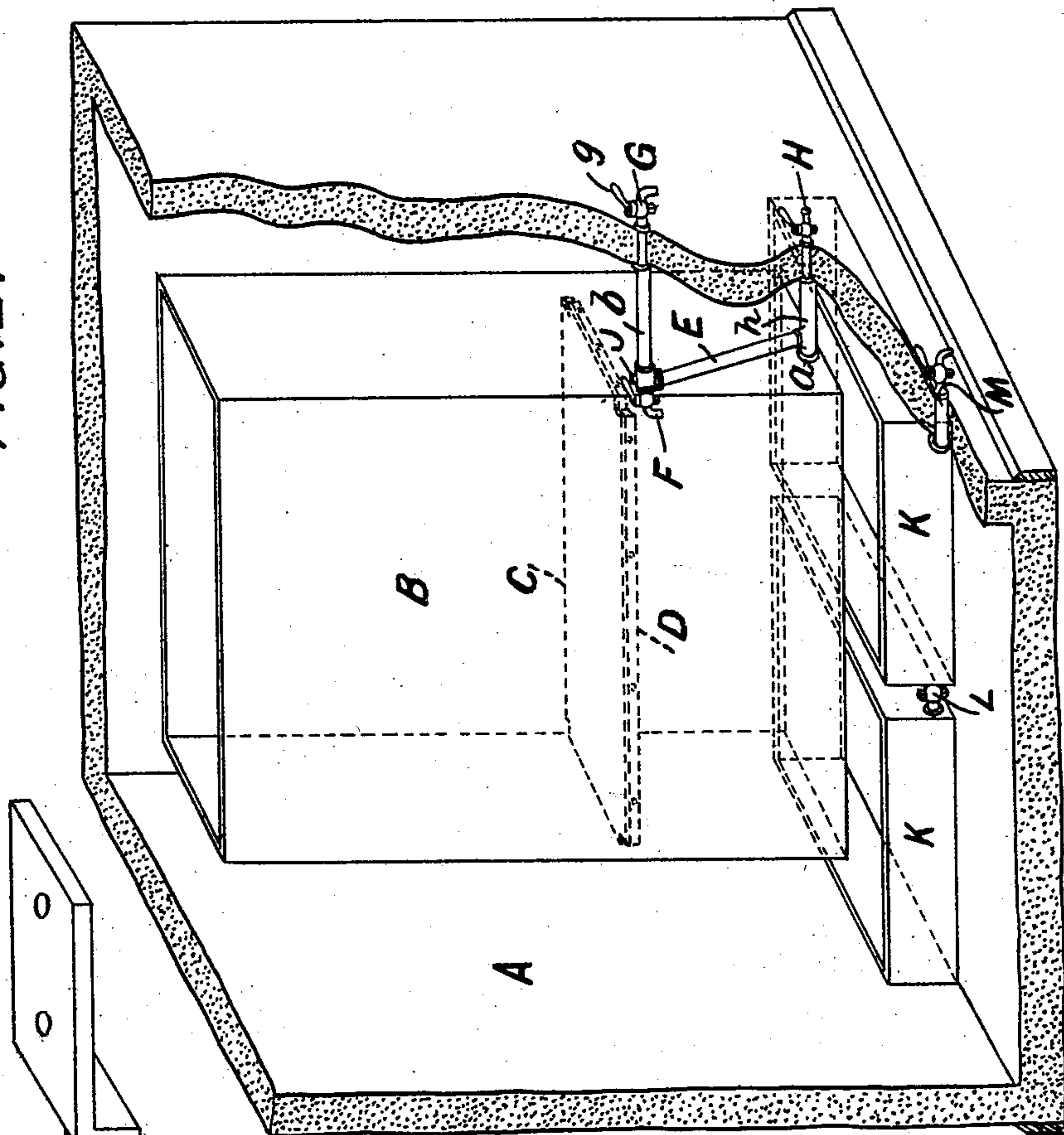


FIG. 3.

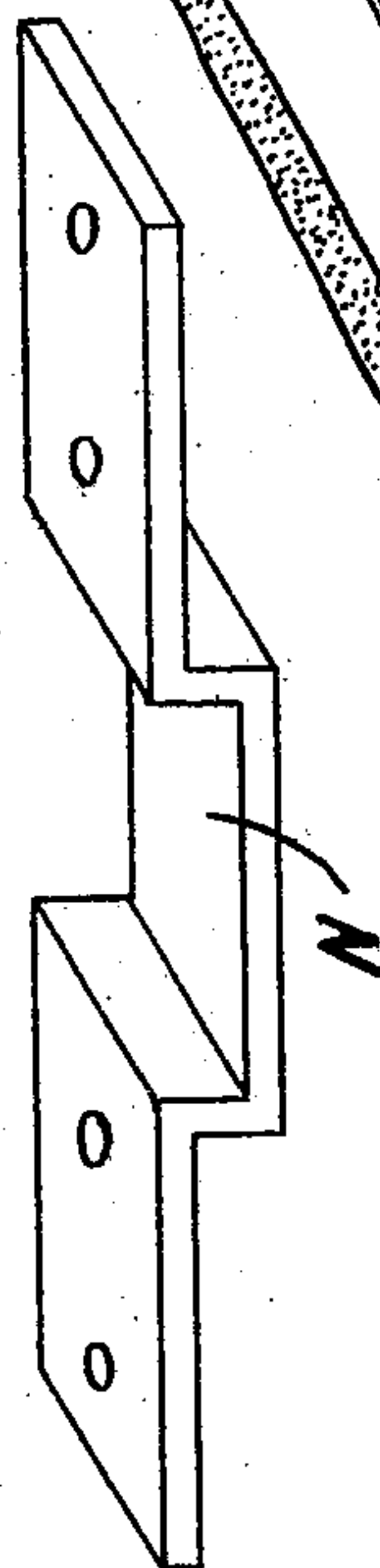


FIG. 4a.

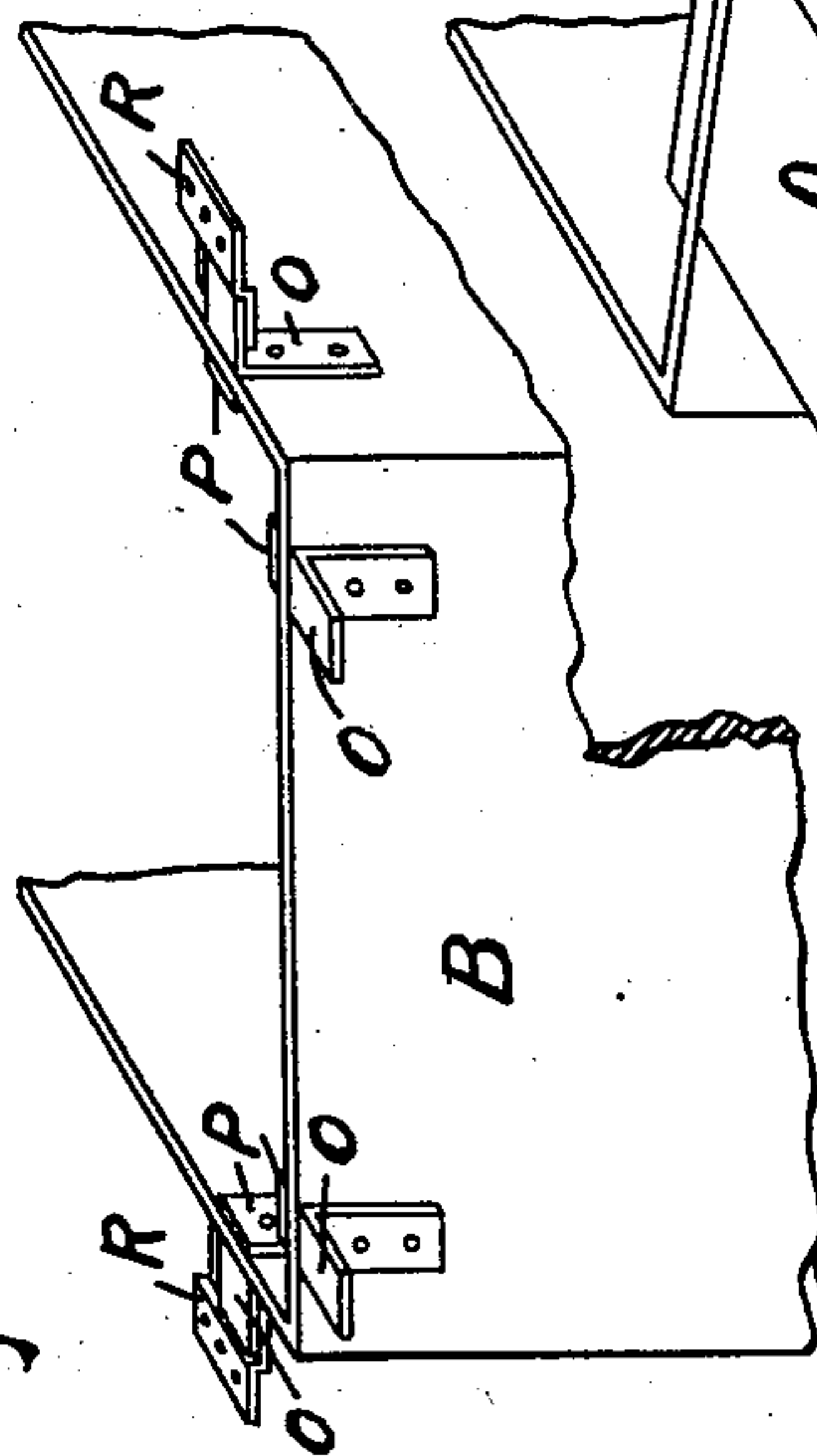
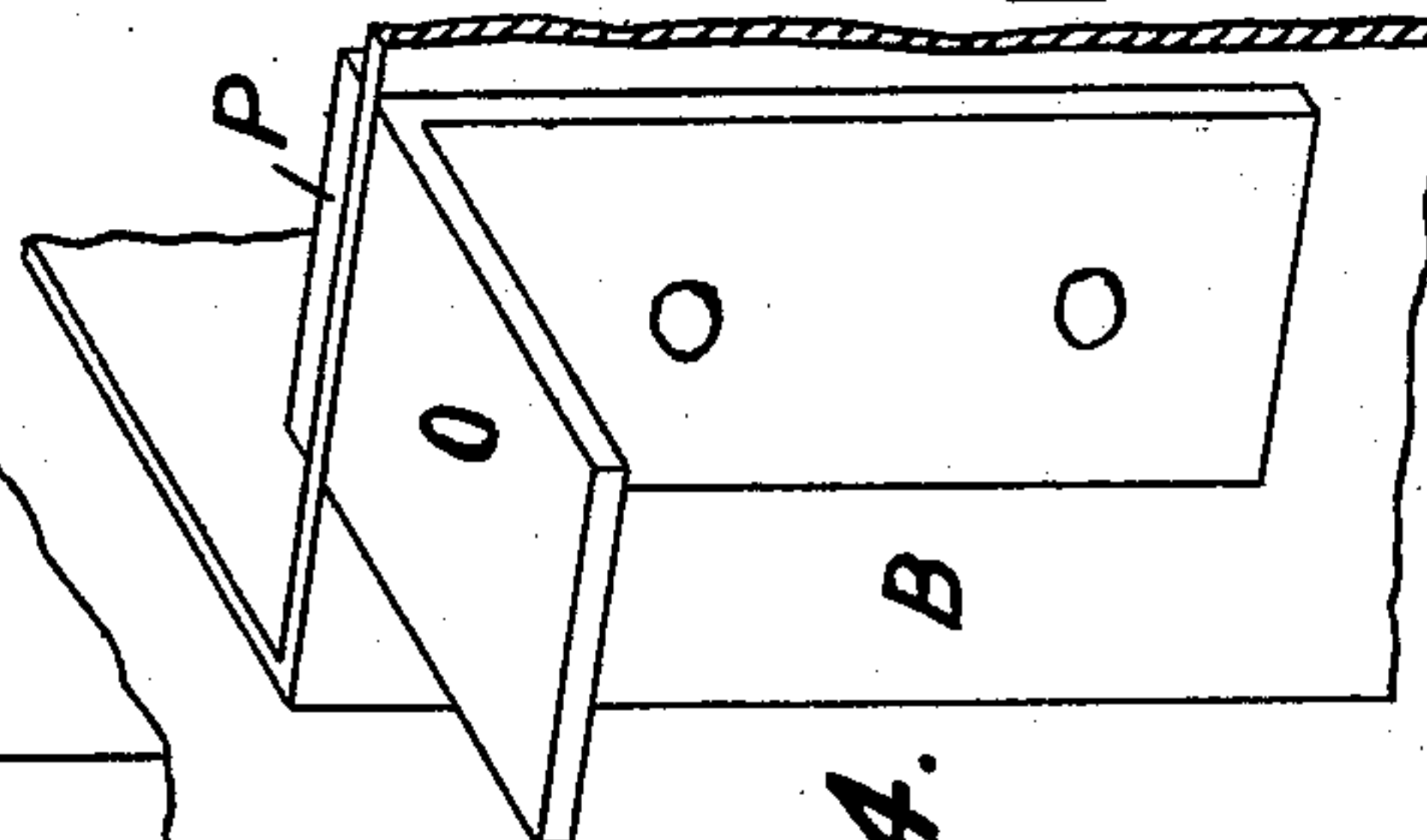


FIG. 4.



WITNESSES

*W. R. Herms*  
*J. J. Emerson*

INVENTOR

*Jas. Crabtree*  
*By J. J. Adams*  
*att'y.*



# UNITED STATES PATENT OFFICE.

JAMES CRABTREE, OF BIRKENHEAD, ENGLAND.

## REFRIGERATING-CHAMBER.

SPECIFICATION forming part of Letters Patent No. 696,133, dated March 25, 1902.

Application filed September 30, 1901. Serial No. 77,030. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES CRABTREE, refrigerator manufacturer, a subject of the King of Great Britain, residing in Birkenhead, in the county of Chester, England, (whose full post-office address is 39 Price street, Birkenhead,) have invented certain new and useful Improvements in or Connected with Refrigerating-Chambers, (for which provisional application only has been made in Great Britain, No. 3,585, dated February 19, 1901,) of which the following is a specification.

My invention relates to refrigerating-chambers of the kind, whether used in shops or other buildings, ships, or railway or other vehicles, in which tanks for the ice or freezing mixture are arranged within air-tight boxes or chambers designed to receive the meat or other substances, articles, or liquids to be refrigerated or preserved.

The object of my invention is to afford an efficient and economical working by preventing the ice or freezing mixture from being submerged, exhausting the full refrigerating effect of the brine before running to waste, providing a good air circulation, and utilizing the brine for pickling purposes in the chamber.

The invention comprises means for attaining these objects, means for supporting the ice-tanks, means for facilitating cleaning, and other improvements, as will be hereinafter set forth.

The invention will be described with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of a chamber having the improvements of my invention, a portion of the walls with the door being removed to show the interior. Fig. 2 is a similar view with a single ice-tank. Figs. 3 and 4 are perspective views showing, on a larger scale, the bracket and hanger for the ice-tanks. Fig. 4<sup>a</sup> shows the use of side brackets.

Within the air-tight refrigerating-chamber A, Fig. 1, which may be of any usual or convenient construction, I provide usually two ice-tanks B, but any desired number may be used. I make these ice-tanks of rectangular shape and place them at one end of the chamber A, but not actually against the walls of the latter, so as to almost fill the end of the

chamber, while leaving a narrow flat air-space all around on three sides and an extensive air-space on the fourth side, where the goods are stored, and I further provide a flat air-space between the tanks. In this way I cause the air to circulate with vigor and throw cold currents to the opposite end of the chamber. Fig. 2 shows a single tank B similarly arranged.

Within the ice-tanks B, I arrange a horizontal shelf or diaphragm C about the middle or one-fourth the total height, but preferably at a point about one-third the total height of the tank from the bottom. This diaphragm is formed with one or more holes or otherwise adapted to allow all liquid to drain through it and is fixed or supported in a removable manner—for instance, on brackets or angle-irons D.

The ice and salt, with or without soda or other mixture, are arranged in layers on this diaphragm, and as the salt water is formed it runs out through the perforations into the lower portion of the tank, the usual overflow or draw-off pipes being so arranged that the level of brine in the tank can be kept down to the level of the diaphragm. By this means I prevent the ice and salt from being submerged in the brine, and the salt solution as it forms runs clear of the same, thus tending to great economy with efficient refrigeration. This salt water is much below the freezing-point of ordinary water; but by remaining in the bottom of the tank it continues to have refrigerating effect and should only be withdrawn from the bottom periodically as that refrigerating effect has become exhausted. The shelf or diaphragm may be fixed or removably supported on angle-irons or brackets.

The overflow or draw pipe E is carried up between the walls of the tank B and chamber A, Fig. 1, and is connected to open at its lower end into the tank B near the bottom at *a*, while its upper end *b* is brought to the exterior through the wall of the chamber A, preferably on a level with the diaphragm before described. This upper bend of the pipe within the chamber A may also have a tap F, as will be hereinafter described. The usual upper tap G is provided on the outer end of the bend for drawing off any surplus of liquid and a lower plug or tap H on the outer end



of a pipe connection *h* from the bottom bend to allow of the ice-tank being quite emptied for cleaning or repairs, and as this is very seldom required I make this pipe connection  
 5 *h* of as small a diameter as possible to prevent loss of cooling effect by conduction. This latter tap *H* should have a straight nose to admit a cleaning-rod, and where two or more tanks *B* are employed I place them in communication one with another by plugged holes  
 10 or short pipe connections *I*, directly opposite one another and facing the outer discharge plug or tap *H*, so that the cleaning-rod after the plug *I* has been opened can be passed  
 15 into and through all the tanks by inserting it in the outer plug or tap *H*. I also arrange a plug *J* on the upper bend to admit a cleaning-rod down the vertical branch, and I provide the upper exterior tap *G* with a loose  
 20 lever-handle *g*, adapted to be taken off and to fit also on the bottom end of its plug, so that it can be used not only as a tap-handle, but also to unscrew and remove the plug, which allows of a cleaning-rod being more  
 25 easily passed into and through the tap and horizontal branch of the bend.

Instead of running the brine directly to waste from the ice-tanks *B*, as it is many degrees below freezing-point, I propose to pass  
 30 it into one or more surplus-tanks in the chamber. By this means I allow it to remain in the chamber until it has no longer any refrigerating effect before I run it to waste through the drain-pipes or taps. I further propose to  
 35 utilize the brine in these surplus-tanks for the purpose of pickling bacon, hams, pork, tongues, beef, and other meat. These surplus-tanks may be arranged in any part of the chamber *A*, but preferably, as shown in  
 40 Figs. 1 and 2, I provide a sufficiently large space between the bottom of the tanks *B* and the floor of the chamber *A* to receive one or more surplus-tanks *K* below the ice-tank. This insures great compactness, as it provides  
 45 a position for the tanks *K* in which they are quite out of the way and do not take up any space in the chamber which might otherwise be required for storing purposes. Moreover, they are in this way arranged in the coldest  
 50 part of the chamber and if used for pickling, as aforesaid, a combined pickling and thorough refrigeration is secured, which keeps the meat in good condition until the pickling is complete.

55 The brine is drawn off from the tanks *B* into the tanks *K* by means of a draw-off pipe or tap *F*, arranged on the upper bend of the pipe *E* within the chamber *A* or directly on the tank *B* and at a height below which the  
 60 level of the brine therein is not desired to fall. By arranging the vertical branch of the pipe *E* with an inclination out of the vertical, as shown, the tap *F* is brought into a more convenient position and may be straight with the  
 65 upper bend.

The pickling or surplus tanks *K* are preferably formed by partitioning a single tank

into compartments for different kinds of meat, as shown.

70 *M* is a drain-pipe with closing-plug or draw-off tap which may lead through the wall of the chamber *A* to draw off the pickle or brine when exhausted. The compartments may be connected, for instance, by holes, as shown  
 75 at *L*, with closing-plugs to enable one tap *M* to be used on a single compartment, as the pickle in the others can be run into this by opening the plugs.

80 The tanks *K* when arranged below the ice-tanks *B* should extend somewhat out from under the latter, as shown, to allow room for inserting the meat; but this is not essential if the bottom of the ice-tank be well above the pickling-tank.

85 If the ice-tanks *B* rest on the tank *K* in any way, the latter cannot be removed should occasion arise, and I therefore prefer to support the ice-tanks clear of the tank *K*. A good plan is to suspend the ice-tank from the  
 90 top of the chamber *A*, to which it may be bolted or screwed, packing being inserted where desired to make a tight joint against the roof about the usual ice-doors or filling-apertures.

95 To facilitate the connection of the ice-tanks to the top or roof of refrigerating-chambers, which is otherwise a difficult matter on account of the restricted space for the men to work in, I have designed special brackets and hangers, which I prefer to employ whether  
 100 the combined arrangement of pickling and ice tanks be used or not. These consist of stout brackets *N*, Fig. 3, of *U* shape, with the upper ends turned horizontally outward to provide a good seating against the top of the  
 105 chamber, to which they may be bolted or screwed, thus forming each a kind of socket or loop of desired shape. On the upper end of the ice-tank *B*, I provide hangers in the form of horizontally-extending arms or lugs  
 110 *O*, Fig. 4, to enter the sockets or loops of the brackets *N*. These hangers *O* may be of *Γ* shape, the vertical member being bolted against the outer side of the tank, with a stiffening-plate *P* on the inside. The horizontal  
 115 member is adapted to be inserted in the brackets *N* after the latter have been attached to the top of the chamber, thus serving to support the tank. A suitable number of hangers having been fixed on the tank—for instance,  
 120 two on the front and two on the back, as shown in Fig. 1—the brackets corresponding to the back are first fixed to the top of the chamber *A* and the tank then lifted and  
 125 pushed with its hangers *O* on that side into said brackets, after which the remaining brackets are slipped over the other hangers and then fixed to the chamber-top, thus securing the tank *B* in position. In some cases  
 130 I may fix hangers on the sides, preferably near the front, as well as on the front and the back, as shown in Fig. 4<sup>a</sup>, and provide brackets *R* of different shape, like angle-boxes or laterally-grooved pieces, to allow of the side



hangers O sliding into them at the same time that the rear hangers enter their sockets. This does away with holding up by the workmen when fixing and facilitates removal of the tanks when required.

The refrigerating-chamber may have any of the usual hooks, shelves, or the like fittings for holding the meat or the like, and I may also provide hooks on pulleys in the usual way to run on overhead rails arranged to allow of the meat suspended on the hooks being rapidly moved about in the chamber or run into or out of the chamber, the rail being cut away to allow for the door and a short loose piece of rail inserted in the hangers to bridge the gap when the door is open, but removed when the door is to be closed.

I declare that what I claim is—

1. In a refrigerating-chamber, the combination with an ice-tank within said chamber, of a draw-off pipe extending from the bottom of the tank upward between the tank and chamber-wall to the desired minimum level for the liquid in the tank, a branch from the top of said upward pipe forming an outward bend passing through the chamber-wall, an exterior tap on said outward bend, a plug for cleaning purposes on the top of the upward pipe, and a branch of small diameter extending outward from the bottom of said pipe through the chamber-wall with an exterior tap having a straight nose adapted to admit a cleaning-rod, substantially as described.

2. In a refrigerating-chamber the combination with an ice-tank within said chamber

of a draw-off pipe extending upward from the bottom of the tank to the desired minimum level for the liquid in the tank, branches from the upper and lower ends of said pipe extending outward through the wall of the chamber for the purpose of drawing off the liquid through either of them and a tap on the upper end of the upward pipe for drawing off the liquid at a point within the chamber, said upward pipe being inclined out of the vertical to enable the tap to be arranged straight with the outward branch, substantially as described.

3. In a refrigerating-chamber, the combination of rectangular ice-tanks located therein at one end, a narrow space for air between the tanks and at the sides and back, connections adapted to be opened to afford communication between the tanks, a large space in front of the tanks for air and storage of goods, one or more surplus-tanks for brine or pickle in a space below the ice-tanks, means for withdrawing brine from the ice-tanks into the surplus-tanks or directly to the exterior of the chamber as required, and means for withdrawing the brine from the surplus-tanks to the exterior of the chamber, substantially as described.

In witness whereof I have hereunto signed my name, this 14th day of September, 1901, in the presence of two subscribing witnesses.

JAMES CRABTREE.

Witnesses:

JOSEPH I. ROYDEN,

F. P. EVANS.