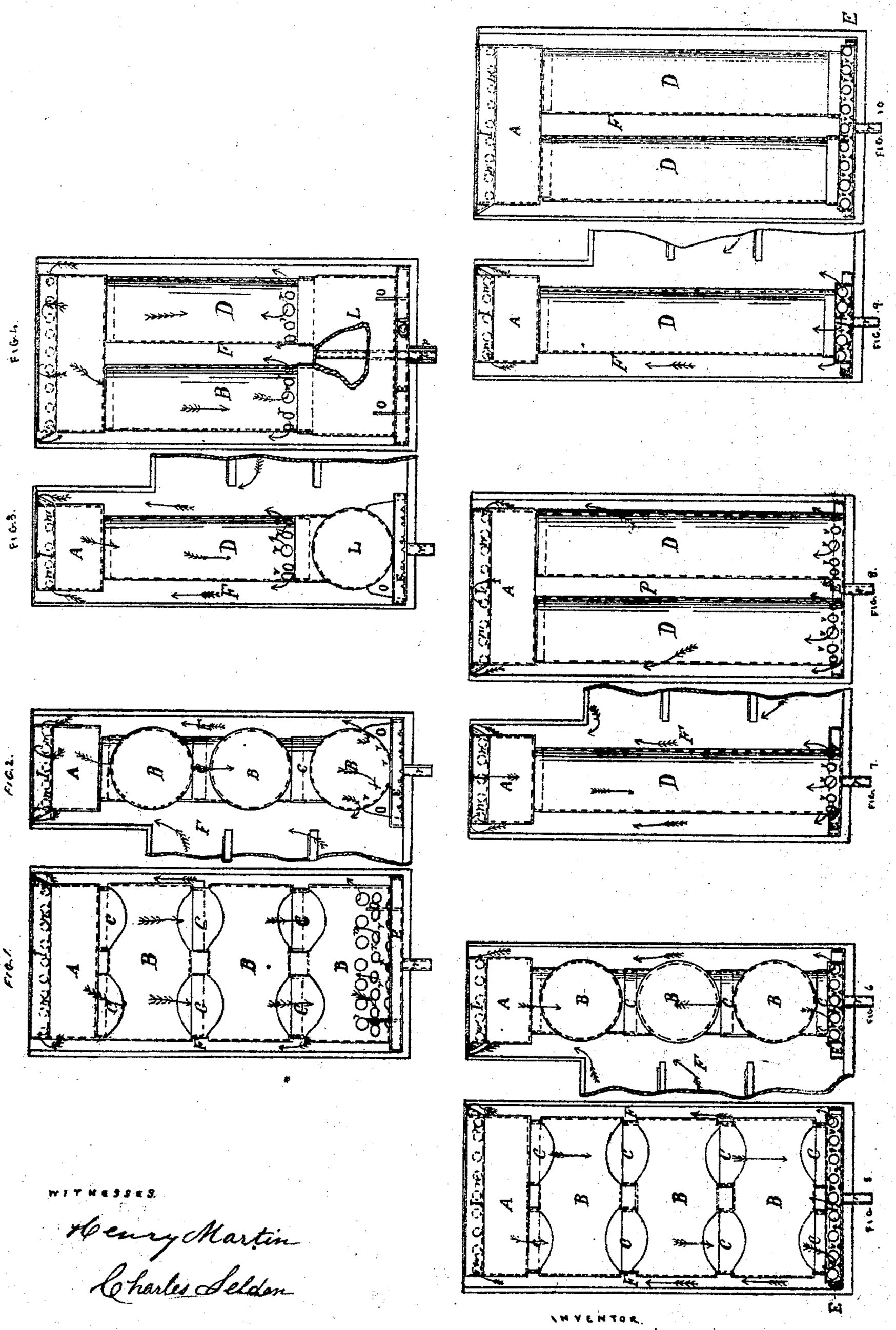
C. F. Pike.

Preserving Meals &c.

No. 71910 Patented Dec. 10, 1867



WITNESSES.

Henry Martin

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CHARLES F. PIKE, OF PROVIDENCE, RHODE ISLAND.

Letters Patent No. 71,910, *dated December* 10, 1867.

IMPROVED APPARATUS FOR PRESERVING MEATS, FISH, POULTRY, AND OTHER PERISHABLE ARTICLES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL TO WHOM IT MAY CONCERN:

Be it known that I, CHARLES F. PIKE, of the city and county of Providence, State of Rhode Island, have invented a new and improved Mode of Refrigeration for the Cooling of the Holds of Vessels, Railroad-Cars, Rooms; and it is applicable to a vessel, railroad-car, corpse-preserver, dead-house, domestic refrigerator, refrigerators for provision-stores, meat and fish-markets, packing-houses where they cut and pack beef and pork, preserving fruits of any and all kinds, where you want a cool temperature; it is also applicable to the preservation of fresh fish. I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and the letters of reference marked thereon.

The nature of my invention consists in having an ice-box or receptacle at the top of the structure, connected by tubes or pipes passing down from the bottom thereof into and through the rooms. These pipes or tubes are perforated at or near the bottom. The ice box or receptacle has slots or holes in it on the side or ends, or both, near the top, to allow the air that is, in this tubular arrangement, connected with the ice-box, to flow out of the holes or slots in the bottom. As it becomes warm it will rise to the top and flow back into the ice-box or receptacle, on to the ice in the box, pipes, or tubes. It becomes cool, flows on down through the ice-box, tubes, or pipes, and so keeps up an internal rotating motion so long as there is ice in the ice-box or receptacle, pipes, or tubes.

For domestic or household purposes, the ice is put into the ice-box or receptacle in large cakes. As it melts, the water and air will pass down into the tubes or pipes, the water to waste away through its proper channel, and the cold air into the room in which it is to do its work. The ice may be broken, and the tubes or pipes may be filled with broken ice, also the ice-box or receptacle. If you desire for any purpose to get a great degree of cold in the chamber, mingle salt with the ice; and if you have surface enough to your pipes or tubes, you can get any of it to most any degree of cold that you desire. The surface of the pipes or tubes wants to be as follows: For every cubic foot of space in the chamber, you want two feet of surface on the pipes or tubes. If you do not wish to freeze, one foot of surface to a cubic foot of space will do.

In the patents granted to me June 12, December 18, A. D. 1866, and January 1, A. D. 1867, the cooling is all by conduction. In this arrangement you get all the benefit of the surface, with a small amount of ice. By connecting the perforated tubes or pipes with the perforated ice-box or receptacle, you let the whole of the contained air in the ice-box or tubes (and so more than double the power of the same machine) out into the room, and so you get the cold by conduction or absorption. It flows out, and is not forced through the pipes or tubes as in my former patents, as will readily be seen by comparing them.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct an ice-box or receptacle, represented in the accompanying drawings by the letter A, of any desired form and size. In the bottom of this ice-box are holes or openings for tubes or pipes, represented in the accompanying drawings by the letters C. On the bottom of this ice-box or receptacle A there are collars, that are from one to three inches long, that slip into the pipes or tubes C, so as to prevent any water passing down otherwise than upon the inside of the tube or pipe C D. These pipes or tubes C D stand in a pan which is in the room, at the bottom, on one or both ends, or in the centre. This pan has a hole in its bottom, with a pipe attached to convey off the drip from the ice, and the condensation from the tubes or pipes. There is a trap attached to this pipe to prevent the egress of the outside air passing into the room F, but so constructed as to let the water out. I have drawn several illustrations of the same thing, only changed the form, without altering the substance. I will proceed to describe the several figures or plates.

Figure 1 is an end elevation of my improved ice-box.

A is the ice-box or receptacle, having a flange on the top to support the ice-box on the case. This flange is wide enough to allow a space all around the ice-box or receptacle, from one to three inches, according to the dimensions of the ice-box or receptacle. Near the top are holes or slots, represented by the letter W, to let the warm air as it rises in the chamber flow into the ice-box, through these holes or slots represented by the letter W, to become cool. I is a flange, that is fastened to the ice-box on its sides or ends, and stands off on an angle,

so as to let the air pass into the ice-box over the top of the flange, and prevent the ice from coming out into the chamber F. In the bottom of this ice-box are openings, of any desired form or number, according to the size of the box and room to be cooled. On the bottom of this ice-box are collars from one to three inches long, that slip inside of the pipes or tubes C, so, as the ice melts in the box A, the water will run down inside, with the air, into the pipes or tubes C D.

C C C C C C are tubes, that the collars on the ice-box slip into, and connect the horizontal pipes or tubes B B B one to the other. The lower horizontal pipe or tube B is different from the one that connects the ice-box A and the one just below it, or the middle one, in this wise: The lower one is perforated on its bottom and sides to let the air and water out—the air to flow into the chamber F, and as it grows warm to rise and pass into the openings W in the ice-box A; the water to flow into the pan E to run off at the pipe P. This pan E fits the inside of the chamber F on one end and the two sides, so that no water passes in between that pan E and the sides of the lining to the room or chamber F. This pan E extends out into the chamber F far enough to catch any moisture that may drop from the ice-box A. This pan E is from one to three inches deep.

O O are supporters that rest on the inside of the pan E, and support the tubes or pipes B. These supporters O O, and the flange around on the top of the ice-box A, are all the support that an ice-box constructed in this form and manner has. In this wise it gives a free circulation of the air around the ice-box A, pipes or tubes B C.

P is a pipe or tube that is connected to the pan E, to carry off the water from the melting of the ice, and condensation of the moisture in the air in chamber F on the ice-box A, pipes or tubes B C. This pipe P has a trap affixed to it, to prevent the outside air from passing into the chamber F; at the same time it does not obstruct the flow of water out.

Figure 2 is a side view of fig. 1. All the letters and description of letters in fig. 1 apply to the same letters and description in this fig. 2.

Figures 3 and 4 are a side and end view of the same thing as described in fig. 1, with this exception, these figures have an upright pipe or tube, D, connected to a horizontal pipe or tube, L, and with the ice-box or receptacle A. The pipe L has a tube running up from its bottom to near the top of it, on the inside, marked *t*. It is open, at both ends, and as the ice in the ice-box A melts, the water drops into the pipe L, and when the pipe L is full to the top of pipe *t*, it flows down the pipe *t* into the pan E, and passes off at the pipe P. The coldest of the water in the pipe L will settle to the bottom, and raise the warmest water, and it will flow down the pipe *t*. As the ice melts in the ice-box A, the air that comes from it will flow down on to the water in the pipe L, and as it cannot pass through the water in the pipe L, and as it cannot pass through the pipe L, it will rise and flow out of the openings in the upright pipe D, represented by the letter *v*, though some of it may flow down the water-escape pipe *t*, when there is not water enough in the pipe L to fill that pipe. If it does, it will do no harm, as it will flow into the room F. By this arrangement you have a pipe or tube of cold ice-water at the bottom of the room F.

Figure 4, near the bottom, is a stop-cock made fast to the pipe L, so that all the water can be drawn off from the pipe L into the pan E, and run off at the pipe P. Then this pipe L can be filled with ice, or ice and salt, or any other freezing-mixture. The supports of this ice-box and tubes are the same as described in fig. 1.

Figures 5 and 6 are a side and end view of another form of the same ice-box, composed of all horizontal pipes or tubes connected with the ice-box A, and with a hollow pan, H, with collars on this pan H for the sockets C on the pipes B to slip into. This hollow pan H is two or more inches deep, with holes upon all sides to let the air out into the chamber F. The water coming from the ice-box A will drop into the pan E, and run off at the pipe P. This hollow pan H is some smaller than the pan E, and the edge of it sits upon the bottom of the pan E, with small-shaped ∧-openings in it to let the water that condenses on the pipes or tubes B and C, and runs into the pan E, pass through these openings to the outlet-pipe P. These openings are represented by the letter *a*.

Figures 7 and 8 are another form of the same ice-box, with the pipes or tubes D extending down from the ice-box A to the pan E. The lower end of this pipe D sets on and into this pan E, with holes in its sides, near the bottom, represented by the letter *v*, to let the air out into the chamber F, and the water from the ice-box A into the pan E, to flow out at the pipe P.

Figures 9 and 10 are still another form of the pipes or tubes D, connected with a hollow or inverted pan, with openings in its sides and ends. This inverted or hollow pan is the same as described in figs. 5 and 6.

This ice-box or receptacle, A, pipes or tubes B D, pans H and E, are made of cast iron, three-sixteenths thick, or of any other metallic substance, like galvanized iron or tinned copper. When made of these metallic substances, the thinner they are, consistent with requisite strength, the better they will be. The ice-box tubes, or pipes, when made of cast iron, will not rust, if they are first put into a tank with oil, (linseed is best,) and heated up to a boiling-point. It opens the pores of the iron, and the oil enters it, and remains in it, and prevents any rust. The ice-pick does not cut it, as it does the copper, or other thin, soft metal. The size and form of the structure, the number of tubes or pipes, in proportion to the dimension of the chamber or room to be cooled. The proportion of all the parts may be varied according to its space, degree of cold, or as other circumstances require.

When my invention is applied to a domestic refrigerator, I do not break up the ice to fill the tubes or pipes. I put it in the ice-box in large pieces; and as it melts, the cold air and water pass down through the tubes or pipes and cool them; and the moisture that is contained in the air in the preserving-chamber is condensed upon these pipes or tubes, as the cold air and water pass down trough them, the air to flow into the chamber; and, as it becomes warmed by the provisions in the chamber, it rises, and is attracted by the opening in the ice-box, where the ice is to pass through them, into the ice-box, and condenses its moisture, taken up by its transit through the chamber wherein the provisions is, and to again become cooled and pass down through

the pipes or tubes, out into the provision-chamber. The water flows out into the pan E, to run off, or is held in bulk, as shown in figs. 3 and 4, to cool the chamber.

When my improved refrigerator is designed for the purpose of getting a very low degree of temperature, for the purposes of freezing, I fill the pipes or tubes, or whatever form is used, with crushed ice, mingled with salt; also the ice-box, that answering or acting as a reservoir, to supply the pipes or tubes. The proportion of the salt and ice is according to the degree of cold that is required. It may be proper to state here that, although you mix them half and half, unless you have about two feet of surface to one cubic foot of space, you cannot freeze quick. I have found the proportion of one-sixth salt to five-sixths ice to work as well as or better than any other proportion.

With my improved arrangement, as here described, making an internal circulation in the chamber, the frost does not make upon the pipes or tubes, as it does upon the pipes or tubes in my former patents, dated June 12 and December 18, A. D. 1866, and January 1, A. D. 1867. This frost is a great preventive to the working of the machine, to its giving off its cold, to what a clean pipe is, with no frost upon it.

The walls or structure to contain this improved ice-box may be made in any of the usual forms for domestic markets, or other refrigerators, fitted with hooks, shelves, and other fixtures, with ventilators, as described in my former patents. For a more particular description I hereby refer to them, and the specifications annexed to them. There may be a case made, with a partition in it, extending nearly to the bottom and most to the top of it, on the inside. On one side of the partition of this ice-box, pipes, or tubes, may be placed, and, as the cold air comes out of the tubes, and is conducted off from them, it will settle to the bottom, and flow out through this opening in the bottom of the partition into the preserving-room. As it takes up moisture in its transit through this preserving-room, it will rise to the top, and, passing through the opening in the top of the partition, it will enter the ice-box, and deposit its moisture in the ice, tubes, or pipes, become cooled, flow out again into the preserving-chamber through this bottom opening in the partition, and will continue this transit so long as the ice remains in the tubes or ice-box.

Having thus fully described my invention, I do not claim to be the first to apply a tubular or cylindrical ice-box to a refrigerator; for, in the patent granted to Thomas H. King, June 20, 1845, he describes placing a cylinder in a refrigerator, and filling it with ice; and there are several English patents that describe the use of pipes or tubes to cool a chamber. In my examination of the construction of those plans, I find no description of any idea to let the cold air out of the bottom of the tubes, and then take it in again at the top, and so keep up an artificial rotation of the air; but, in all the plans heretofore, it was to cool the chamber by conduction. With my idea the plan is to get the combined power and surface of conduction, absorption, and flow of cold air from the ice direct into the chamber or room wherein it is to be used, thereby getting a greater degree of cold with less ice; as the colder the temperature in the room is, so the less will the ice melt; the stronger the internal circulation, the less frost will there be upon the pipes or tubes.

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

1. Constructing a tubular ice-box, with holes or openings in the tubes or pipes, at or near the bottom, to let the air out into the chamber F, and slots or openings into the ice-receptacle, reservoir, or depository, near the top, and so get the combined and double purpose of radiation, conduction, and internal circulation of the air in the chamber F, substantially as and for the purposes set forth and described in the drawing and specification hereunto annexed, without confining myself to any particular form, size, or shape of the pipes or tubes, whether they be vertical or horizontal, round, square, oval, oblong, or in any other form; neither do I confine myself to any particular form of ice-receptacle, reservoir, or depository.

2. I claim the perforating or making slots, holes, or openings in the tubes or pipes, near the bottom, for the purposes set forth and described, howsoever the same may be made, whether used in connection with the ice-receptacle, reservoir, or depository as described, or without the openings in the ice-receptacle, reservoir, or depository, for the purpose of the rotating of the air.

3. I claim the ice-receptacle, reservoir, or depository, with its openings to let the air into and on to the ice in this ice-receptacle, reservoir, or depository, for the purpose of taking off the moisture in the preserving-room, at or near its top, whether the tubes connected to the bottom of this ice-receptacle, reservoir, or depository are perforated or not, or whether the ice-receptacle, reservoir, or depository is removed altogether, and the tops or collars of the tubes or pipes are perforated.

4. I claim the ice-box, receptacle, reservoir, or depository A, as described, pipes or tubes B C D L, pan E H, room F, substantially as described and set forth, with their appendages.

CHARLES F. PIKE.

Witnesses:
HENRY MARTIN,
CHARLES SELDEN.