

No. 731,802.

PATENTED JUNE 23, 1903.

E. W. MILLBURN.
REFRIGERATING APPARATUS.

APPLICATION FILED MAR. 27, 1903.

NO MODEL.

Fig. 1.

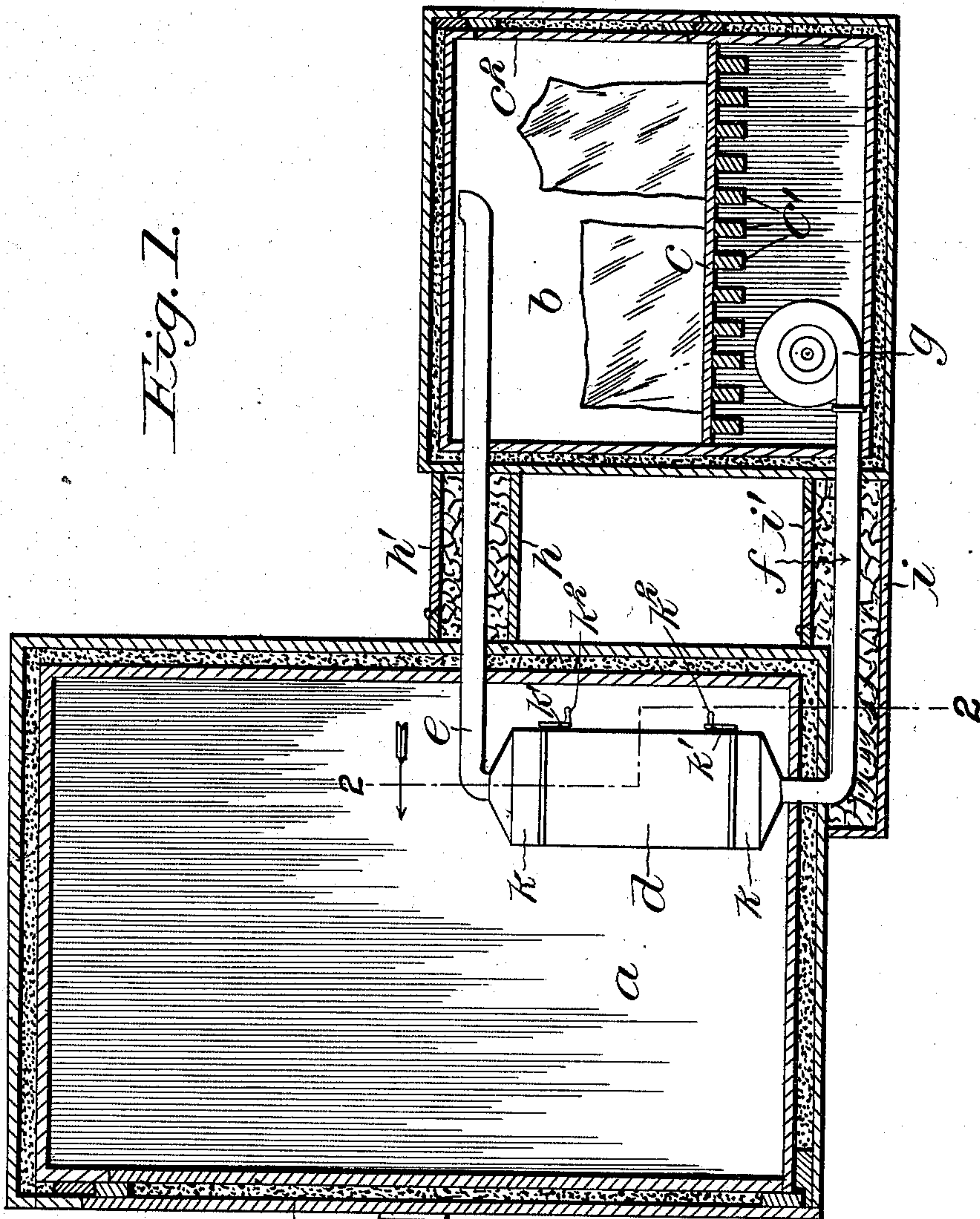
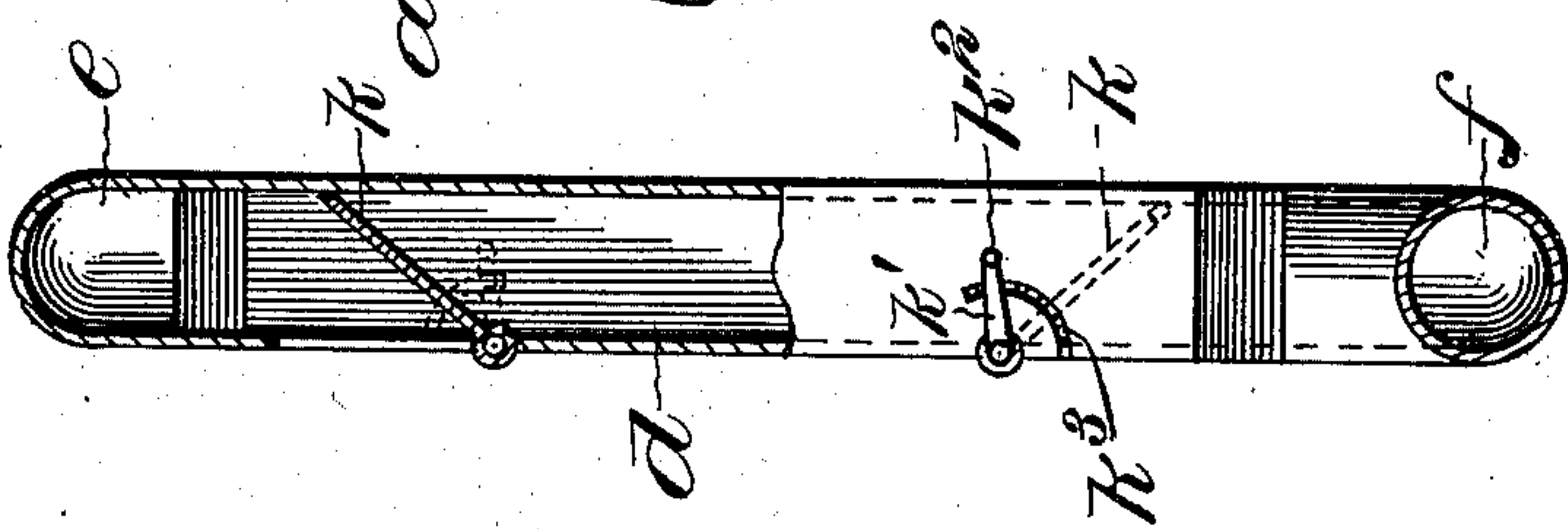


Fig. 2.



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REFRIGERATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 731,802, dated June 23, 1903.

Application filed March 27, 1903. Serial No. 149,889. (No model.)

To all whom it may concern:

Be it known that I, EDMUN W. MILLBURN, of Tecumseh, in the county of Pottawatomie and Territory of Oklahoma, have invented new and useful Improvements in Refrigerating Apparatus; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to refrigerators, and has particular reference to that kind of cold-storage apparatus commonly called "meat-boxes," such as are used by dealers in meats and other perishable goods. It is to be understood, however, that my invention is not limited to such apparatus, but may be employed in refrigerators in general.

The object of my invention is to provide improved means for economizing in the matter of the consumption of ice.

Another object of the invention is to provide a heat-absorbing surface within the storage-chamber without locating ice directly therein.

Another object of my invention is to provide means for producing exceedingly low temperatures without drawing upon or wasting the main body of ice, while at the same time providing for a large reserve of ice ready to be automatically drawn upon for refrigerating purposes if through lack of attention or otherwise the producers of the very low temperatures should cease to be operative.

To these ends my invention consists in the construction and combination of parts, substantially as hereinafter described and claimed.

Of the accompanying drawings, Figure 1 represents an apparatus embodying my invention, the storage-room, the main ice-box, and the small pipe-chilling boxes being represented in sectional elevation. Fig. 2 represents an enlarged section on the line 2 2 of Fig. 1 looking toward the left, the floor of the cold-storage room being omitted.

A cold-storage room or meat-box of a conventional type is represented at *a*, the same being provided with a suitable door, as at *a'*. Separated from the room or box *a* by a slight space is a suitable ice-box *b*. This ice-box

may be of any desired size, it being preferred, however, that it shall have a capacity for storing all the ice that will be needed for a number of days or even weeks. A suitable floor for the support of the ice may comprise strips *c*, extending crosswise of beams *c'*. Ice may be introduced through a door *c''*.

Located within the storage-room *a* is a sheet-metal box *d*, which may be made of any desired metal, such as galvanized iron. This box may be located, it desired, close to one of the vertical walls of the room *a*. The upper and lower ends communicate with the interior of the ice-box *b* by pipes *e* and *f*, respectively, the upper pipe *e* preferably opening in the upper part of the ice-box. The lower pipe *f* is connected with the casing *g* of a fan located in the ice-box below the floor-beams *c'*, the fan being adapted to be driven by any suitable motor. The pipes *e* and *f*, between the cold-storage room and the ice-box, pass through small boxes *h* and *i*, respectively, the lower box *i* being shown as extending also partially under the storage-room *a*, so as to leave no portion of the pipe exposed. The boxes *h* and *i* are provided, respectively, with lids or doors *h'* *i'*, through which a mixture of ice and salt or other suitable chemical mixture for producing very low temperatures may be introduced into said boxes.

One wall of the metal box *d* is provided with upper and lower openings adapted to be closed by flaps or valves *k*, each of said valves *k* having its pintle or trunnion at one end provided with a crank *k'*, having a handle *k''*. Said crank is adapted to engage a toothed segment *k'''*, secured to the side of the box *d*, so that the valve may be held in position to close the opening or to be held in a wide-open or an intermediate position. It is not essential, however, that the upper valve be provided with means for holding it, as its action may be automatic, as hereinafter explained. When the valves are wide open, they will preferably rest against the wall of the box opposite the wall to which they are pivoted. I will now describe the operation of the apparatus: The box *b* being filled with ice and the small boxes *h* and *i* being filled with ice and salt or other chemical mixture capable of producing temperatures below the freezing-point of water, the fan is started to carry air from the ice-box

through the lower pipe *f*, the heat-absorbing box *d*, and back to the ice-box through the pipe *e*. If the valves *k* are closed, the circulation will be confined to the course just described. The exceedingly low temperatures produced by the mixtures in the boxes *h* and *i* will in a very short time chill the circulating air to such a low point that there will be no further melting of the ice in the box *b*, and the temperature of the air-box or heat-absorbing box *d* will be so low that moisture in the air of room *a* will be condensed and frozen upon the outside of the box *d*, thus rendering the latter the equivalent of a block of ice, having the further power, however, of drying the air in the room *a* instead of moistening it. This last action is due to the condensation of moisture upon the box *d*. Of course the supply of freezing mixture in the boxes *h* and *i* will require replenishing from time to time if the desired low temperature is to be preserved. If said supply is not properly replenished, the temperature of the circulating air will rise somewhat and begin to draw then upon the ice in the box *b*. Such latter action will cease soon after the replenishing of the boxes *h* and *i*. By entirely opening the valves *k* the intensely cold air from the pipe *f* will pass into the room *a* and then return again into the upper part of the box *d* and through the pipe *e*, where it will be again chilled before escaping into the ice-box *b*. By setting the valves in intermediate positions the air can be divided, so that only a portion of the intensely cold air will circulate through the storage-room *a*. I am therefore able to control or regulate to a nicety the temperature within the cold-storage room. If the upper valve *k* is left free or unprovided with a crank *k'*, it will automatically assume an open, closed, or intermediate position, according to whether the lower valve is set open, closed, or in an intermediate position. If the lower valve be closed, the upward current of air past the upper valve will close it, while if the lower valve be opened the air will be deflected outward into the room *a*, increasing the atmospheric pressure therein, thus causing the upper valve *k* to open, so that the air may escape therethrough. Of course I may further regulate the temperature in the meat-box *a* by varying the speed of the fan and consequently the rate of circulation of air.

It will be observed that access to the chilling-boxes *h* and *i* is very convenient and that the supply of freezing mixture may be replenished without requiring the opening of the doors of either the ice-box *b* or the cold-storage room *a*.

I have not attempted to illustrate any of the well-known details of construction of the

meat or ice rooms, as the same may be variously modified to suit the requirements of individuals. I may also vary the proportions and relative arrangements of the parts without departing from the spirit of my invention.

Having now described my invention, what I claim is—

1. A refrigerating apparatus comprising a storage-chamber, an ice-chamber, upper and lower air-pipes connecting said chambers, means for circulating air through the pipes and chambers, and a plurality of intermediate freezing-mixture receptacles through which said pipes pass, whereby the air may be reduced in temperature below that of the ice in the ice-chamber both on outflow and return to the ice-chamber.

2. A refrigerating apparatus comprising a storage-chamber, an ice-chamber, intermediate boxes having means for permitting the introduction thereto of a chemical freezing mixture, said boxes being accessible outside of both chambers, air-pipes connecting the two chambers and passing through said boxes, and means for circulating air through said chambers and pipes.

3. A refrigerating apparatus comprising a storage-chamber, a metal box therein, an ice-chamber, pipes extending into the ice-chamber from said metal box, receptacles for a chemical freezing mixture inclosing portions of said pipes, said boxes being accessible outside of both chambers, and means for forcing air through said pipes.

4. A refrigerating apparatus comprising a storage-chamber, a metal box therein and having valved openings, an ice-chamber, pipes extending into the ice-chamber from said metal box, receptacles for a chemical freezing mixture inclosing portions of said pipes, said boxes being accessible outside of both chambers, and means for forcing air through said pipes, the valves controlling the openings in the said metal box being adapted to divert a portion or all of the air through the storage-chamber.

5. A refrigerating apparatus comprising a storage-chamber, a metal box therein, an ice-chamber, pipes extending into the ice-chamber from said metal box, and receptacles for a chemical freezing mixture inclosing portions of said pipes between the storage-chamber and the ice-chamber and accessible outside of both chambers.

In testimony whereof I affix my signature in presence of two witnesses.

EDMUN W. MILLBURN.

Witnesses:

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W. T. MAPES.