(No Model.) 3 Sheets—Sheet 1.

D. P. EDGAR.

REFRIGERATOR BUILDING.

No. 475,851. Patented May 31, 1892.

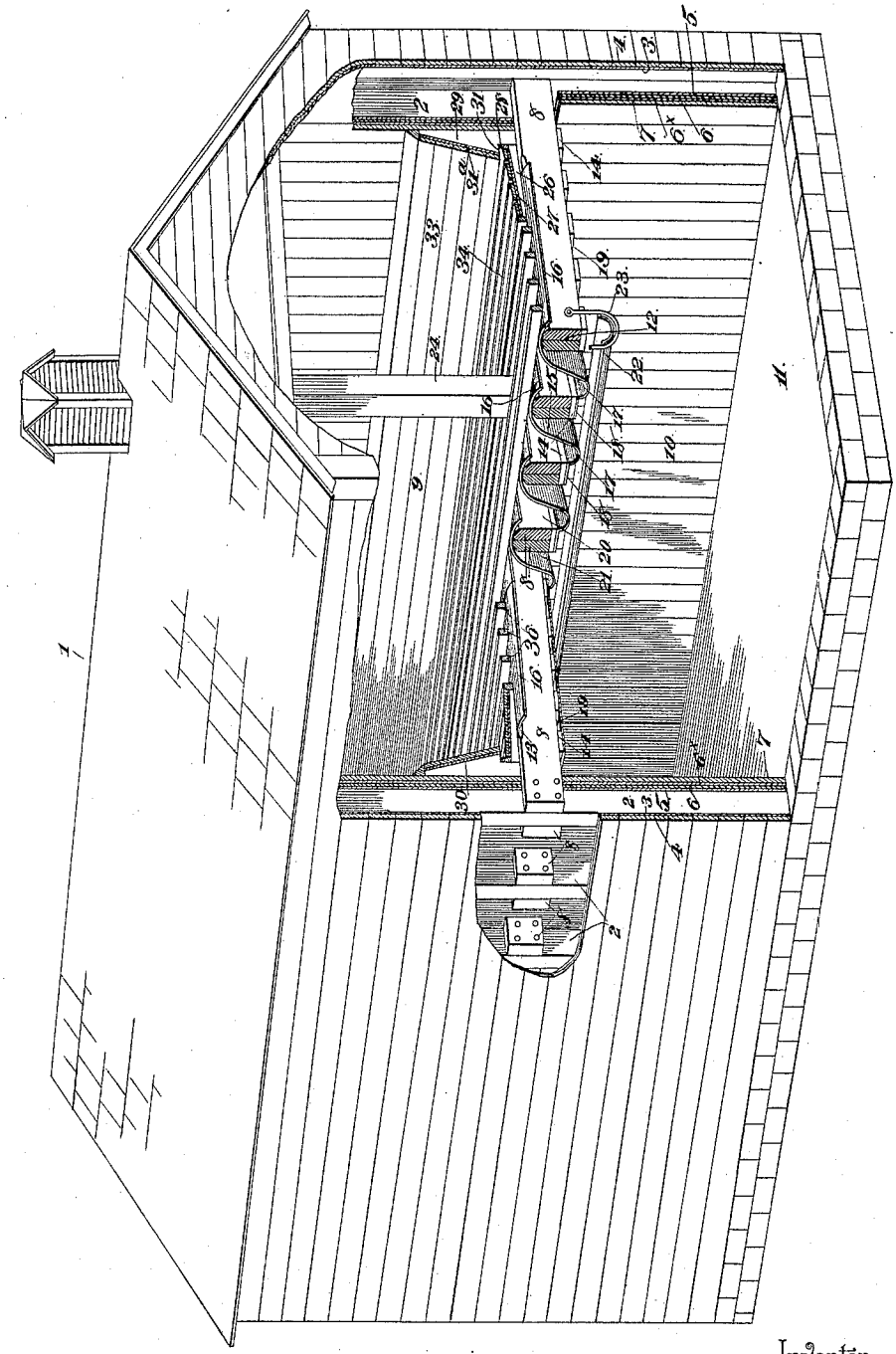

Fig. 1.

Witnesses

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

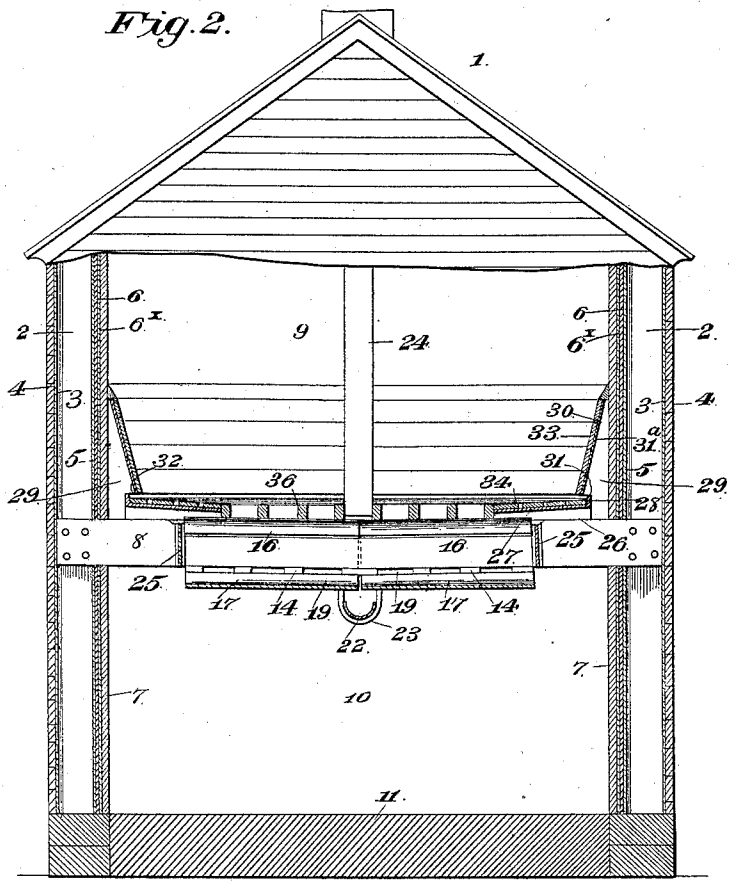

Fig. 3.

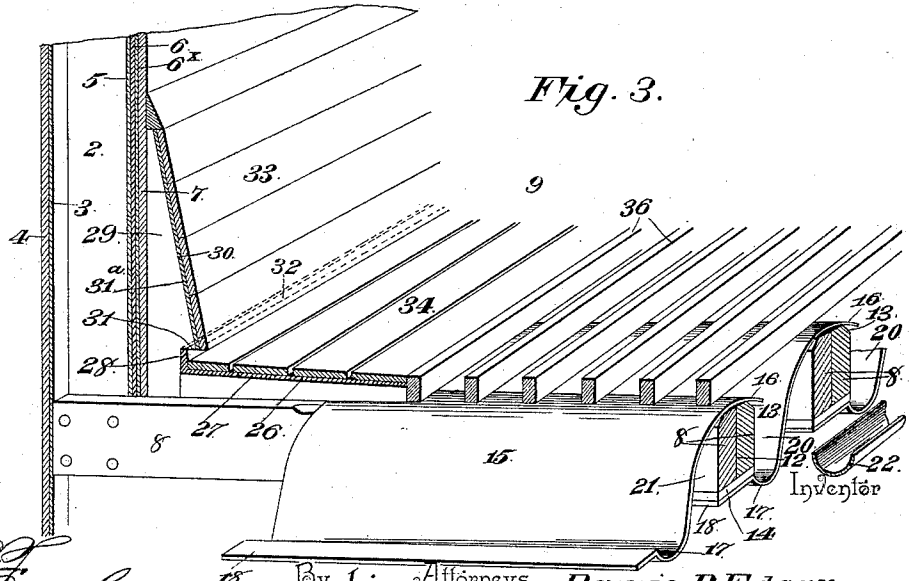

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Fig. 4.

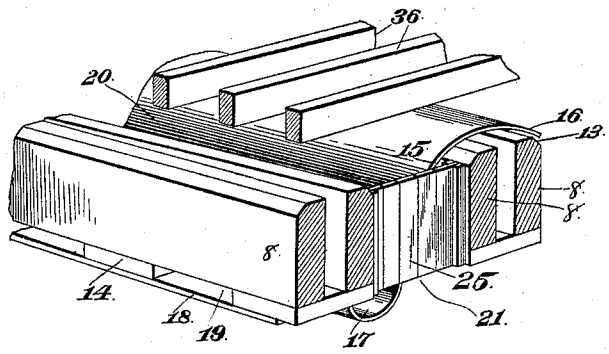


Fig. 5.

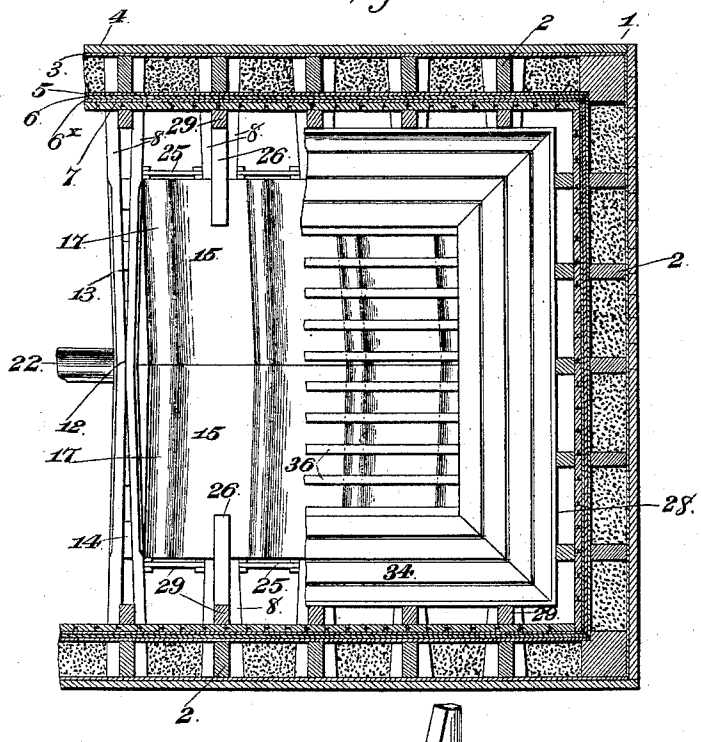
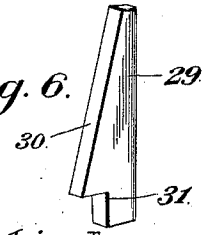


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

DENNIS P. EDGAR, OF MANCHESTER, MICHIGAN.

REFRIGERATOR-BUILDING.

SPECIFICATION forming part of Letters Patent No. 475,851, dated May 31, 1892.

Application filed July 10, 1891. Serial No. 399,022. (No model.)

To all whom it may concern:

Be it known that I, DENNIS P. EDGAR, a citizen of the United States, residing at Manchester, in the county of Washtenaw and State of Michigan, have invented a new and useful Refrigerator or Cold-Storage Building, of which the following is a specification.

My invention relates to improvements in refrigerator or cold-storage buildings; and it has for its object to provide an especially-constructed building or refrigerator that will keep the storage room or compartment in a very low temperature as long as any ice remains within the same and providing means whereby all the cold emanating from the evaporating ice will be concentrated and stored up beneath the ice, while the vapors arising from the compartments from beneath the ice-chamber will be condensed and returned back beneath the ice and drawn off, the same process continuing until the cold from the cold-storage spaces beneath the packed ice shall have permeated through the entire storage-room beneath the same and have produced an even cold dry atmosphere within the same, which is preserved, as already stated, until the ice-chamber has been emptied.

With these and other objects in view the invention consists of a peculiarly constructed and arranged ice-compartment and cold-storage chamber, which will be hereinafter more fully described, illustrated in the accompanying drawings, and specifically pointed out in the appended claims.

In the drawings, Figure 1 is an inner perspective, partly in section, of a cold-storage building constructed in accordance with my invention. Fig. 2 is a transverse vertical sectional view of the same. Fig. 3 is an enlarged detail in perspective of a section of the ice-chamber floor and side walls. Fig. 4 is a detail view showing one of the end sections of the curved drip-plates and troughs, the sliding gate covering the same. Fig. 5 is a horizontal sectional view of one end of the building, portions thereof being broken away. Fig. 6 is a detail in perspective of the vertically-inclined drip-plate blocks.

Referring to the accompanying drawings, 1 designates a suitably-constructed building in which I employ my refrigerating apparatus, the said building being used for cold-storage purposes.

2 2 represent the vertical studding, extending the full height of the building, and to which are secured the sidings and facings forming the outer wall of the building, which is constructed so as to be non-conducting either to heat or cold. On the outside of said studding are laid layers of brick and moth-proof paper 3, which is laid at right angles to the studding, the sheets of which overlap each other to prevent the sawdust from falling between the paper and the wood siding.

Upon the layer of paper is nailed the outside siding 4 of the building. A similar lining of paper 5 is placed on the inside of the said studding and secured to the same in the same manner as the outside lining, and this inside lining is covered with sheets of steel or iron 6, extending up to the partition-joists dividing the cold-storage room from the ice-chamber above, and is itself covered with sheets of parchment-paper $6^{\times}$. The studding is now lined up with the inner facing or lining 7, which is composed of the ordinary tongue-and-groove strips, which have been chemically treated to preserve the same from the action of the cold and dampness thereupon. The spaces between the outer siding and the inner facing and the intermediate linings are filled with sawdust, which completes the exterior sides of a building with walls which will not be either penetrated by heat or cold.

To each side of the studding 2 are secured the joists 8, which extend horizontally across the building intermediate of its height, forming the ice-chamber 9 and the cold-storage room 10 beneath the same, which is in itself provided with a concrete or other similar compact flooring 11, being, preferably, concrete mixed with a solution composed of four ounces of concentrated lye, one ounce of carbonate of ammonia, and one gallon of water, which will be impervious to the water of condensation and be a perfect non-conductor of warm air or the cold air and will serve to retain the latter in store within the storage-chamber, within which are placed the articles to be cooled and preserved, and prevents the formation of icicles or stalactites. These

joists, being arranged in pairs, are secured together at their meeting faces, as at 12, to give pitch to the same for the purposes hereinafter described and also to strengthen the floor supporting the ice. The joists 8 are beveled or rounded on their top edges, as at 13, while the under sides of the same are provided with the spaced blocks 14. Over said joists and upon their rounded edges are placed the curved plates 15, which are placed longitudinally of said joists and preferably abreast of each other, meeting at the spiked centers of the pairs of joists, which causes the said plates to incline toward each other. The portions of the curved plates curving over the top edges of said joists project and overlap the same, as at 16, for a slight distance, in order to fully protect the joists from the ice and drip from above. From the top of the joists the said plates are curved down and between each pair of joists, and are provided at their lower ends with a longitudinally-extending trough 17, while horizontally projecting from the top edge of the trough formed in the curved plates is the flange 18, which is secured to the blocks 14 on the under sides of each pair of joists, and thus forms between said blocks the passage or space 19, which communicates with the inner cold-storage space 20, formed by said plates between the joists, and with the space 21, formed between the joists and under the curved plates, to which the warmer air of the storage-room beneath the ice-chamber arises and is subsequently cooled by being in communication with the cold-air chamber.

Extending beneath the meeting edges of the curved plates 15 and at right angles to the joists is the conducting-trough 22, supported by the brackets 23, connected to the first and last pair of joists, and thus conducts the drip from the plates 15 from without the storage-chamber, as stated, the trough 22 being directly under the ends of the inclined trough 17, formed in the lower end of the curved drip-plates.

Communicating with the cold-air space 20 between the joists is the escape-tube 24, which passes up through the ice-chamber and into the outer air and serves the purpose of carrying off any gases that may have collected in said cold-air chamber. The curved plates 15 are not extended across the full width of the joists 8, but, terminating short of their length, an open space is left at their terminals, which space is closed by the sliding end gates 25, which fit snugly between the joists and over the ends of said plates, and thus effectively shut off the gases and warmer air from the lower storage-compartment from the cold-air space 20, formed between the joists and by said plates.

Secured to the joists a short distance from the walls of the building are the inclined blocks 26, which extend over the edges of the curved drip-plates 15 and assist in holding the same in position upon the top of the joists. Upon said blocks or strips, which extend entirely around the chamber, are placed the horizontally-arranged drip-plates 27, which are provided with an upwardly-extending end flange 28, said plates being soldered together to form a continuous drip plate or tray encircling the entire ice-chamber and which overlaps a short distance the edge of the central drip-plates and troughs 15, the inclination of said blocks upon which the said plates are secured inclining the same to the main drip-plate arranged over and between the joists.

Arranged around the walls of the ice-chamber and vertically secured to the same above the joists is a series of inclined strips or blocks 29, arranged at right angles to the strips or blocks 26, supporting the horizontally-arranged drip-plate 27, and the said strips or blocks are provided at the lower ends of their inclined sides 30 with the shouldered recesses 31, into which snugly fits and rests the flange 28 of the horizontal drip-plate.

Secured to the inclined faces 30 of the blocks 29 are the vertically-inclined drip-plates 31^a, which are also soldered together and extend entirely around the inner walls of the ice-chamber. The said plates are inclined from their joint or meeting point with the inner wall 7 over the horizontally-arranged plates 27, the flange of which, being seated within the shoulder of the inclined block 29, forms between the lower extremity of the plate 31 and the top edge of said flange a space 32, through which the drip or drain from said plate 31^a is allowed to pass onto the horizontal drip-plate and from thence onto the main central drip-plates and troughs and to the main conducting-spout 22.

A lining or facing 33 covers the inclined plate 31^a and serves as a protection to the same, and at the same time retards the passage of cold air and prevents the conducting of the same through said plate, while a similar facing or covering 34 covers the horizontal drip-plate 27 and differs from the covering 33 in that the boards forming said facing or covering are loosely placed thereon, in order that the pan can easily catch and conduct the drip from the ice, both facings or coverings also keeping said inclined drip-plates out of contact with the ice. Within the space inclosed by said horizontally and continuously arranged drip-plates ice-sills 36 are placed at right angles to the joists 8 and upon the top of the drip-plates, lapping over the same, which, when the weight of the ice is upon the sills, together with that upon the overprojecting blocks 26, are held firmly to their places upon the joists. As thus completed the ice is placed within the chamber. The same is evenly and compactly packed upon the sills, inclined and protected drip-plates, and against the sides of the chamber up to its full height, at which point the top of the ice is covered with sawdust, as is customary. The curved plates arranged over and between the joists receive the drainage from the ice and also form an ob-

struction between the ice and the warmer temperature of the storage-room beneath. The cold air is collected and stored beneath the ice-sills and in the space 20 between the joists formed by the curved plates 15, and, increasing in quantity as the ice melts, forces the warmer air, which is ascended, up beneath the curved plates and into the openings beneath the joists communicating with the said cold-air space and is forced and concentrated in the space 21, formed between the joists and under the said plates, and thrown into contact with the cold plates, upon which it is condensed and drops to the floor. Evaporating again, the vapor therefrom is forced by the fall of cold air into the center of the storage-room to the outside wall. It then arises to the space between the vertically-inclined drip-plate 31ª and outer walls of the building, and, coming in contact with the said cold plates, is again condensed and trickles down said vertically-inclined plates extending around the walls of the building. The condensed vapor trickles from these plates to the horizontally arranged and inclined drip plates or pans, and from thence onto the curved plates and troughs, and is finally conducted off by the main conducting-spout 23. This action is repeated until the stronger force of cold atmosphere has reduced the warmer air of the storage-room beneath the ice-chamber to the same temperature as the cold air itself emanating from the melting ice, and thus produces a pure cold dry atmosphere within the refrigerator or storage building, which, as previously stated, is retained until the ice has all melted.

From the foregoing description it is thought that the construction and operation of my improved refrigerating system is apparent without further details.

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

1. In a refrigerator or cold-storage building, horizontally-arranged joists secured to both sides of the side vertical studding and provided on their top portions with central beveled edges, drip-plates and troughs arranged over and between the said joists, surrounding inclined drip-plates encircling the ice-chamber and communicating with said drip-plates and troughs arranged over the joists, and longitudinal ice-sills arranged on the top of said joists and at right angles thereto, substantially as set forth.

2. In a refrigerator or cold-storage building, horizontally-arranged joists secured in pairs at their centers to form an incline to the center of the same, curved drip-plates and troughs arranged over and between said joists, inclined drip-plates encircling the ice-chamber above said joists and communicating with the longitudinally-arranged plates and troughs, a conducting-trough arranged under said plates and troughs, and ice-sills arranged over the same at right angles to said joists, substantially as set forth.

3. In a refrigerator or cold-storage building, horizontally-arranged joists, curved drip-plates and troughs arranged thereover and between the same, a continuous drip-plate encircling the ice-chamber and inclined above the plane of the joist and overlapping said curved plates and troughs, vertically-arranged drip-plates encircling the chamber and inclined from the side walls of the same outward and communicating with said horizontally-arranged inclined drip-plate, and ice-sills arranged upon and at right angles to said joists, substantially as set forth.

4. In a refrigerator or cold-storage building, the combination, with hollow non-conducting walls, of horizontally-arranged joists secured in pairs at their centers to form an incline toward the center of the chamber and provided on their top portions with central beveled edges, curved drip-plates and troughs curved over said beveled portions and between said joists, a continuous horizontal drip-plate encircling the ice-chamber and inclined above the plane of the joists toward and over said curved plates and troughs, vertically-arranged drip-plates encircling the chamber and vertically inclined over said horizontal plate, ice-sills arranged at right angles to the joists, and an escape tube or spout communicating with the spaces between the joists and the outer air, substantially as set forth.

5. In a refrigerator or cold-storage building, the combination, with hollow non-conducting walls, of horizontally-arranged joists secured in pairs at their centers to form an incline toward the center, curved plates arranged over the top of said joists and overlapping the same and passing down and under the succeeding pairs of joists, forming a cold-air space and a trough between said joists, surrounding inclined drip-plates encircling the ice-chamber and communicating with said curved plates, and right-angularly-arranged ice-sills, substantially as set forth.

6. In a refrigerator or cold-storage building, the combination, with the hollow non-conducting walls, of horizontally-arranged joists secured in pairs at their centers to form an incline toward the center of the chamber, curved plates provided with a longitudinal flange and trough arranged over the top of said joists and overlapping the same and passing down and under the succeeding pair of joists, forming a cold-air space and a trough between said joists, sliding gates working between the joists and closing the open ends of said air-spaces, surrounding inclined drip-plates encircling the ice-chamber and communicating with said curved plates and troughs, and right-angularly-arranged ice-sills, substantially as set forth.

7. In a refrigerator or cold-storage building, horizontally-arranged joists, curved drip-

plates and troughs arranged thereover and between the same, horizontally-arranged and continuous drip-plates provided with a continuous flange and inclined toward and over said drip-plates and troughs, vertically-arranged drip-plates encircling the chamber and secured to inclined and shouldered blocks surrounding the walls of the ice-chamber, said vertically-arranged and continuous drip-plate overlapping the flange of said horizontally-arranged drip-plate, and facing covering and protecting both horizontally and vertically arranged and inclined plates, substantially as set forth.

8. In a refrigerator or cold-storage building, horizontally-arranged joists secured in pairs at their centers to form an incline toward the center and provided with beveled top edges and on their under sides with a series of blocks, curved plates provided with a longitudinal flange and trough arranged abreast of each other over said joists, the same overlapping each pair of joists and passing down between the same, the flange of which is secured to the under sides of the blocks on said joists, forming openings under the joists, communicating with the cold-air space formed between the same, and inclined drip-plates encircling the ice-chamber and communicating with said plates and troughs, substantially as set forth.

9. In a refrigerator or cold-storage building, horizontally-arranged joists secured in pairs at their centers to form an incline toward the center, a series of blocks secured to the under side of said joists, curved plates arranged over and overlapping each pair of joists and passing down between the same and secured to the blocks to the under side of the succeeding pair of joists, forming a cold-air space and a longitudinal trough between the same, and communicating openings between said space and the under storage-chamber, sliding gates closing the open ends of said air-spaces between the joists, an escape-trough arranged under the drip of said curved plates, a gas-escape tube or pipe, and lateral and encircling drip-plates communicating with the troughs, substantially as set forth.

10. In a refrigerator or cold-storage building, the combination, with non-conducting inclosing walls, of horizontal joists arranged in pairs, curved plates arranged longitudinally thereon between and under the same, forming horizontal troughs and cold-air spaces, horizontally-inclined drip-plates continuously encircling the ice-chamber and provided with a surrounding flange, the same overlapping said drip-plates, inclined blocks arranged vertically around the inner walls of the ice-chamber and provided with notches in which said flange rests, vertically-inclined drip-plates secured to said blocks and overlapping and communicating with the horizontally-arranged drip-plates, and ice-sills arranged at right angles over said joists within the encircling horizontal drip-plates, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

DENNIS P. EDGAR.

Witnesses:

CHAMPLIN H. EDGAR,

WILLIAM A. AYLWORTH.