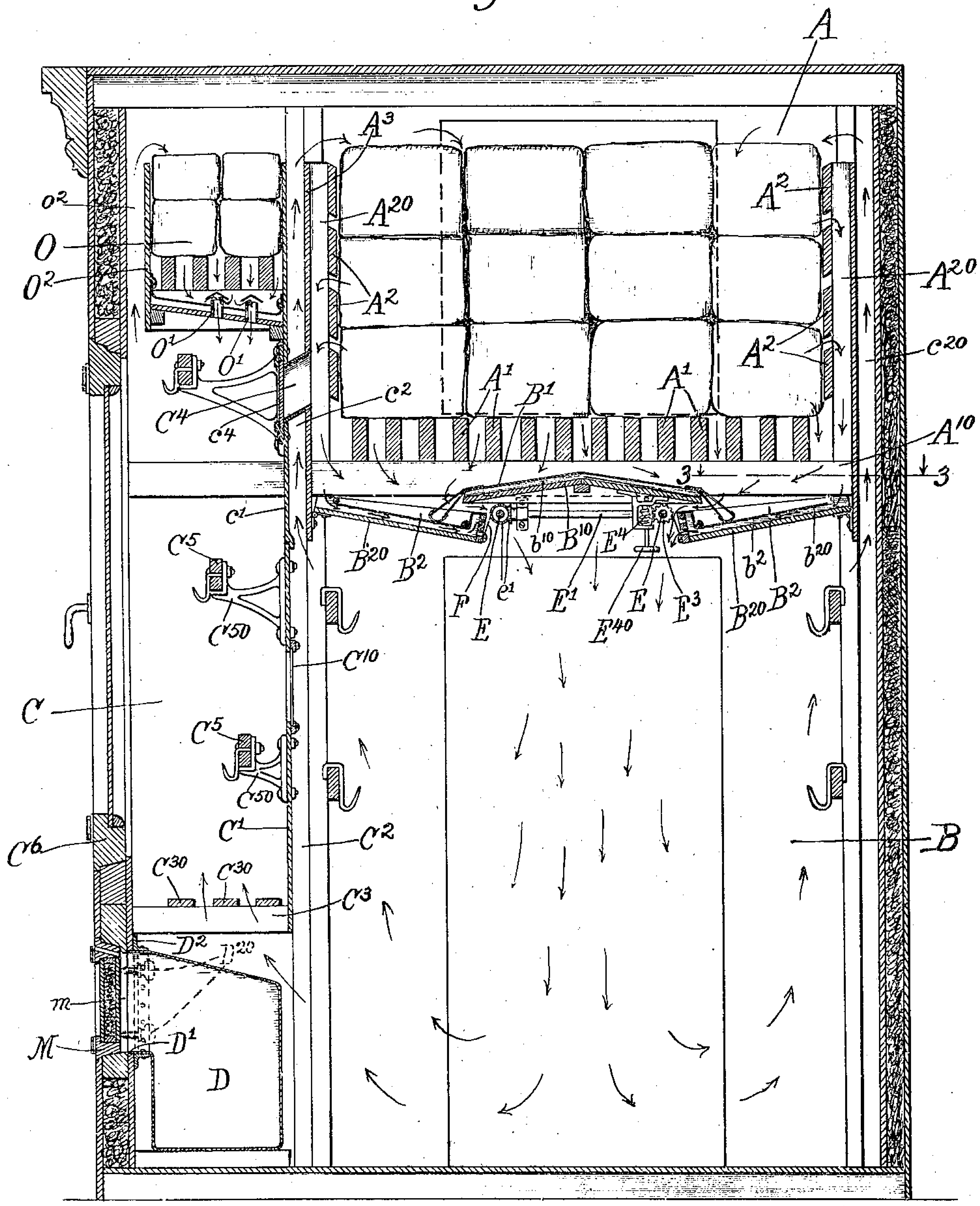
(No Model.) 2 Sheets—Sheet 1.

P. J. DAEMICKE.

COOLING ROOM.

No. 496,867 Patented May 9, 1893.

Fig. 1.



Witnesses.
E. T. Wray.
Jean Elliott

Inventor.
Paul J. Daemicke
By Burton & Burton
his attys.

(No Model.)

2 Sheets—Sheet 2.

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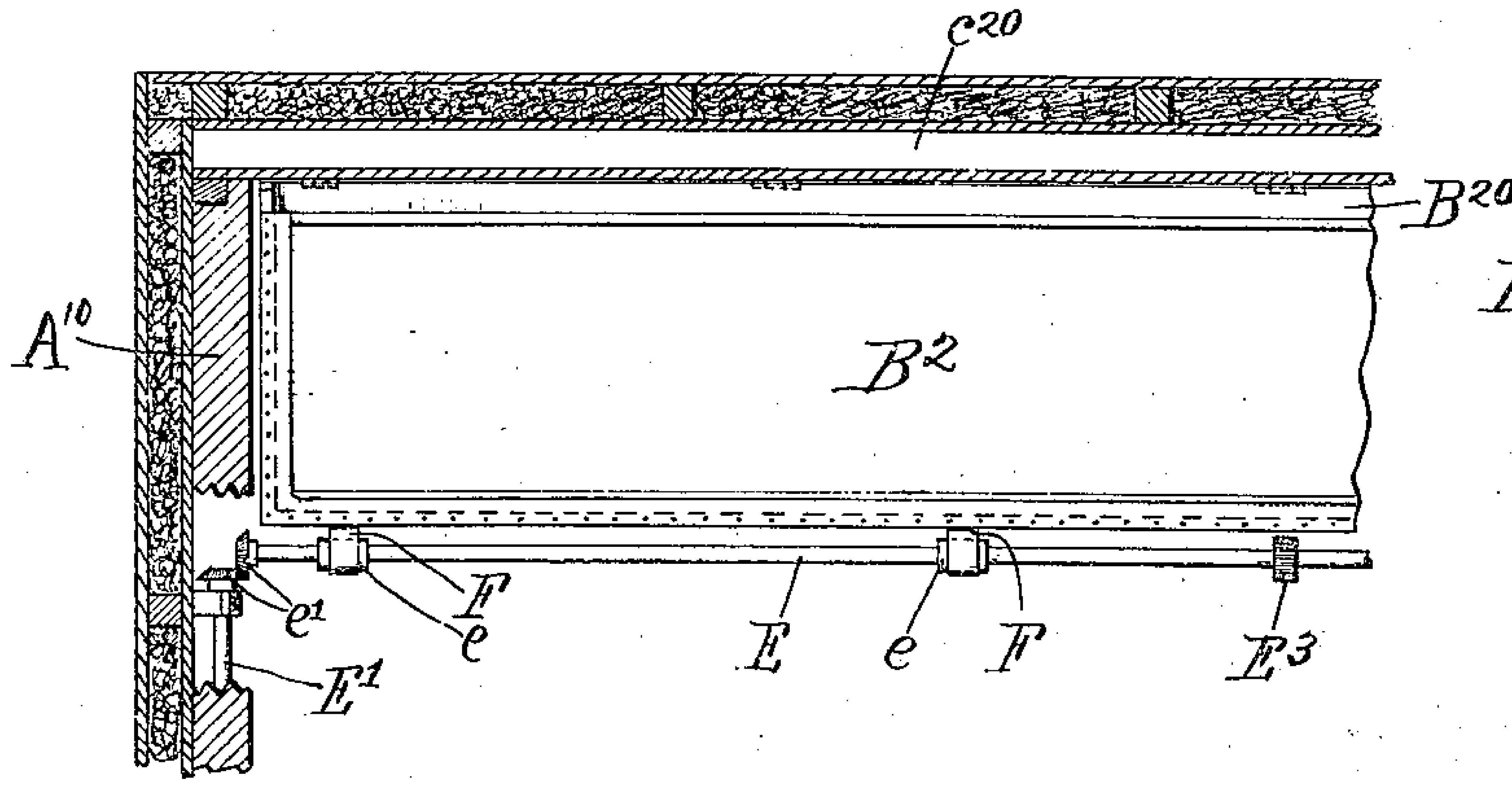


Fig. 3.

Fig. 5.

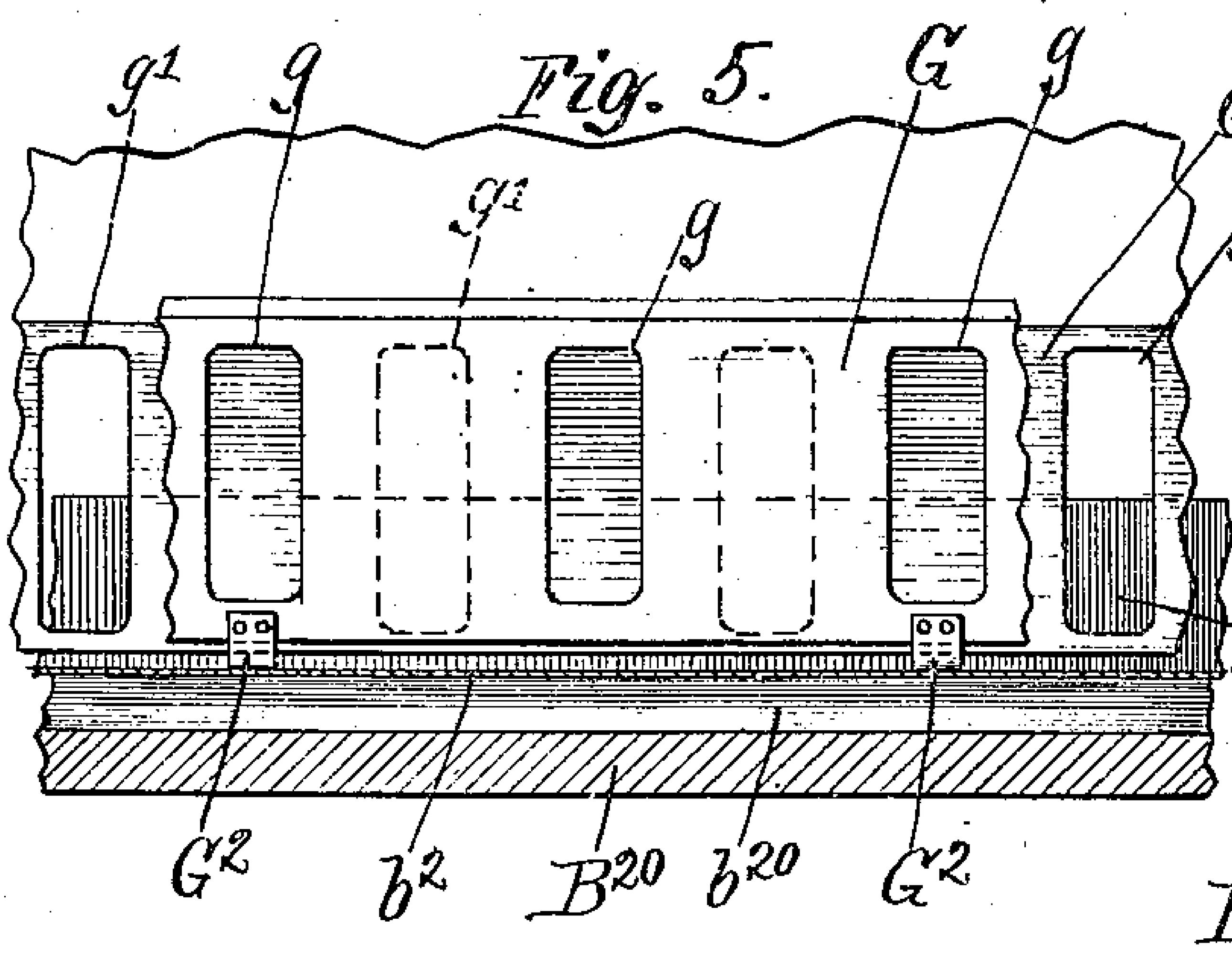
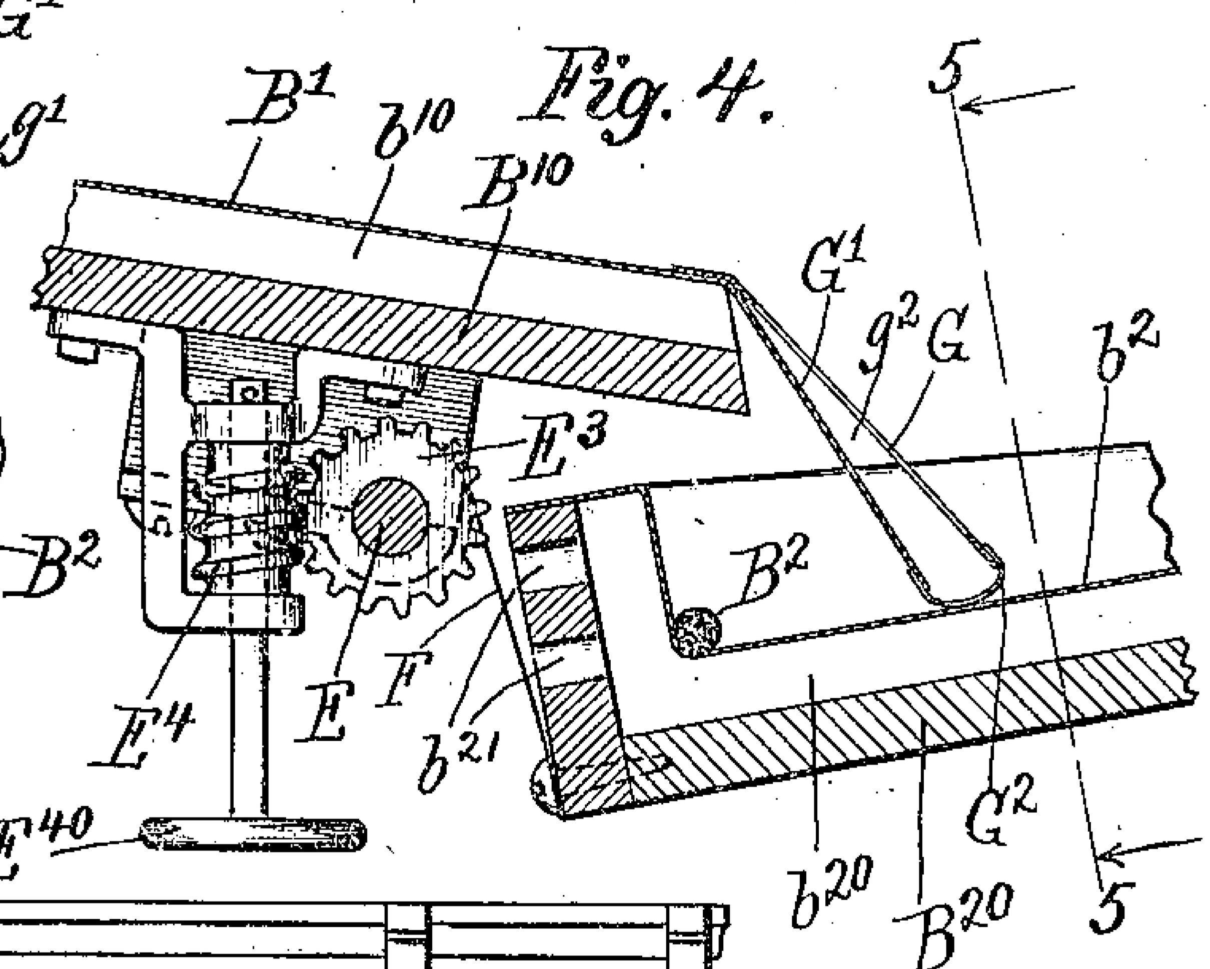


Fig. 4.



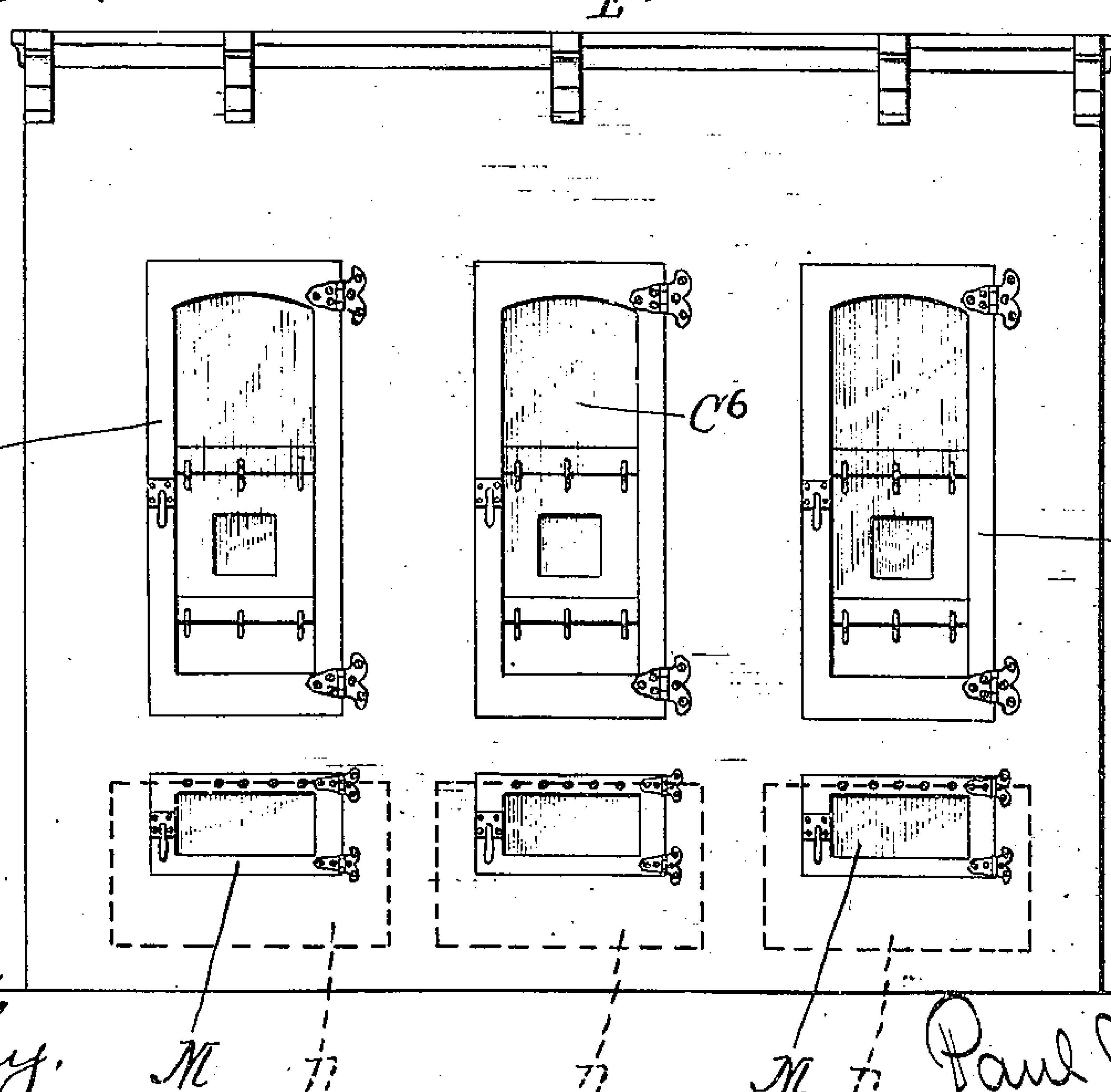


Fig. 2.

Witnesses,
E. T. Wray.
Jean Elliott.

Inventor.
Paul J. Daemicke
By Burton & Burton
his Attys

UNITED STATES PATENT OFFICE.

PAUL J. DAEMICKE, OF CHICAGO, ILLINOIS.

COOLING-ROOM.

SPECIFICATION forming part of Letters Patent No. 496,867, dated May 9, 1893.

Application filed December 5, 1892. Serial No. 454,139. (No model.)

To all whom it may concern:

Be it known that I, PAUL J. DAEMICKE, a citizen of the United States, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Cooling-Rooms, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

In the drawings:—Figure 1 is a section from front to rear through my improved cooling room or refrigerator. Fig. 2 is a front elevation on a reduced scale. Fig. 3 is a detail sectional plan of a drip pan, which serves as a valve to control the circulation of cold air from the ice-chamber into the main cooling chamber, and devices for operating it, the walls of the refrigerator being shown in horizontal section at the line 3—3 on Fig. 1. Fig. 4 is an enlarged detail vertical section from front to rear through one of the drip pans and adjacent parts and mechanism for operating it. Fig. 5 is a section at the line 5—5 on Fig. 4, showing, in elevation, a device for preventing the splashing of water and permitting the circulation of air over the drip pan.

My improved cooling room embodies, in connection with other features, the combination of the main cooling chamber and an exhibit chamber or show-case, and tanks cooled by the main cooling chamber, but accessible without opening the main chamber, and having no air communication with the latter, such tanks being designed and adapted for storage of substances which it is necessary to separate from each other and from the other substances in the cooling chamber to prevent the transmission of odors and flavors from such substances as fish and vegetables, which will taint such other substances as dairy products and the like, to the latter class of products which are liable to receive taint not only from the former, but from fresh meats in the cooling chamber also.

A is the main ice chamber.

B is the main cooling chamber.

C is the exhibit chamber which is in front of the main cooling chamber and extends up in front of the main ice chamber, and may have, at its upper part, a small supplemental ice chamber O.

D D D are the tanks which are located in the lower forward part of the main chamber but do not communicate therewith, but are accessible through the front of the refrigerator by independent doors.

The main ice chamber has the usual ice rack composed of bars A′ A′, &c., and the ice fenders A^2 A^2 at the sides, the bars A′ being supported upon joists A^{10}, extending from front to rear, and the fenders A^2 being secured to studding posts A^{20} in the customary manner, so that there is opportunity for the free circulation of the air off the ice between the studding and between the bars A′ and the supporting joists A^{10} downward. Below the joists A^{10}, there is located the horizontal partition which separates the ice chamber from the cooling chamber, consisting of a fixed portion B′, constituting a water shed which extends longitudinally midway from front to rear in the width of the chamber, and two drip pans B^2 B^2, hinged to the front and rear walls respectively of the cooling chamber, and having their proximate vibrating edges overhung by the edges respectively of the water-shed B′. The air off the ice, descending by the avenue described, can pass into the cooling chamber only by passing over the surfaces of the drip pans, and over the upper edges of the proximate sides of the latter between said edges and the overhanging edges of the water-shed. Drip pans B^2, being hinged and adjustable at their vibrating edges toward and from the overhanging edges of the water-shed, may be considered as valves to open and close the air passage from the ice chamber to the cooling chamber. In order that the circulation may be uniform throughout the chamber and entirely under control, it is desirable that the air opening thus controlled should be uniform throughout the chamber, and, in order that it may be thus uniform and easily regulated, I operate all the drip pans or valves B^2 B^2 from one point by means of a train of horizontal shafts geared together, from which the vibrating edges of the drip pans, respectively, are suspended, and by whose rotation said vibrating edges are raised and lowered by the suspending connections, said connections being in the form illustrated and preferably, flexible bands wound upon the shafts.

E E are two longitudinal shafts located under the water shed, inward respectively from the inner vibrating edges of the drip pans and parallel thereto.

E′ is a transverse shaft which is connected by miter gears e' e', &c., to the two longitudinal shafts. One of the longitudinal shafts has a worm wheel E^3, and I provide a worm E^4, suitably journaled, meshing with said worm wheel and having a handle E^{40} by which it may be rotated, and thereby, the entire train of shafts connected by the miter gears is simultaneously rotated and made to raise and lower the vibrating edges of the drip pans.

e e are pulleys, or enlargements on the shafts E E, and the bands F F, &c., by which the vibrating edges of the drip pans are suspended on these pulleys. Obvious means, equivalent to this windlass-like construction, might be substituted without departing from my invention. The water which drains from the ice will be received in the drip pans, and the air which passes from the ice chamber into the cooling chamber must pass over the cold upper surfaces of the ventilated double bottom drip pans to enter the cooling chamber. Any suitable means of drainage for the pans may be provided, and as this is not a part of my invention, it is not illustrated. It is found in actual practice that the drops of water falling from the ice onto the sloping drip pans are spattered or broken into a spray or splash of which a considerable part escapes through the cold air passage into the cooling room, producing an injurious moisture therein. To prevent this, and, at the same time, not to prevent the free passage of air as desired, I provide, depending from the edges of the water-shed B′, the metal curtains G G′, which are double, consisting of two metal sheets G and G′ respectively, with an interspace between them which is secured by holding the lower edges of the curtains spread by means of stiff straps G^2 G^2 at intervals along the length of the curtain edges. These curtains G and G′ are apertured at *g* and *g′*, respectively, said apertures being out of line transversely with respect to the length of the curtains, so that no aperture *g* is directly opposite an aperture *g′*. This prevents water from splashing through the double curtain, since if it splashes through an aperture *g*, it will not strike an aperture *g′* but will strike the surface of the curtain G′, and fall back into the pan. The air, nevertheless, can pass freely through the apertures *g* into the inter-space g^2, and thence through the apertures *g′*, and thence into the cooling chamber. It is not desirable that the lower edges of the curtain should touch throughout its length upon the bottom of the drip pans, because, if it should do so, sawdust and other sediment from the melted ice would be dammed up against it and obstruct the water and to some extent limit the passage of air. I therefore make the straps G^2 serve as feet to hold up the edges of the curtain from the bottom of the pan, leaving a rift under the edge of the curtain interrupted only at the few points where the feet rest. The water-shed, as well as the drip pans, is made with double walls and an air-inter-space, the upper wall in each case being of sheet-metal and the lower wall being preferably of wood, and free circulation of air is obtained between the two walls to prevent sweating of the metal wall, as would result without such circulation, from the fact that this metal wall is exposed on its upper side to the cold water dripping from the ice.

B′ is the upper or metal wall of the water-shed, and B^{10}, the lower wall; b^2, the upper wall or lining of the drip pans, and B^{20} the lower wall.

b^{10} is an air inter-space between the walls of the water-shed, and b^{20}, the air-interspace between the walls of the drip pan. The two walls are held apart by suitable transverse ribs which need no explanation. The inter-space b^{20} in the drip pan opens at the hinged edge which is back of the vertical plane of the side-fenders of the ice-chamber, and therefore, beyond any point from which water can drip, but in suitable position to permit the cold air descending along the sides of the ice chamber to enter the inter-space b^{20}. The inner side of the drip pan has the apertures b^{21} to permit the cold air which enters the inter-space to pass into the cooling room, thus affording complete air circulation under the metal b^2.

The exhibit chamber C is separated from the cooling chamber B by a plate C′, which constitutes a meat rack,—that is, serves as the support for the brackets or hooks or bars, or all of such devices, on which the joints of meat or other articles are suspended for exhibition. This meat rack C′, or partition wall, is suitably supported on the uprights C^2, to which the joists A^{10} under the ice rack are secured, and it is provided with windows,—that is to say, openings closed by glass plates C^{10}, through which light is admitted into the cooling room B. This meat rack or partition wall does not extend down to the bottom of the cooling room, but stops short a considerable distance above that point, and the exhibit chamber C has an open bottom or rack formed by the cross-bars C^3 and the rack bars C^{30} extending longitudinally thereon and defining the limits of the cooling room and not closing its bottom, but permitting free circulation of air from the bottom of the cooling chamber upward through the exhibit chamber. The partition of which the meat rack C′ forms the lower part extends up higher than the top of the cooling chamber B, the upper portion *c′*, lapping in front of the ice chamber A. But, whereas this partition constitutes the only separating wall between the cooling chamber B and the exhibit chamber C, so that the latter is cooled by conduction through that wall from the former, it is not the only intervening wall between the ice-chamber and the upper part of the exhibit chamber, but, on the contrary, the forward wall of the ice-chamber, represented at A^3, and extending down below the joists A^{10} far enough to constitute the support for the hinges of the front drip pan, is located a little distance rearward of the upper portion c' of the partition wall, leaving between the two an air space c^2, which opens at the lower end into the cooling chamber B, and at the upper end has free communication with the top of the ice chamber A. This space c^2 is one of the avenues for the return of the air upward from the cooling chamber B into the ice chamber A, as shown by the arrows, but in order to gain the advantage of cooled air directly off the ice to cool the exhibit chamber, I provide the air duct C^4, extending from the ice chamber across the air space c^2, and through the partition c' into the upper portion of the exhibit chamber. This duct may be provided with a slide or gate c^4, which may be opened more or less to control the passage of cold air from the ice chamber or prevent it altogether.

The circulation of air between the ice chamber A and the cooling chamber B, as indicated by the arrows, is that cold air descends from the ice chamber and over the surface of the drip pan, passing through the splash curtains, and then through the aperture between the edges of the pans and the overhanging edges of the water-shed, descending then down through the middle portion of the cooling chamber B, to the bottom thereof, and rising chiefly toward the sides as it is somewhat warmed by the contents of the chamber, passing up through the air-spaces c^2 at the front and a corresponding air space c^{20} at the rear, and entering the ice chamber at the top, and being again cooled, and so repeating the circulation. The circulation in the exhibit chamber is also indicated by the arrows, the air entering the bottom of the exhibit chamber from the main cooling chamber B, and rising through the exhibit chamber, and passing out at the top thereof over the upper ends of the partitions between which the air-space c^2 is formed into the top of the ice chamber; and when the gate c^4 is open, cold air from the lower part of the ice chamber will pass through the duct C^4 over into the upper part of the exhibit chamber, and down through the latter chiefly on the rear side, the rising current which enters at the bottom, and also the air returning from the said descending current, passing up at the forward side. It may be desirable to provide, and a part of my invention consists in providing, a supplemental ice chamber or chamber containing cooling mixtures of any sort at the upper part or above the exhibit chamber proper, as shown at O. This chamber, when provided, will have the ordinary form of an ice chamber, the cold air passing down from it through a drip pan at the bottom of it, upstanding air ducts O′ being provided to permit such downward passage of the air into the exhibit chamber. The forward wall O^2 of the supplemental ice chamber is separated from the forward wall of the refrigerator by an air space o^2, through which the rising current of air out of the exhibit chamber passes to enter the upper end of the ice chamber A, and the upper end of the supplemental chamber O. The air circulation in the exhibit chamber is not affected particularly by the presence of this supplemental ice chamber, the only office of said supplemental chamber being to assist in cooling the exhibit chamber, and to do so with less waste of cooling material than might be required to maintain it at an equally low temperature by means of the ice in the main ice chamber A alone. Also, when the exhibit chamber is not in use, or contains no articles to be cooled, it constitutes simply an air space to protect the main cooling chamber from the exterior warmth, the circulation being then confined practically to the main ice chamber and the main cooling chamber B, and requiring, therefore, less ice than would be required if the construction were such that the exhibit chamber were necessarily and at all times cooled from the main ice chamber.

Tanks D are made of sheet metal and are located in the portion of the main cooling chamber B which extends underneath the exhibit chamber C, the front wall of the refrigerator having the apertures m closed by the doors M, which are of the usual insulating construction, having double walls and an inter-space filled with non-conducting material, and the tanks D have apertures through the forward side at the upper part and are flanged about such apertures, said apertures registering with the apertures m, so that when the tank is secured to the inner wall of the refrigerator at the margins of the apertures in the refrigerator walls, respectively, there is no air communication between the main cooling chamber B and the interior of the tanks D, but said tanks are cooled by conduction through their metal walls and access is obtained into them through the doors M without permitting the escape of cold air from or access of warm air to the cooling chamber. A convenient construction, mechanically, for the tanks, is that illustrated, wherein the metal is flanged at D′, such flange projecting forward, adapted to match the aperture m in the refrigerator wall, and the flange being bound by an angle iron band D^2, having one of its lips riveted to the flange and the other lip adapted to be secured to the inner plate of the refrigerator wall, the thumb screws D^{20}, serving to effect such attachment in a manner which permits the easy detachment of the tank when occasion requires.

It is a matter of convenience that the meat racks of the bars C^5, which are adapted to be hung on the brackets C^{50} of the partition meat rack C′, are of suitable length to be hung also in the main cooling chamber B, so that they may be transferred bodily from the cooling chamber to the exhibit chamber.

The exhibit chamber, as will be understood from its name, is accessible through the front, which is provided with glazed doors C^6 C^6, through which the contents of the exhibit chamber can be seen without opening the doors.

I claim—

1. In a refrigerator, in combination with the ice chamber and the cooling chamber underneath it, the water-shed between the two chambers; the shafts extending thereunder; the hinged drip pans suspended at one edge from the shafts and adapted to be raised and lowered by the rotation of the latter and overhung by the water-shed: substantially as set forth.

2. In a refrigerator, in combination with the ice chamber and the cooling chamber underneath it, the water-shed between the two chambers; the inclined drip pans overhung thereby, said pans having double bottoms and walls with an air interspace; said interspace having free communication at the upper sides of the pans with the ice chamber, and at the lower sides with the cooling chamber, whereby cold air circulation is obtained between the two walls of the pans: substantially as set forth.

3. In a refrigerator, in combination with the ice chamber and the cooling chamber and the water-shed between them, the longitudinal and transverse shafts under the water-shed and miter gears which connect the shafts in train; drip pans hinged at one edge and having the opposite edge overhung by the water-shed and suspended from the shafts; a worm gear on one of said shafts and a suitable worm to operate it, whereby all the shafts are rotated to adjust all the pans simultaneously: substantially as set forth.

4. In combination with the water-shed and the drip pans having their lower edges overhung by the water-shed, the double curtains depending from the water-shed into the drip pans, said curtains having mismatched apertures to permit air circulation and to prevent the water splashing through them: substantially as set forth.

5. In combination with the water-shed and the drip pan overhung thereby, the double curtains and the straps which hold them apart at their lower edges, said straps being adapted to operate to serve as feet projecting from the edges of the curtains and resting upon the bottoms of the pans to hold the curtain edges up off the latter: substantially as set forth.

6. In a refrigerator, in combination with the main ice chamber and the main cooling room underneath it, a supplemental cooling room extending in front of both the main ice chamber and cooling chamber and separated from the cooling chamber only by a single partition, and separated from the ice chamber by a double wall with an inter-space, and provided with a duct leading into it at the rear across said inter-space from the lower part of the ice chamber; said exhibit chamber being obstructed at the upper part above said duct from the rear wall to a point near the front wall and provided with an air passage upward along the front only communicating with the top of the ice-chamber, to cause the air from the ice chamber to descend along the rear and permit the return current to rise along the front of the exhibit chamber: substantially as set forth.

7. In a refrigerator, in combination, substantially as set forth, the main ice chamber A, the main cooling chamber B, the exhibit chamber C, the supplemental ice chamber O, the chamber B and the exhibit chamber C communicating at the bottom and the partition between them being single, whereby the exhibit chamber is cooled by conduction from the main cooling chamber; a return passage for air being provided from the upper part of the exhibit chamber at the forward side only to the top of the ice chamber: substantially as set forth.

In testimony whereof I have hereunto set my hand, at Chicago, Illinois, in the presence of two witnesses, this 19th day of November, 1892.

PAUL J. DAEMICKE.

Witnesses:
CHAS. S. BURTON,
JEAN ELLIOTT.