

(No Model.)

2 Sheets—Sheet 1.

D. H. METCALF & W. S. DOY.
REFRIGERATOR.

No. 500,147.

Patented June 27, 1893.

Fig. 2.

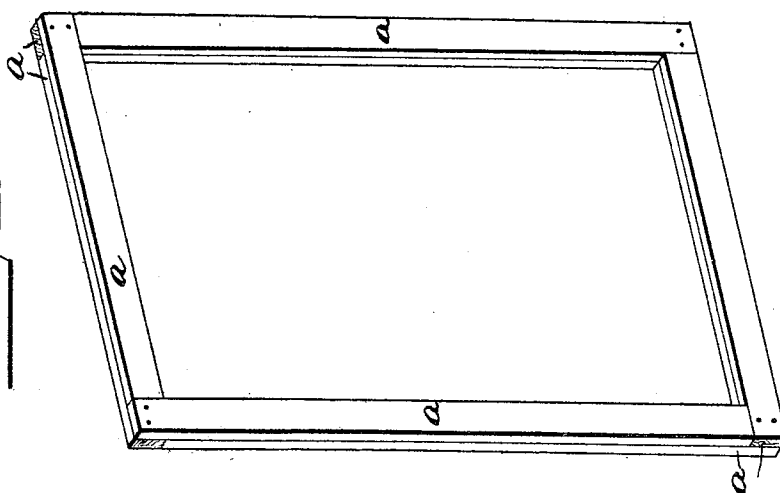
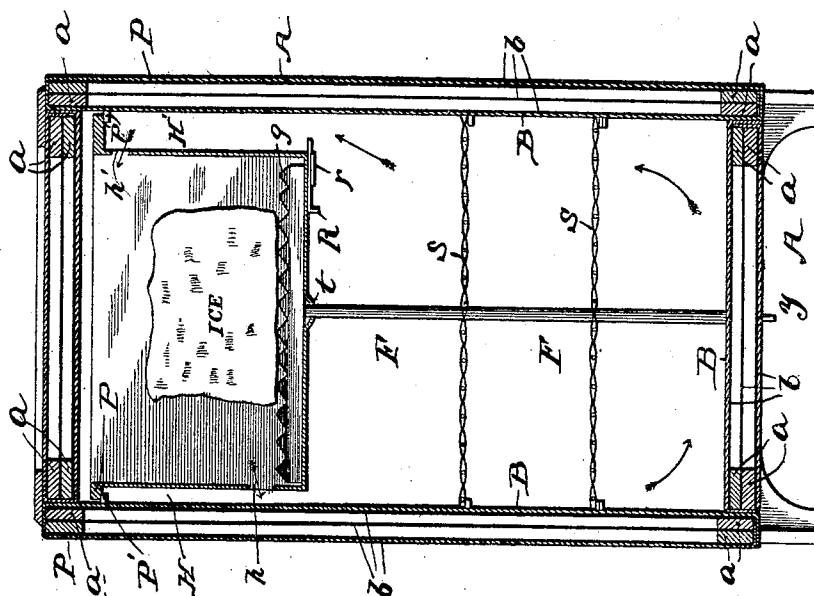


Fig. 1.



David H. Metcalf.
William S. Doy.

INVENTORS

By *Martin Metcalf*
ATTY.

WITNESSES,
Walter Jamieson
O. W. Indlong

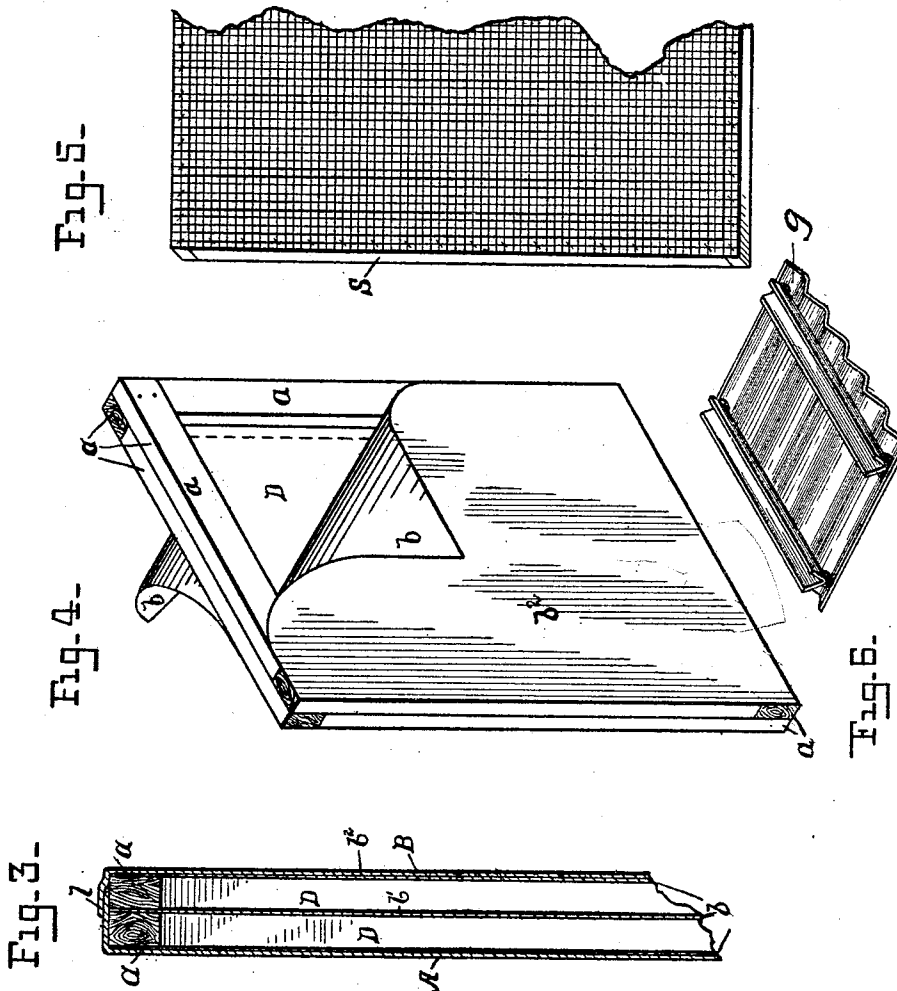
(No Model.)

2 Sheets—Sheet 2.

D. H. METCALF & W. S. DOY.
REFRIGERATOR.

No. 500,147.

Patented June 27, 1893.



Witnesses.

P. M. Metcalf
J. E. Hall

Inventors.

David H. Metcalf.
William S. Doy.
By Martin Metcalf.
Att'y.

UNITED STATES PATENT OFFICE.

DAVID H. METCALF AND WILLIAM S. DOY, OF BATTLE CREEK, MICHIGAN.

REFRIGERATOR.

SPECIFICATION forming part of Letters Patent No. 500,147, dated June 27, 1893.

Application filed June 27, 1892. Serial No. 438,232. (No model.)

To all whom it may concern:

Be it known that we, DAVID H. METCALF and WILLIAM S. DOY, citizens of the United States, residing at Battle Creek, in the county of Calhoun and State of Michigan, have invented certain new and useful Improvements in Refrigerators; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

The objects accomplished by this invention are, first, to so construct the refrigerator that the several parts composing the sides, top and bottom thereof, shall be absolutely air-tight, and impenetrable from either within or without; second, to so construct the body, in putting the said parts together, that there can be no possible intercommunication between the air, or vapors, of the vegetable and ice chambers, and the non-conducting air-spaces between the several hollow walls or "dead-air-spaces," often so called; third, to construct and combine the several parts in such manner that the least possible amount of wood, or other shrinkable material, shall enter into the construction of the structure; fourth, to so contrive the main frame, or body of the casing, that no possible deterioration thereof can occur caused by expansion and contraction, in changes of temperature; or other extraneous means. In short, the object of our invention is to provide at a minimum expense a refrigerator which will have great capacity and in which a given supply of ice will last a maximum length of time and keep the contents perfectly cool and sweet. These definite and desirable results we have accomplished in the manner and by the means now to be particularly pointed out, as follows, viz:

Referring to the drawings, wherein the sides of the sheets represent the top and bottom parts of the refrigerator, in the several views, Figure 1. represents a transverse vertical section, drawn on a line near the rear inside wall thereof. Fig. 2. shows the construction, and manner of placing of the frames, constituting the skeleton of the structure,

which is all the wooden materials entering into the entire fabrication of the refrigerator. Fig. 3. represents the said "skeleton frame," with a non-conducting wall interposed between the frames and the same, or similar walls, side by side, with outside and inside casing, closing and sealing the said frame, walls and dead-air-spaces, all around,—the sides and edges—throughout. Fig. 4. shows the manner and process of construction of the same; and Fig. 5. represents a portion of one of a series of screen wire shelves; so made in order to aid in securing a free circulation of air from, and too the ice-box above, and within the refrigerator chamber, and Fig. 6 is a detail view of the bottom of the ice-tray.

Referring now to the reference letters, designating the several parts:—*a*, represents strips of wood, prepared in suitable length, width and thickness, for the size of refrigerator; placed end, to end, after the manner shown in Fig. 2. On one side of the frame, a covering of brown paper, *b*, of good, substantial thickness, is fixed to the side-bars, by glue, or otherwise secured; when another frame is laid thereon, and the twin-frames, constituting the interior of the side, is fastened to the paper and to the first frame at the corners thereof, as shown. On both faces of the twin-frames, like coverings, *b*, *b'* are secured, whereby dead-air-spaces, *D*, are provided, on each side of the central paper wall *b*, *b'*, within the area of the frame, as seen, (see Fig. 4.) We now proceed to inclose and seal air-tight, the entire structure thus made, with sheet-metal. One of the sides thereof we cover with sheet-steel, *A*, preferably "galvanized" for convenience in soldering;—this is for the outside wall of the refrigerator. The opposite side is for the interior wall. It is preferably covered in like manner with sheet-zinc, *B*, and the union lap *l*, (shown at top of Fig. 3,) of the two metals, is sealed by soldering air-tight, or by equivalent means. In this manner of making we have: (first) the outside "galvanized," closure, *A*, (second) the contacting paper, or non-conductor wall, *b*, (third) the dead-air-space, *D*, (fourth) the central wall, *b*, (fifth) the contacting non-conductor, *b*, (sixth) and the inside, sheet zinc lining, or wall *B*. Four of these structures,

constitute the four-sides of the refrigerator body,—and suitably constructed in similar manner, make the top, and bottom. These are soldered tightly at their intersecting inside edges, whereby an absolutely impervious refrigerator body is secured having dependent co-acting and integral walls and the inner walls kept sweet and free from foul contamination, at all seasons, climates and conditions.

An ornamental border, *a'*, may be placed around the opening of the top-cover, above the ice-tray, *E*, and a like binding border may be provided for the refrigerator corners; forming a handsome, paneled exterior; and the galvanized exterior wall may be stamped into various ornamental shapes for greater strength and beauty. A sub-frame, not shown of similar make, provides for the door for gaining access to the vegetable chamber, *F*, in the well known way;—as does the top-cover construction shown, to the ice-tray, or box *E*, as already seen. The said ice-tray is conveniently suspended close to the top of the refrigerator, by means of an outwardly projecting integral bead, *p*, or border thereof, which rests on fixed pins, *p'*, projecting from the adjacent inside wall, for this purpose, said ice tray being of such size relative to the body as to leave air passages *H H'* between it and said body.

The bottom of the ice-tray is provided with inverted V-shaped grate-bars, *g*, and adjacent above said bars, at one end of the tray, the air-duct, *h*, is provided, and near the top and at the opposite end, or side of said ice-tray, is located the air duct *h'*. These ducts give circulation from and to, the ice tray, and throughout the refrigerator chamber, in the direction indicated by the arrows; and agreeably to certain well known laws, governed by the slowly melting ice; the condensing noxious vapors, meanwhile arising from contacting vegetables, &c., finding egress in the form of water, by way of the pipe *y*, connecting the bottom of the said ice-tray by the water-trap, *t*, with the drain, or receptacle for that purpose placed beneath the refrigerator bottom.

The regulation of the air currents of refrigerators has been found to constitute an important element in the problem,—not only of

cost of ice for preserving the necessary equilibrium of temperature, but for properly keeping the various perishable products it is desired to preserve and protect; and therefore we have devised a regulating gate, *R*, by means of which the air-duct on one side of the ice tray may be closed, or controlled at will, and the amount of air circulation, to and from the said ice-tray, *E*, may be regulated at all times. (See Fig. 1.) This damper, *R*, is movable horizontally inward or outward, by hand or otherwise, and may be adjusted so as to leave the air passage entirely, or only partially open, or to entirely close the same. It is supported upon and guided by the strap *r*.

Having thus clearly and fully described and illustrated our invention, and pointed out the more prominent particulars and process of manufacture; and shown some of the manifest advantages for various uses to which it is obviously applicable, what we claim, and desire to secure by Letters Patent of the United States, is—

1. In a rectangular refrigerator, the side, top and bottom walls thereof, each of said walls consisting of a plurality of open rectangular frames, paper partitions secured to said frames, and a metallic covering entirely inclosing said frames and partitions; said walls being assembled and permanently secured together at their contacting surfaces, substantially as described.

2. In a rectangular refrigerator, the side, top and bottom walls thereof, each of said walls consisting of a plurality of open rectangular frames laid side by side, paper partitions secured to said frames and located between and also on opposite sides of the same, and a metallic covering, entirely inclosing said frames and partitions; said walls being assembled and permanently secured together at their contacting surfaces, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

DAVID H. METCALF.
WILLIAM S. DOY.

Witnesses:

WILLIAM ANDRUS,
JAY A. FORD.