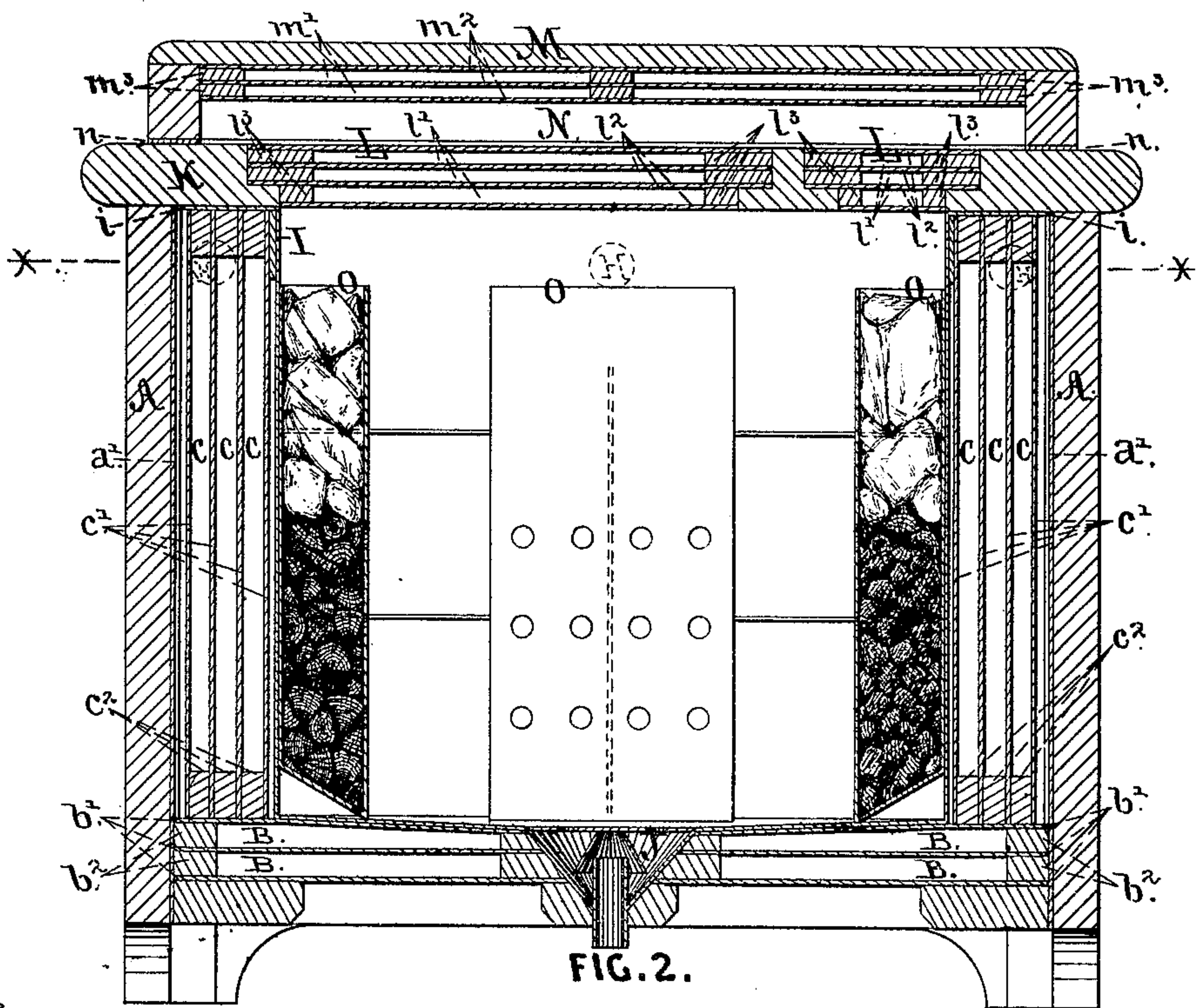
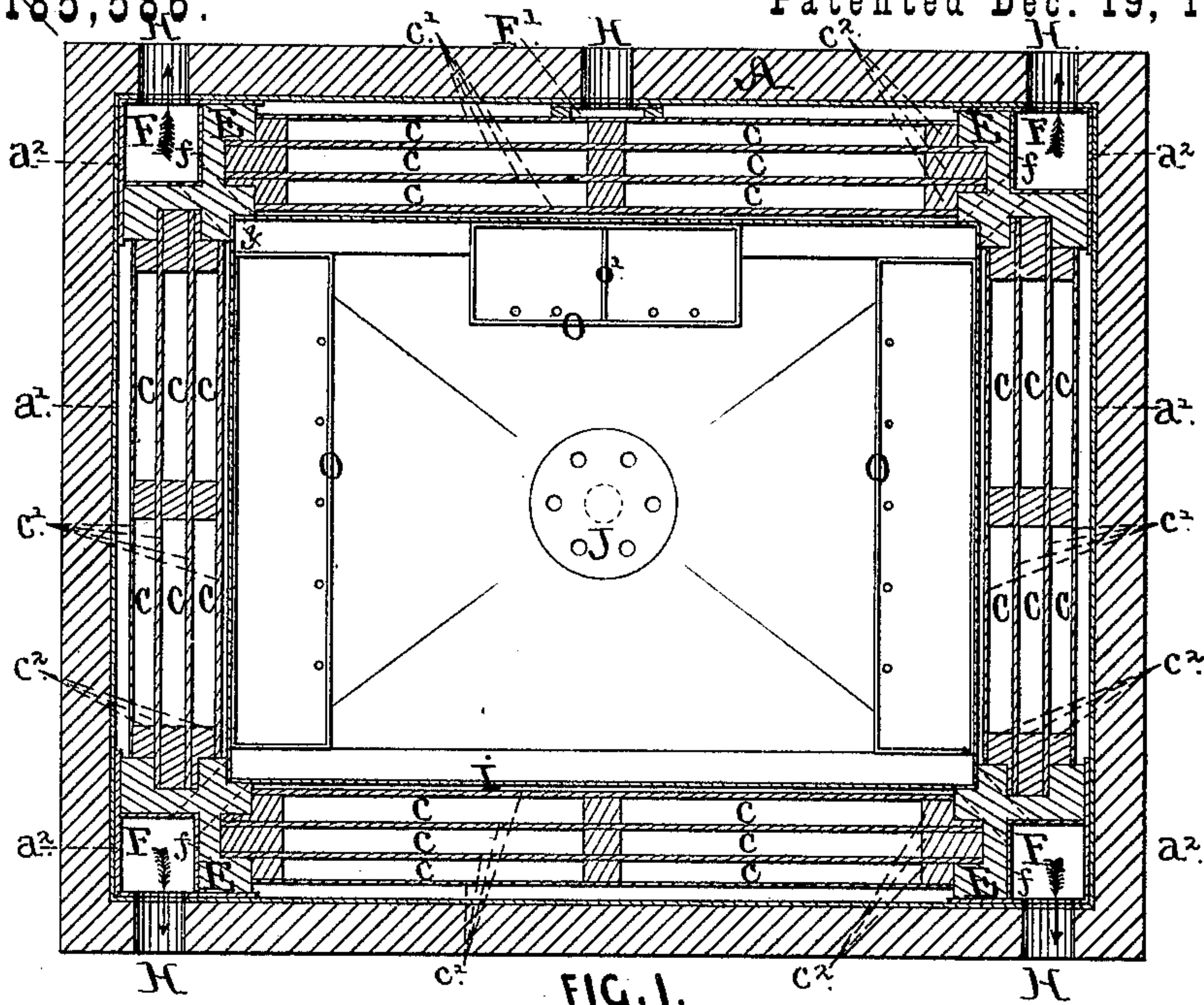


E. B. SMITH.  
REFRIGERATOR.

No. 185,586.

Patented Dec. 19, 1876.



Thomas W. Stevens  
William H. Long

Witnesses.

Inventor.  
Edgar B. Smith.

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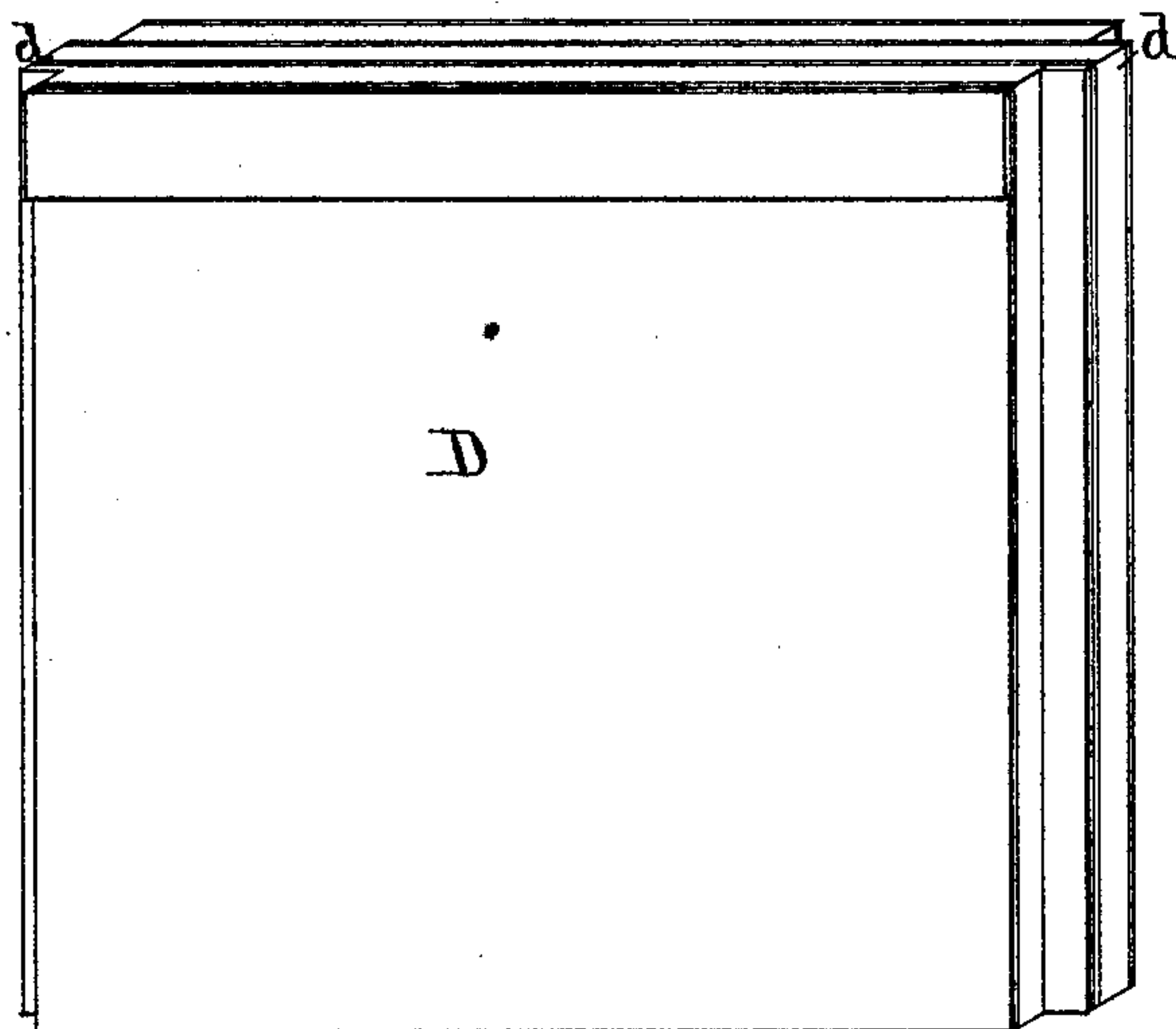


FIG. 3.

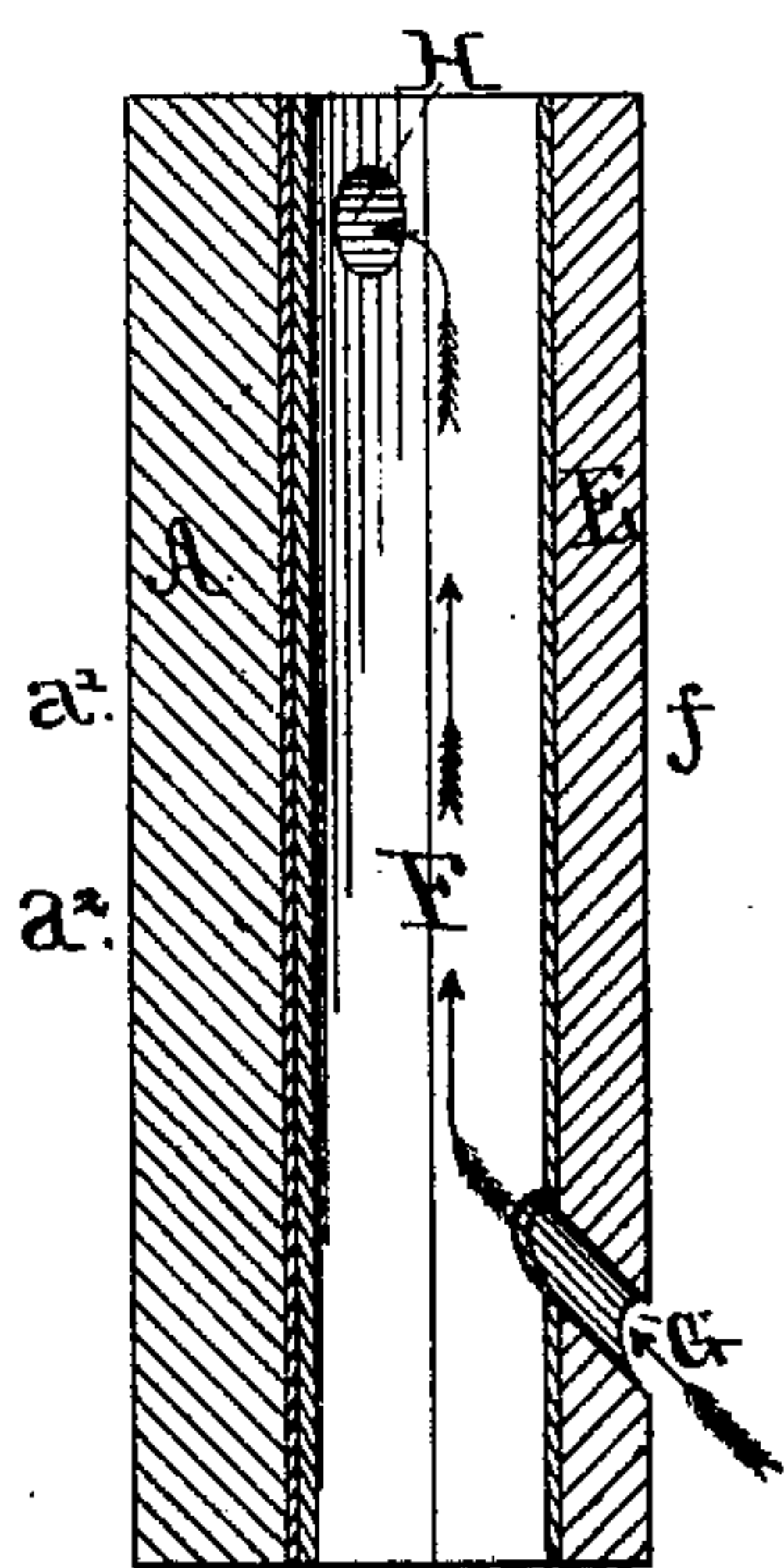


FIG. 4.

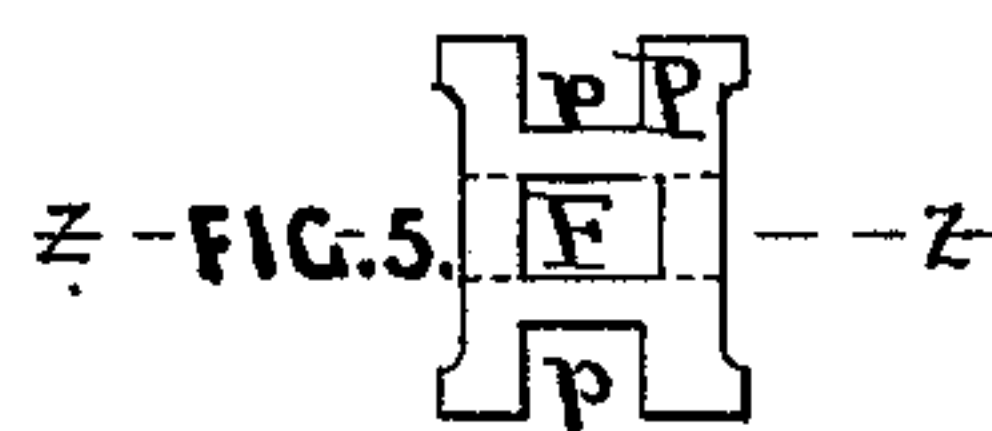


FIG. 5.

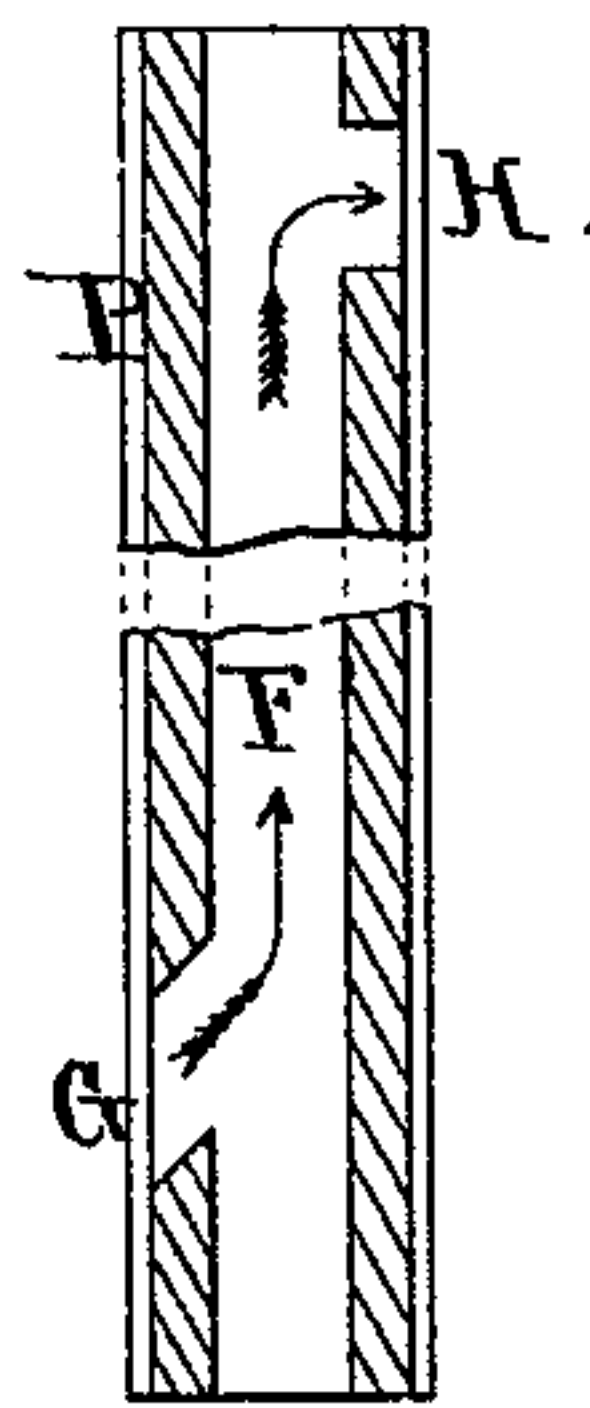


FIG. 6.

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# UNITED STATES PATENT OFFICE.

EDGAR B. SMITH, OF ALBANY, NEW YORK, ASSIGNOR TO FRANCES L. OSBORN, OF SAME PLACE.

## IMPROVEMENT IN REFRIGERATORS.

Specification forming part of Letters Patent No. **185,586**, dated December 19, 1876; application filed June 14, 1876.

*To all whom it may concern:*

Be it known that I, EDGAR B. SMITH, of the city and county of Albany, and State of New York, have invented certain new and useful Improvements on Refrigerators, of which the following is a full and exact description:

My invention relates to refrigerators and other similar structures for maintaining low temperatures, including transportation-cars, chests, ice-houses, &c.; and it consists, first, in forming the interior compartment or preserving-chamber of the refrigerator of dead-air cells, constructed in sections in the manner herein shown and described, such sections being made either detachable or forming permanent parts of the structure; secondly, in constructing the sections of dead-air cells in the manner herein set forth, so that each section shall consist of several independent cells; thirdly, in the method herein described for connecting these sections together by means of corner-pieces and connecting-pieces; fourthly, in the uptake-flues for conveying the foul air and other gaseous impurities mechanically discharged from the preserving-chamber, in the manner hereinafter described; fifthly, in the employment of antiseptic absorbents within the preserving-chamber for purifying and absorbing the humidity from the air contained in said chamber; sixthly, in the means employed for removing the unabsorbed foul air from the preserving-chamber, consisting of the co-operative action of the blast produced by the closing of the lids and the uptake-flues; seventhly, in the construction of the receptacles for containing the ice and absorbents.

In the accompanying drawings, making a part of this specification, Figure 1 is a horizontal section of my refrigerator at the line *x x*; Fig. 2, a longitudinal section; Fig. 3, a perspective view of a detached section of the dead-air cells; Fig. 4, a vertical section at the line *y y* of one of the corner-pieces and uptake-flue; Fig. 5, a plan view of a connecting-piece for attaching together in a continuous line a series of sections of dead-air cells; and Fig. 6, a vertical section of the same at the line *z z*.

As shown in the drawings, A represents the

cabinet or exterior casing of my refrigerator for domestic purposes. It has a lining, *a*<sup>1</sup>, of paper, coated with any water-proof preparation, cemented thereto, and, for the purpose of securing air-tight joints, the re-enforcing strips *a*<sup>2</sup>, of water-proof paper, cover the joints at each corner of the casing. The bottom section of the preserving-chamber consists of a series of dead-air cells, B, formed by means of the plates *b*<sup>1</sup>, of water-proof paper, board, or other material, secured to the division-frames *b*<sup>2</sup> by any suitable means, whereby an air-tight joint can be obtained. This bottom section is maintained in its place by the bottom of the casing A, or by the battens shown in Fig. 2. The sides and ends of the preserving-chamber are formed by the sections containing the dead-air cells C, made by attaching the plates *c*<sup>1</sup>, of water-proof paper or other material, by means of air-tight joints, to the division-frames *c*<sup>2</sup>. These plates *c*<sup>1</sup> and division-frames *c*<sup>2</sup>, when attached together, as above described, constitute the sections of dead-air cells D shown in Fig. 3, which, for the purpose of attaching them to their adjacent parts, are provided with a tongue-piece, *d*, at each end. E is a corner-piece for securing together the sections D at the corners of refrigerators, rooms, &c. It is provided with suitable grooves for receiving the tongue-pieces *d* of the sections. Each of these corner-pieces is so constructed as to form, in conjunction with corners of the casing A, the uptake-flue F, in which a lining, *f*, of water-proof paper, is secured to the corner-piece. An inlet-opening, G, is made in each corner-piece, near its lower end, for the purpose of forming a communication between the preserving-chamber and the flue F, by means of which the unabsorbed noxious gases are expelled from the preserving-chamber (in the manner hereinafter described) through the outlet-opening H of the exterior casing. These uptake-flues, instead of being made in the corner-pieces, may be formed, as shown at F<sup>1</sup>, Fig. 1, at any other part of the refrigerator; or the corner flues may be used in conjunction with uptake-flues arranged at different parts of the structure. A metallic casing, I, forms a lining for the preserving-chamber, to protect the paper plates of the



dead-air cells from injury by being punctured and broken, whereby their utility would become impaired or destroyed. A flange, *i*, is turned over from the top of the lining *I*, which extends over the upper edges of the sections *D* of dead-air cells. The bottom of the lining *I*, which I preferably make dishing toward its center, is provided with a trap, *J*, which, while it permits the free escape of any water from the preserving-chamber, prevents the admission of any air from the external atmosphere at that point. *K* is the top frame of the casing *A*, to which the lids and cover are hinged. It is secured to the casing by screws, or by any similar means, whereby it can be readily detached from the casing. The inner lids *L*, which fit into rabbets formed in the frame *K*, are composed of the dead-air cells *l*<sup>1</sup>, made by the water-proof plates *l*<sup>2</sup> and the division-frames *l*<sup>3</sup>. Over the inner lids *L* is the hinged cover *M*, provided with the dead-air cells *m*<sup>1</sup>, made by the water-proof plates *m*<sup>2</sup> and division-frames *m*<sup>3</sup>. A recess is formed in the under side of the cover, which, when the cover is closed, constitutes the dead-air chamber *N*, and, for the purpose of preventing the admission of the external air within this chamber, a cushion or packing, *n*, of water-proof paper, india-rubber, or other suitable material, is attached to the lower edge of the cover *M*. One or more metallic receptacles, *O*, are placed within the preserving-chamber, into the lower perforated portion of which an antiseptic absorbent is placed, for which purpose I preferably make use of charcoal, on account of its well-known affinity for absorbing mephitic gases and the humid particles of the air. The portion of the receptacles *O* for containing the charcoal is perforated for the purpose of affording to the mephitic and humid particles of the air within the preserving-chamber a free and uninterrupted passage to the charcoal. Above the charcoal a quantity of ice is placed for cooling the air in the preserving-chamber.

In some cases, when desirable, the receptacle *O* may be made in two sections, giving to the upper or ice-containing chamber a greater area than the lower one, in which case the bottom of the upper chamber should be perforated to allow the water formed by the melting of the ice to pass off without coming in contact with the charcoal. These receptacles may also be divided, when desirable, by the partition *O'*, into two separate vertical chambers—one for the ice and the other for the charcoal. When made in this form, lime may be mingled with the charcoal for the purpose of aiding in the purification and drying of the air in the preserving-chamber.

By the use of antiseptic absorbents within the preserving-chamber, which, co-operating with the ice, produces a pure, cold, anhydrous atmosphere therein, the necessity for producing the circulation of currents of air, commonly employed in refrigerators for carrying off the impurities of the air, is entirely avoided. As

fast as the mephitic exhalations are evolved by the perishable articles in the preserving-chamber they are absorbed by the charcoal, which, when it becomes surcharged with these impurities, can be removed from the receptacle *O*, and a new charge of charcoal substituted, and the old charge exposed to the action of the atmosphere, by which it is restored to a proper condition for being used again, which operation may be repeated *ad infinitum*.

While the refrigerator remains closed it is manifest that, from the density of the air in the preserving-chamber, the external atmosphere cannot gain admission into it through the uptake-flues and their outlet and inlet opening, and in this respect its functions are precisely the same as an air-tight compartment; and it is also manifest that by placing the access-opening at the top of the refrigerator, instead of its side, the disturbance of the air contained in the preserving-chamber, commonly caused by the opening the doors of the chamber, is entirely avoided. The impulse of closing down the lids *L* carries a volume of fresh air into the preserving-chamber, which displaces an equal quantity of the most impure air contained in the chamber, which, from its greater gravity, settles at the bottom, and which, by the blast caused by this bellows-like action of the lids, is forced out through the inlet-opening *G*, uptake-flue *F*, and outlet-opening *H*, as indicated by the arrows in Figs. 4 and 6.

In using the sections *D* for the purpose of constructing the non-conducting side walls for refrigerating-rooms, cars, and other similar large structures, I make use of the connecting-pieces *P*, (shown in Figs. 5 and 6,) each of which is provided with the grooves *p*, for receiving the tongue-pieces *d* of the sections, and I preferably make them with the uptake-flue *F*, inlet-opening *G*, and outlet-opening *H*. In this way a continuous wall for a compartment of any dimensions may be constructed, the angles of the compartment being formed by the corner-pieces *E*, as in the smaller structures.

For packing large quantities of fish, meat, &c., the antiseptic absorbents may, when desirable, be mingled with the ice and articles to be preserved in the body of the preserving-chamber, and by so doing the use of the receptacles *O* may be dispensed with; but where the refrigerator is to contain a variety of different perishable articles, I preferably make use of the receptacles, as affording the best manner of obtaining the useful action of the absorbents.

I claim as my invention—

1. A refrigerator having its non-conducting walls composed of sectional panels *D*, containing a series of separated and independent dead-air cells, constructed, as herein described, of plates of water-proof material, having division-frames interposed between them, and secured thereto, in the manner and for the purpose specified.



2. The sectional panels D of dead-air cells, for forming the non-conducting walls of refrigerating chambers and rooms, composed of plates of water-proof material, having division-frames interposed between them, for forming the dead-air cells, in the manner and for the purpose herein specified.

3. In a refrigerator whose preserving-chamber is unprovided with openings for the admission of the external atmosphere for producing a constant circulation of air through said chamber, the combination of the uptake-flues F, inlet-openings G, and outlet-openings H, constructed and arranged, in the manner

herein described, to form a system of communication from the bottom of the preserving-chamber with the external atmosphere surrounding the top of the refrigerator, as and for the purpose herein specified.

4. The combination, with the sections D, of the corner-pieces E and connecting-pieces P, for forming the preserving-chambers of refrigerators, rooms, &c., as and for the purpose herein specified.

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Witnesses:

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WILLIAM H. LOW.