

J. A. WHITNEY.  
Refrigerator.

No. 209,534.

Patented Oct. 29, 1878.

Fig. 1.

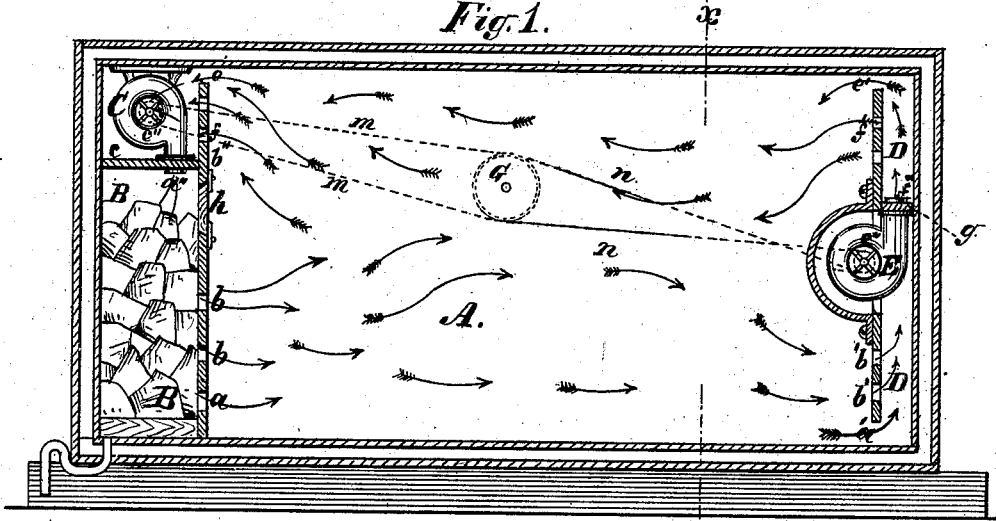


Fig. 2.

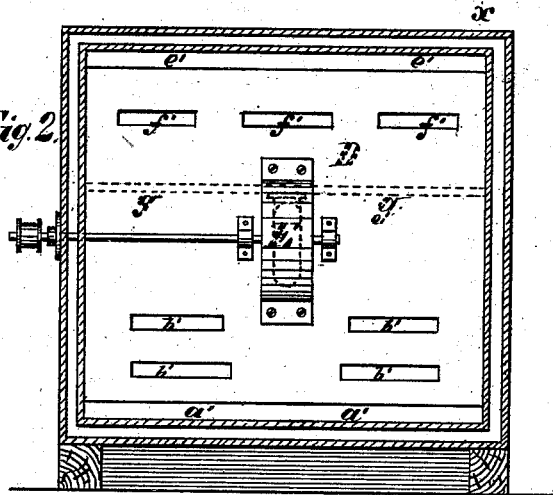
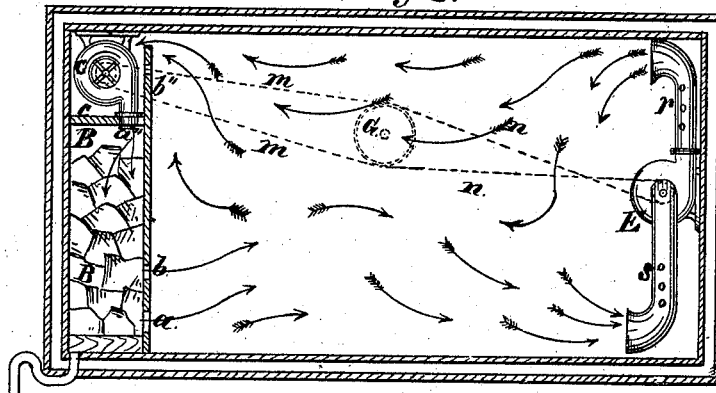


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN REFRIGERATORS.

Specification forming part of Letters Patent No. 209,534, dated October 29, 1878; application filed October 10, 1878.

*To all whom it may concern:*

Be it known that I, JAMES A. WHITNEY, of the city, county, and State of New York, have invented certain Improvements in Refrigerators, of which the following is a specification:

The object of this invention is to secure a forced circulation and distribution of cooled air to the different parts of a room or apartment without the use of conduits arranged to convey the air to or from the different portions of the horizontal area of the said room or apartments, such conduits being, in their operation, imperfect, and to a certain extent objectionable, for the reason that a very large proportion of the power applied to moving the air is consumed by the friction of the air upon the internal surfaces of the horizontal tubes through which, in various refrigerators hitherto devised, it has been caused to pass.

The invention embraces the combination, in a refrigerator, of two fans located at different sides of the structure for simultaneous and united operation to move the air from one fan to the other and back again to circulate and distribute the air; also, the combination of an ice-box with the two fans thus located; also, in a novel combination of parts for most effectually carrying the aforesaid features into practice.

Figure 1 is a vertical longitudinal sectional view of a refrigerating apparatus made according to my invention; and Fig. 2 is a vertical transverse sectional view of the same, taken in the line *x x* of Fig. 1. Fig. 3 is a vertical longitudinal sectional view of a modification of said apparatus.

A is the room or apartment to be cooled. When the apparatus is to be used for the preservation of meats, vegetables, or other perishable articles of food, the walls, floor, and ceiling of this room or apartment should be made as nearly as possible non-conducting as against the transmission of heat, and care should be taken to exclude the external atmosphere. Said room or apartment may be of any appropriate shape, but is preferably of rectangular form. At one end of the aforesaid room A is an ice-box, B, which may extend nearly or quite across said end of said room, or across such part or proportion thereof

as may be convenient or desirable. The front of the ice-box B is open at the bottom to afford an air-passage, *a*. Other air-passages, *b*, may be provided higher up in the lower portion of the front of the ice-box.

The top of the ice-box is closed by a cover or partition, *c*, through which the mouth or outlet A' of a fan or fan-blower, C, is passed, and made to project downward into the top of the ice-box. The front of the ice-box may be extended higher than its top, as shown at *b''*, but in such case is formed with openings to afford communication between the upper part of the room A and the fan C. Thus the inlet-opening *e''* of the fan C has communication with the upper part of the room A through an air-passage, *e*, extending nearly or quite the width of the front of the ice-box. Other openings, *f*, to establish communication between the inlet of the fan C and the upper part of the room A, may also be provided.

The ice-box may be supplied with ice through an opening in its front, which is closed, when the apparatus is in operation, by a door, *h*.

At another portion of the room A, preferably at the opposite side or end, is a vertical chamber, D, divided by a horizontal partition, *g*, into an upper and lower portion. Shown at E is a second fan or fan-blower, the inlet or central opening, *e''*, of which communicates with that portion of the chamber D below the partition *g*, while the outlet or mouth *f''* is passed up through the said partition *g*, and communicates with that portion of the chamber D above said partition. The lower part of the chamber D communicates with the room A—as, for example, by a long opening, *a'*, answering to the air-passage *a* of the ice-box; and, if desired, other openings, *b'*, answering to the air-passages *b* of the ice-box, may also be provided. The upper part of the chamber D communicates with the room A—as, for example, by a long opening, *e'*, answering to the air-passage *e*, adjacent to the fan C, and, if desired, by other openings, *f'*, answering to the air-passages *f*, which latter also, as hereinbefore set forth, admit to the fan C.

The two fans C and E are designed to be operated substantially in unison, so that while the action of the fan C draws in air from the upper part of the room A, and forces it down

through the ice-box B, and thence out through the passages *a b* at the bottom to the lower part of the room A, the action of the other fan, E, draws the air (cooled by passing through and in contact with the ice in the ice-box) from the lower part of the room A, and causes it to pass upward through the chamber D, whence it is ejected into the upper part of the room A. By this means the air of the room A is cooled by being passed repeatedly through the ice-box, and in contact with the ice contained therein, and is circulated and distributed through the room A without the use of the usual horizontal conducting tubes or conduits, and consequently without the loss of power incident to the friction of air moved through such tubes, and in contact with the inner surfaces thereof. Furthermore, as the air (circulated and distributed as aforesaid) moves, so to speak, in two oppositely-moving floods or volumes, it follows that said air is brought into the most intimate contact with the articles within the room A—as, for instance, meat, vegetables, or other perishable articles of food placed therein for preservation.

It is, of course, to be understood that the two fans may, if desired, be so placed or operated that the air may be passed upward through the ice-box, and downward through the chamber D—in other words, so as to reverse the direction of the flow of air through the room; but, in practice, it is preferable that the air should descend through the ice-box and rise through the chamber D, as hereinbefore fully set forth. When the room A is of no great width there may be used, as an equivalent of the chamber D and its fan E, a fan-

blower, E, having a vertical pipe, *r*, extending from its outlet, and another vertical pipe, *s*, extending from its inlet, as represented in Fig. 3, these two vertical pipes *r s* serving the same purpose in relation to the fan or fan-blower E as the upper and lower portions of the chamber D, divided by the partition *g*, as hereinbefore explained.

The simultaneous operation of the two fans C and E may be provided for by any suitable means—as, for example, by belts, (shown in dotted lines at *m n* in Figs. 1 and 2,) and extending from a pulley, G, driven by any suitable power, to pulleys on the ends of the shafts of the fans; or, in lieu of this arrangement, there may be employed bevel-gears on the ends of the fan-shafts, driven by other bevel-gears on a driving-shaft actuated from the motive power.

What I claim as my invention is—

1. In a refrigerator, the combination of two fans, located at different sides of the structure, for simultaneous and united operation, whereby the air is moved from one to the other and back again, as set forth.

2. In a refrigerator, the combination of two fans, located at different sides of the structure, and an ice-box, substantially as and for the purpose described.

3. In a refrigerator, the combination of chamber D and its fan E with the ice-box and its fan C, the whole arranged and operating substantially as and for the purpose set forth.

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Witnesses:

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