

J. J. BATE.
Refrigerators.

No. 156,269.

Patented Oct. 27, 1874.

Fig. 1.

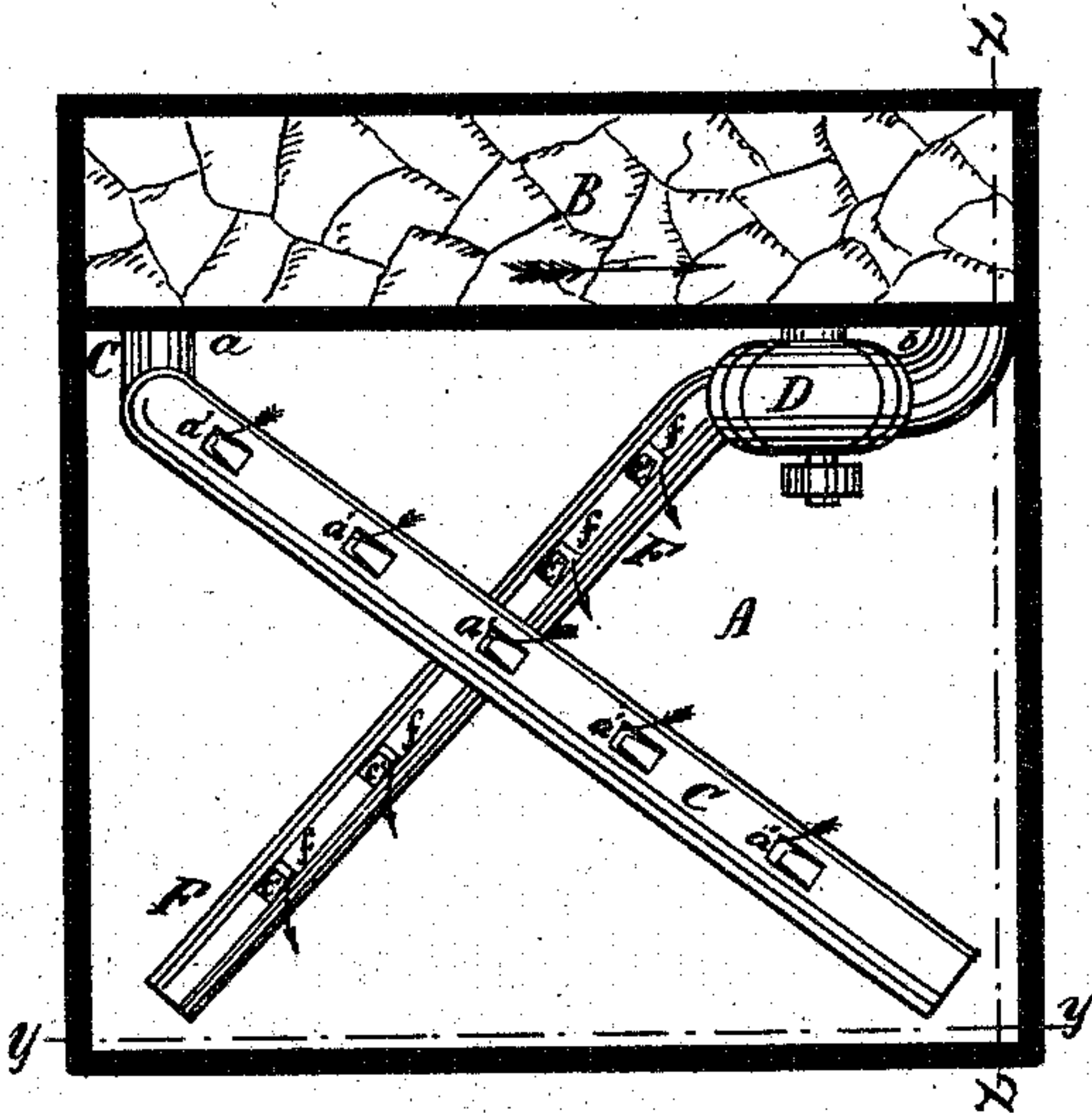


Fig. 2.

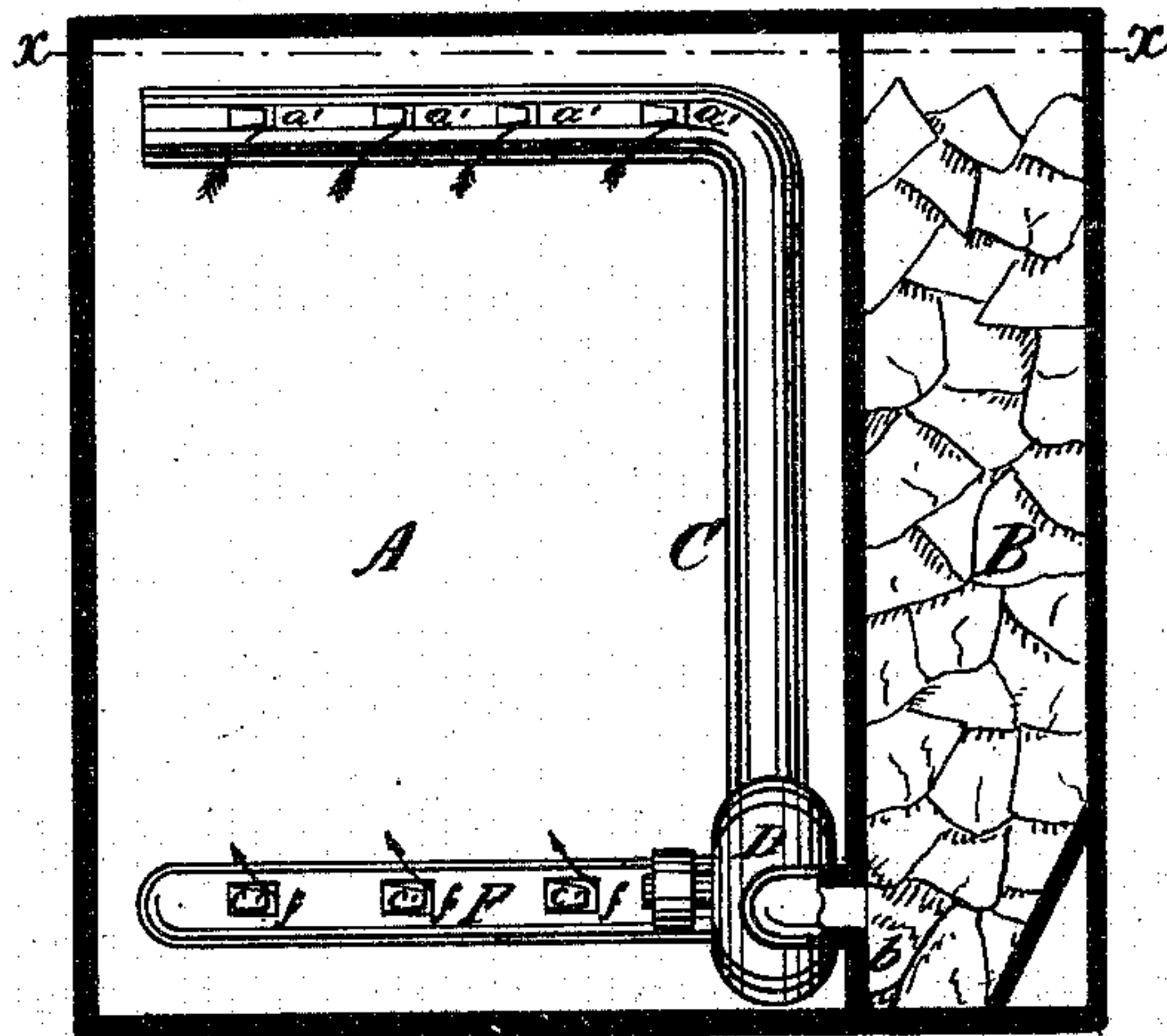
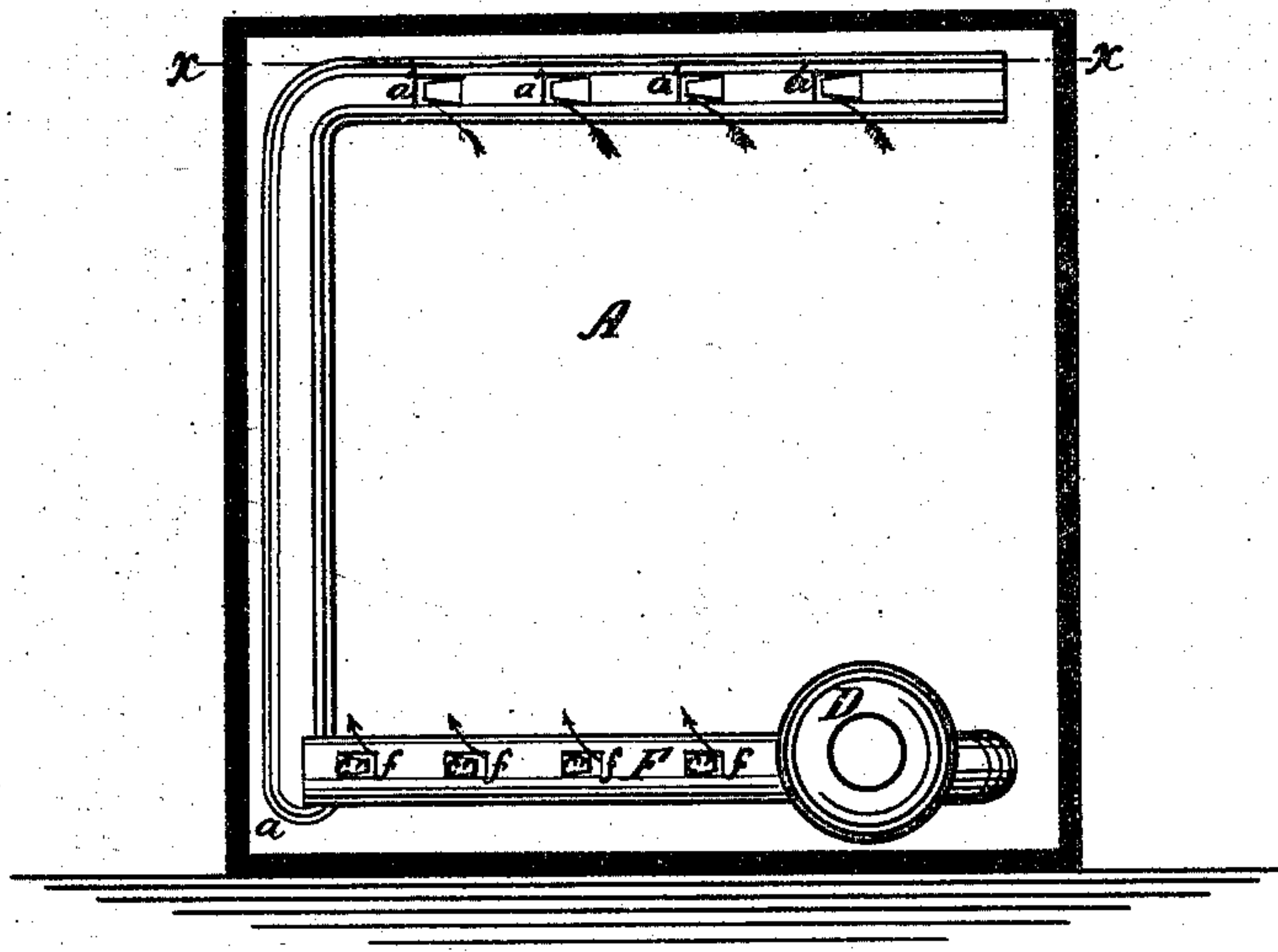


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

JOHN J. BATE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN REFRIGERATORS.

Specification forming part of Letters Patent No. **156,269**, dated October 27, 1874; application filed August 28, 1874.

To all whom it may concern:

Be it known that I, JOHN J. BATE, of Brooklyn, in the county of Kings and State of New York, have invented certain Improvements in Refrigerators, of which the following is a specification:

This invention comprises a self-feeding ice-reservoir closed at the top and on all sides, but provided at bottom with inlet and outlet air-passages nearly or quite on the same level, in combination with a fan-wheel or equivalent air forcing or exhausting apparatus, and a suitable refrigerating-chamber, closed against the access of external air. By this novel combination of parts the air is caused to pass in a horizontal current through the lower part of the ice-reservoir to be suitably cooled thereby, the ice melted by the action of the said current being continually replaced by that fed downward from the closed upper part of the reservoir, so that the proper quantity of ice, neither more nor less, is at all times brought in contact with the air-current aforesaid to cool or refrigerate the chamber. This, moreover, in conjunction with the fact that the flow of air through the ice is directly dependent upon the fan-wheel or equivalent mechanical agency, causes the circulation of the air through the ice to the chamber, and consequently the degree of its refrigeration bears a nearly-definite ratio to the power of the fan or the like, and may be regulated at will by varying the speed of the same.

The invention further comprises a novel combination of a warm-air-conducting pipe or passage and an ice-reservoir closed at top and at all sides, but provided at or near its bottom with inlet and outlet openings for the passage of a horizontal air-current through the lower part of the reservoir, by which means the warmer air from the upper part of the refrigerating-chamber is conveyed to the inlet-opening aforesaid, and the circulation of air throughout the refrigerating-chamber and an approximately-uniform temperature in all parts of the same are secured.

Figure 1 is a horizontal sectional view of a refrigerator made according to my invention, taken in the line of xx , Figs. 2 and 3. Fig. 2 is a vertical section of the same, taken in the

line zz of Fig. 1; and Fig. 3 is a similar section taken in the line yy of Fig. 1.

A is the refrigerating-chamber, containing the meat, fruit, vegetables, or other substances to be kept at a low temperature. B is the ice-reservoir, which, when in use, is to be filled to any requisite degree with ice in blocks or fragments. This ice-chamber is closed at all parts except at bottom, where, near its two ends, it is provided with two openings at a and b . The opening a is the air-inlet of the ice-reservoir, and b is the air-outlet of the same, the current of air forced through the ice, as hereinafter more fully set forth, being horizontal from a to b . Extending upward from the opening a is a pipe, C, the upper portion of which is turned to a horizontal position across the upper part of the chamber A, preferably diagonally from one corner to another. The upper or horizontal portion of this pipe is slotted at intervals along its length, as shown at a' , to permit the ingress of the warmer air at the top of the chamber A, this warmer air being then conducted outside of and apart from the ice-reservoir to the opening a at the bottom and one end of the said reservoir, whence, by the means hereinafter set forth, it is drawn horizontally through the bottom or lower part of the reservoir to the outlet-opening b , as shown by the arrow in Fig. 1. The outlet-opening b is in communication with the case of a fan-wheel at D, from which extends a distributing-pipe, F, laid upon or near the floor of the chamber, and provided with slots f at intervals along its sides. Within this pipe F, suitably adjacent to the slots f , are fixed deflecting-plates, so arranged that the air forced through and from the pipe F will be projected from the aforesaid slots f in jets or streams in various directions, and thus driven to all the lower portions of the chamber A. The pipe F is preferably arranged to extend diagonally from one corner to another of the chamber.

In the operation of the apparatus the fan-wheel D is set in motion by a small water-motor or other suitable power, and draws the air through and from the pipe C, horizontally through the lower portion of the ice-reservoir, and thence through the case of the fan-wheel to the pipe F, through the

slots *f*, provided with deflecting-plates *c'*, as set forth, of which it is projected laterally in various directions throughout the lower portion of the chamber A, the warmer air being thus drawn from the upper portion of the chamber, passed to and through the ice in the bottom of the reservoir B, being thereby cooled or refrigerated to the desired extent, and then in this cooled condition ejected to the chamber again at or near the floor, a circulation of the cooled air being, by this means, forcibly maintained throughout the entire chamber, the air at the upper part of the chamber, although warmer than that at the lower part, being kept at a temperature sufficiently reduced to prevent it from having any effect detrimental to the contents of the chamber. Inasmuch as the air during its passage through the reservoir B can only come in contact with the ice in the lower part of the said reservoir, the ice in the upper part thereof being wholly out of contact with the air-current, it follows that the ice in said upper part forms, as it were, a reserve, which, as fast as the ice in the lower portion melts, is caused to automatically descend, or be fed downward, to supply the waste of ice below.

By this means the quantity of ice actually presented to the current of air is always the same, and as there is thus no variation in the quantity of refrigerating material with which the air-current is brought in contact, and as this current is entirely dependent upon the fan-wheel or equivalent mechanical agency, it follows that the velocity of the current through the ice, consequently the degree of its refrigeration and the rapidity of its circu-

lation through the chamber A, may be readily regulated by a proper adjustment of the speed or working power of the fan or its equivalent.

The water resulting from the melting of the ice may be conducted from the ice-reservoir by means of a suitable opening in the bottom of the latter, or by a pipe leading to the street or to the sewer, or by any other of the well-known methods of permitting or insuring the outflow of waste water from the ice-reservoir of a refrigerating apparatus, such outlet being provided with the usual goose-neck or water-seal to prevent the inward passage of external air to the ice-reservoir.

What I claim as my invention is—

1. The combination of the self-feeding reservoir B, closed at top and at all sides, but provided at or near its bottom with inlet and outlet openings *a b*, the fan-wheel or equivalent air-forcing mechanism D, and the refrigerating-chamber A, closed against the access of external air, substantially as and for the purpose set forth.

2. The slotted pipe C, extended upward from the inlet-opening *a*, at or near the bottom of the self-feeding ice-reservoir B, and across the upper part of the chamber A, in combination with the fan-wheel or equivalent air-forcing mechanism and the pipe F, extending from the outlet-opening *b* of the aforesaid reservoir across the lower portion of the chamber, substantially as and for the purpose set forth.

JOHN J. BATE.

Witnesses:

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