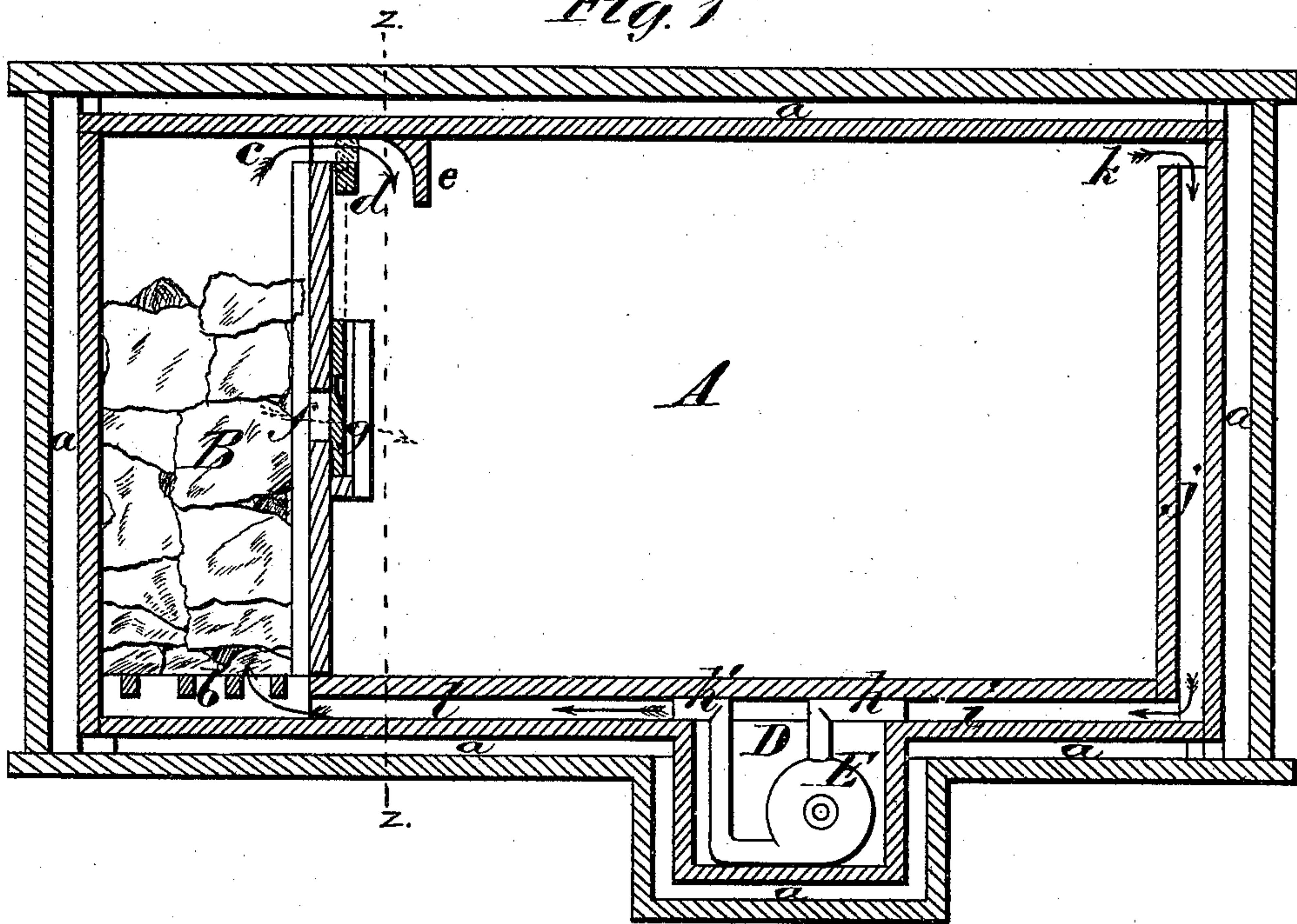


H. HUNGERFORD.  
REFRIGERATOR.

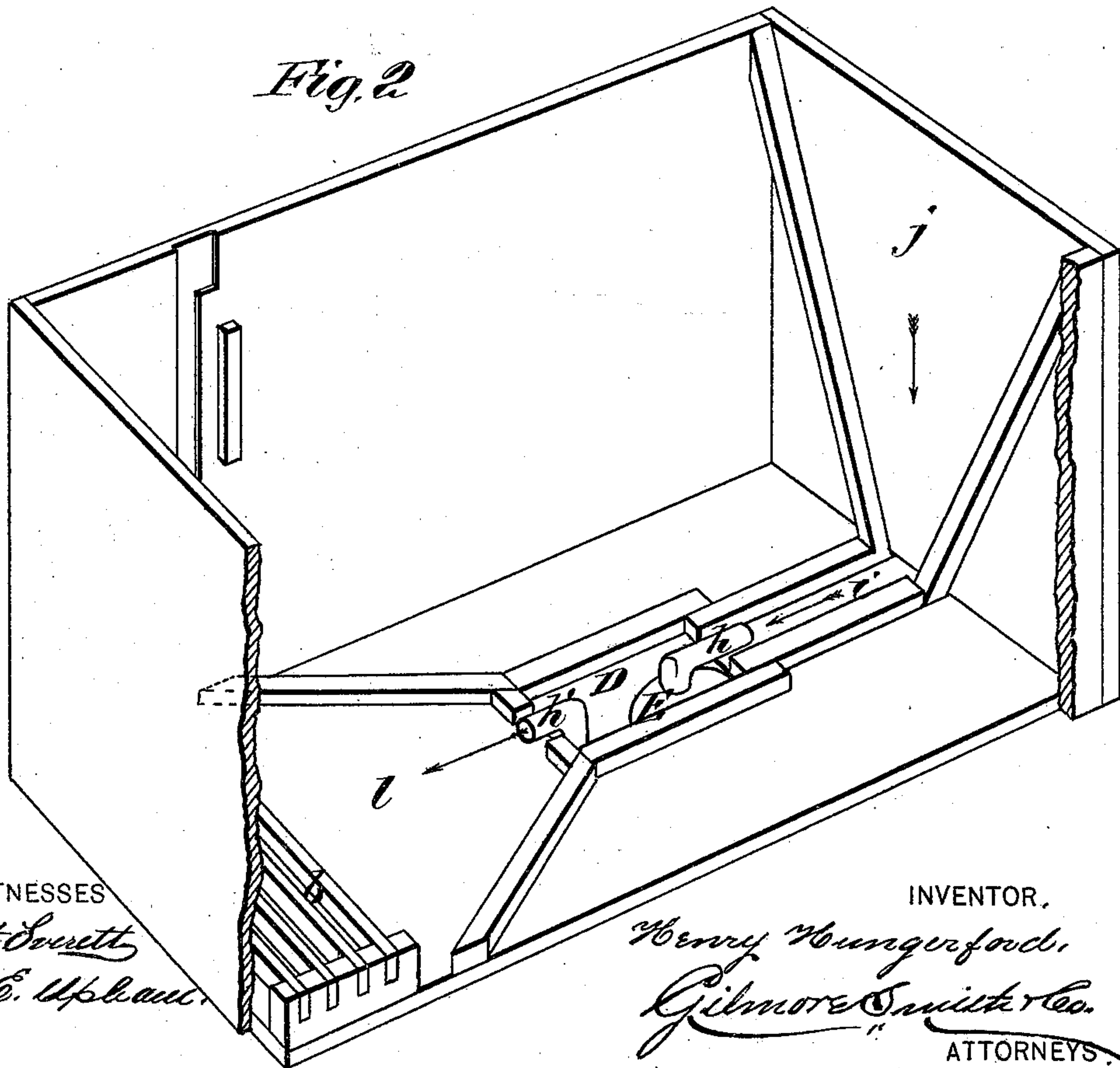
No. 173,639.

Patented Feb. 15, 1876.

*Fig. 1*



*Fig. 2*



WITNESSES

*Robert Barrett*  
*George E. Upshaw*

INVENTOR.

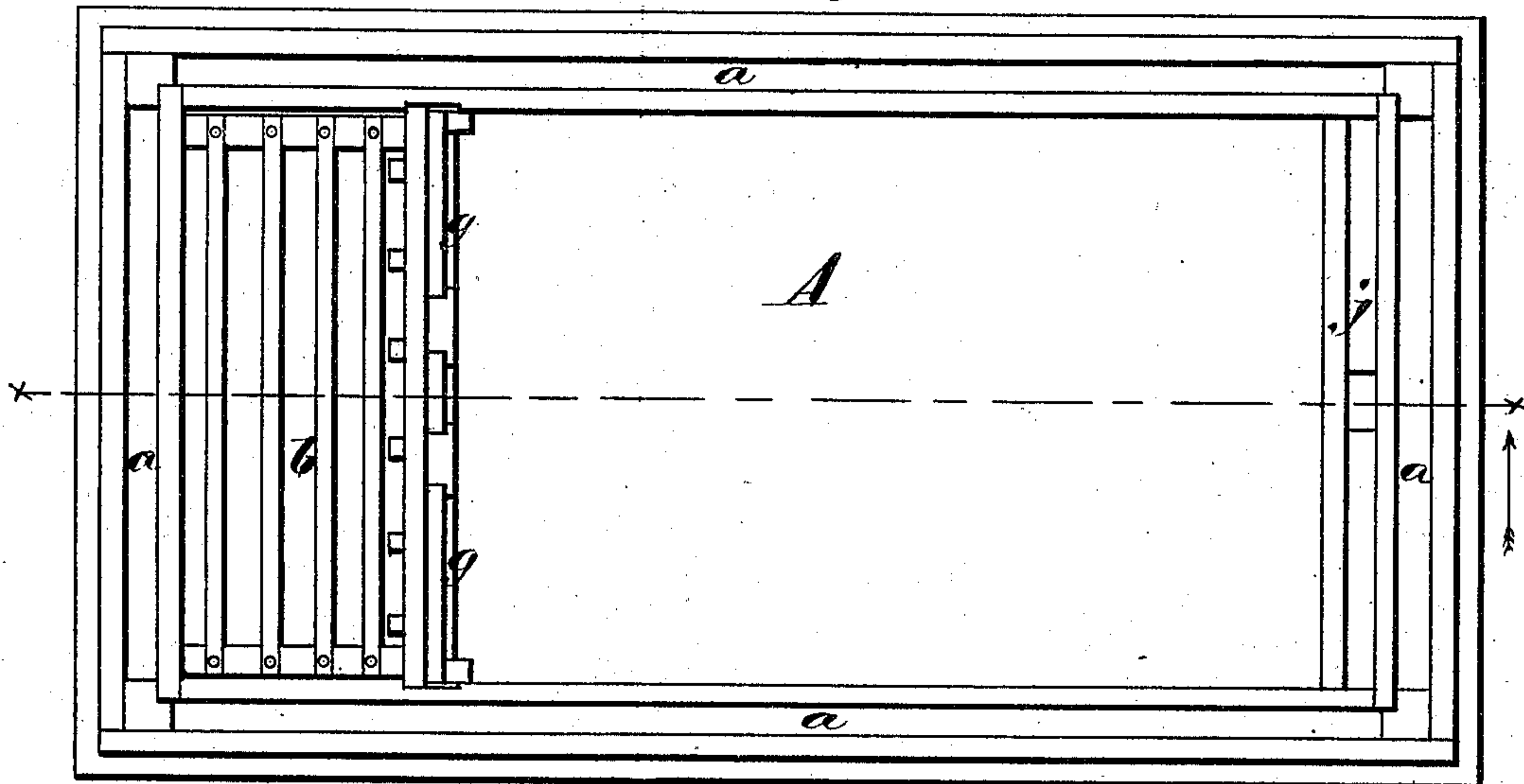
*Henry Hungerford,*  
*Gilmore & Smith & Co.*  
ATTORNEYS.

H. HUNGERFORD.  
REFRIGERATOR.

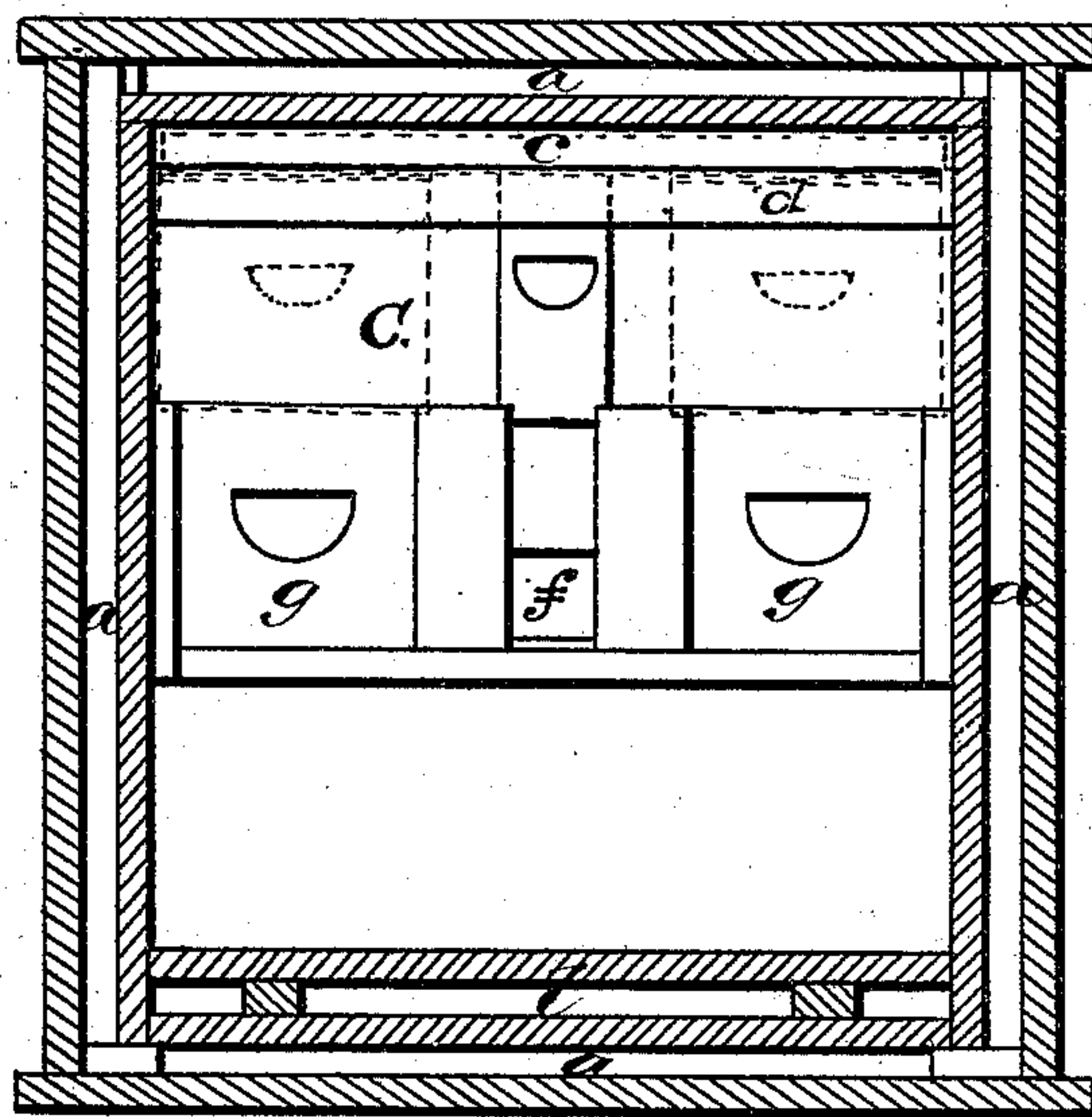
No. 173,639.

Patented Feb. 15, 1876.

*Fig. 3*



*Fig. 4*



WITNESSES

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# UNITED STATES PATENT OFFICE.

HENRY HUNGERFORD, OF NORWALK, CONNECTICUT.

## IMPROVEMENT IN REFRIGERATORS.

Specification forming part of Letters Patent No. **173,639**, dated February 15, 1876; application filed February 2, 1876.

*To all whom it may concern :*

Be it known that I, HENRY HUNGERFORD, of Norwalk, in the county of Fairfield and State of Connecticut, have invented a new and valuable Improvement in Refrigerating Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical section of my refrigerating apparatus, and Fig. 2 is a perspective view of the same, with section broken away. Fig. 3 is a plan view, and Fig. 4 a transverse vertical sectional view of the same, on the line *z z* of Fig. 1.

This invention has relation to means for cooling apartments, whether stationary or portable, and I design my invention especially for cooling railroad-cars, meat-houses, the holds of ships, and other rooms.

The nature of my invention and improvement consists in a novel arrangement and combination of an ice-receptacle, air-conduits, and an air-forcing engine, whereby air is drawn from the apartment being cooled, then forced up through the ice-receptacle, and thence forced, in a cool state, into the said apartment again at or near the highest part thereof.

Prior to my invention air-engines have been employed in connection with refrigerators for the purpose of inducing currents of air down through a chamber containing ice, and thence drawing the air upward through the apartment to be cooled. I have reversed this order of things, by forcing cold air directly from the ice-receptacle down into the cooling-apartment, and taking the vitiated air therefrom and forcing it back again through the ice, thus purifying and drying the air at each rotation, as will be understood from the following description, which shows my means for producing the result stated.

In the annexed drawings A designates the cooling-room of a meat-house, which I prefer to construct with double walls, forming a non-conducting air space, *a*, which, if desired, may

be filled with some material that is a poor conductor of heat. B designates an ice-receptacle which, in the drawings, is represented as arranged at one end of the cooling-room A, but which may be arranged at any other convenient place. The bottom of this ice-receptacle is grated as shown at *b*, and its upper end communicates with the room A by means of a passage, *c*, provided with a valve, *d*, and a deflecting plate, *e*. Below the passage *c*, one or more openings, *f*, are made through the division C, which are provided with closing slides, *g*. When slides *g* are fully raised they will move up the valve *d*, and shut the passage *c*, thus allowing the cold air to pass from the receptacle B directly into the room A at a point below the said passage *c*. D designates a receptacle in which is arranged an air-engine, E, of any suitable construction, and driven by any convenient motive power. The exhaust pipe *h* of this engine enters a narrow passage, *i*, which communicates with an upwardly flaring-space, *j*, the upper end of which is equal in width to the width of the room A, and communicates by means of a passage, *k*, with this room. The blast or discharge pipe *h'* enters a flaring space, *l*, which communicates with the ice-chamber B, beneath the grate *b*, as shown clearly in Fig. 1.

When the air-engine is in motion air will be drawn from the room A, as indicated by the descending arrows in Fig. 1, and forced up through the ice chamber and discharged into said room again, either through the passage *c* or through the opening *f*. When the air from the ice-chamber enters the room A through the passage *c*, it will be directed downward by the deflector *e*, so as to circulate generally through the room A.

What I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the air-passage *l*, leading under the grid, the ice-chamber B, and cooling-room A, I claim the air-deflector *e*, substantially as and for the purpose specified.

2. The air-passages *k j i l*, air-engine E, ice-chamber B, and air-passage *c*, combined with a cooling-room, A, substantially as described.

3. The passage *f* through division *c*, provided with slide *g*, in combination with the

valve *d* and induction-passage *c*, substantially as described.

4. The upwardly-flaring air-space *j*, provided with a passage, *k*, from the cooling-room, in combination with the narrow passages *i h h'* and flaring air-space *l*, substantially as described and for the purpose set forth.

5. The combination of the ice-chamber B, provided with lower valved air-passages, *f*, in

its division wall C, and cooling chamber A, substantially as described and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

HENRY HUNGERFORD.

Witnesses:

JOHN F. ACKER, Jr.,

EUGENE W. JOHNSON.