

W. BRAY.
Refrigerating Apparatus for Vessels, Railway-
Cars, &c.

No. 136,484.

Patented March 4, 1873.

Fig. 2.

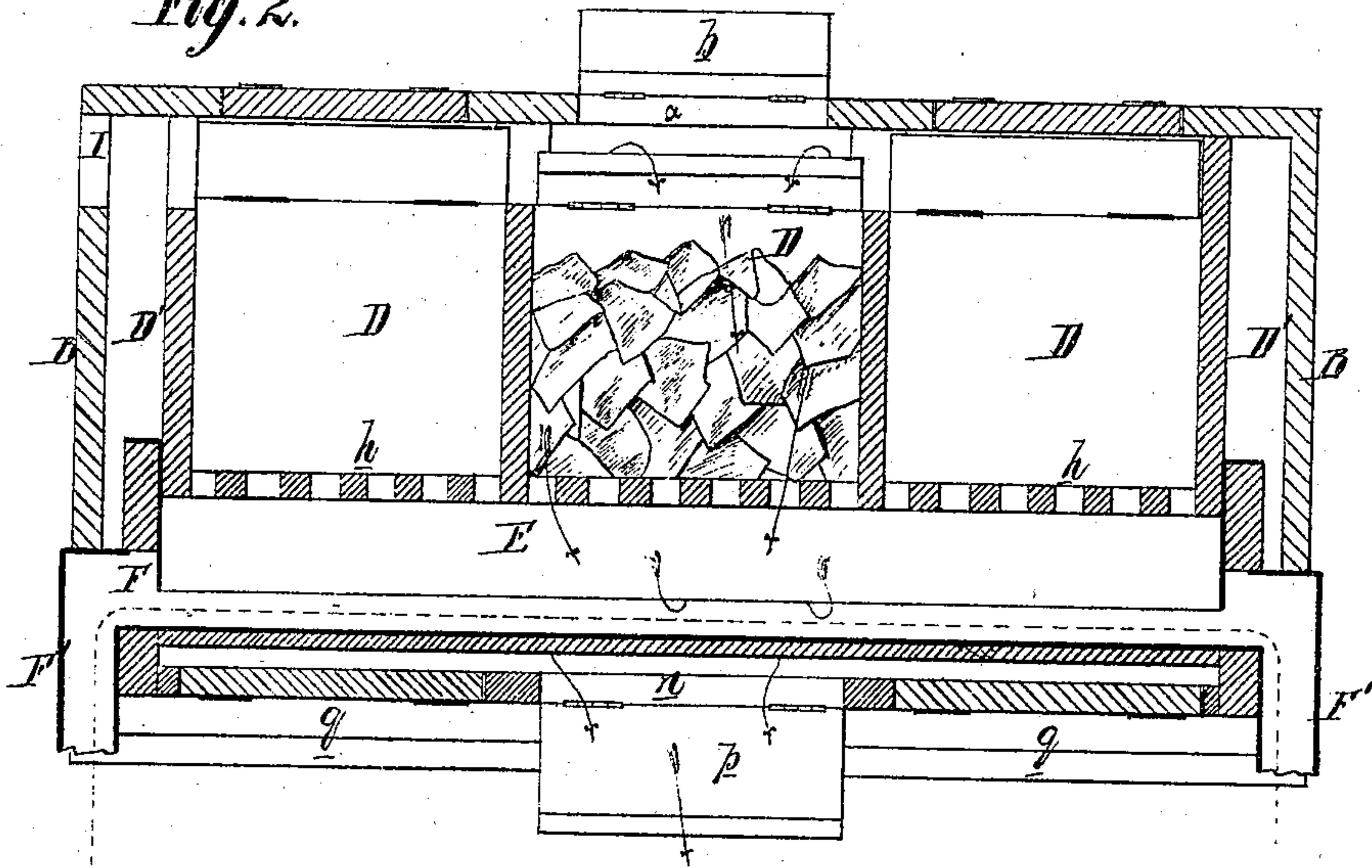


Fig. 1.

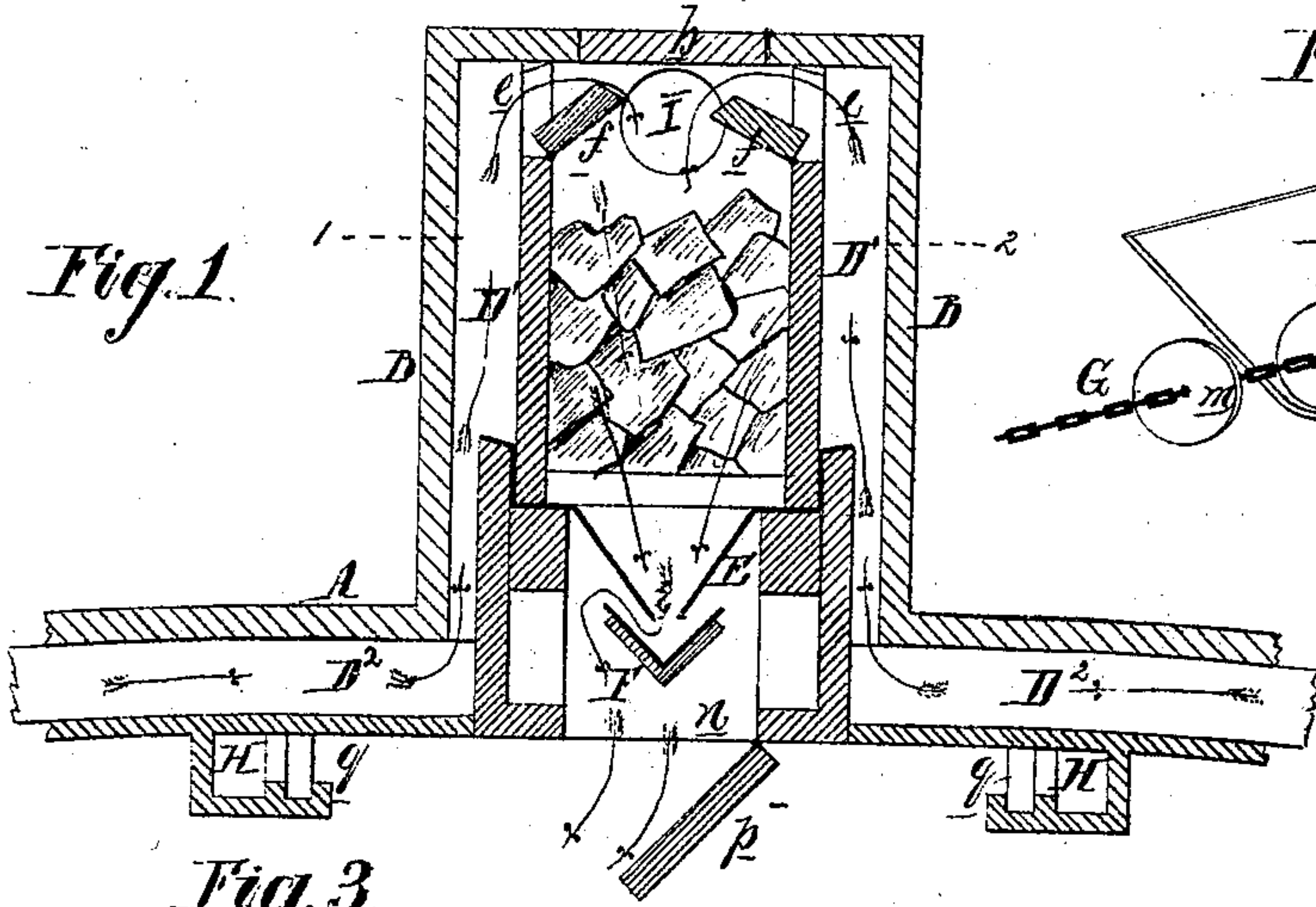


Fig. 4.

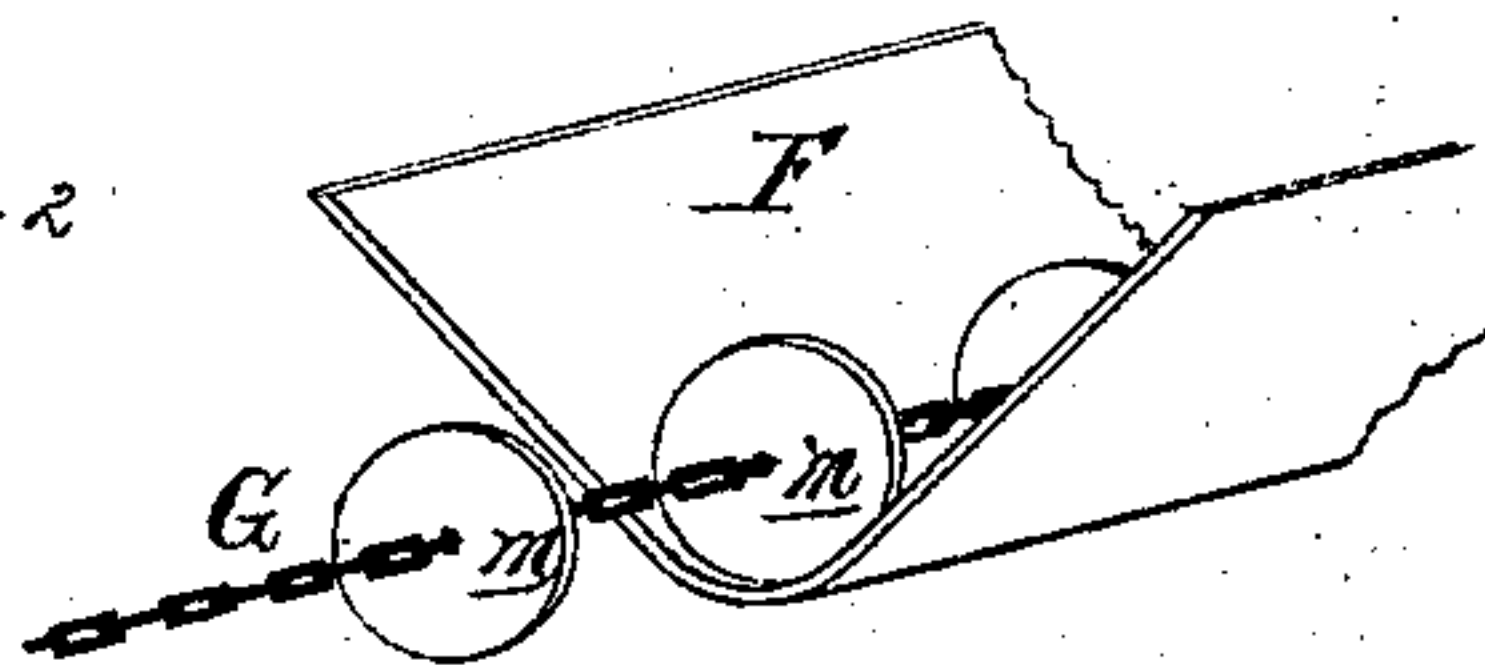
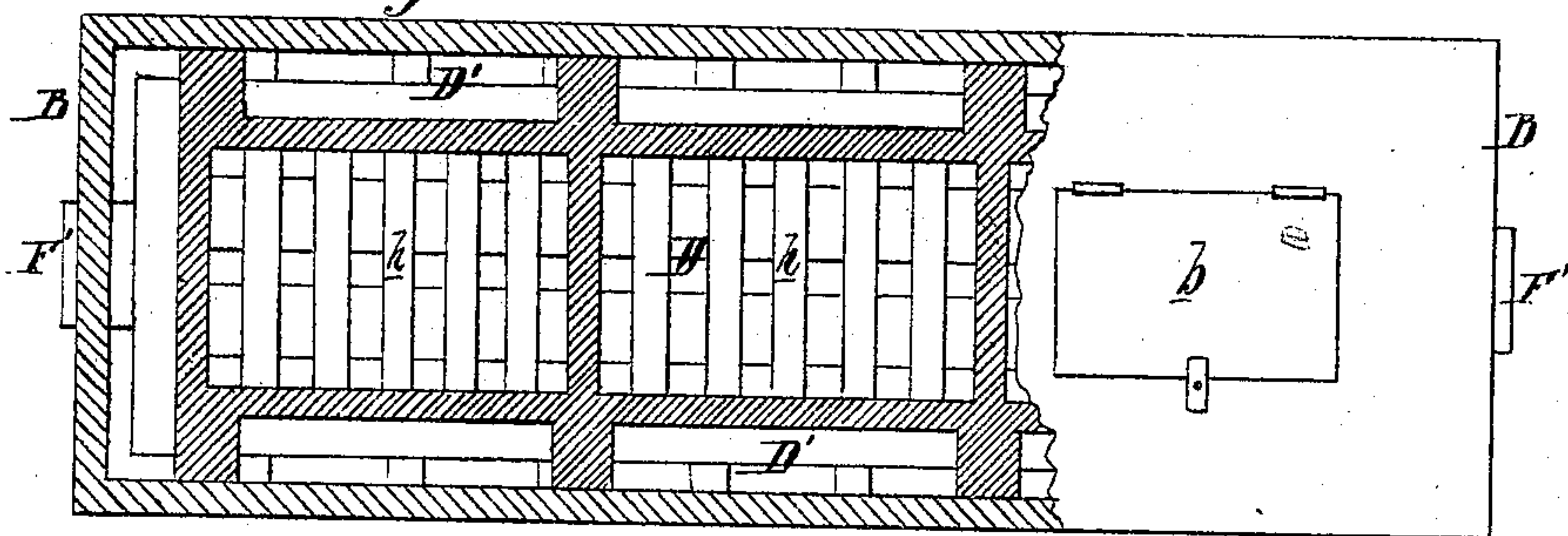


Fig. 3.



Witnesses.

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WILSON BRAY, OF LAMBERTVILLE, NEW JERSEY.

IMPROVEMENT IN REFRIGERATING APPARATUS FOR VESSELS, RAILWAY CARS, &c.

Specification forming part of Letters Patent No. 136,484, dated March 4, 1873.

To all whom it may concern:

Be it known that I, WILSON BRAY, of Lambertville, Hunterdon county and State of New Jersey, have invented a Refrigerating Apparatus for Vessels, Railroad Cars, Preserving Warehouses, and other structures, of which the following is a specification:

The object of my invention is the preservation of perishable articles of diet for storage or during transportation between distant points, and this object I attain by the combination of certain refrigerating-chambers, ice-boxes, and passages, and by the maintenance in the said chambers of a constant natural or forcible circulation of air, in a manner too fully described hereafter to need preliminary description.

Figure 1 is a transverse vertical section of the refrigerating apparatus as applied to a vessel; Fig. 2, a longitudinal vertical section on the line 1 2, Fig. 1; Fig. 3, a plan view, partly in section; and Fig. 4, a detached view of part of the apparatus.

A represents the deck of a vessel, on which is built the refrigerating structure; this consists of an outer casing, within which is arranged any desired number of ice-boxes, D D D, there being between the sides of each ice-box and the exterior casing passages D¹ D¹, communicating with passages D² D² below the deck. In the top of the exterior casing, above each ice-box, is an opening, *a*, closed by a door, *b*, which is raised when the ice-boxes have to be replenished. Each side passage D¹ communicates with the ice-box through an opening, *e*, which can be closed by a door, *f*. All the ice-boxes communicate through grated bottoms *h* with a drip, E, common to all the ice-boxes, this drip consisting of a sheet-metal casing with converging sides, terminating at an opening, through which the water as it passes from the ice drops into a long trough, F, communicating with pipes F', through which the waste water is carried off. It becomes necessary from time to time to clean from the trough or channel F sawdust and other foreign matter which accompanies the ice and is carried therefrom with the water as the ice melts. This clearance I effect by means of a rope or chain, G, to which are attached disks *m*, bearing upon the bottom of the trough, as shown in Fig. 4. By pulling this chain from time to time,

the sawdust and other impurities are carried off by the disks to the waste-pipes F'. Each ice-box communicates through a passage, *n*, with a refrigerating-chamber built beneath the deck, there being as many refrigerating-compartments as the size of the vessel and other circumstances may suggest. The communication between the ice-box and the refrigerating-chamber may be closed when necessary by a door, *p*. Beneath the deck are passages H H, communicating with the exhaust-opening of a fan-blower or other equivalent pneumatic apparatus, the discharge-opening of which communicates through any convenient system of pipes or passages with an opening, I, in the structure containing the ice-boxes. The communication between any one or more of the refrigerating-chambers and the passages H can be closed by sliding valves *q*, Fig. 1, or other equivalent appliances. Each refrigerating-chamber communicates with the side passage D¹ of the casing B.

The meat, vegetables, &c., having been properly stored in the separate refrigerating-chambers, all communications between the latter and the external air are closed, the top of the casing B being also closed. The air from the refrigerating-chambers ascends through the passages D¹, as indicated by the arrows, enters the ice-boxes through the opening *e*, and passes downward through the ice or freezing mixture into the top of the refrigerating-compartments at a low temperature acquired by contact with the ice, and this air descending drives out the warmer air below, and expels it through the pipes or passages communicating with the passages D¹ of the structure containing the ice-boxes; thus a constant circulation is maintained through the refrigerating-chambers, and the contents maintained in the low temperature necessary for their preservation. It is desirable that there should be separate refrigerating-compartments, each having its own ice-box, as some articles are more perishable than others, and demand a lower temperature. When the articles in any one or more of the compartments are rendered so cold for the time being that a further consumption of ice would be unnecessary, the doors *p* of such chambers may be closed and the supply of ice to its ice-box discontinued. When meat-vegetables, &c., are stowed in the compart,

ments in the first instance a more prompt cooling of the same may be necessary than that which is acquired by the natural circulation of the air described above. In such cases I resort to a forcible artificial circulation, by starting the blowing-fan referred to above, so as to exhaust the air from the passages H and drive it through the opening I into the casing B above the ice-boxes, at the same time opening the sliding valves *q* of the refrigerating-chambers, through which a forcible circulation is desired, taking care, however, to close the communications between the passages D¹ and the ice-boxes by the door *f*. As fast as the air is exhausted from the chambers that cooled by contact with the ice takes its place, and as the temperature of this air is raised it rushes through the passages H and into the casing B above the ice-boxes, to be again cooled before it again enters the refrigerating-chambers. The temporary maintenance of this forcible circulation is especially necessary when meat, vegetables, &c., are stored in the chamber in a warm climate.

The economical construction of the ice-box is secured and leakage at the same time prevented by forming the drip E with shoulders, on which the sides rest, and carrying the sides or flanges of the drip upward outside the sides of the box, as shown in Fig. 1.

Although I have described my invention as applied to a vessel, it is equally applicable to railroad cars, or to buildings for storing perishable articles; and in adapting my invention to different vessels and other structures it may be advisable to depart from the arrangement of parts described above; I therefore do not

desire to restrict myself to the specific construction of parts herein described; but

I claim—

1. The combination with a vessel or other structure of refrigerating apparatus, consisting of a series of refrigerating-chambers, one or more ice-boxes, and passages, all arranged and communicating substantially as described, so as to create and maintain a circulation of air through any or all of said chambers, passages, and boxes.

2. The combination of the said refrigerating apparatus with a fan-blower or other equivalent pneumatic apparatus, for maintaining a forcible circulation of air through the ice-box, passage, and chamber, in the manner described.

3. The combination, with the trough F, of a rope or chain, G, having disks *m m*, or their equivalents.

4. The combination of the refrigerating-chamber, ice-box communicating with the chamber at the top, and the passages H, all as set forth.

5. The combination, with the ice-box, chamber, and passages H, of the passage I, as specified.

6. The combination of the drip E, its shoulders, and flanges with the sides of the ice-box.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILSON BRAY.

Witnesses:

WM. A. STEEL,

HARRY W. DOUTY.

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