

(No Model.)

2 Sheets—Sheet 1.

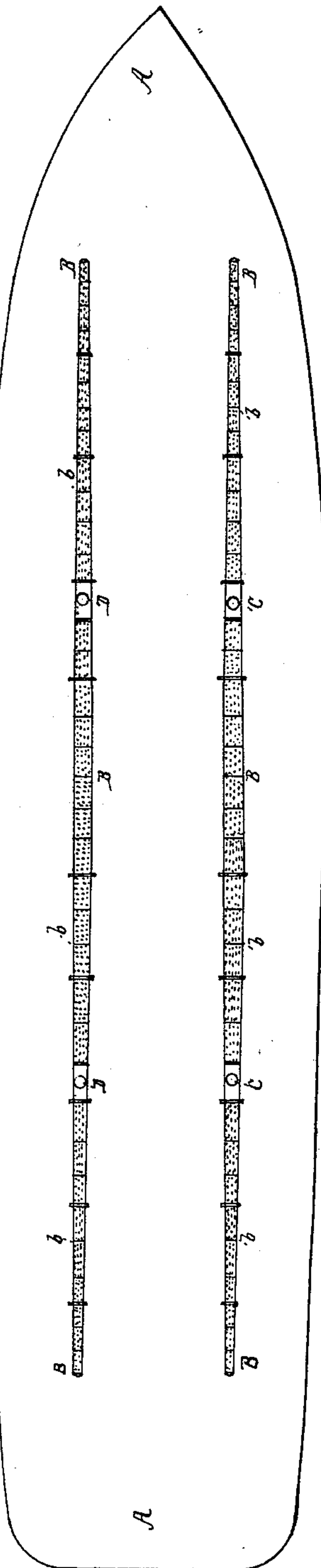
G. S. DODMAN.

APPARATUS FOR VENTILATING SHIPS' HOLDS.

No. 368,196.

Patented Aug. 16, 1887.

Fig. 1.



Witnesses:
F. Barrett,
David McKee

Fig. 2.

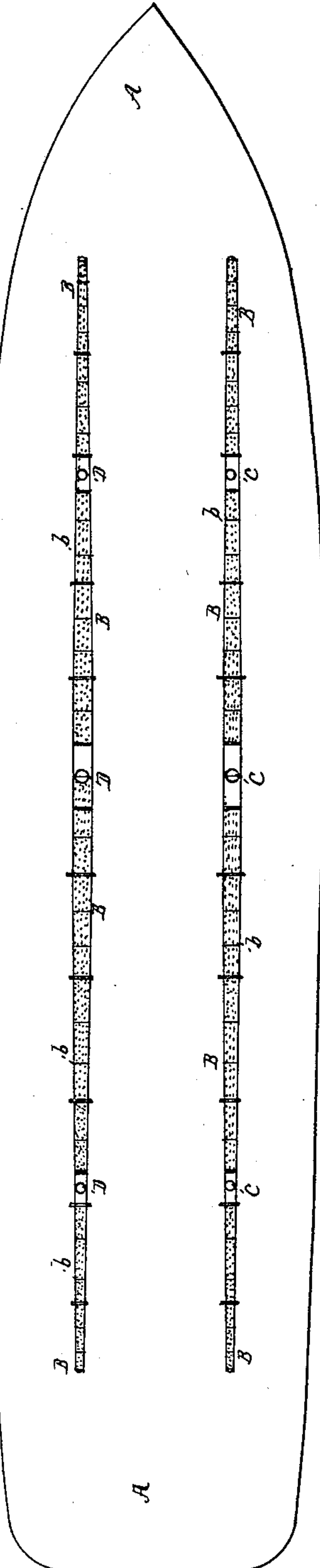
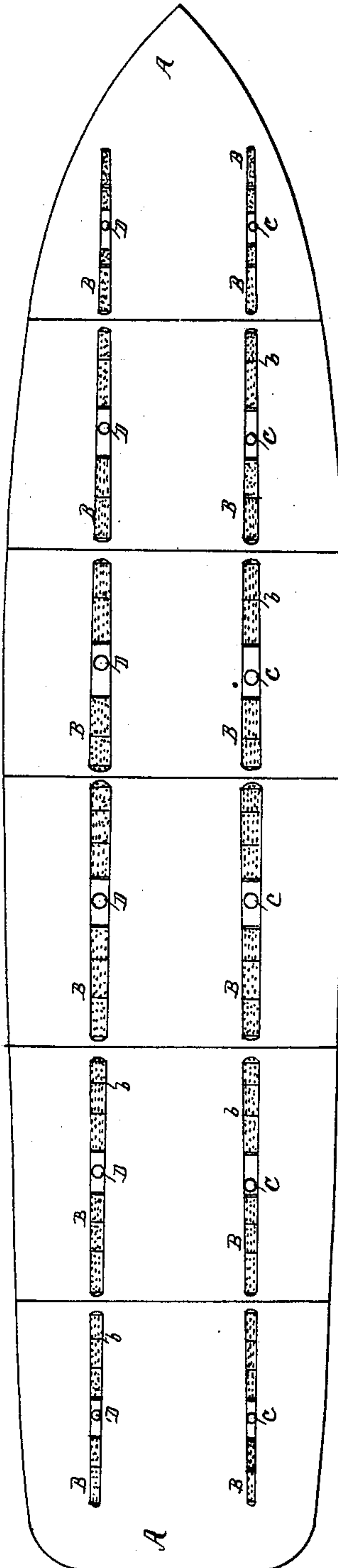


Fig. 3.



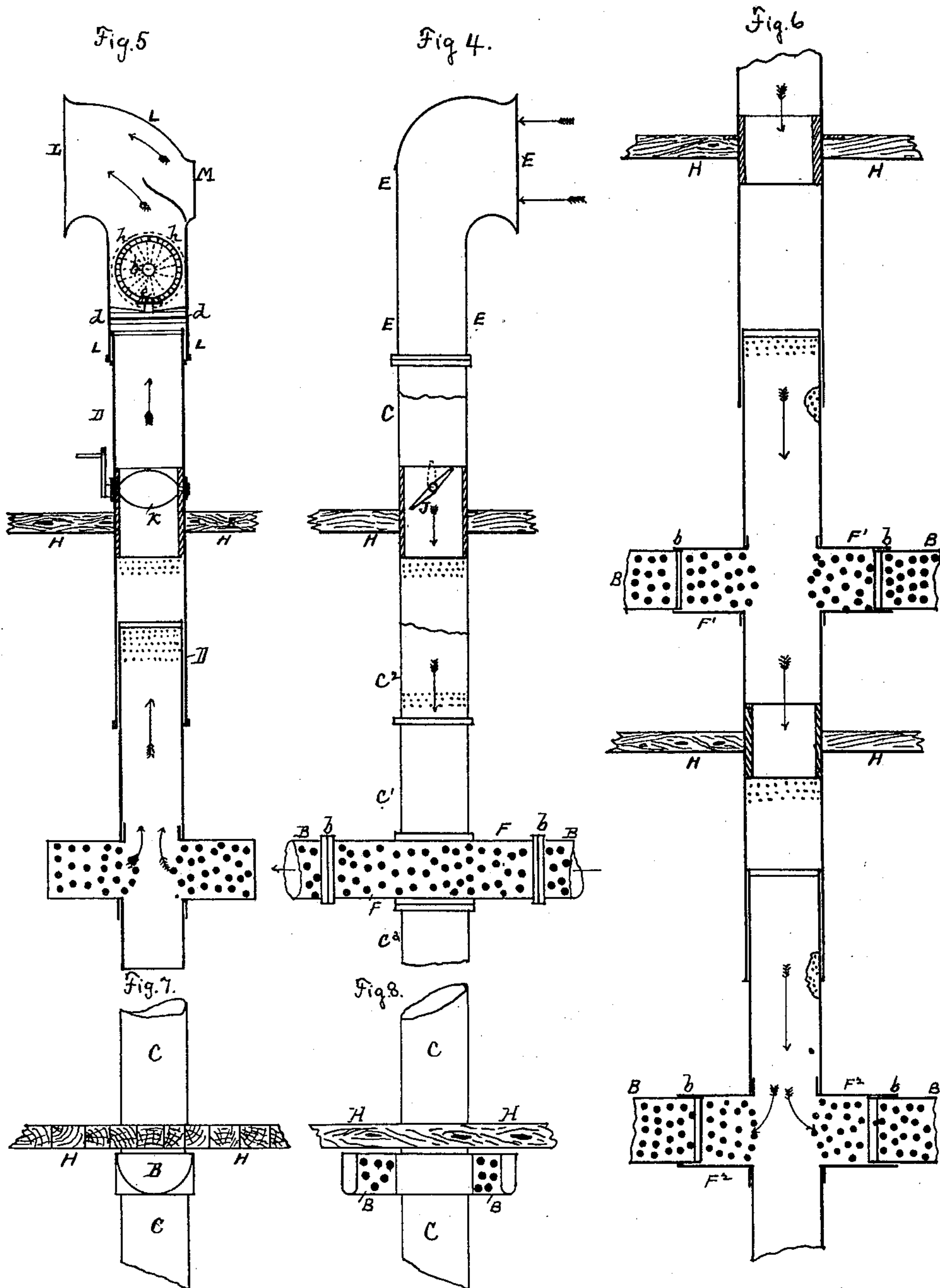
Inventor:
George Sutherland Dodman
Per: James H. Lancaster - Atty.

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UNITED STATES PATENT OFFICE.

GEORGE SUTHERLAND DODMAN, OF LIVERPOOL, COUNTY OF LANCASTER,
ENGLAND.

APPARATUS FOR VENTILATING SHIPS' HOLDS.

SPECIFICATION forming part of Letters Patent No. 368,196, dated August 16, 1887.

Application filed March 31, 1886. Serial No. 197,359. (No model.) Patented in England October 11, 1884, No. 13,449.

To all whom it may concern:

Be it known that I, GEORGE SUTHERLAND DODMAN, of 81 Tower Buildings, Water street, Liverpool, in the county of Lancaster and in the country of Great Britain, have invented certain new and useful Improvements in Apparatus for Ventilating Ships' Holds, applicable to coal and other cargoes; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object the prevention of noxious, injurious, or dangerous gases accumulating in ships' holds or between decks and cargoes, particularly in the holds of ships carrying coal cargoes and grain cargoes. Such a prevention of accumulation obviates all liability of explosion or damage of goods or cargoes, as the case may be.

My invention consists as follows: Tubes are laid in the hold somewhat below the center of the cargo. These tubes are in sections, and are made of sheet-iron, perforated according to position, say from three to six inches apart, and sufficiently strong to resist any ordinary pressure. Each section is provided with iron bands to strengthen same. The end band is fitted to form a flange for the next section. The end of extreme sections has a perforated cap. The sections are so constructed that when not in use every other one telescopes into the larger section, thus occupying little space when stowed away. The downcast and upcast shafts are fitted in the fore and aft tubes, and can be regulated to any tube, as occasion may require. The downcast and upcast shafts under the deck are made in two pieces of telescopic form, to prevent any strain should the cargo settle, also to allow the fitting of the fore and aft tubes without any exact level being required. Both upcast and downcast are perforated, so that the deck-sections can be changed at will, and so that the gas and heat accumulated under the deck may be withdrawn. In the upcast and downcast pipes are fitted valves which can be closed at will from the outside, when necessary—for instance, in case of heavy weather suddenly coming on. They can also be used to regulate or stop the upcast when it is necessary to force a circulation of air through

the entire cargo. On the valve-shaft outside is a catch to regulate the draft or hold the same in position when closed. The downcast-pipe is provided with a bell-mouth fitted to work in any direction to catch the wind, also handles to unship same or regulate at will. The upcast is similar in formation to the downcast, but has a back-draft cowl, and has a stay fitted inside to hold a stud. On this stud is worked an inside fan, formed so as to draw the largest possible quantity of gas or heat from the entire hold through the upcast, and on this stud is fitted a small bevel-wheel, which is driven by a second bevel-wheel fitted on a spindle worked in a bush fitted in the side of the upcast shaft. This mechanism is driven from the outside on the same shaft by a fan or fans capable of catching the wind without regulating every time the wind changes a point. A back-draft cowl may be applied to help the up current to clear itself speedily and create an extra draft for the inside fan. The outside fans are arranged to unship when the ventilators are required to be stowed away. The downcast and upcast can be reversed at will, according to the position of the wind, or as occasion may require, or the fan can be arranged to be driven by hand.

In applying my invention to a double-decked ship the construction of apparatus is similar to that before described, only that it is continued from one hold to the other, with an addition in the between-decks shaft of a slide to close the pipes of each shaft when required. The object of this is, say, in the downcast, that the wind may not be sufficiently strong to fill the entire ship, so the between-decks can be closed and the air conveyed to the lower hold. At the same time the upcast deck-valve can be regulated or closed and effect a complete distribution of air throughout the lower hold. By my invention an uninterrupted current of air is caused to pass through the entire ship and cargo, displacing gas and heat that may have been generated, and so preventing possibility of fire or explosion.

The foregoing being the general description of the nature, object, and purposes of my invention, I will now proceed to set forth the

same more clearly by the aid of the two sheets of drawings hereto annexed, and which form part of this specification.

The drawings are marked with figures and letters of reference corresponding with those in the following explanation, like letters and figures being used to denote the same or corresponding parts throughout the various views.

Figure 1 is a plan of a between-decks or hold of a ship provided with apparatus according to my invention. Fig. 2 is a modification of Fig. 1. Fig. 3 is a plan of a ship's between-decks or hold divided into compartments by bulk-heads, each compartment being provided with apparatus according to my invention. Fig. 4 is an elevation of the downcast shaft according to my invention; partly in section, shown connected to the fore and aft pipes in the between-decks or hold. Fig. 5 is a sectional elevation of the upcast shaft according to my invention. Fig. 6 is a sectional elevation of the continuation of either the upcast shaft or downcast shaft. Fig. 7 illustrates the shape of pipe I employ when placing my system for ventilating immediately under the deck. Fig. 8 is a side elevation of Fig. 7.

Upon reference to the drawings, Figs. 1, 2, and 3, it will be seen A is a plan outline of a ship, and may represent the between-decks or any of the holds. According to my invention I place in the hold and somewhat below the center of the cargo the system of tubes B, decreasing in size toward the ends of the vessel. These tubes are constructed in sections, and are made of sheet-iron and are perforated with holes throughout their length. Each section or length is provided with iron strengthening-bands *b*. The end band of each section is so fitted as to form a flange for the next section, as shown at Fig. 4, and the extreme ends are provided with perforated caps. The sections or lengths of tubes are made of such diameter that when not in use No. 1 will ship into No. 3 and No. 2 will ship into No. 4, and so on, thus occupying little space when stowed away.

In connection with the tubes B, which are laid in duplicate, as shown in Figs. 1, 2, and 3, I provide downcast and upcast shafts—namely, one line of tubes has downcast shafts, the other line of tubes has upcast shafts—the shafts being constructed, as hereinafter described, so that by changing the cowls or above-deck lengths they can be changed from upcast into downcast or from downcast into upcast. C are the downcast shafts and D are the upcast shafts, or their position may be reversed. These shafts extend from the upper deck to the bottom timbers of the ship, so that in cases of an emergency they can be used not only as ventilating-shafts, but as leads for bilge-pumps or fire-engine pumps.

The construction of the downcast will be understood upon reference to Fig. 4. It con-

sists of a vertical tube, C, which is surmounted by a cowl, E, the mouth of which is always kept facing the wind. The tube C is made in sections telescoping one within the other—namely, the section C' telescopes into the section C², the upper part of C' being perforated, and the lower part, C², being perforated, so that when extended the perforations are open. The upper part of the section C² is also perforated under the deck H, as shown. F is a cross piece or section which connects the downcast C to the horizontal pipes B. By moving the cross-piece F the section C' will draw down and fit over the section C², and in like manner to that above described the downcast C may be in connection at the same time with each system of pipes within each of the decks or hold through the cross-pieces F F' F², as shown at Figs. 4 and 6, or any one system of pipes of the series may be disconnected by removing its cross-connecting piece and dropping the telescope-section of the shaft C. The shaft C is provided with a valve or damper, J, by which the shaft can be closed or the draft of air therethrough regulated. The upcast shaft D is of similar construction to the downcast shaft C—namely, it is provided with cross-pieces for connecting it to its pipes B, and is perforated and made to telescope in sections, the same as the downcast C. It is also provided with a valve or damper, K, by which the passage of air through it can be regulated, or by which it can be closed altogether. The cowl L of the upcast is placed with its back to the wind and is provided with a back-draft cowl, M, and with a suction-fan, *d*. This suction-fan *d* is driven by a bevel pinion and wheel, *e*, which receives motion from a wind-propeller, *h*, which is carried by the spindle *i* of the bevel-wheel *e*. This propeller *h* is in duplicate, one on each side of the cowl L.

When it is desirable, as in the case of ventilating saloons and passenger-decks on board ship, and also cattle-steamers, that the pipes B should be as much as possible out of the way, I make the pipes B semi-cylindrical in section, and place them close under the deck H, as shown at Figs. 7 and 8.

Having now particularly described the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an apparatus for ventilating ships, the perforated tubes B, constructed in sections tapered from end to end, and provided with strengthening-bands *b*, and perforated caps, in combination with the upcast shafts C, downcast shafts D, and vessel A, substantially as and for the purpose set forth.

2. In an apparatus for ventilating ships, the combination of the perforated vertical tubes D, arranged telescopically, in combination with the horizontal telescopic tubes B, substantially as and for the purpose set forth.

3. In an apparatus for ventilating ships,
the combination of the horizontal perforated
tubes B, telescopic in arrangement, the down-
cast telescopic shafts C, with damper J, the
5 cowl E, and the upcast telescopic shaft D, with
cowl M, substantially as and for the purpose
set forth.

In testimony that I claim the foregoing I
have hereunto set my hand this 10th day of
October, 1885.

GEORGE SUTHERLAND DODMAN.

Witnesses:

HARRY E. BELK,
ARTHUR H. BELK.