2 Sheets—Sheet 1.

B. F. DELANO.

Ventilating Ships.

No. 203,005. **Patented April 30, 1878.**

Fig. 1.

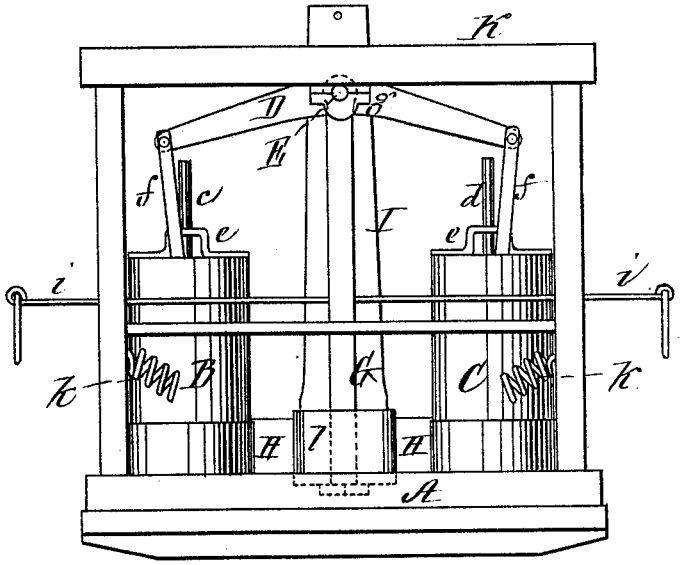
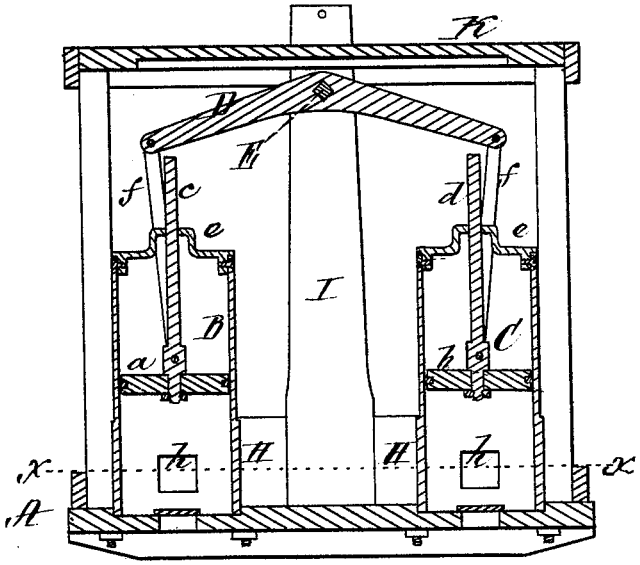


Fig. 2.



Witnesses,
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D. B. Loring

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2 Sheets—Sheet 2.

B. F. DELANO.

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Fig. 3.

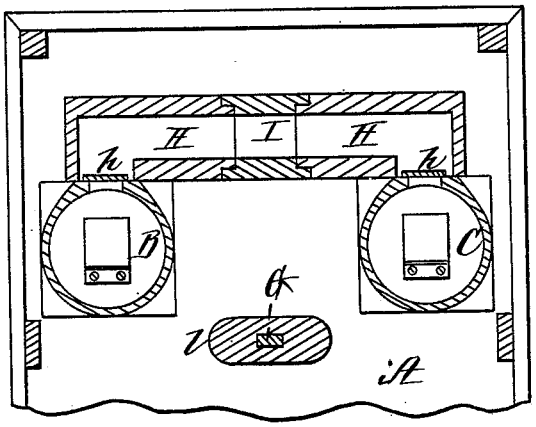
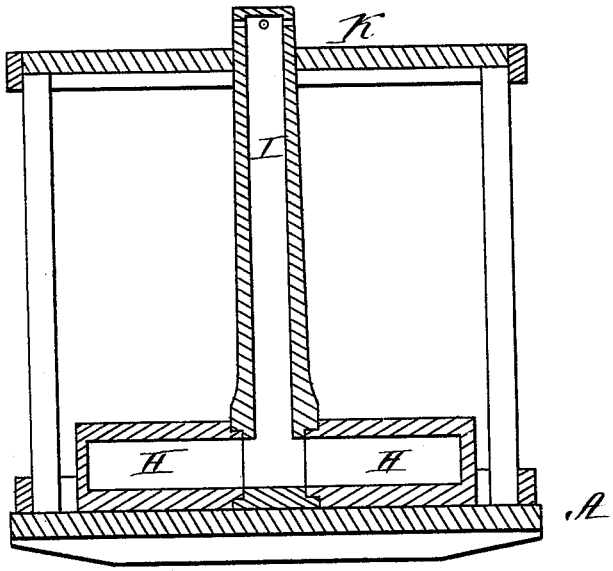


Fig. 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. DELANO, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN VENTILATING SHIPS.

Specification forming part of Letters Patent No. **203,005**, dated April 30, 1878; application filed March 26, 1878.

To all whom it may concern:

Be it known that I, BENJAMIN F. DELANO, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improved Method of Ventilating Ships, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of my apparatus for ventilating ships. Fig. 2 is a vertical section through the center of the same. Fig. 3 is a horizontal section on the line *x x* of Fig. 2. Fig. 4 is a vertical section through the discharge-pipe and its branches.

The ordinary ship's ventilators now in use are objectionable for the reason that they fail properly to relieve the hold and "between decks" of the foul air and gases generated therein, which are injurious to the cargo, hasten the decay of the wood; and, where the cargo consists of soft coal, these gases, if not allowed to escape, are liable to produce spontaneous combustion.

My invention has for its object to provide a simple and effectual means of exhausting the foul air and gases from between the decks and from the hold of a vessel, thus allowing of the introduction of a constant supply of fresh air to take the place of the impure air expelled; and my invention consists in the adaptation to a vessel of an air-pump, operated by a weighted arm, vibrated automatically by the motion of the vessel, the pump being provided with inlet and exhaust passages, through which the foul air is drawn up out of the vessel and discharged outside thereof, fresh air being supplied through suitable apertures to take the place of that discharged.

To enable others skilled in the art to understand and use my invention, I will proceed to describe the manner in which I have carried it out.

In the said drawings, A represents the upper deck of a vessel, upon which is firmly secured an air-pump having two cylinders, B C, to the pistons *a b* of which are secured the piston-rods *c d*, which run in guides *e*, and are united, by means of connecting-rods *f*, to the beam or lever D, which is secured to a horizontal rock-shaft, E, supported in suitable bearings *g*, and to this rock-shaft is secured a weighted arm, G, which is arranged to swing from side to side, like a pendulum, as the vessel rocks, and thus automatically operate the air-pump, the inlet-valves of which communicate with the space below the upper deck A or other part of the interior of the vessel.

The exhaust-valves *h h* of the cylinders B C communicate with horizontal branch pipes or conductors H H, which are connected with a vertical pipe or conductor, I, which extends up through the top K of the house on deck, as shown; and thus, as the air-pump is operated, the foul air or gas which may collect in the space between the decks or in the hold or other portion of the vessel in communication with the pump is exhausted or drawn out, and is discharged through the pipe I, the top of which is provided with one or more outlet-apertures.

As the foul air is exhausted by means of the air-pump, as described, its place is supplied with pure fresh air, which is admitted through any suitable apertures, which should be properly protected to exclude water, and by this means the most perfect ventilation is secured, and all of the objections incident to the use of ordinary ventilators entirely avoided.

If desired, an air-pump having one cylinder only may be employed; but I prefer two, as described.

Instead of both cylinders communicating with the space between decks, as shown, one of them may communicate through a suitable pipe or conductor with the hold or other portion of the interior of the vessel, and the air-pump can thus be arranged and applied so as to exhaust or draw the impure air from any desired portion of the vessel.

Instead of operating the air-pump automatically by the motion of the vessel, as shown, it may be connected with and operated by a steam-engine or other motor; or it may be actuated by hand-power applied to the rods *i i* attached to the swinging arm G, or in any other suitable manner.

k k are springs or buffers, against which the weight *l* of the arm G strikes, and by which the concussion is relieved.

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

The combination, with the cylinders B C of an air-pump, of the swinging weighted arm G, connected by suitable mechanism therewith, and operated automatically by the motion of the vessel, substantially as described, for the purpose set forth.

Witness my hand this 22d day of March, A. D. 1878.

BENJAMIN F. DELANO.

In presence of—
N. W. STEARNS,
P. E. TESCHEMACHER.