2 Sheets—Sheet 1.

F. L. NORTON.

Ventilating Buildings, Vessels, &c.

No. 216,804. **Patented June 24, 1879.**

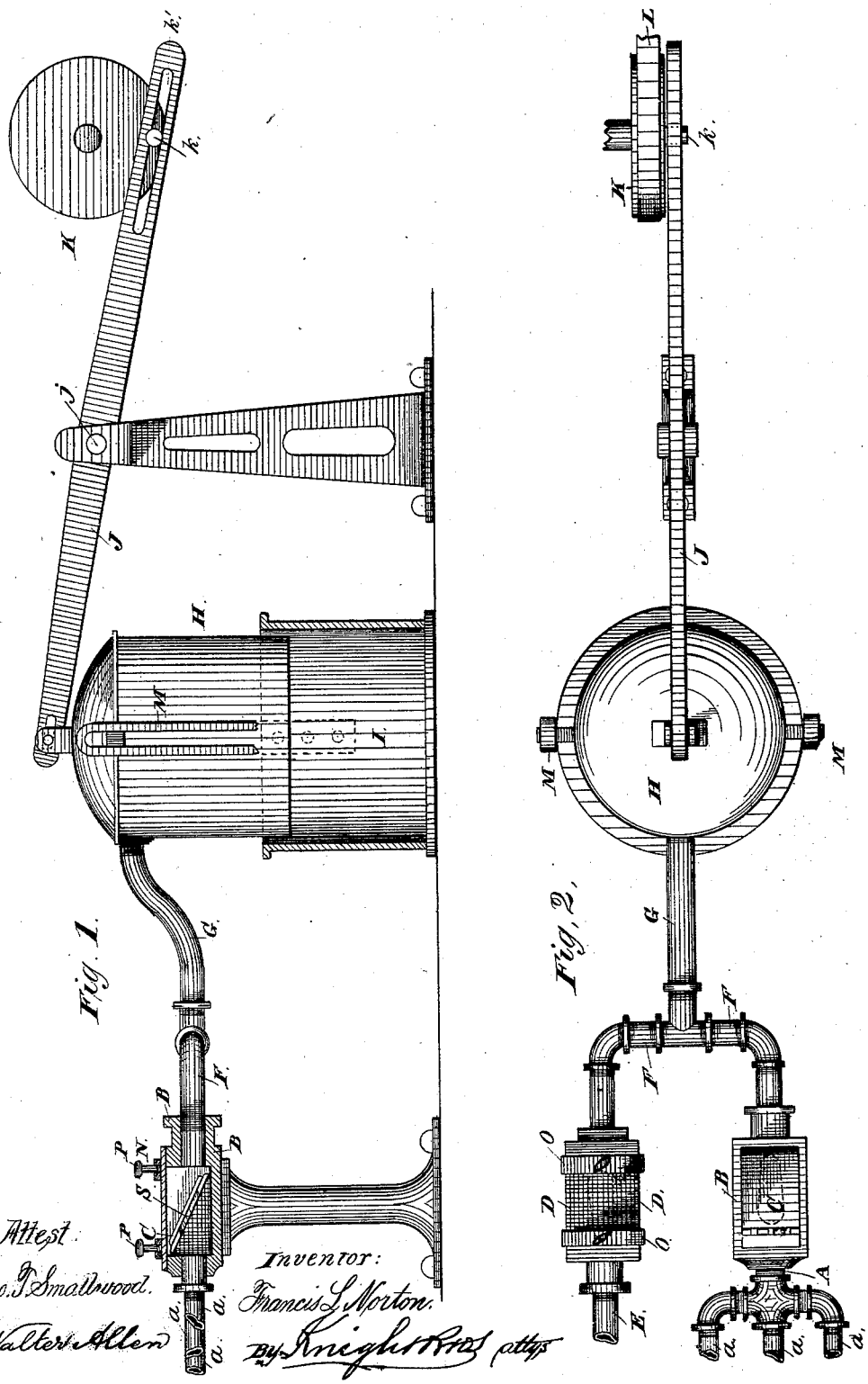

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Fig. 6.

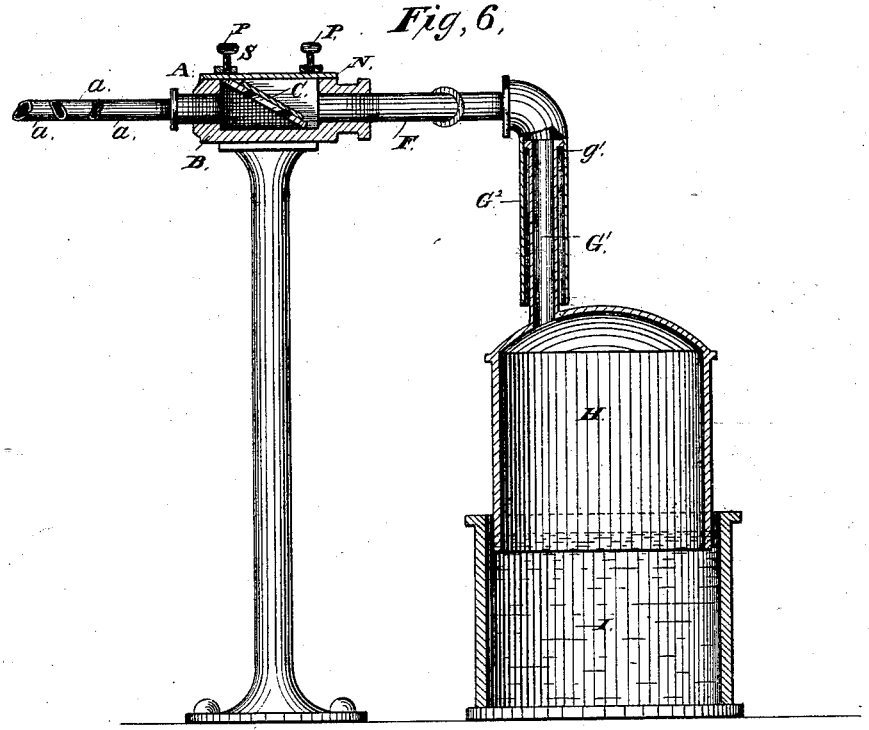


Fig. 3.

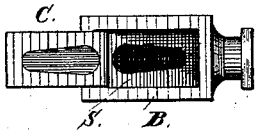


Fig. 4.

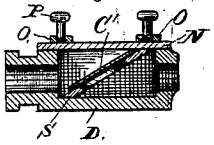


Fig. 5.

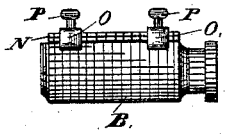


Fig. 7.

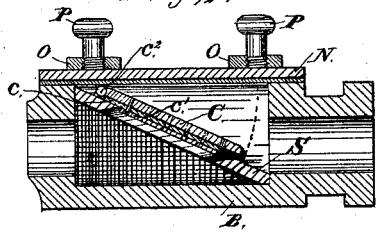
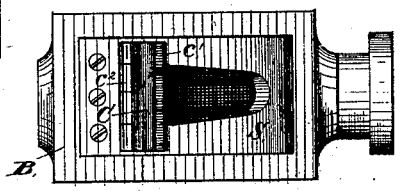


Fig. 8.



Attest:
Geo. T. Smallwood Jr.
Walter Allen

Inventor:
Francis L. Norton
By Knight Bros Attys

UNITED STATES PATENT OFFICE.

FRANCIS L. NORTON, OF NEW YORK, N. Y.

IMPROVEMENT IN VENTILATING BUILDINGS, VESSELS, &c.

Specification forming part of Letters Patent No. **216,804**, dated June 24, 1879; application filed March 11, 1879.

To all whom it may concern:

Be it known that I, FRANCIS LAY NORTON, of the city, county, and State of New York, have invented certain new and useful Improvements in Appliances for Ventilating Buildings, Vessels, and other structures, of which the following is a specification.

The apparatus consists of a system of pipes connected with apartments to be cleared of foul air, and communicating, through a clapper-valve and flexible or jointed or sliding pipe, with an exhausting and forcing device, consisting of a water-bell, to which a vertical reciprocating motion is imparted by any suitable means—as, for example, a beam operated by a steam or water engine or other motor. The return or down stroke of the bell forces the air through the same flexible or jointed pipe, when it is arrested by the clapper-valve guarding the exhaust-pipes, and is forced through a similar clapper-valve opening in the opposite direction, and discharged into the open air.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which Figure 1 is an elevation, partly in section, of an apparatus illustrating the invention. Fig. 2 is a plan of the same. Fig. 3 is a plan of the exhaust-valve with cap removed and valve proper or clapper turned back. Fig. 4 is a vertical longitudinal section of the discharge-valve. Fig. 5 is a side view of one of the valves. Fig. 6 is a vertical section showing the bell connected with the valves by a sliding telescopic pipe instead of a flexible pipe. Fig. 7 is a vertical section of one of the valves on a larger scale. Fig. 8 is a plan of the same with the cap removed and the clapper raised.

a a a represent branch exhaust-pipes communicating through a main exhaust-pipe, A, with a chamber, B, containing a gravitating clapper-valve, C. D is a chamber containing a valve, C′, similar in construction to C, but opening in the other direction, as shown in Fig. 4, so as to pass air to the discharge-pipe E and prevent its return. A branch pipe, F, connects the rear ends of the valve-chambers B and D.

G represents a flexible, or it may be a jointed, pipe, connecting with the interior of a bell, H, which works in a water-tank, I, and has imparted to it a vertical reciprocating motion by any suitable means.

The present illustration represents a beam, J, fulcrumed at *j*, and actuated by a crank-wheel, K, driven by a band, L. The wrist *k* of the crank works in a slot, *k′*, in the beam J.

A steam or water engine or other motor may be employed to work the beam either directly or indirectly, or may have a direct or other connection with the bell H. But little power is required. M M represent a pair of slotted standards to guide the bell H in a vertical path.

Fig. 6 shows a modification in the mode of connecting the reciprocating bell H with the valve-chambers. In this modification a pipe, G^1, fixed to the bell and communicating with its interior, works telescopically within a stationary pipe, G^2, connected to the branch pipe F of the valves. A suitable packing, *g′*, is provided at the extremity of either pipe G^1 or G^2, to form a tight joint between them.

In operation, the elevation of the bell H, causing a partial vacuum, draws foul air from any apartments with which the branch pipes *a a a* are connected. On the return or downward motion of the bell the valve C closes, and the foul air which has filled the bell is forced out through the valve-chamber D and discharge-pipe E. As this is repeated at every stroke of the bell, it is manifest that the apartments will be rapidly cleared of foul air, its place being supplied by fresh air from without, which may pass through any customary or suitable heating apparatus in cold weather.

The particular construction of the valves is best shown in Figs. 7 and 8. The valve-case or chamber B is of oblong form and placed in horizontal position. It contains a diagonal plate, S, constituting the seat, on which the clapper C or valve proper closes by gravity, the valve-seat being pierced with an aperture of elliptical shape, which about corresponds in vertical area with the inlet and outlet ports of the valve-case.

The valve-plate C is of metal, is hinged at its upper end, c^2, and has a sheet of rubber, *c*, of corresponding size, fastened to its under surface by means of a plate, c^1, which fits

within the opening of the valve-seat, and is secured to the valve-plate C by rivets passing through the rubber, as shown in Fig. 7. This mode of constructing the valve of two plates of metal, one resting upon the valve-seat and the other fitting the aperture therein, confining between them a sheet of rubber the size of the larger one, is found good in practice in that the elastic and yielding qualities of the rubber are fully availed of without the exposure of metal on any part of the working-surface of the valve which forms the tight joint, and at the same time the rubber is effectually held in position by the lower plate, so as to prevent the liability of buckling or folding over or within the valve-port which would otherwise exist. The top of the valve-case is closed by a cap, N, beneath which is interposed a sheet of rubber of same size, the whole being secured by straps or yokes O O and clamp-screws P P.

This form of valve is well adapted for the purposes of my ventilating apparatus, and is also useful and appropriate for other purposes in controlling the passage of water or other liquids, as well as aeriform fluids.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. The combination of the reciprocating pumping apparatus and the paired valves to exhaust and discharge the air, in manner substantially as herein described.

2. The combination of the water-tank I, the reciprocating bell or receiver H, and the flexible or jointed or sliding pipe G, for ventilating buildings or apartments, in the manner explained.

In testimony whereof I hereunto set my hand this 8th day of March, 1879.

FRANCIS L. NORTON.

Witnesses:

OCTAVIUS KNIGHT,

WALTER ALLEN.