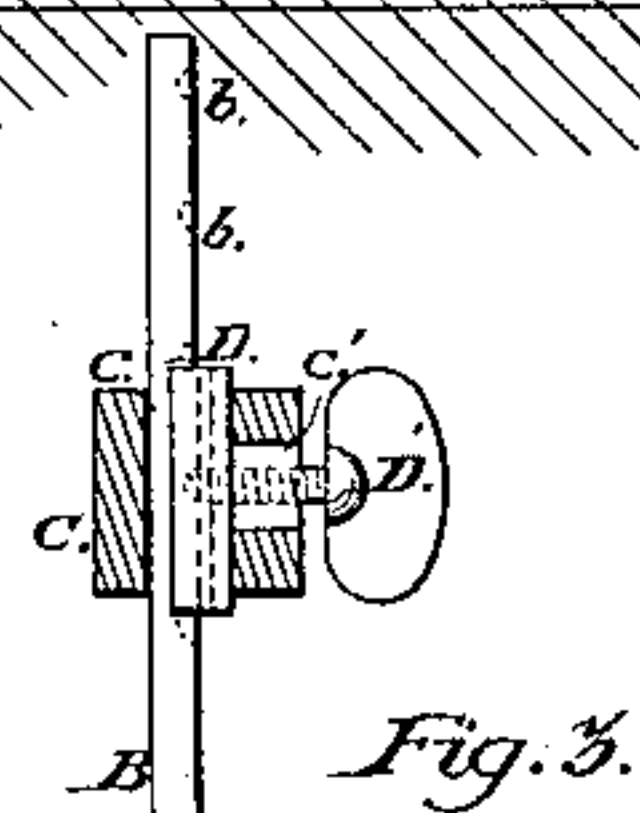
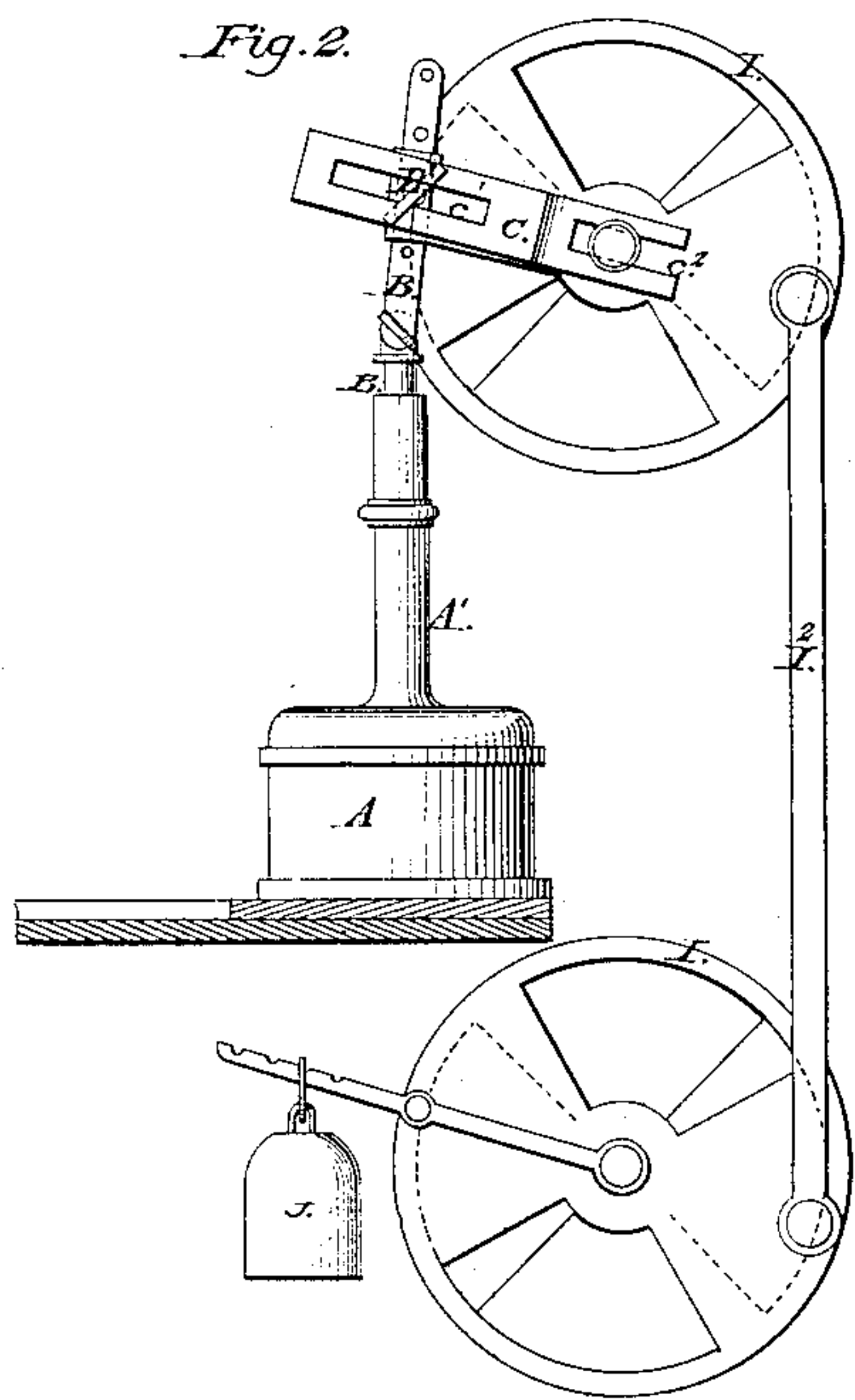
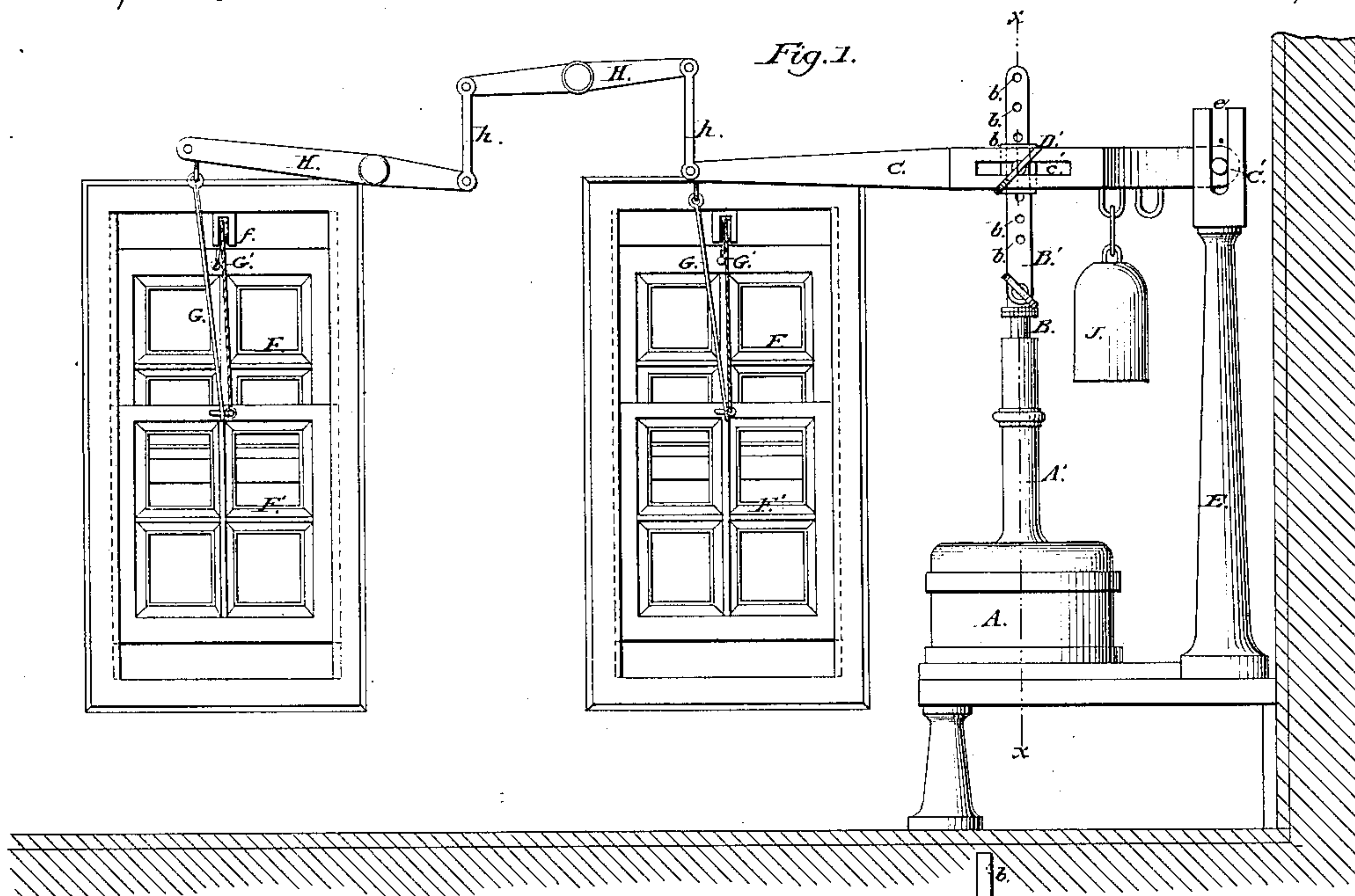


# N. Hammond, House Ventilator,

N<sup>o</sup> 46,898.

Patented Mar. 21, 1865.



Witnesses:  
C. D. Smith  
Alex. C. Hancock

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Attorneys.



# UNITED STATES PATENT OFFICE.

NELSON HAMMOND, OF TIOGA, PENNSYLVANIA.

## SELF-REGULATING VENTILATOR.

Specification forming part of Letters Patent No. 46,898, dated March 21, 1865.

*To all whom it may concern:*

Be it known that I, NELSON HAMMOND, of the city and county of Tioga, in the State of Pennsylvania, have invented a new and Improved Self-Regulating Ventilator; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front elevation of my improved ventilating apparatus. Fig. 2 is a similar view illustrating a modification of my invention. Fig. 3 is a vertical section on the line *xx* of the liquid-containing vessel and the parts operating in immediate connection therewith.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in the application or use for ventilating purposes of the power created by the expansion and contraction of liquid or other suitable fluid or a solid. I use a rod or piston, fitted to slide within a tube erected upon and communicating with a vessel containing oil, mercury, or other adequate matter, which may be desirable on account of the degree to which it is susceptible of being varied in bulk with the changes of the temperature of the atmosphere. Motion is to be transmitted from such piston to a window-sash ventilator or register by suitable mechanical devices, and one way of doing this will be clearly described.

To enable others skilled in the art to which my invention appertains to fully understand and use the same, I will proceed to describe the manner of carrying it into effect.

A represents a vessel or reservoir containing, by preference, a quantity of oil or mercury, according as it is made of copper, or brass, or iron. Rising upward from the vessel A is a tube, A', within which the liquid rises and falls with the variations of the temperature. B is a piston fitting within the tube A', so as to be acted upon by and moved to correspond with the height of the column of liquid in said tube. Attached to the piston B is a rod or arm, B', passing upward through a slot, *c*, in a lever, C, and held tightly in said slot, so as to move the lever C when pushed upward by the expansion of the liquid, by a clamp, D, and thumb-screw D', the latter passing through a slot, *c'*, in the side of the

lever C, through the clamp D, and into a series of perforations, *b*, in the arm B', while on the clamp D there is formed a projection, *d*, which, resting in the slot *c*, serves as an additional medium for securing the simultaneous movement of the arm B' and lever C.

The lever C has its axis of motion in the top of a post, E, and its other extremity is connected with the window-sash F', or other similar ventilating contrivances, by means of a rod, G. The upper sash, F, may be adapted to slide downward by its own weight, and is provided with a pulley, *f*, over which runs a cord, G', attached at its respective ends to the two sashes F F'.

The effect of the elevation of the lever C, in consequence of the expanding of the liquid in the vessel A, is to lift the sash F' and allow the upper sash, F, to fall, thus opening the window at top and bottom. When the liquid contracts and the lever C descends, together with the piston B and arm B', the result is the rising of the sash F and dropping of the sash F', the extent of such movement or of the reverse movement of the sashes being commensurate with the vibration of the lever C, and consequently with the degree to which the liquid is varied in bulk. By means of the connecting levers and rods H *h*, exhibited in Fig. 1, the movement of the sashes of one window may be transmitted to those of the next, and so on throughout the entire building or structure, one apparatus serving for the entire number. A weight, J, retains in a depressed condition the end on which the lever C turns, and overcomes the friction of the parts, to insure the falling of the piston B and lever C on the contraction of the mercury or oil in the reservoir. If the lower sash be made sufficiently heavy to pull and hold the upper sash, F, in its elevated position, a cord or other loose connection can be used instead of the rod G, the purpose of which is to push down the sash F', and thus forcibly raise the sash F.

To allow the axis end of the lever to move upward, and thus prevent the breaking or staining of the parts when the sashes F F' or ventilators have reached their open limit, I form the bearing in the top of the post E of slots *e*, disposed like a cross in order to accommodate the end of the lever and the pin C' upon which it turns.



The apparatus is graduated as to degrees of heat at which it shall become operative by means of the series of perforations *b* in the arm *B'*, the thumb-screw *D* being adjusted in a higher or lower perforation, according to the time at which the piston *B* is to act.

The speed with which the apparatus shall operate under a given increase of heat may be regulated by adjusting the arm *B'* nearer to or farther from the axis of vibration of the lever, the slot *c* admitting of such adjustment to any extent. The lever may pass beyond the axis of motion, and the power be located so as to make the lever act as one of the first order, when convenience requires it.

Fig. 2 illustrates the application of my invention, the opening and closing of registers *I I'* for permitting hot air to escape at the top of the apartment and cold air to enter below, the registers being connected by a rod, *I*<sup>2</sup>. The slots *c*<sup>2</sup> in the lever *C* is to admit of lateral motion in case of further expansion in the reservoir after the ventilation has reached its open limit.

In adjusting the arm *B'* nearer to or farther from the axis of vibration of the lever *C*, the weight may also be moved when it is desired to maintain the same relative depressing power.

The adaptation of the apparatus to varying circumstances—such as elevating or depressing but one window, or raising or depressing a ventilator, or turning a register on its axis—would require such a mere change of mechanical devices that I will not attempt to make definite provision for them.

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

1. Adapting both the bar *B'* and the weight

*J* to be adjusted longitudinally upon the lever *C* to maintain a uniform effect of the weight, while varying the extent to which the ventilator will be moved by a given motion of the piston.

2. In combination with the close vessel *A*, the piston *B*, arm *B'*, when connected to the lever *C*, in the manner described, so as to permit the said arm or bar *B'* to be adjusted vertically upon the lever to adapt it to the height of the fluid or the position of the ventilator, the whole constituting a thermal medium for regulating ventilators, substantially as set forth.

3. In combination with the lever *C*, operated as described, the rod *G* and cord *G'* for raising and lowering the sashes *F F'*, as explained.

4. In combination with the aforesaid lever *C* and the close vessel *A*, cylinder *A'*, and piston *B*, the levers *H*, and rods *h* for transmitting motion from the sashes of one window to those of the other or others, substantially as specified.

5. The combination of the vertical slots *e* with the weight *J* and piston *B* for restricting the motion of the lever *C* to the operating end thereof, while the ventilator is being opened or closed, and permitting the fulcrum end of the lever to move after the operating end has reached the extremity of its movement, substantially as and for the purposes set forth.

The above specification of my improvement in thermal ventilating apparatus signed this 21st day of January, 1865.

NELSON HAMMOND.

Witnesses:

ALEX. A. C. KLAUCKE,  
EDWARD H. KNIGHT.