

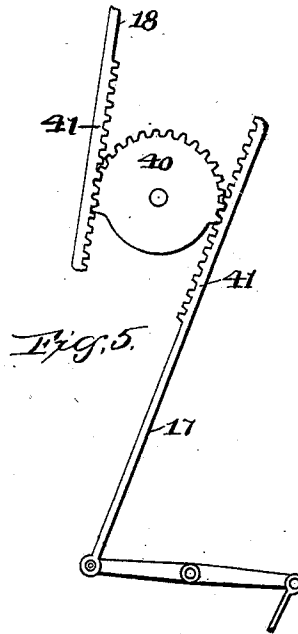
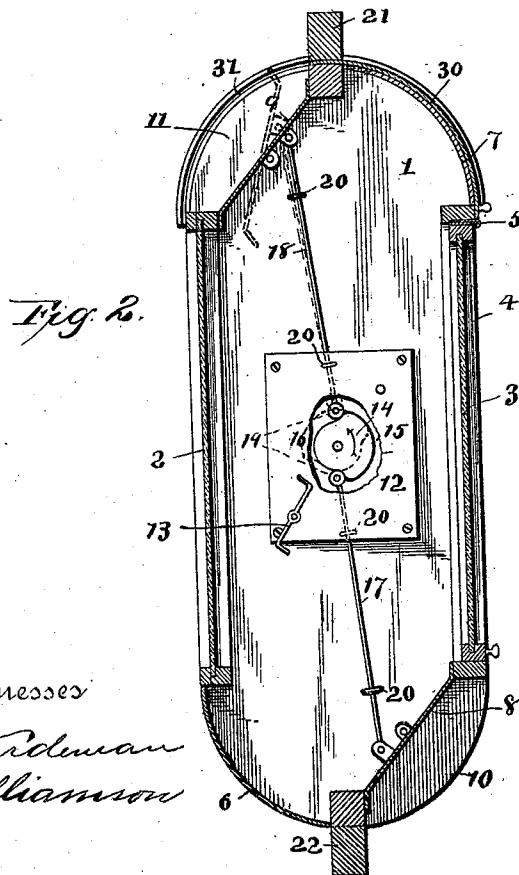
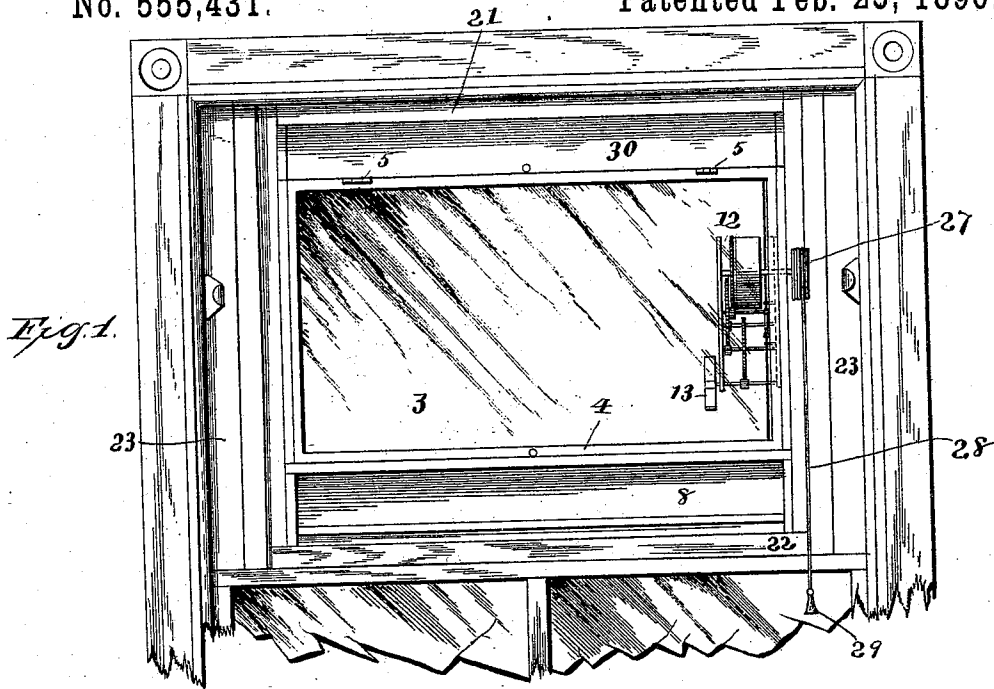
(No Model.)

2 Sheets—Sheet 1.

L. H. CONARD & A. R. COLLINS.
VENTILATOR.

No. 555,431.

Patented Feb. 25, 1896.



Witnesses
E. C. Wurdeman
S. S. Williamson

Inventors
Linford H. Conard and
Alfred R. Collins
By *Geo. H. Holgate*
their Attorney

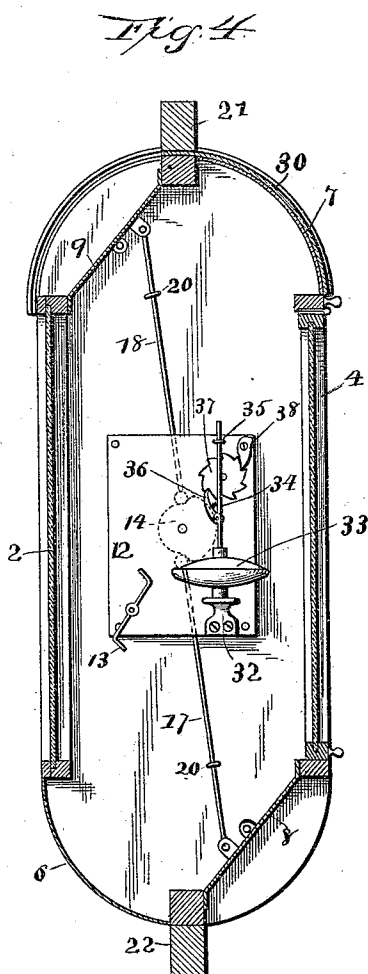
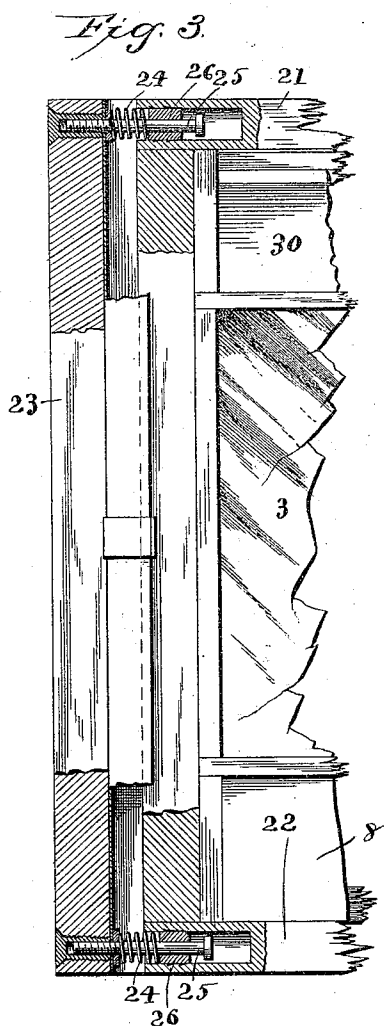
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2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

LINFORD H. CONARD AND ALFRED R. COLLINS, OF CAMDEN, NEW JERSEY.

VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 555,431, dated February 25, 1896.

Application filed March 30, 1895. Renewed January 23, 1896. Serial No. 576,607. (No model.)

To all whom it may concern:

Be it known that we, LINFORD H. CONARD and ALFRED R. COLLINS, citizens of the United States, residing at Camden, in county of Camden and State of New Jersey, have invented certain new and useful Improvements in Ventilators, of which the following is a specification.

Our invention relates to a new and useful improvement in ventilators, and has for its object to provide such a device that will be automatic in its operation and will so control the inflow and outflow of air as to positively change the atmospheric contents of a room in a specified time.

With these ends in view the invention consists in certain details of construction and combinations of elements hereinafter set forth, and then specifically designated by the claims.

In order that those skilled in the art to which this invention appertains may understand how to make and use the same, we will describe its construction and operation in detail, referring by number to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is an elevation of our improvement in proper position relative to a window; Fig. 2, a central vertical section thereof; Fig. 3, a sectional elevation of a method by which the device is adjusted to varying widths of window-frames; Fig. 4, a view similar to Fig. 2, showing an automatic means for winding the motor mechanism; and Fig. 5 is a diagram of a modified form of connection between the motor and valves.

Similar numbers denote like parts in the several views of the drawings.

1 is a chamber formed by suitable framework, its sides being inclosed by glasses 2 and 3, the latter set in a swinging frame 4, which is hinged at 5, so as to permit access to the inside of the chamber.

6 and 7 are curved sheet-metal caps, which inclose a portion of the bottom and top, respectively, of the chamber.

8 and 9 are butterfly-valves pivoted to the ends of the casing and adapted to regulate the passage of air through the openings 10 and 11, respectively, for the purpose hereinafter explained.

Secured within the chamber, and to one end thereof, is a spring or other motor 12, provided with a regulator 13, whereby a given speed is maintained.

14 is a cam carried by and receiving a rotary motion from the motor 12, and is provided with two concentric surfaces 15 and 16, the latter of a smaller diameter than the former.

17 and 18 are rods pivoted to the valves 8 and 9, respectively, and carrying rolls 19 at their ends, which bear against the surfaces of the cam 14, so that when said cam revolves the rods 17 and 18 are caused to reciprocate in their guides 20.

The valves 8 and 9 are counterbalanced so as to close of their own weight, or they may be operated by a spring against the action of the cam 14.

21 and 22 are rails secured to the top and bottom of the frame, and 23 are sliding side rails, whereby the device is adapted to different widths of window-frames, and these rails 23 are normally distended by the springs 24 coiled around bolts 25, which slide in sockets 26 set in the top and bottom rails, so that in order to place the device in its proper position within the window-frame the upper sash of the window is lowered and the rails 23 compressed to the width of the window-frame against the sides of which they will bear when released, when, by raising the window-sash against the lower rail of the device, the latter will be securely held in the position shown in Fig. 1.

The spring of the motor 12 may be wound by an ordinary key, or it may be provided with a drum 27, around which is a cord 28, terminating in a hand-hold 29, so that by pulling upon the cord 28 the spring of said motor will be wound to the proper tension and so retained by the ordinary ratchet-and-pawl mechanism.

From the above description the operation of the device will be as follows: The motor being regulated and set in motion, causing the cam 14 to revolve in the direction indicated by the arrow, the surface 15 of said cam, acting upon the roll carried by the rod 18, will elevate said rod and open the valve 9, as shown in dotted lines in Fig. 2, and permit the external air to flow through the opening into the chamber 1, displacing the warmer

and consequently lighter air therein, and the cam 14, continuing to revolve, the surface 16 will be brought into a position that will permit the rod 18 to drop, thus closing the valve 9 and shutting off any further flow of air, when the rod 17 will be operated upon by the surface 15 of the cam to open the valve 8 and permit the cool air in the chamber to flow into the room and its place be taken by the warmer and lighter air of the room. A repetition of these movements will close the valve 8 and again open the valve 9, when the warmer and lighter air just admitted to the chamber will be displaced by the inflowing of the heavier outside air, as before described, so that it will be seen that if the motor be regulated to make so many revolutions in a given time a given amount of the air of the room will be displaced by a like amount of external air, regardless of the direction or force of the wind outside, and further, as the ingress of the outside air to the room is interrupted and sufficient time allowed for said air to become combined with the air in the room and its temperature equalized, there can be no dangerous or annoying drafts, and this is very advantageous in sick-rooms and hospitals.

By the use of our improved ventilator, to change the atmospheric contents of a room in a given time, it is only necessary to know the size of said room and the relative capacity of the chamber 1, when by regulating the speed of the motor the air in the room will be displaced in a predetermined time.

30 is a curved slide adapted to run in grooves 31, in order that the opening 11 may be varied or entirely closed.

To obviate the necessity of having to wind the spring of the motor by hand, we have shown an arrangement in Fig. 4 for automatically accomplishing this result, and it is as follows: To the face of the motor 12 is attached a bracket 32, which supports a hollow vessel 33, composed preferably of two thin disks of metal, secured at their edges to each other and capable of having a spring movement to and from each other.

34 is a rod secured to the upper portion of the vessel 33 and guided in suitable bearing 35, and pivoted to this rod 34 is a pawl 36 adapted to engage with and actuate the ratchet 37, which is secured to or connected with the shaft by which the spring of the motor is wound.

The vessel 33 is filled with mercury or other material whose volume is readily affected by changes in temperature, so that when the cool outside air is admitted to the chamber 1 the mercury in the vessel 33 will contract, allowing the disks of said vessel to spring toward each other, which will lower the rod 34 and permit the pawl 36 to engage with a new tooth in the ratchet 37; but when this cool air is displaced by the warmer air of the room, upon the closing of the valve 9 and opening of the valve 8, the mercury in the vessel 33, absorb-

ing the heat of said warm air, will expand and cause the rod 34 and pawl carried thereby to move upward, thus actuating the ratchet 37 one tooth, which will wind the spring of the motor a corresponding amount and the ratchet will be prevented from a retrograde movement by the pawl 38. By the use of this automatic motor-winder our ventilator is adapted for use at times and in places where it is inconvenient to give it attention.

While we have shown as our preferred construction a two-surface cam for operating the valves, it will be obvious that a segmental gear 40, Fig. 5, in connection with racks 41, formed upon the rods 17 and 18 or their equivalents, might be used for bringing about this alternate reciprocation of said rods.

We do not wish to limit ourselves to the exact construction shown and described, as many modified forms of our ventilator and its operating mechanism may be made without departing from the spirit of our invention, which rests on the broad idea of automatically changing the air in a room by positive means without dependence upon the direction or force of outside-air currents.

Having thus fully described our invention, what we claim as new and useful is—

1. In a ventilator, a chamber adapted to be placed in communication with the air of a room and the outside atmosphere, in combination with valves for alternately admitting the outside atmosphere to said chamber and then permitting said air in said chamber to pass into the room, in combination with cams for operating the valves as specified.

2. In a ventilator, a chamber having an inlet communicating with the outside atmosphere and an outlet communicating with the air of a room, in combination with valves adapted to regulate the flow of air through said inlet and outlet, cams for operating the valves and a motor for continuously operating the cams, as and for the purpose described.

3. In a ventilator, a chamber having an opening at its bottom and top, valves for closing said openings, a cam for operating said valves alternately, and a motor for imparting a continuous and regular rotation to said cam, substantially as shown and described.

4. In combination with the valves of an automatic ventilator, a spring-motor for operating the valves of said ventilator; and a winding mechanism consisting of a mercury-vessel responsive to the changes of temperature produced by the operation of said ventilator and a connection from said vessel to the motor-spring, as specified.

5. In a device of the character described, a spring-motor and means for automatically winding said motor, in combination with valves communicating with atmospheres of different temperatures and operated by the motor, whereby the temperature of the winding means is altered to cause it to operate, as and for the purpose described.

6. In combination with the valves of an au-

5 tomatic ventilator, a spring-motor for operating said valves and a winding mechanism consisting of a mercury-vessel responsive to the changes of temperature produced by the operation of said ventilator and connections from said vessel to the motor-spring as specified.

In testimony whereof we have hereunto af-

fixed our signatures in the presence of two subscribing witnesses.

LINFORD H. CONARD.
ALFRED R. COLLINS.

Witnesses:

SAMUEL L. TAYLOR,
S. S. WILLIAMSON.