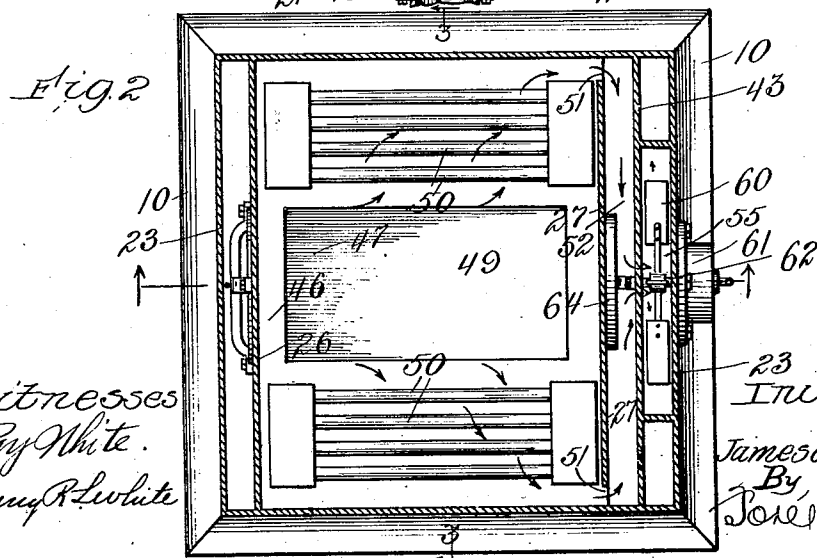
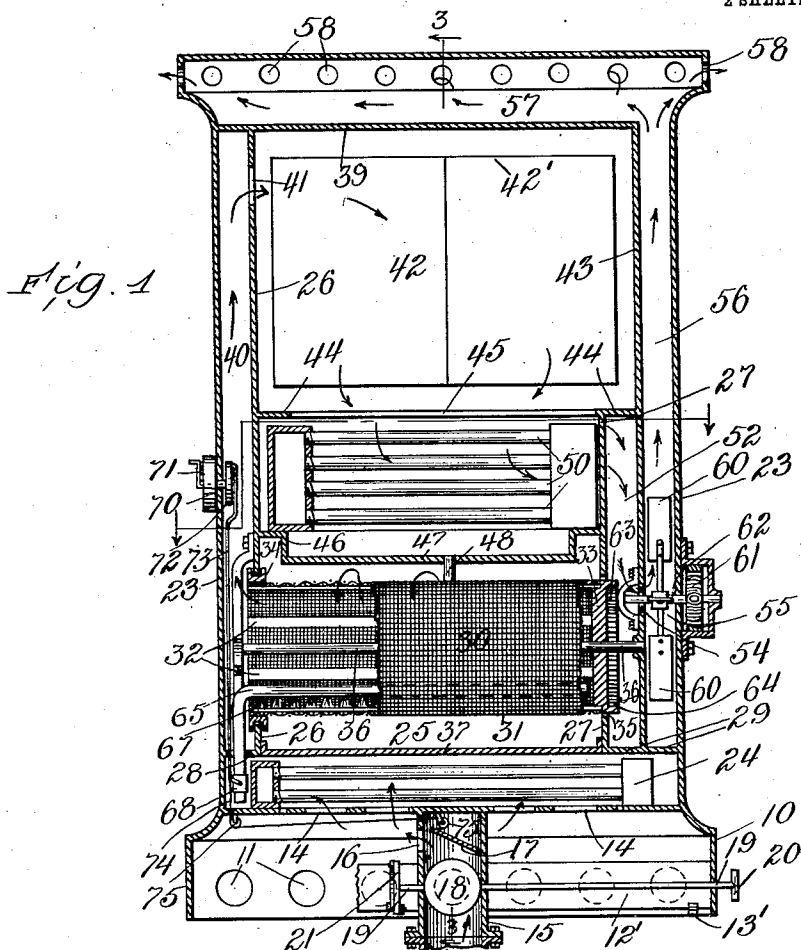


No. 849,061.

PATENTED APR. 2, 1907.

J. G. GARNER.
VENTILATING APPARATUS.
APPLICATION FILED DEC. 9, 1904.

2 SHEETS—SHEET 1.



Witnesses
Ray White.
Harry R. White

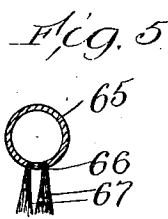
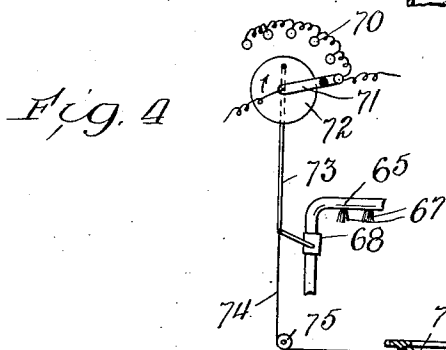
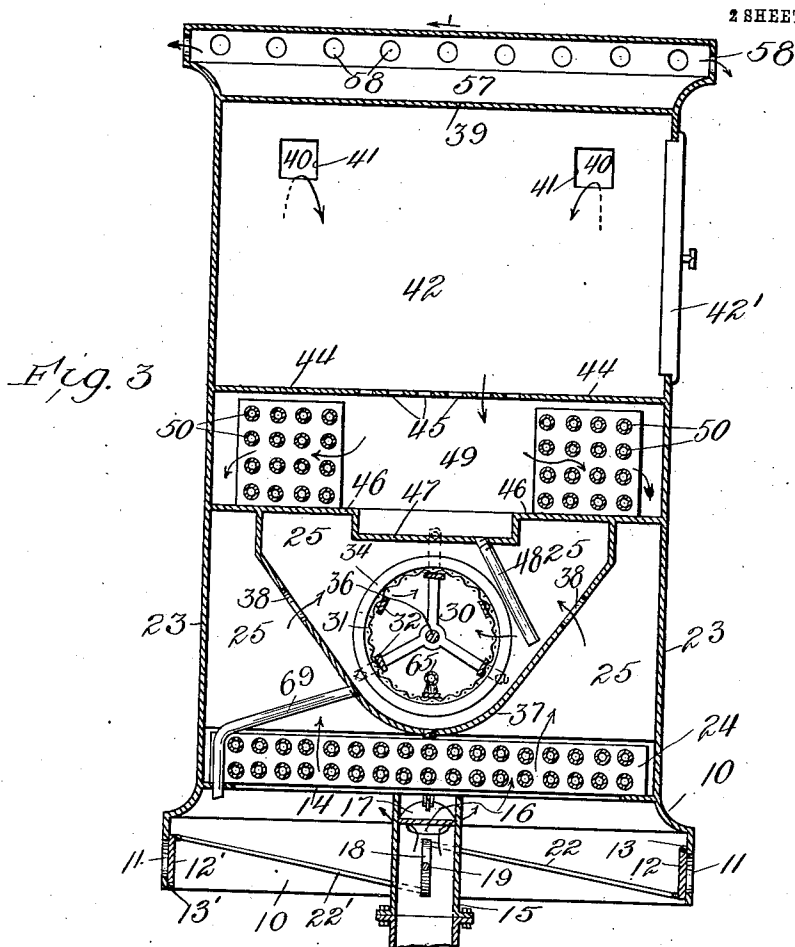
Inventor:
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By
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Ray White.
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UNITED STATES PATENT OFFICE.

JAMES G. GARNER, OF CHICAGO, ILLINOIS.

VENTILATING APPARATUS.

No. 849,061.

Specification of Letters Patent.

Patented April 2, 1907.

Application filed December 9, 1904. Serial No. 236,249.

To all whom it may concern:

Be it known that I, JAMES G. GARNER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Ventilating Apparatus; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to improvements in ventilating apparatus, and has for its general object to provide a ventilating apparatus particularly adapted for use in offices, homes, workshops, cars, small public halls, and other places where it is not customary to provide in the construction of the building mechanical devices for insuring the introduction of proper quantities of fresh air to supply the needs of the occupants.

The ventilating systems now generally known and used are not well adapted for this purpose, as the installations are expensive, unsightly, and so bulky as to require much space, and, further, the installation of such systems under the present prevailing practice requires that the building be designed with special reference to the ventilating system or that the building be much cut up to permit of the running of the pipes and placing of the apparatus employed.

My present invention contemplates the provision of a complete ventilating system comprising means for positively introducing air from whatever source it is desired to draw it into the area to be ventilated, with means for purifying and means for either heating or cooling, as may be desired, the air in its transit from the source of supply to the area to be ventilated, and devices for actuating and controlling the mechanical parts of such installation, all combined and arranged in a self-contained apparatus which will be of small size, of simple construction, and of neat and attractive appearance. Numerous other objects are also attained by my invention; but these may best be gathered by reference to the following description, taken in conjunction with the accompanying drawings, illustrating one operative embodiment of my invention.

In said drawings, Figure 1 is a central vertical section on line 1 1 of Fig. 2 or, as I will arbitrarily term it, "lengthwise," or from end to end of the casing. Fig. 2 is a transverse horizontal section on line 2 2 of Fig. 1. Fig. 3 is a central vertical section on line 3 3 of

Fig. 2, or, as I will arbitrarily designate the direction, "crosswise," or from side to side of the casing. Fig. 4 is a diagrammatic representation of certain regulating and controlling devices of the apparatus, and Fig. 5 is a detail of a water-supply device incorporated therein.

Throughout the drawings like numerals of reference refer always to like parts.

In general it will be seen that my associated apparatus presents externally the form of a cabinet, which may be of any suitable size and shape according to the capacity which it is desired the apparatus shall have.

In the specific device shown 10 indicates a rectangular base, in the two sides of which I preferably form inlet-apertures 11, adapted to be closed from the inside by dampers or valves 12 12', herein illustrated as straight flaps, one pivoted at its upper edge, as at 13, and the other pivoted at its lower edge, as at 13'. The top of the base 10 is provided with suitable openings 14 to permit free passage of the air therethrough.

15 indicates a section of the main inlet-pipe, preferably depending from the top of the base 10 and provided below said top with a suitable aperture 16 to permit free egress of the air. The pipe-section 15, it will be understood, may be connected by any suitable piping arrangement to the exterior of the building or other source from which it is desired to derive the air to be introduced into the area being ventilated.

In the pipe-section 15 I preferably arrange two dampers, adapted to close the pipe below the egress-opening 16, one of said dampers 17 being preferably arranged in conjunction with devices, to be hereinafter described, for automatic control and the other damper 18 being provided with an operating-rod 19, extending to exterior of the casing and provided with a handle 20 for a hand-control.

The operating-rod 19 is connected, as by the cross-bar 21 and links 22 22', with the free edges of the flap-valves 12 and 12', the parts being so arranged that when the damper 18 stands in position to leave the pipe-section 15 open the valves 12 and 12' close the inlet 11; but when said damper 18 is moved to close its pipe-section 15 the valves 12 12' are concurrently moved to open the inlets 11. The purpose of this arrangement will hereafter become apparent.

Above the base 10 is disposed a casing 23, preferably rectangular in shape, the interior

of which is divided up into chambers and air passages or conduits, which I will now describe.

Immediately above the base 10 is disposed a tempering-coil 24, preferably in the form of a small steam or hot-water radiator and so located with reference to the openings 14 in the base that the air passing through the openings must traverse said coil.

Above the tempering-coil 24, for communication therewith, is a chamber 25, extending from side to side of the machine, as shown in Fig. 3, and in the opposite direction, or lengthwise of the machine, included between two walls 26 and 27, respectively adjoining what I will arbitrarily term the "front" and "rear" ends of the casing the walls 26 and 27 are connected at their lower ends above the tempering-coil with the adjacent end walls of the casing by webs 28 and 29, so that air passing through the tempering-coil is delivered only into the chamber 25. The top of the chamber 25 is provided by a transverse floor 46, to be hereinafter adverted to.

Within the chamber 25 is arranged the air filter or purifier, generally indicated as 30, and which I prefer shall be of the construction herein shown. Such filter comprises in part a cylinder 31, of a close-mesh reticulated material, preferably brass-wire screening, carried by suitable frame-pieces 32, at one end secured to the practically-imperforate head 33 and at the other end secured to the open ring 34. The head 33 is preferably arranged in and adapted to substantially close an aperture 35 in the end wall 27 of the chamber 25 and is secured to a rotatable shaft 36 for rotation therewith. The opposite end of the cylinder is left entirely open, the ring 34 being mounted for revolution in a suitable aperture in the wall 26. Below or around the cylinder 31 is a shroud or drip-pan 37, provided with air-apertures 38. Means are provided for automatically rotating and cleaning the cylinders 31, as hereinafter described.

The partition 26 referred to is vertically extended to meet a horizontal cross-partition 39, extending from side to side of the casing 23 and from the end nearest partition 26 almost to the opposite end wall of the casing 23. Between said partition 26 and the adjacent end wall of the casing 23 is formed an air-channel 40, with which the open end of the cylinder 31 communicates. At a point near the horizontal partition 39 the partition 26 is provided with apertures 41, effecting communication between the conduit 40 and the cooling-chamber 42. Said cooling-chamber is arranged directly below the horizontal partition 39 and is of suitable size to contain a block of ice, entrance being effected to said chamber through doors 42' in one side of the casing. The end of the cooling-chamber 42 opposite the wall 26 is closed by a

vertical wall 43, which extends from the edge of the horizontal wall 39 downward to the wall 29, its lower end passing between the partition 27 and the exterior wall of the casing and dividing the space therebetween into two compartments. The bottom of the cooling-chamber is provided by a plate 44, having an imperforate edge portion which bridges the space between the wall 27 and the partition 43 and is centrally provided with a series of openings 45. Between the plate 44 and the air-purifier chamber 25 is an imperforate floor 46, extending crosswise of the casing, from side to side thereof, between the partitions 26 and 27, with which it makes close contact. Preferably a drip-pan 47 is sunk in the center of the floor 46 below the openings 45, and from the drip-pan 47 to the shroud or pan 37 is extended a drip-pipe 48.

In the heating-chamber 49, between the plate 44 and the floor 46, are arranged the main heat-coils 50, of any suitable construction, adapted to heat the incoming air to the desired degree of temperature. Apertures 51 are provided in the portion of the partition 27 confronting the heating-chamber 49, so disposed that air entering the heating-chambers through the grate 45 in the top wall 44 and passing out through the apertures 51 in the end wall 27 must traverse said main heat-coils 50. The air-passage 52 between the walls 27 and 43 communicates through an aperture 54 with the casing 55 of a centrifugal fan whose outlet 56 is provided between the wall 43 and the exterior casing 23 and opens directly into a plenum-chamber 57 at the extreme top of the device. Apertures 58 afford communication between the exterior area to be ventilated and the chamber 57. If desired, hand-slide dampers may be provided for cutting off or regulating the openings 58.

In the fan-casing 55 is located the centrifugal fan 60, arranged to be driven by a small electric motor 61, suitably disposed on or within the casing and having its shaft 62 extending through the aperture 54 and provided with a small pinion 63, meshing with an internal gear 64, carried by the closed head 33 of the air-purifier. It will thus be apparent that as the motor is run to drive the fan the air-purifier 30 is consistently driven at a slower speed through the agency of the reduction-gears 63.

To provide for cleansing the cylinder 31, I arrange a water-pipe 65 within the cylinder, preferably close to the bottom thereof, and provide said pipe with jet-holes 66, through which the water is projected against the wire-netting constituting the cylinder. If preferred, brushes 67 may be attached to the pipe 65 to assist in cleaning the cylinder. The water-pipe 65 is preferably led in through the air-spaces of the machine and is

provided with a turn-cock 68, which regulates the water-supply. A drip-pipe 69 is also provided for leading the water off from the drip-pan 37 to any suitable point of escape.

I preferably provide in conjunction with my machine means for controlling the speed of the fan and air-purifier and automatic devices for constantly regulating the water and air supply, and such devices may be best seen in the diagram of Fig. 4. Specifically, 70 indicates a rheostat for controlling the motor-speed, preferably arranged on the front of the casing for convenient access and having its handle-shaft 71 extended through the casing-wall and provided on its inner end with a disk 72, with which is eccentrically connected a rod 73, extending to and connected with the turn-cock 68, and also connected, as by the cord 74, running over pulleys 75, or other convenient means, with the damper 17 in the main air-supply pipe 15. These parts are so arranged that when the rheostat-handle 71 is moved to open the motor-circuit and stop the motor the water-supply is shut off and the damper 17 lowered to close the air-pipe, while as the handle is moved to start the motor and run it at different speeds the openings of the water and air supply pipe are consistently increased, so that the supply of air and water will always be properly proportioned to the speed of the fan or the volume of air being handled.

The operation of a device constructed as above described will be as follows: When it is desired to supply to the room a body of outside air, preferably tempered or heated, damper-handle 20 is turned to move the hand-dampers to the position shown in full lines in Fig. 4, the apertures 11 being closed and the pipe 15 being opened by the damper 18. Now assuming that the motor is started to rotate the fan and air-purifier by movement of the rheostat-handle and the water and air supply consistently adjusted, the action of the fan drawing air in through the intake 15 into the base of the apparatus, up through the apertures 14; through the tempering-coil 24, thence through the apertures 38 of the shroud 37 and in through the meshes of the wire cylinder 31 to the interior thereof, thence through the open end of the air-purifier to the air-passage 40, through the apertures 41 into the cooling-chamber 42, (which of course is now not in use,) down through the openings 45 into the main heating-chamber 49, through the coils of the radiator 50 and the apertures 51 into the air-channel 52, and thence through aperture 54 into the eye of the fan-casing 55, whence the air is propelled by the fan through the spout 56 into the plenum-chamber 57, and through the opening 58 into the area to be ventilated.

It is to be noted that the arrangement of air-passages is such that the course of the air

is positively fixed and that the incoming air must pass first through the tempering-coil, thence through the air-filter, and then through the main heating-coil. Thus in its transit through the machine the incoming air is first heated by the tempering-coil just sufficiently to raise it above freezing-point, so that it will not freeze the water adhering to the wire cylinder 31. Then as it passes through the air-filter 30 most of the dust and other impurities are strained out by its passage through the wire fabric, which, in virtue of the water-spray constantly playing upon the revolving surface, is maintained always clean and moist, so that the dust may readily adhere thereto, while the air passes freely through its meshes. It is on account of this moistening of the air-filter that the tempering-coils and the main heating-coils are separated and the filter interposed therebetween, as it is well known to ventilating engineers that heated air will absorb and carry moisture more readily than relatively cold air, so that if the air be heated to 120° or thereabout and then passed through a moist screen it will absorb such an amount of moisture that the humidity in the area being ventilated is too great and the atmosphere made to feel oppressive. By my arrangement, however, the air is passed in a relatively cooled condition through the moist-air purifier and thereafter heated, so that it does not absorb enough moisture to render it unpleasantly humid.

In regard to the air-purifier it is also to be noted that the dust enters the purifier from the outside and that the action of the cleansing media—that is to say, the water-jet and the brushes—are from the inside, so that the tendency of the water-jet and the brushes is to force the dust back and prevent it penetrating clear through the screen, so it is readily washed away into the drip-pan. The association of the rotary purifier with the fan insures that the rate of cleansing of its surface shall be proportional to the volume of the air handled by the apparatus.

The hand-damper apparatus is provided for use when it is desired to cool rather than heat the area to be ventilated. In such cases the heat is turned off from the ventilating-coils and a block of ice is placed in the cooling-chamber 42. Now the hand-damper 18 is turned to close the pipe 15 and open the apertures 11 in the base of the apparatus, so that no air is introduced from the exterior of the building, but internal circulation within the area to be cooled is provided for, the air entering the base through the apertures 11 rather than through the pipes 15 and then taking the course heretofore described. The object of this arrangement is to prevent the undue melting of the ice by the introduction of heated air from the exterior of the building by recirculating through the room the cool air from the floor-level.

It will be apparent to those skilled in the art that if it be desired to provide a forced exit for air from the area to be ventilated a second fan can be provided and connected by an air-passage within the casing leading from openings at the floor-level to the exterior of the building. Such an addition would, however, not change the essential operation of my device.

While for purposes of a full disclosure I have herein shown and described in some detail a particular arrangement of air-passages and association of elements, I do not desire to be understood as limiting myself to the specific construction shown and described further than as specified in the claims, as it will be apparent that the construction might be modified and changed in many ways without departing from the spirit and scope of my invention. Further, it will be apparent that while I have described the elements of my machine with particular reference to association in a completely self-contained apparatus that certain novel features thereof might be incorporated in machines for large ventilating installations.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A device for ventilating relatively small areas, comprising a containing-casing provided with an inlet and an outlet, a damper for said inlet, and between the inlet and outlet means for attemperating air, and an air-circulating fan, and means whereby the damper is respectively opened and closed substantially simultaneously with the starting and stopping of the fan.

2. A device for ventilating relatively small areas, comprising a unitary containing-casing provided with an inlet and an outlet, a damper for said inlet, and between the inlet and outlet means for attemperating, cleansing and positively circulating air, said air-circulating means comprising a centrifugal fan; controlling means for starting and stopping the fan and connections between the said controlling means and the damper for opening the damper when the fan is started and closing it when the fan is stopped.

3. In a ventilating apparatus, a fan, an air-purifier, regulable means for supplying water to the purifier, regulable means for supplying air to be purified, and means for varying the speed of the fan arranged to simultaneously regulate the water and air supply.

4. In a ventilating apparatus, a rotary air-purifier, means for rotating said air-purifier, means for supplying water to the purifier, means for regulating the water-supply, and means for controlling the speed of rotation of the purifier arranged to simultaneously control the water-regulating means.

5. In a self-contained ventilating appara-

tus, a casing of cabinet form adapted for inclusion directly in the area to be ventilated, and the following-named instrumentalities disposed within and on the casing to wit: a motor, a centrifugal fan driven thereby, a purifier, attemperating means, regulable means for supplying air to the casing, passages for directing air through the air purifying and attemperating means, and means for controlling the operation of the fan arranged to control also the regulable air-supply means.

6. In a self-contained ventilating apparatus, a casing of cabinet form adapted for inclusion directly in the area to be ventilated, and the following-named instrumentalities disposed on and within the casing, viz: a motor, a centrifugal fan driven thereby, an air-purifier, air-attemperating means, regulable means for supplying air to the casing, means for controlling the operation of the motor, arranged to control also the regulable air-supply means.

7. In a self-contained ventilating apparatus, a casing of cabinet form having an air-inlet, and the following-named instrumentalities associated with said casing, to wit; a purifying and attemperating means, a centrifugal fan for circulating air through the casing, a fan-motor, a motor-controlling device, a damper in the air-inlet, and a connection between said damper and the motor-controlling means arranged to open the damper when the motor is started and to close it when the motor is stopped.

8. In a self-contained ventilating apparatus, a casing of cabinet form adapted for installation in the room to be ventilated, and the following-named instrumentalities assembled and disposed on and within the casing, viz: a motor, a fan driven thereby, a rotary air-purifier also driven thereby, means for cleansing the purifier, a tempering-coil, a main heating-coil, regulable means for supplying air to the casing, passages for directing the air successively through the tempering-coil, the air-purifier and the heating-coil, and means for regulating the speed of the fan and coincidentally adjusting the regulable air-supply means.

9. In a device of the character described, a casing adapted for inclusion directly in the area to be ventilated, said casing containing therein means for attemperating the air, a screen for purifying the air, and regulable means for supplying water to said screen to cleanse the same, there being associated with said casing a motor, a fan driven thereby and arranged to impel air through the casing and the apparatus contained therein, and means for controlling the motor speed arranged to automatically control the water-supply means.

10. In a machine of the character described, a casing of cabinet form adapted for inclusion directly in the area to be ventilated, an

inlet to said casing, attemperating areas therein, a distributing area in communication with said attemperating areas and having outlets therein for distributing air to the area
 5 to be ventilated, a fan for positively circulating the air through the casing, means for controlling the speed of the fan, means for regulating the capacity of the inlet to the casing, said inlet-regulating means being arranged
 10 for automatic control consistently with the speed of the fan.

11. In a machine of the character described, a casing of cabinet form adapted for inclusion directly in the area to be ventilated, and comprising a base having inlet-openings 11 therein, an inlet-pipe 15 adapted to be led to the outer air, a damper 18 in said pipe, a damper 12' for the inlet-apertures 11, suitable connections between said dampers whereby
 20 as one damper is opened the other is closed, an auxiliary damper 17 to control the inlet 15, attemperating means within the casing, a fan for impelling air through the casing, means for regulating the speed of the fan, and
 25 connections between said fan-regulating means and the damper 17 whereby the said damper is adjusted when the speed of the fan is changed.

12. In a self-contained ventilating apparatus adapted for installation directly in the area to be ventilated, a casing providing an outlet in its upper part, an inlet communicating with the area to be ventilated, and an inlet communicating with an area outside of
 35 the area to be ventilated both communicating with the casing below the outlet; means for closing each of said inlets; and within the casing a heating means between the inlet and outlet, and a fan, there being a passage for
 40 constant free circulation of air through the

casing, whereby air may be positively impelled through the casing by the fan, or allowed to circulate naturally when the fan is stopped.

13. In a self-contained ventilating apparatus, adapted for installation directly in the area to be ventilated, a casing providing an outlet, an inlet communicating with the area to be ventilated, an inlet communicating with the outside air, a damper for closing each
 50 inlet, a fan, means for driving the fan, means for starting and stopping the fan, an attemperating area within the casing, there being a free path of air circulation from the inlets through said area to the outlet, and means
 55 operable simultaneously with the fan starting and stopping means for opening the outside-air damper when the fan is started and closing it when the fan is stopped.

14. In a self-contained ventilating apparatus, adapted for installation directly in the area to be ventilated, a casing providing an outlet, an inlet communicating with the area to be ventilated, and an inlet for communication with the outside air, there being within
 65 the casing a constantly-free passage for air circulation from the inlet to the outlet, air-attemperating means in said path, a fan for positively propelling air through said path, dampers for the inlets and connections between the dampers, whereby as one is opened
 70 the other is closed.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES G. GARNER.

In presence of—

GEO. T. MAY, Jr.,
 GEORGE L. CHINDAHL.