

July 29, 1924.

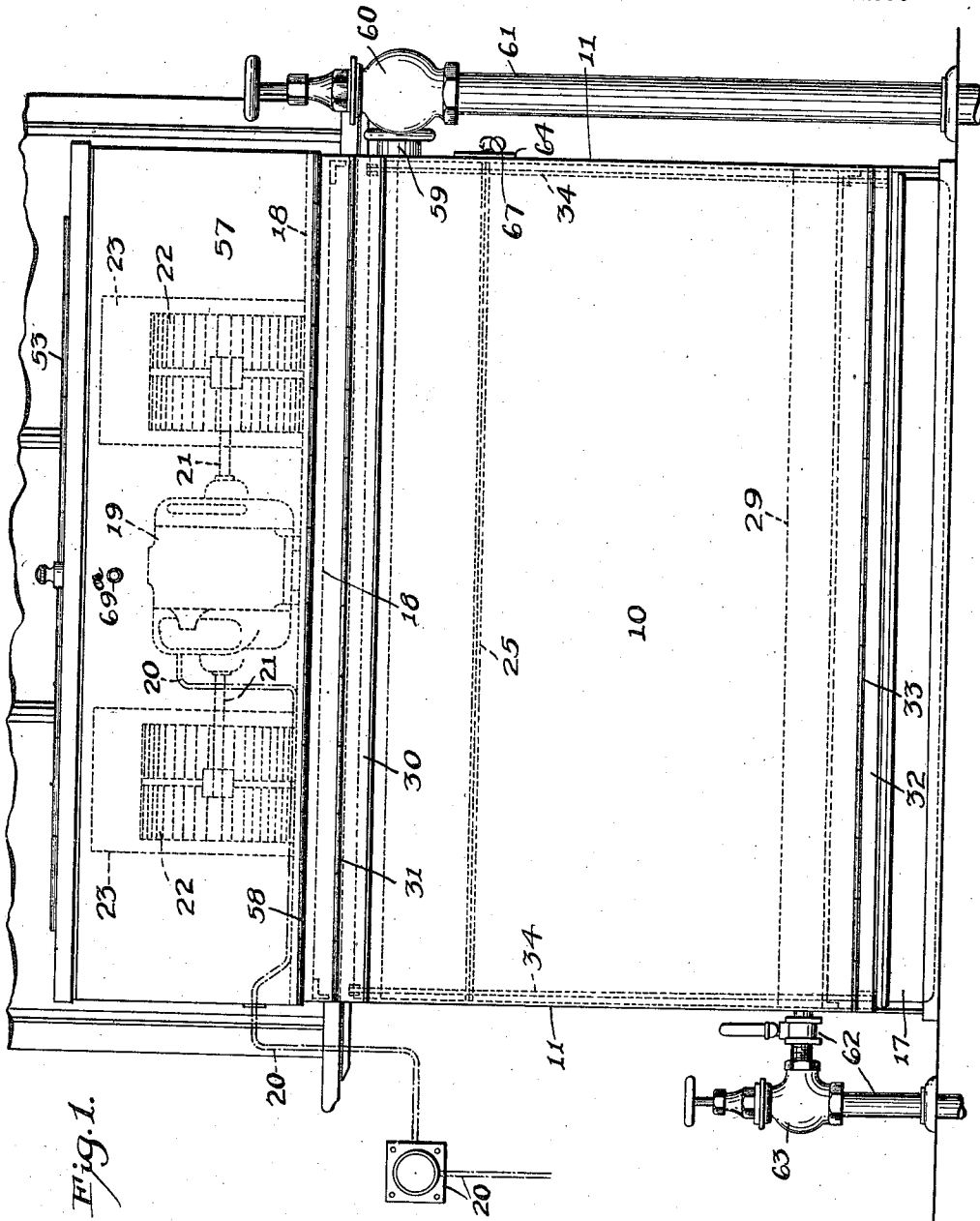
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M. J. CALLAHAN

VENTILATING UNIT

Filed June 2, 1919

4 Sheets-Sheet 1



INVENTOR:
Michael J. Callahan
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July 29, 1924.

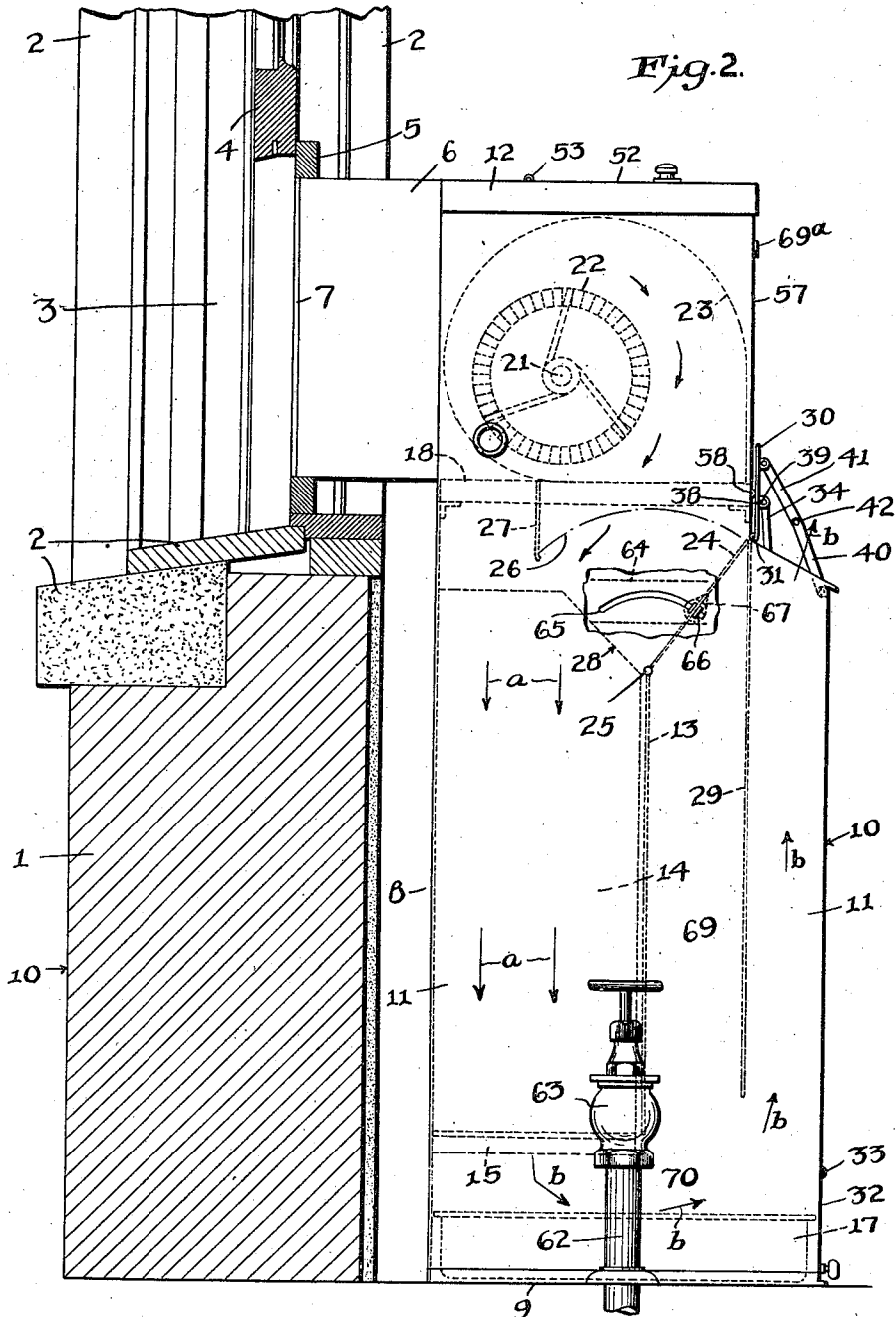
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4 Sheets-Sheet 2



INVENTOR:
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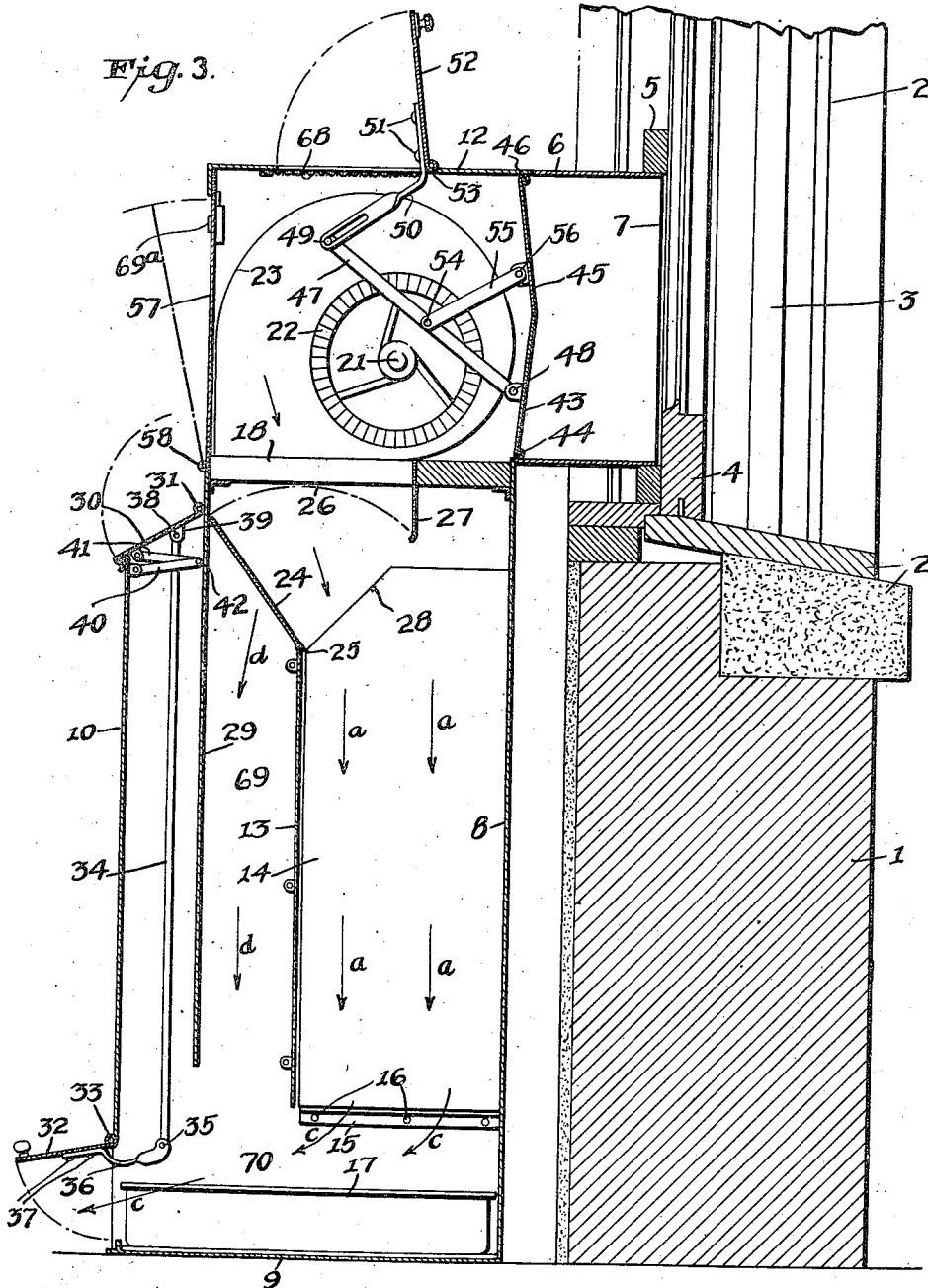
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VENTILATING UNIT

Filed June 2, 1919

4 Sheets-Sheet 3



INVENTOR:
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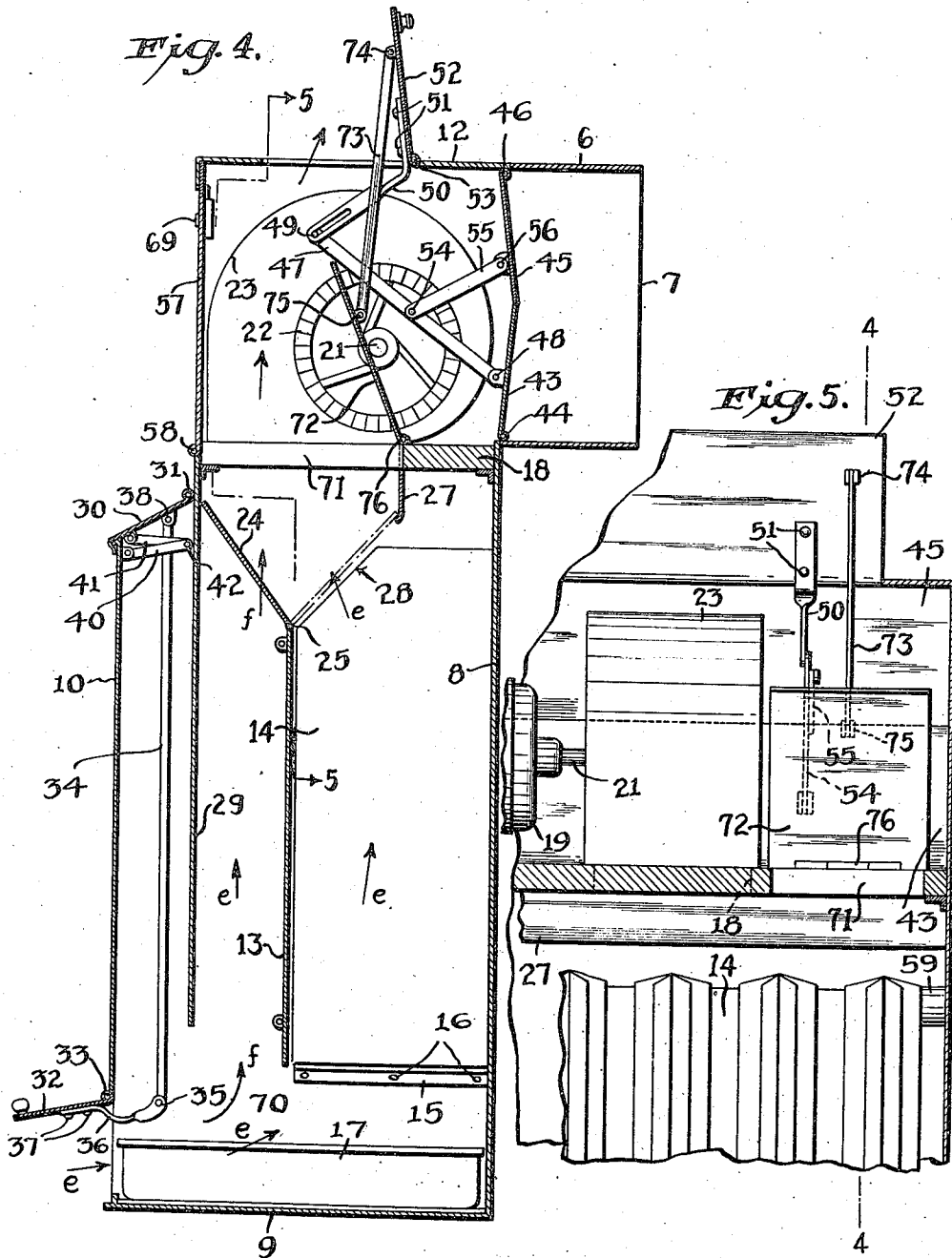
M. J. CALLAHAN

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VENTILATING UNIT

Filed June 2, 1919

4 Sheets-Sheet 4



Inventor:
Michael J. Callahan.
By his Attorney
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UNITED STATES PATENT OFFICE.

MICHAEL J. CALLAHAN, OF NEW YORK, N. Y.

VENTILATING UNIT.

Application filed June 2, 1919. Serial No. 301,190.

To all whom it may concern:

Be it known that I, MICHAEL J. CALLAHAN, a citizen of the United States, residing in the borough of Manhattan, city, county, and State of New York, have invented a new and useful Improvement in Ventilating Units, of which the following is a description.

This invention has reference to ventilating apparatus, and, particularly, to ventilating units adapted for individual installation in schools, houses, lofts, basements, and buildings generally, as well as where the installation of the usual type of ventilating systems would be impracticable or too expensive.

Among the objects of my invention may be noted the following: to provide a ventilator, or ventilating unit, adapted to be installed at a window and around a radiator, or around the latter in places where an opening may be made in the building wall for the ingress of air; to provide a unit ventilating apparatus which is highly efficient, is simple, compact, economical to build, and which can be regulated so as to heat all portions of the room where installation is made to any degree desired, regardless of the outside temperatures; to provide a heating unit adapted to supply heated air to the room where installed to any desired temperature, with a steam pressure of comparatively small amount, and to deliver any desired quantity of fresh air per minute to each occupant of the room; to provide a unit ventilating apparatus with means whereby the air passing therethrough may be heated to any desired degree and properly humidified before entering the room; to provide a ventilating unit with means whereby the entire volume of air entering the same may be brought into contact with the radiator or heating apparatus, humidified, and passed in entire volume into the room, or, by means of which only a portion of the air entering the unit may be heated, humidified, and delivered into the room, or the entire volume of air entering the unit may be humidified and delivered into the room cold or without any preliminary heating; to provide a ventilating unit with heating and humidifying means and with a means by which the air may be directed to the heating means, or by which the latter may be by-passed, so that the air may en-

ter the room without preliminary heating; to provide a ventilating unit by means of which fresh air can be brought from out of doors, heated, humidified, and circulated in the room, and by which the air in the room may be recirculated and reheated, if desired, and by which, in either instance, regulation can be so effected as to insure constant delivery of the required amount of air and of practically any desired temperature; to provide a system of dampers and baffles in a ventilating unit by which the maximum air requirement can be delivered into a room at a temperature rise not to exceed 5° F. between inlet and outlet when the outside temperature is below 65° F. for example; to provide a ventilating unit with means by which certain of the dampers can be regulated by hand, or automatically, as by electric or thermostatic devices; to provide a ventilating unit with a combination of dampers and closures so connected as to enable the same to be opened and closed or shifted simultaneously, according to the effects desired or the ventilating requirements; and to provide a ventilating apparatus which may be quickly, effectively and economically installed, and which is cheaply maintained, easily operated for any requirement and which is effective for all the purposes set forth in the foregoing.

In order that my invention may be clearly understood, I have provided drawings wherein:

Figure 1 is a front elevation of a ventilating unit installed, for example, at a window having a radiator thereunder;

Figure 2 is a sectional elevation looking at the apparatus from one end;

Figure 3 is a cross-sectional view of the apparatus.

Figure 4 is a cross-sectional view of the apparatus on a line corresponding to the line 4—4 of Figure 5; and

Figure 5 is a sectional view substantially on the line 5—5 of Figure 4.

Referring to the drawings, the numeral 1 indicates the wall of a building having a window opening and surrounding framing for the window-sashes, as usual, and generally indicated by 2. I desire it understood, however, that the passage 3, for the inlet of air to my ventilating unit, may be through the wall of the building, or through flues from any point or place where

air can be obtained and which may be found most convenient, or suitable for the installation. The lower sash 4 of the window is shown elevated in Figure 2 sufficiently to provide for the inlet of a maximum supply of air to the ventilating unit. In Figure 3 the sash 4 is shown closed so as to shut out the cold air supply. The sash may be elevated to any extent desired so as to control the amount of cold air supply to the unit. 5 is the framing surrounding the inlet duct or casing 6 at the entrance to which a screen 7 is placed, in order to keep out insects, large particles, and, as effectively as possible, screen the indrawn air. The casing of the ventilating unit may be made in practically any form desired; but, in the form of my invention shown in the drawings, it has been made to conform to the parts and disposition generally of the apparatus contained therein. As shown, the casing extends down to the floor of the room, and the rear wall of the same is indicated by 8, the bottom thereof by 9, the front wall by 10, and the end walls by 11. The top of the casing is indicated by 12. Within the casing is a partition 13 adapted to encase a radiator 14 through the medium of which the air is heated. The radiator may be of any usual type of steam or hot water coils, or, it may be of the special form and construction shown in my design patent granted Nov. 4, 1919, No. 54,059. The radiator is preferably supported at its bottom upon the opposite end walls 11 of the casing by angle-irons or brackets 15, bolted or otherwise rigidly secured in place, as at 16. The chamber in which the radiator is set is open at its bottom and the radiator is supported above the bottom of the casing sufficiently high to provide a chamber to freely admit a water pan or basin 17 of suitable form and size which is preferably removable to enable it to be cleaned and renovated when found necessary. Above the radiator 14 a shelf 18 is provided, for the support of a motor 19 of any approved type, a D. C. motor being preferable. The leads to the motor from a source of supply, including a junction box, are indicated at 20.

The drive-shaft of the motor is extended in opposite directions, as at 21, and the outer ends thereof have removably applied thereto centrifugal blowers or fans 22 adapted to draw the air through the inlet opening 3 and screen 7 and to rotate in the casings 23 which are open at their bottoms, thus enabling the air, drawn in by the blowers, to be driven through the shelf or support 18 into the chambers below the latter, where the radiator and dampers and other devices are located. Thus, the air may be driven by the blowers into contact with and through the radiator, where it is heated in its passage to the pan 17, and thence upwardly or

through the front wall of the casing into the room. As shown in Figures 2 and 3, a damper 24 is hinged at 25 to the partition 13, said damper being adapted to swing, as shown by the dotted line 26, in a space or chamber above the radiator and below the support 18, from the full line position into engagement with the support 27 depending into the chamber above the top of the radiator, which latter is so constructed as to have its top surface inclined, as at 28, to enable the damper 24 to cover the same and rest upon the support 27. The support 27 is connected in any suitable manner with the shelf 18, and the blower casing is extended around the blower, as at 23, so as to shunt or deflect the air into the chambers below the support or shelf 18, through the openings in the latter. Pendent within the casing of the ventilator is a baffle 29, dividing vertically the space between the radiator and the front wall 10 of the casing and helping to define the damper chamber between the blower chamber and heater chamber. The damper 24 is adapted to engage or lie against the baffle 29 at its upper end adjacent the shelf 18, thus cutting off the passage for the air between the partition 13 and baffle 29, and compelling the air to travel in full volume through the radiator and to the outside of the baffle, or through the discharge chamber between the latter and the front wall 10 of the casing. The front wall 10 of the casing, at its top, is provided with a damper 30 pivoted at 31 and adapted to swing upwardly, as shown by adjacent dotted line. At its bottom, the casing is provided with a damper 32 pivoted at 33, and adapted to swing upwardly, as shown by adjacent dotted line. The dampers 30 and 32 are connected together for simultaneous and conjoint operation by the rod 34 pivotally connected at its lower end, as at 35, to an angle-bar or piece 36 rigidly fixed, at its opposite end, to the damper 32, as at 37. The upper end of the rod 34 is pivotally connected at 38 to a lug 39 secured to the inside of the damper 30. Thus, when the damper 30 is lifted, the damper 32 will be closed and held tightly, since the lifting action of the rod 34 will draw the angle-piece inwardly, thus depressing the damper 32. Reverse action will occur when the damper 30 is closed. The damper 30 may be maintained open by a pair of toggle links 40-41, pivoted together at 42, and the one 40 pivoted to the casing member 10 and the one 41 pivoted to the damper 30. Thus, when the damper 30 is lifted, the links 40-41 may be pressed to the position shown in Figure 2, and, when the damper is closed, will assume the position shown in Figure 3.

Ingress of the air through the opening 3 may be barred, either by lowering the sash 130

4, if the installation be at a window, or by cooperation of a pair of dampers, if the installation be at an opening not otherwise provided with a cut-off means; and the dampers may be so set or regulated as to control the intake of air by the blowers. As shown in Figure 3, a damper 43 is pivoted at 44 to the inlet duct 6, or adjacent part of the frame, and cooperates, at its upper end, with a damper 45, pivoted at 46 to the top 12 of the casing. A lever 47 is pivoted at one end at 48 to the damper 43, and, at its other end, has a pivotal and sliding connection at 49 to an angle-bar 50 rigidly connected at 51 to the closure 52 hinged at 53 to the top 12 of the casing. Between its ends, the lever 47 is pivoted at 54 to the end of a link 55, the other end of which is pivoted at 56 to the damper 45. Thus, when the closure 52 is raised, as shown in Figure 3, the two dampers 43 and 45 will be brought together so as to close the inlet and bar the ingress of air to the blowers. When, however, the closure 52 is lowered to close the opening in the top of the casing, as shown in Figure 2, the dampers 43 and 45 will be thrown wide open to admit full volume of air to the blowers through the inlet 3. The top of the casing, at its front, is also provided with a closure 57 pivoted at 58 and adapted to be opened for access to the blowers, the motor, and other apparatus contained in the upper part of the frame.

The steam or heating medium is preferably admitted to the radiator 14 at the top thereof, as at 59, Figure 1, and is controlled by usual valvular means 60, the supply being furnished through pipe 61. The heating fluid, after passing through the radiator, leaves the latter preferably at the bottom thereof, as at 62, where further control is obtained by usual valvular means 63.

The damper 24 may be controlled either manually, thermostatically or electrically, as may be desired; but, for simplicity and as an example of control means, I have shown manually operated means consisting of a plate 64, shown in dotted outline in Figure 2, in which is an arcuate slot 65, which extends also through the end wall 11 of the casing. Extending through the slot 65 is a bifurcated stud 66, which embraces the valve 24 and to which the valve is connected, whereby the latter may be shifted in the arc of a circle represented by the slot 65 about its pivot at 25. The bifurcated stud is provided with a pointer 67 which may cooperate with calibrations, or other indicia, on the face of the plate 64, or on the casing of the machine, in the event a plate is not employed or set into the casing. This simple means of manipulation and for controlling the damper 24 is merely an example of my invention, and it is to be understood, as previously suggested, that the damper may be

manipulated by thermostatic means connected with the heating fluid regulator, so that the damper 24 may be shifted in accordance with the operation, automatically or otherwise, of the thermostatic regulator. The damper may also be operated electrically under thermostatic control.

Having thus described the details of my invention, the following mode of operation will be readily understood:

As shown in Figure 2 the, window-sash 4 is raised sufficiently to enable full volume of air to enter at the inlet 3, through the screen 7, to the fan or blower chamber, and, the motor having been set in operation, the centrifugal fans will draw in the air and drive the same with great force into the chambers below through the shelf or support 18. With the damper set as shown in Figures 2 and 3, the full volume of air, driven down by the fans, will pass through the radiator, as shown by the arrows *a* in the two figures, being deflected in great measure by damper 24. Having passed through the radiators, the heated air will be cleansed and humidified by contact with the water in the pan 17 in the chamber at the base of the apparatus, and, with the position of dampers 30, 32 shown in Figure 2, will thence pass upwardly, through the discharge chamber, as shown by the arrows *b*, and out through the opening at damper 30 into the room. The force of the blowers is such as to cause the air to be driven upwardly into the room where the ventilator is located and into contact with the ceiling, where it will be diffused throughout the room. With the damper at 30 open, the damper 32 at the bottom of the apparatus will be shut, Figure 2, and the closure 52 at the top of the apparatus will also be shut. Thus, the full volume of air will pass through the apparatus, will be heated by the radiator, cleansed and humidified by the water, and driven into the room. Regulation of the inlet at 3 may be controlled by lowering the sash 4. The inlet of air may be entirely cut off by raising the closure 52 at the top of the apparatus, which will, through the lever mechanism described, close the dampers 43, 45 and thus entirely shut off the inlet of cold or fresh air to the blowers. When this is accomplished, the air in the room may be re-circulated without the admission of fresh cold air, and be passed through the radiator and into contact with the humidifying and cleansing means in the same way as just described. This will cause a quick rise of temperature in the room. Or, the air, after passing through the radiator and in contact with the water in the pan 17, may be driven out through the bottom of the apparatus by shutting the damper 30 which will simultaneously open the damper 32. This position of valves or dampers is shown in Figure 3 and the direc-

tion of passage of the re-heated air is shown by the arrows *c*. On the other hand, the air in the room may be re-circulated without being re-heated, in which case the damper 24 will be set over to cover the top of the radiator and thus shunt all the air around the radiator and downwardly to the water pan, as indicated by arrows *d*, Figure 3, in which event it may be either driven out through the bottom of the apparatus,—arrows *e*,—or through the opening at damper 30, taking the course of arrows *b*, Figure 2. This is an important feature of my invention, since the entire volume of air from the room, or cold air from outdoors, can be shunted past the radiator and delivered into the room, either through the bottom of the ventilator or through its damper opening at 30. If it is desired to admit fresh cold air to the room, the closure 52 will be shut, whereupon the dampers 43—45 will be opened, thus admitting the full or regulated volume of air from the outside, whereupon the blowers will drive the air downwardly, and, with the valve or damper 24 set to cover the radiator, the air will pass by the latter,—arrows *d*, Figure 3,—and in contact with the water in the pan and into the room either through the bottom of the apparatus,—arrows *e*,—or through the opening covered by the valve 30,—arrows *b*, Figure 2,—according to the way in which the dampers 30, 32 are set. Regulation of the damper 24, as by shifting the same to any intermediate position between the two extremes indicated by the support 27 and the baffle 29, may be brought about by manipulating the device 66—67, so as to regulate or control the amount of air passing through the heating chamber and the by-pass chamber 69, from the damper chamber; and this may be with reference to the cold air admitted at 3 or the air of the room admitted at 68. In either event the regulation of the damper controls or modifies the temperature of the air delivered from the unit.

From the foregoing description, it will be seen that hot or cold air can be driven into the room, and the air so driven in may be heated to any desired degree, and also a mixture of hot and cold air can be driven into the room, according to the way in which the damper 24 is set, viz, either partly over the radiator, or partly over the chamber in front thereof, or midway between, as when said damper is set vertically in its chamber. These various modes of operation and the means by which the same are brought about in my apparatus, are important features of my invention and upon them I desire to lay great stress since I am enabled to raise the temperature in the room very rapidly by reheating the air as described, and am also enabled to bring into the room fresh cold air and completely by-pass the radiator,

whether the same be in operation or not. In the foregoing description, however, it has been assumed that the radiator is in full, or controlled, operation and that the many important effects have been thus obtained; but, it is important to note that my ventilating unit may be used in warm weather with no heat turned on, and also in mild weather with heat turned on. It is also important to note that, in my unit or apparatus, the heating element or chamber can be completely by-passed, the air passing downwardly through the damper chamber into the chamber 69 at no point entering the heating chamber or commingling with the air in the heating chamber. On the other hand, the body of air passing downwardly through passage 18, from the blower chamber into the damper chamber, is divided in the latter chamber according to the position the damper 24 is set therein and the two columns, equal or unequal, are driven through the heating and by-pass chambers, respectively, and commingled or mixed in the chamber or space 70 above the pan 17, said space becoming a mixing chamber for the unit, the air therein being delivered from the unit at any predetermined temperature.

In addition to the advantages of control, as set forth in the foregoing, my apparatus does away with the necessity for building in, or installing in the structure of the building, supply ducts, passages, flues and other similar means and auxiliary apparatus usually required in mechanical and other ventilating systems. It is very economical in matter of construction and installation, since the entire apparatus can be made at the factory, transported to the place of installation, and very quickly installed. Each room in which the apparatus is installed can have the temperature therein regulated, by a supply of fresh heated air, to any degree or extent desired. When the ventilating unit is installed in rooms which are not in use, it can be put out of operation, thus saving the expense of running the same and economizing operation. Fresh air is brought directly from the outside, either exactly at the temperature of the outside air, or controlled to any degree desired. There are no drafts created by my apparatus, since the air is taken in at a given point and driven to the top of the room, where it is diffused against the ceiling. The temperature in the room can be raised very rapidly and much more effectively than is possible with ordinary duct systems.

Another important feature of my invention is that the hot and cold air can be mixed in the apparatus, humidified and driven into the room; that is to say, cold air entering at 3, and with the damper set vertically, or tilted to the degree desired in either direction, will, in part, be driven through the

radiator and, in part, through the by-pass chamber 69 to the chamber 70, between the pan 17 and the bottom of the radiator, where mixing and humidifying will take place before the air is driven into the room either through the bottom, Figure 3, or the top, Figure 2, of the apparatus. Thus my apparatus has, in effect, a mixing and tempering chamber. When ventilation is not required, as at night, for example, during cold weather, but heat is required in the room, the motor and fans may be stopped. In such circumstance, the closure 52 will be raised, as in Figure 3, thus shutting out cold air, by simultaneously closing dampers 43, 45, the dampers 30 will be closed and damper 32 opened; the damper 24 will be set as in Figure 3. This is the position of parts, practically, for re-circulation as previously described. Now, the air in the room, as it cools will descend to the floor, enter the opening at lower damper 32, pass upwardly through the radiator, through the fan housings, and thence through grille 68, which protects the opening at the closure 52. This provides for a certain degree of gravity circulation or recirculation through the ventilator. To increase such circulation or recirculation, and thereby increase the volume of heated air passing through the radiator in a given time, I provide the shelf 18, see Figures 4 and 5, with a plurality of openings 71, one at each end of said shelf, each opening being located between the end wall 11 of the main casing and the adjacent blower casing 23. In Figures 4 and 5, only one of the openings 71 is shown, since this is deemed sufficient for purposes of illustration. These openings 71 are controlled or covered by dampers 72 mechanically connected to the closure 52 by links 73, pivoted at one end at 74, to the closure 52 and, at the other end at 75, to the damper 72, so that, as said closure 52 is opened and the dampers 43, 45 are closed, the dampers 72 in the shelf 18 will be raised to permit free circulation through the apparatus. The dampers are hinged at 76 to the shelf 18 and only one is shown in the drawings, as previously stated. This is quite an important mode of operation and gives a big feature of advantage to the apparatus, since it may frequently happen that, in extremely cold weather, this mode of recirculation or gravity circulation may be necessary because of lack of sufficient heat in the radiator, or because of very cold weather, or both. In Figures 4 and 5, the damper 72 is shown elevated, the closure 52 is likewise elevated, and the dampers 43 and 45 are closed, while the by-pass damper 24 is shown in Figure 4 in full lines as closing the by-pass chamber, thus allowing recirculation through the damper and heating chamber. Also, in Figure 4, the damper 30 is closed while the damper 32 is open. In this position of the parts, the cold air falling to the floor will enter the main casing at the open damper 32, as shown by the arrows *e*, and will pass over the water in the pan 17 and through the heating chamber 14 into the by-pass chamber, and from thence through the damper chamber and the opening 71 in the shelf 18 and upwardly through the opening in the top of the casing, it being understood, as previously described, that the air will also pass up through the shelf 18 into the blower chamber and outwardly at the sides thereof and upwardly through the top of the main casing. The added openings 71 in the opposite ends of the shelves increase the capacity of the apparatus for gravity circulation or recirculation without the admission of fresh air into the apparatus through the dampers 43, 45, and it will also be understood that, as just described, the air passing upwardly through the apparatus following the course of the arrows *e* is heated in the heating chamber. However, the by-pass damper 24 may be thrown over to the dotted line position, Figure 4, thus closing the passage through the heating chamber and opening the passage through the by-pass chamber into the damper chamber. Under these conditions, the cold air will enter the apparatus at the bottom, as indicated by the arrow *e* and will follow the course of arrows *f* instead of *e* upwardly through the by-pass chamber, the damper chamber, through the openings in the shelf 18, and, respectively, through the blower casings and beside the same through the openings 71 controlled by the dampers 72. Thus the air will be recirculated through the apparatus without being reheated. The two preceding operations may be modified by shifting the damper 24 to any extent desired between the two extremes of full line and dotted line positions, Figure 4, thus enabling the air entering the apparatus at the bottom thereof to follow both the courses indicated by the arrows *e* and *f* and thus be only partially reheated.

The damper 32, in the position shown in Figure 3, acts to deflect the air passing from the casing downwardly toward the floor, and this effect will be increased according to the position of the damper. This is also true of the damper or closure 30, the angle of deflection depending upon the position of the closures. Similar effects would also be derived from the closure 52, if it were desired to adjust the same between extremes, and the position of the closure 52 will control the position of the dampers 43 and 45 with modification of functions or effects. The grille 68 will prevent articles of any kind being accidentally dropped into the chamber containing the motor and fans. It will also prevent tampering with the motor

and fans, and accidents by inserting the hand in said opening. The closure 57 may be provided with a lock 69^a. My ventilating unit may be set in alcoves or niches or other spaces in the walls of rooms, thus, in great measure, overcoming its projection into the room. In fact, the formation of the system lends itself readily to disposition in practically any place in a room where a radiator can be set.

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

1. A ventilating unit consisting of an enclosing casing; a heating chamber and a discharge chamber formed therein by a vertically extending partition; a radiator set in one chamber; humidifying means in the bottom of the casing; a chamber in the top of the casing and a blower in said chamber; means for admitting air to the top chamber; a damper movably mounted at the top of the partition and adapted to be shifted to regulate the admission of air into the radiator chamber; and a passage between the top chamber and the radiator chamber whereby the blower may drive the air down through the radiator chamber, when the damper is properly set, and to the humidifying means and out of the casing through the discharge chamber.

2. A ventilating unit comprising an enclosing casing divided into a plurality of chambers, two being arranged in parallelism and one of the latter having two discharge openings arranged one above the other; a third chamber above the other two and a blower therein; a heating element in one of the parallel chambers; a passage between the blower and heater chambers; dampers arranged in cooperative relation to the discharge openings; and means for actuating the dampers whereby the heated air may be driven from the casing through either one of the discharge openings.

3. A ventilating unit comprising an enclosing casing; a heating element and a blower in the casing; two independent discharge openings in the casing arranged one above the other; a damper at each opening for controlling the discharge of air therefrom, and means for actuating the dampers whereby the heated air may be driven from the casing through either one of the discharge openings.

4. A ventilating unit comprising an enclosing casing divided into a plurality of chambers; a blower in one chamber; a heating element in another chamber; the casing being provided with a passage between the two chambers; and also with a plurality of discharge openings arranged remotely to each other and one above the other; dampers arranged in cooperative relation to the discharge openings; and means for setting the

dampers so that air driven by the blower through the heating chamber can be discharged from the casing in either one of a plurality of directions.

5. A ventilating unit comprising an enclosing casing divided into a plurality of chambers; a blower in one chamber; a heating element in a second chamber; and humidifying means in a third chamber; the casing being provided with a passage between the blower and heater chambers and between the latter and the third chamber, and also with a plurality of discharge openings arranged remotely to each other and one above the other; dampers arranged in cooperative relation to the discharge openings; and means for setting said dampers so that air driven by the blower through the heating and humidifying chambers can be discharged from the casing in either one of a plurality of directions.

6. A ventilating unit comprising an enclosing casing having a chamber at its top and a blower therein; a chamber, below the blower chamber, and a heater therein; a chamber, below the heater chamber, and humidifying means therein; a by-pass chamber arranged beside the heating chamber; a discharge chamber arranged beside the by-pass chamber; and a damper located at the entrance to the heating and by-pass chambers for operation between the two and relatively to the blower chamber, whereby air emanating from the blower chamber may pass through either or both the heating and by-pass chambers and through the discharge chamber.

7. A ventilating unit comprising a casing having a plurality of chambers therein; a fan or blower contained in the topmost chamber; a heating element contained in a lower chamber; humidifying means contained in a third chamber below the heating chamber; and a damper controlling the entrance into a fourth chamber; means whereby the damper may be set so as to entirely close the heating chamber or entirely close the fourth chamber, or to permit the fan to drive air through both said chambers into the humidifying chamber; a discharge chamber having independent openings one above the other; and means whereby the air thus humidified may be driven through the casing and out through either of said openings.

8. A ventilating unit comprising a casing having a plurality of chambers extending lengthwise thereof and certain of them in parallelism between the front and back walls of the casing; a blower in one chamber; a heating element in another of the chambers adjacent the back of the casing; one of the parallel chambers being for discharge of air and located at the front of the casing; and means located at the entrance to

the heating chamber, whereby the air driven by the fan may be caused to completely by-pass the heating chambers so as to deliver cold air from the apparatus.

9. A ventilating unit comprising a casing divided into a plurality of chambers, one of which is at the top of the casing and is provided with a fan or blower, and another of which is at the bottom of the casing, and two others of which are parallel and between the top and bottom chambers and between the front and rear walls of the casing; a discharge chamber at the front of the casing; heating means in the between chambers adjacent the rear wall of the casing; and a damper located at the entrance to the heating chamber to cooperate with the heating means and to swing across and close the other between chamber, whereby air driven by the fan may be caused to pass through the between chambers and bottom chamber and out through the discharge chamber.

10. A ventilating unit comprising a casing having an air inlet and two separated outlets; means for forcing air through the casing; dampers controlling said outlets; and means connecting said dampers whereby as one is opened the other will be closed.

11. A ventilating unit comprising a casing having an air inlet and two separated outlets; a heater located between the inlet and outlets; means for forcing air through the heater and casing; dampers controlling the outlets; and means connecting the dampers whereby when one is opened the other will be closed.

12. A ventilating unit comprising a casing having an air inlet at its top and two separated outlets, one of which is at the bottom of the casing; means for forcing air through the casing; dampers controlling said outlets; and means connecting said dampers whereby as one is opened the other will be closed.

13. A ventilating unit comprising a casing divided into a plurality of chambers; means for admitting air to one of the chambers; means for blowing air from said chamber into another of the chambers; heating means in the latter chamber; and means whereby air driven from the first named chamber may be caused to pass in part through the heating chamber and in part through a third chamber, and mixed, and humidified in a fourth chamber in the casing; and means for permitting the air to be delivered through the casing either at its bottom or near its top.

14. A ventilating unit having a heating chamber and a by-pass chamber, and also a chamber above the two said chambers, a fan or blower in the latter chamber, and a passage therefrom which communicates with the other two chambers; a damper control-

ling the admission of air to both of said two chambers from the fan chamber; and means whereby the air divided between the heating and by-pass chambers may be delivered through the casing either at its bottom or near its top.

15. A ventilating unit comprising an enclosing casing provided with a fan chamber; a heating chamber adjacent the back of the casing; a by-pass chamber; a discharge opening at the front of the casing; a fan in the fan chamber; heating means in the heating chamber; and means at the entrance to the heating chamber whereby the heating chamber may be by-passed entirely so as to deliver cold air through the casing.

16. A ventilating unit comprising a casing having a chamber at its top; a fan or blower located in said chamber; an air inlet to said chamber in rear of the fan; an air inlet at the top of said chamber; means for controlling the air inlet at the top of said chamber and connected for simultaneously controlling the air inlet at the rear of said chamber.

17. A ventilating unit having a chamber in the top thereof; a fan in said chamber; an air inlet at the rear of the chamber; an air inlet at the top of the chamber; means for covering the air inlet at the top of the chamber; means for covering the air inlet at the rear of the chamber; and means connecting the two said covering means whereby, when one is opened, the other is closed, and vice versa.

18. A heating unit comprising a casing divided into a top chamber, a bottom chamber, a heating chamber, a by-pass chamber, and a delivery chamber; a fan in the top chamber; humidifying means in the bottom chamber; heating means in the heating chamber; a damper mounted so as to close either the heating chamber at its top or the by-pass chamber at its top, and means for manipulating said damper; and means for closing the delivery chamber at its opposite ends comprising dampers and means connecting the two whereby, when one of the dampers is opened, the other is closed, and vice versa.

19. A ventilating unit comprising a casing divided into a plurality of chambers; a fan or blower in one of the chambers; heating means in another of the chambers; an inlet to the fan chamber through which cold air may be admitted to said chamber and driven through the heating chamber; means whereby the heating chamber may be more or less cut off, so that air driven by the fan may by-pass the heating chamber; and means whereby the cold air inlet may be cut off and the air in the room may be recirculated through the ventilating unit.

20. A ventilating unit comprising heating means and air driving means; means where-

by fresh air may be admitted to the air driving means and driven to the heating means; a closure for controlling the admission of fresh air; a closure at the top of the unit; and connections between the closures for opening one when the other is closed so as to re-circulate the air in the room at will through the unit.

21. A ventilating unit having a casing provided with a direct opening into the room to be ventilated and divided into a plurality of chambers, and interacting means located in said chambers whereby air may be driven from one through another of said chambers, or air may be caused to travel either downwardly or upwardly through said unit.

22. A ventilating unit comprising a housing having a blower chamber; and a heating chamber below the blower chamber; the blower chamber being provided with inside and outside air admission means; closures for said air admission means; and said heating chamber being provided with an outlet opening; and means connecting said closures to effect the operation of one by the other.

23. A ventilating unit comprising a housing having a blower chamber and a heating chamber communicating with each other, the latter having an outlet; outside and inside air inlet openings to said blower chamber; dampers in said openings; means connecting said dampers acting to close the outside air damper when the inside air damper is opened; and a damper mounted in the outlet of the heating chamber to control discharge therefrom.

24. A ventilating unit comprising a housing having an outside air inlet and an inside air inlet, and an outlet below said inlets; a blower within said housing; a damper in said outside air inlet; a damper for said inside air inlet, comprising a hinged structure; and means connecting said dampers to effect the opening and closing of the outside air damper when the inside air damper is closed and opened, respectively.

25. A ventilating unit comprising a blower, heater and a damper; an inclosing casing provided with chambers for each of said elements to operate in; the blower being arranged above the heater and damper so as to drive air downwardly against the two; a discharge chamber defined by a wall of the casing and a baffle; the damper being pivotally mounted adjacent the heater and adapted to swing toward and from the latter and the baffle; and means cooperating with the damper by which it may be adjusted toward and from the heater and baffle so as to modify the temperature of the air delivered from the unit through the discharge chamber.

26. A ventilating unit comprising an inclosing casing partitioned to provide a

blower chamber, a heating chamber, a cleaning chamber, a by-pass chamber, and a discharge chamber; the first three chambers being arranged one above the other and containing a blower, a heater and a water pan, respectively, and the discharge chamber being above the cleaning chamber; a damper pivotally mounted to swing relatively to the heater and to close the by-pass when in one extreme position; and means cooperating with the damper by which it may be shifted, whereby the damper may shunt the air from the blower into the heater, or allow the air to go through the by-pass, or allow part of the air to go through the heater and part through the by-pass, and in all instances to pass through the cleaning chamber and out of the unit through the discharge chamber.

27. A ventilating unit comprising an inclosing casing partitioned to provide a blower chamber, a heating chamber, a mixing chamber, a by-pass chamber, and a discharge chamber; the first three chambers being arranged one above the other and two containing a blower and a heater, respectively; a damper pivotally mounted to swing relatively to the heater and to close the by-pass when in one extreme position; and means cooperating with the damper by which it may be shifted, whereby the damper may shunt the air from the blower into the heater, or allow the air to go through the by-pass, or allow part of the air to go through the heater and part through the by-pass, and in all instances to pass through the mixing chamber and out of the unit through the discharge chamber.

28. A ventilating unit comprising an inclosing casing partitioned to provide a chamber at its top, a chamber at its bottom, and three parallel between chambers; a blower in the top chamber; a heater in one of the between chambers; and a damper adapted to close another of the between chambers; the third between chamber being for air discharge, and the three between chambers opening at their bottom in the bottom chamber; and means cooperating with the damper by which it may be shifted, whereby air passing into the bottom chamber may be driven from the unit through the discharge chamber.

29. A ventilating unit comprising a casing divided into a plurality of chambers, one of which latter is at the top of the casing and is provided with a fan or blower, and another of which chambers is at the bottom of the casing and is provided with humidifying means, and another of which chambers is between the fan and humidifying chambers and contains a heating element suspended above the humidifying chamber; and another of which chambers is parallel with the heating chamber; and means whereby the air driven by the fan may be

caused to pass through either the heating chamber or the parallel chamber to the humidifying chamber, and out through the casing near the top thereof.

30. A ventilating unit comprising a housing having an air inlet; and an air outlet near its upper end; a blower chamber at the upper end of said housing and a blower therein; a radiator within the housing between the blower outlet and air outlet; a water pan within the housing between the radiator and the air outlet; a damper adjustable to cause all the air from the blower to be heated by the radiator before delivery thereof through said outlet and adjustable to cause part or all of the air from the blower to flow directly through said air outlet; and said water pan being located in position to cleanse the air passing through said air outlet.

31. A unit ventilator comprising a main housing, an air intake, an upper chamber connected to said air intake, a motor and

blower mounted in said upper chamber, a lower chamber, an air passage connecting said blower and said lower chambers, a damper in the lower chamber controlling the flow of air therethrough, a heating device mounted in said lower chamber, a water tank in the base of said lower chamber underneath said heating device, and an air outlet extending upward from the lower part of said lower or heating chamber.

32. In a device of the class described, the combination of a housing having an air inlet and an air outlet near its upper end, a blower chamber at the upper end of said housing and a blower therein, a radiator within the housing between the blower outlet and the air outlet, a damper adjustable to cause all the air from the blower to be heated by said radiator before delivery thereof through said outlet and adjustable to cause part or all of the air from the blower to flow directly through said air outlet.

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