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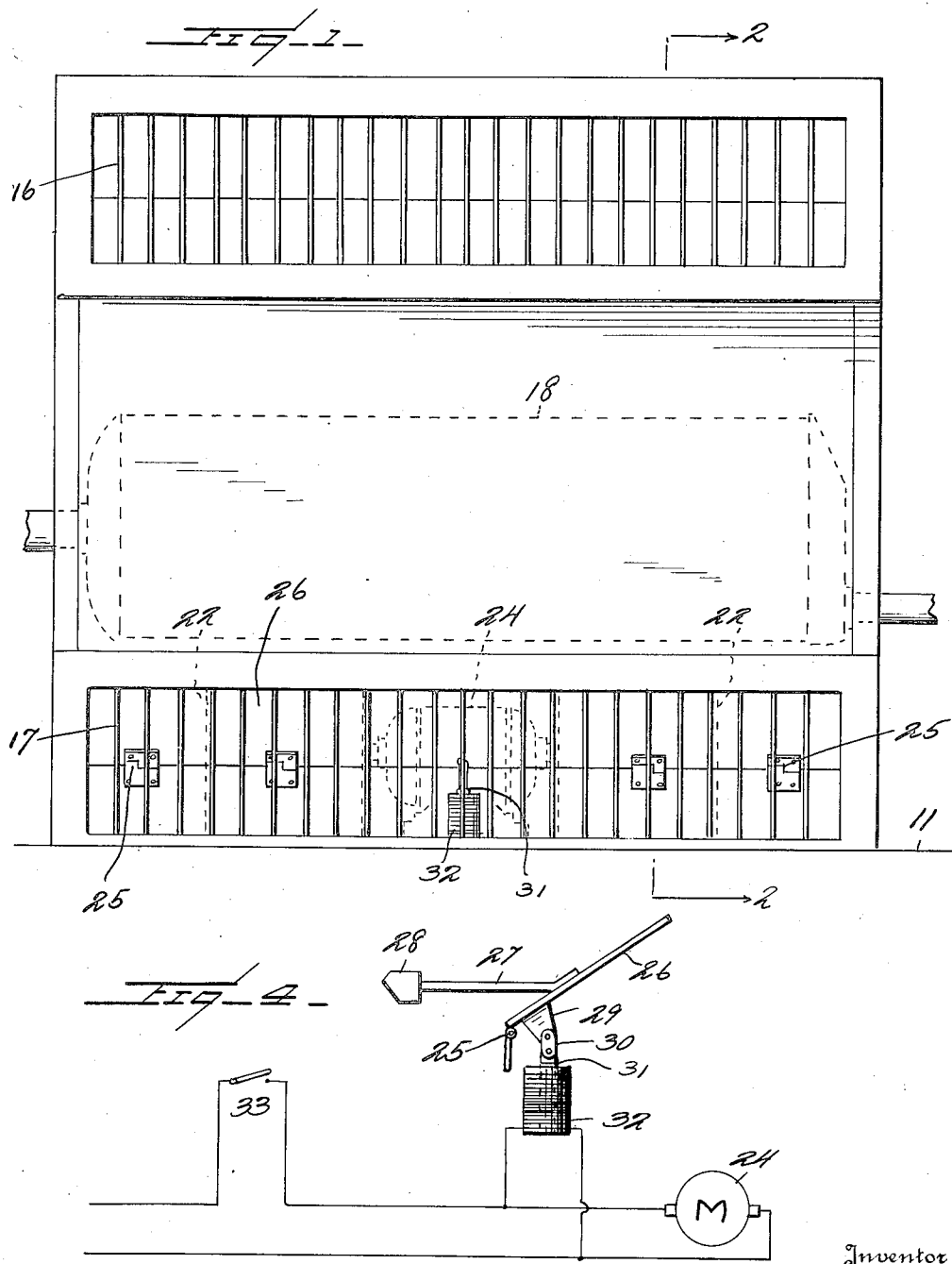
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HEATING AND VENTILATING UNIT

Filed June 17, 1930

3 Sheets-Sheet 1



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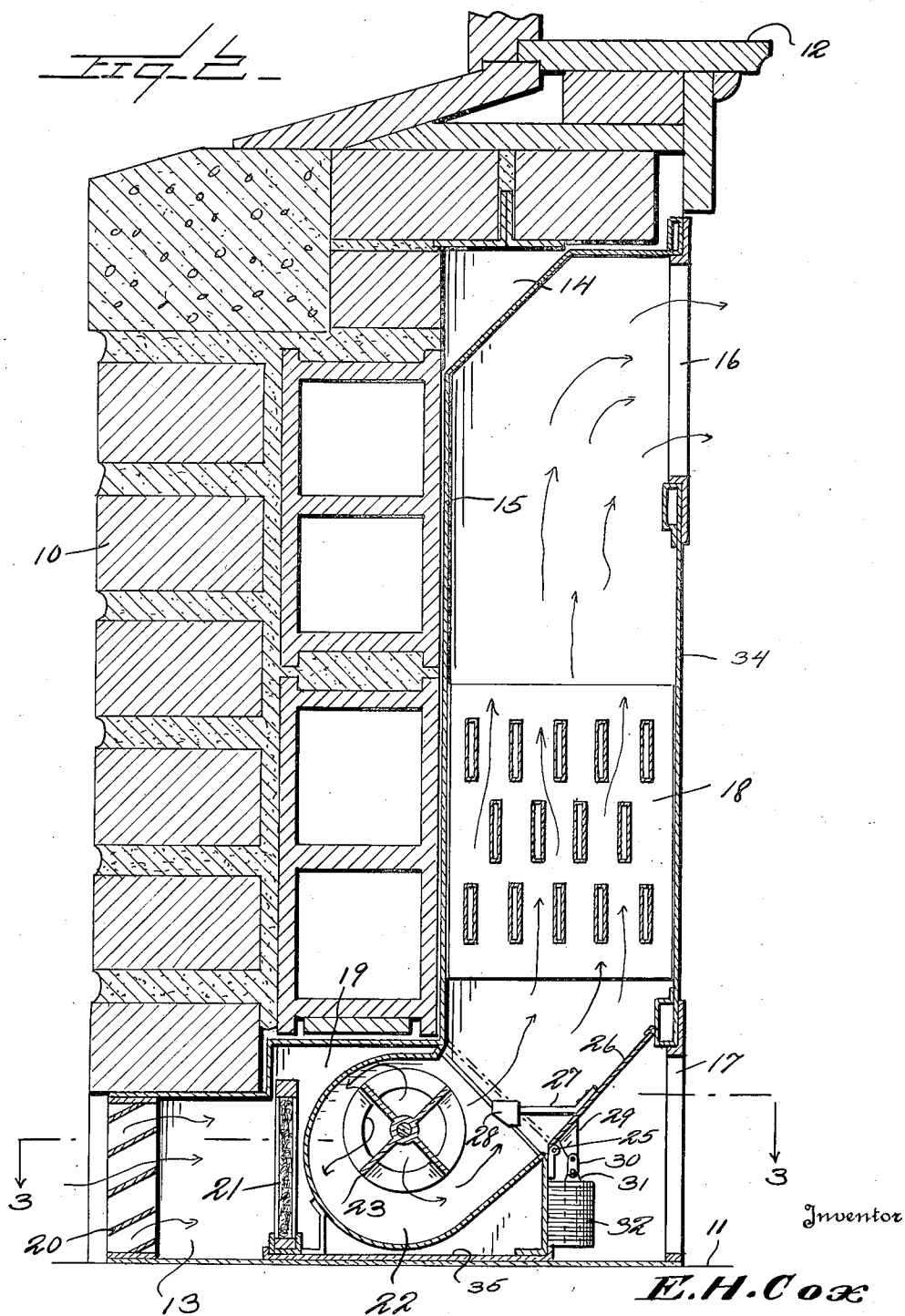
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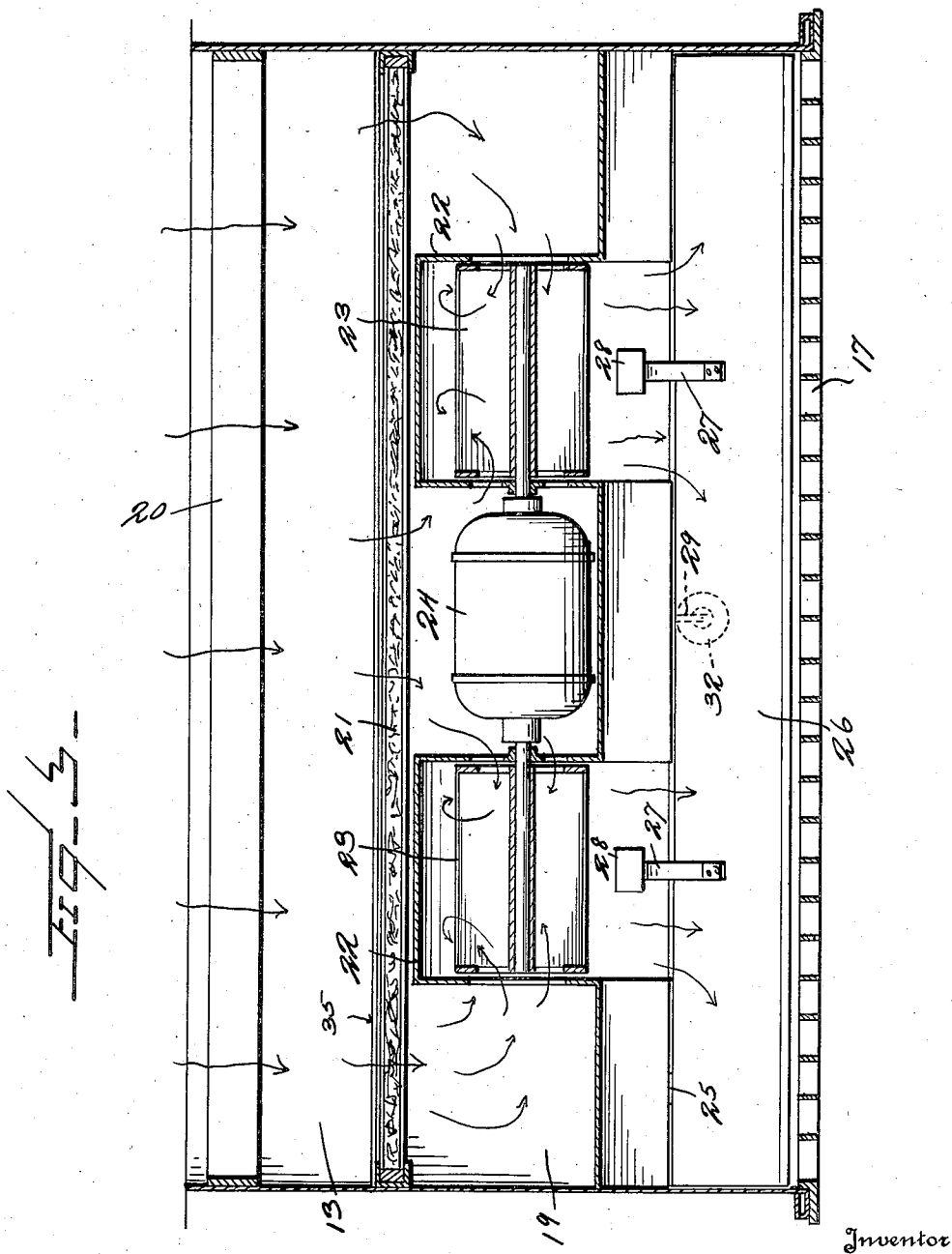
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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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HEATING AND VENTILATING UNIT

Application filed June 17, 1930. Serial No. 461,823.

This invention relates to heating devices in the nature of radiators and particularly to a heating unit of the radiator type preferably disposed in the wall of a building but discharging into the room.

The general object of the invention is to provide a heater of this general type wherein fresh air may be drawn in from the exterior of the building and directed past the radiator and discharged out through the casing enclosing the radiator and so into the room or whereby the inlet of fresh air may be cut off and the air within the room allowed to circulate through the radiator.

A further object is to provide a construction of this character having an electrically operated fan positively drawing the fresh air into the room and discharging it through the radiator and providing in connection with this fan a damper, this damper when the fan is operating being automatically shifted to prevent the circulation of air from the room through the radiator and when the fan is switched off automatically closing to prevent the inlet of fresh air to the room and allowing the circulation of air within the room.

A further object is to provide, in combination, a concealed gravity type heating unit with a mechanically operated ventilating system adaptable to homes, offices, stores, hospitals, schools, etc.

Another object is to provide for a positive supply of heated fresh air whereby the room is heated at the same time that it is ventilated.

A further object is to provide a concealed heating unit in combination with a ventilation system which does not require any floor space, and to provide a construction of this character which is adapted economically to all types of buildings where heating is required and whereby the additional feature of providing fresh air can be had at a minimum expense, and further to provide an apparatus of this character of such construction that the temperature of the room may be manually or automatically controlled and provide for filtering the incoming fresh air if desired.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a front elevation of a heater and ventilator constructed in accordance with my invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a section on the line 3—3 of Figure 2;

Figure 4 is a diagrammatic view of the electric connections to the damper operating mechanism.

Referring to these drawings, 10 designates a portion of the wall of a building and 11 the floor line thereof, 12 designating the window casing and the window sill of the building. In the wall of the building at any suitable distance below the window sill there is disposed a fresh air intake 13.

The wall is so formed as to provide a recess 14 of any suitable character wherein is disposed the heating unit which I will now describe. This unit is contained within the casing 15. The upper end of this casing is formed with a discharge grille 16 on the face of the casing opening into the room. The lower end of the casing is formed with a grille 17 whereby the cold air of the room may be passed into and through the heating unit. Disposed within the casing 15 is a radiator or heater 18 of any suitable character. This may be a steam radiator, a hot water radiator, an electric radiator or any heater and I do not wish to be limited to any particular form of heater. This heater is disposed above the inlet 17. The lower end of the casing 15 is shown as angularly extended as at 19 toward the opening 13 and has an opening to receive air from this opening 13. Disposed in the opening 13 is preferably a louvre 20 of any suitable or usual construction so as to prevent the entrance of rain or snow.

Preferably disposed at the inlet opening of the offset portion 19 of the casing is an air filter 21 of any suitable or desired character. Disposed immediately in front of the filter and at the lower end of the casing 15 is a fan housing 22 containing a rotary fan 23 of any suitable character which is driven

by a motor 24. Preferably, there will be two fans 23 as illustrated in Figure 1 and the motor will be disposed between these fans. Hingedly mounted at 25 is a damper 26 which when turned inward will close the discharge opening from housing 22 and when turned outward to its full extent will close the opening 17, that is, prevent air entering this opening 17 from passing upward through this radiator.

This damper 26 carries upon it an arm 27 having a counter-weight 28, this counter-weight normally urges the damper inwardly to its fresh air closing position. For the purpose of opening the damper, I provide an arm 29 on the damper which is connected by a link 30 to a solenoid core 31 disposed within the coil 32. When this coil is energized, the core will be drawn downwardly, shifting the damper 26 to the position shown in Figure 4 in full lines. When the solenoid coil is deenergized, the weight 28 will cause the damper to close to the position shown in dotted lines in Figure 2.

The solenoid coil 32 is connected in series with the wiring of the motor as shown diagrammatically in Figure 4 and with a source of supply and with the switch 33. Therefore, it will be seen that when the switch is closed the motor will be energized and the solenoid will be likewise energized, causing the operation of the motor and opening of the damper, that is, the swinging of the damper to a position discharging the air from the fan upward through the radiator. Thus, whenever the motor is energized, the fans will be driven, air will be drawn in from the exterior of the building and forced up through the casing 15 and discharged out through the opening 14, and on the other hand when the switch is turned to an off position, the solenoid 32 will be deenergized, the motor will also be deenergized and the weight 28 will act to turn the damper 26 to a closed position so that air from the interior of the room may pass up through the grille 17 through the heater and out through the grille 16.

It will be seen that the grilles 16 and 17 are disposed respectively above and below a metal panel. These grilles and the panel may be made in one piece held in place by screws within the recess formed in the wall so that this panel 34 and the grilles may be readily withdrawn, thus disclosing the entire interior of the casing. It will be also seen from Figure 2 that the filter 21, the fan housings 23, the motor, the damper and the damper actuating mechanism are all mounted upon a single base plate 35 so that when the front of the cabinet or casing is removed, this base plate 35 with the supported parts may be drawn out as a unit and it is obvious from Figure 2 that if the grille 17 be removable from beneath the lower end plate or panel 34,

that this base plate with the filters, fan housings, etc., may be removed as a unit.

It will be understood, of course, that I do not wish to be limited to a discharge grille 16 which is disposed beneath the window sill and discharges laterally into the room as the position of this discharge grille might be changed without departing from the spirit of the invention as stated in the claims.

Of course, instead of the radiators getting their heat from a separate steam or hot water plant, it may be advisable under certain conditions to make each heater and ventilator an entirely separate unit with water heated, for instance, by a separate gas or electrical heating element. This would make the device more portable than the fixed type shown in Figure 2 and in the case of being installed in a room where ventilation and heating was not often needed, the gas or electricity could be turned off, thus reducing the cost of operation of the individual radiator.

Particular attention is called to the fact that I have provided a combined heating and ventilating unit which occupies little or no floor space. Inasmuch as floor space is becoming more and more valuable, this is a particularly important feature of my invention.

It will be seen that I have devised a mechanically operated forced ventilating system which may be used either as a gravity type heating unit or as a force feed heating and ventilating system as desired and that an air filter of any common or usual construction designated 21 may be disposed at the inlet for fresh air so as to thoroughly cleanse the air before it passes into the room. It will be obvious that the entire system may comprise any number of these heating or ventilating units and that these all may be controlled by one centrally located switch. Thus all of the heating and ventilating units may be controlled from one switch by the engineer of the building or the units of one room or one series of rooms might be controlled from a switch common thereto or from a thermostat.

It will further be seen that I have provided a concealed heating unit, provided for a positive supply of heated fresh air, provided for a combination heating unit and ventilating system which does not require any floor space, which is flexible so as to adapt itself economically to all types of buildings and which may use for its source of heat either steam, hot water, vapor or electricity.

While I have illustrated certain details of construction and arrangements of parts, I do not wish to be limited thereto as it is obvious that these details may be changed in many ways without departing from the spirit of the invention as defined in the appended claims.

I claim:—

1. A heating and ventilating unit comprising a heating element, a casing contain-

ing the heating element and having a discharge opening and two inlet openings, one of said inlet openings being connected to a source of fresh air, a motor driven fan disposed to draw air through the last named opening and discharge it into said casing and through the heating element thereof, a damper adapted to be shifted to close or open the fresh air inlet, and means for causing the stoppage of the motor simultaneously with the closing of the damper and the starting of the motor simultaneously with the opening of the damper.

2. A combined ventilating and heating unit comprising a casing having a discharge opening at one end and an inlet opening at the opposite end, a heating element disposed within the casing between the two openings, a fresh air inlet opening leading into the lower end of the casing, a fan therein drawing air from said opening and discharging it into the casing, the fan having a housing, a damper swingable to a position to close said housing and open the air inlet opening or into a position to open said housing to permit the discharge of air therethrough and close said air inlet opening, and means whereby the damper may be shifted to open the fan housing to the interior of the casing and thereby permit the inlet of fresh air to the casing or whereby the damper may be shifted to a position closing the fan housing, and means for stopping or starting the motor.

3. A combined ventilating and heating unit comprising a casing having a discharge opening at one end and an inlet opening at the opposite end, a heating element disposed within the casing between the two openings, a fresh air inlet opening leading into the lower end of the casing, a fan therein drawing air from said opening and discharging it into the casing, the fan having a housing, a damper swingable to a position to close said housing and disclose the air inlet opening or into a position to open said housing to permit the discharge of air therethrough and close said air inlet opening, and means whereby the damper may be shifted to open the fan housing to the interior of the casing and thereby permit the inlet of fresh air to the casing or whereby the damper may be shifted to a position closing the fan housing, and means for stopping or starting the motor, said means being operated automatically with the shifting of the damper.

4. As an article of manufacture, a heating unit for use in buildings comprising a casing having a discharge grille at its upper end, and an inlet grille at its lower end, both of said grilles being upon the front of the casing, a heating element disposed within said casing between said grilles, the lower end of the casing being normally extended and adapted to constitute a fresh air intake passage, an electric motor operated fan

disposed in the lateral extension of the casing taking its air from said inlet passage and discharging it into the body of the casing, and electrically operated means for stopping the fan and simultaneously cutting off the inlet of fresh air to the interior of the casing and allowing air to enter through the lower grille or cutting off the entrance of air through the lower grille starting said fan motor and permitting the discharge of air from said fan into the casing.

5. As an article of manufacture, a unit for use in buildings comprising a casing having a discharge grille at its upper end, and an inlet grille at its lower end, a heating element disposed within said casing within said grilles, the lower end of the casing being rearwardly extended and adapted to constitute a fresh air intake passage, a motor operated fan disposed in the casing and taking its air from said inlet passage and discharging it into the body of the casing, and automatically actuated means for stopping the motor and simultaneously cutting off the inlet of fresh air to the interior of the casing and allowing air to enter through the lower grille, or cutting off the entrance of air through the lower grille and simultaneously starting said fan motor and permitting the discharge of air from said fan into the casing.

6. As an article of manufacture, a heating unit for use in buildings comprising a casing having a discharge grille at its upper end and an inlet grille at its lower end, a heating element disposed within the casing between said grilles, the lower end of the casing having a fresh air intake passage at its rear, a base plate mounted in the lower end of the casing, an air filter supported by said base plate and through which air from said rear opening must pass, a motor operated fan disposed on said base plate, a housing for the fan discharging into the front of the casing, an automatically operated damper carried by the housing, and means acting to stop the fan motor and automatically simultaneously close said damper to cut off air from the housing and permit air to pass into the casing through the lower grille or to start the motor and automatically shift the damper to a position permitting the discharge of air from the housing and cutting off the passage of air into the housing through the lower grille, the filter, the fan housing, fan, motor and damper being removable as a unit through the front of the housing.

7. A combined ventilating and heating unit including a casing having a room confronting front face and a rear face, the front face of the casing having a discharge opening at its upper end and an inlet opening at its lower end, a heating element disposed within the casing between said openings, a fresh air inlet opening into the rear of the casing at its lower end, means disposed in

said casing for drawing air through the fresh air inlet opening and forcing it up through said casing, means in one position preventing the passage of air from the fresh air inlet opening to the heating element and permitting the passage of air into the casing through the air inlet opening on the front of the casing at its lower end and in the other position closing said last named inlet opening but permitting the discharge of air upward into the casing from the first named air inlet opening, said means in its first named position stopping the operation of the air drawing means in the casing, and in the second position starting the operation of said air drawing means.

8. A heating and ventilating unit comprising a casing having an air discharge opening in its upper end on its front face and an air inlet opening at the lower end of its front face, the lower end of the casing having a fresh air inlet opening on the rear face of the casing, the casing providing a passage leading to said opening, a fan housing disposed within said passage and taking air from the fresh air inlet opening and discharging it into the casing, a motor operated fan disposed in said housing, a damper pivotally mounted upon the housing and in one position closing the housing and opening the air inlet opening in the front of the casing and in the other position closing said last named opening, but permitting the discharge of air from the fan housing, means urging the damper to a position preventing the discharge of air from the housing, electrically operated means for shifting the damper to a position permitting the discharge of air from the housing but closing the air inlet opening of the casing, and means for simultaneously stopping the fan motor.

9. A heating unit comprising a casing adapted to be disposed in the wall of a building, the casing having an air discharge opening at its upper front face and an air inlet opening at its lower front face, the lower rear face of the casing having a fresh air inlet opening and the casing forming a passage leading thereto, a fan housing disposed within said passage, and receiving air from said fresh air inlet opening, a motor operated fan disposed in said housing, a damper pivotally mounted within said housing and in one position closing said housing and opening the air inlet opening in the front of the casing and in the other position closing said last named opening but permitting the discharge of air from the housing, a weight urging the damper to a position closing said housing, a solenoid coil, a core therefor operatively connected to the damper, and means for simultaneously energizing said solenoid and the fan motor or deenergizing said solenoid and the fan motor.

10. In combination, a ventilating and heat-

ing unit having a fresh air inlet, a circulating air inlet and an air outlet, of a power operated fan causing the passage of air from the fresh air inlet to the outlet, a damper in one position cutting off the fresh air inlet and opening the circulating air inlet and in another position closing the circulating air inlet and opening the fresh air inlet, means acting to shift the damper to its first named position when the fan is stopped, and means whereby the damper is automatically shifted to its second-named position when the fan has started.

In testimony whereof I hereunto affix my signature.

EDWARD H. COX.

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