March 4, 1924. 1,485,887

C. J. SCANLAN

VENTILATING APPARATUS

Filed June 30 1922 3 Sheets-Sheet 1

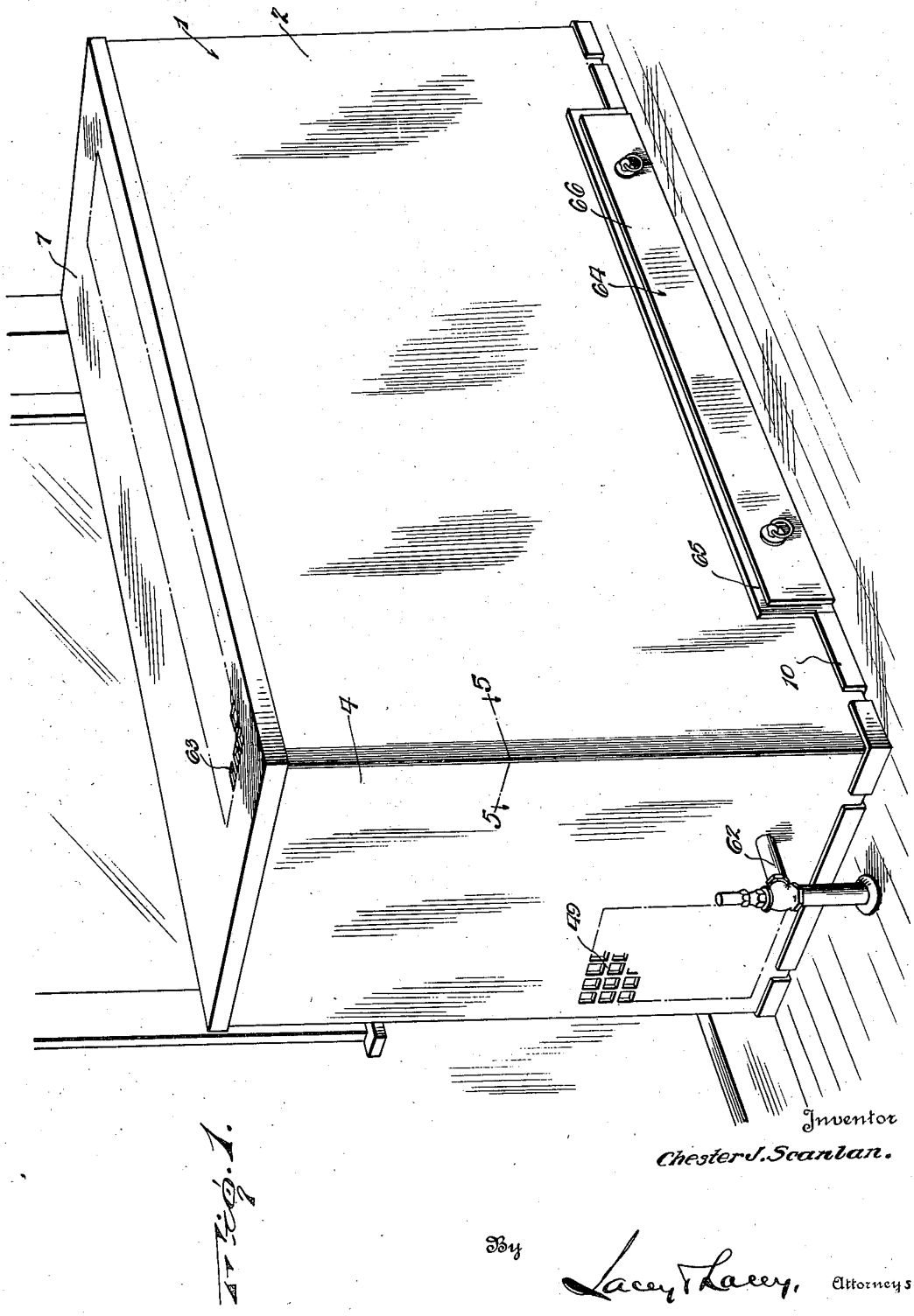


Fig. 1.

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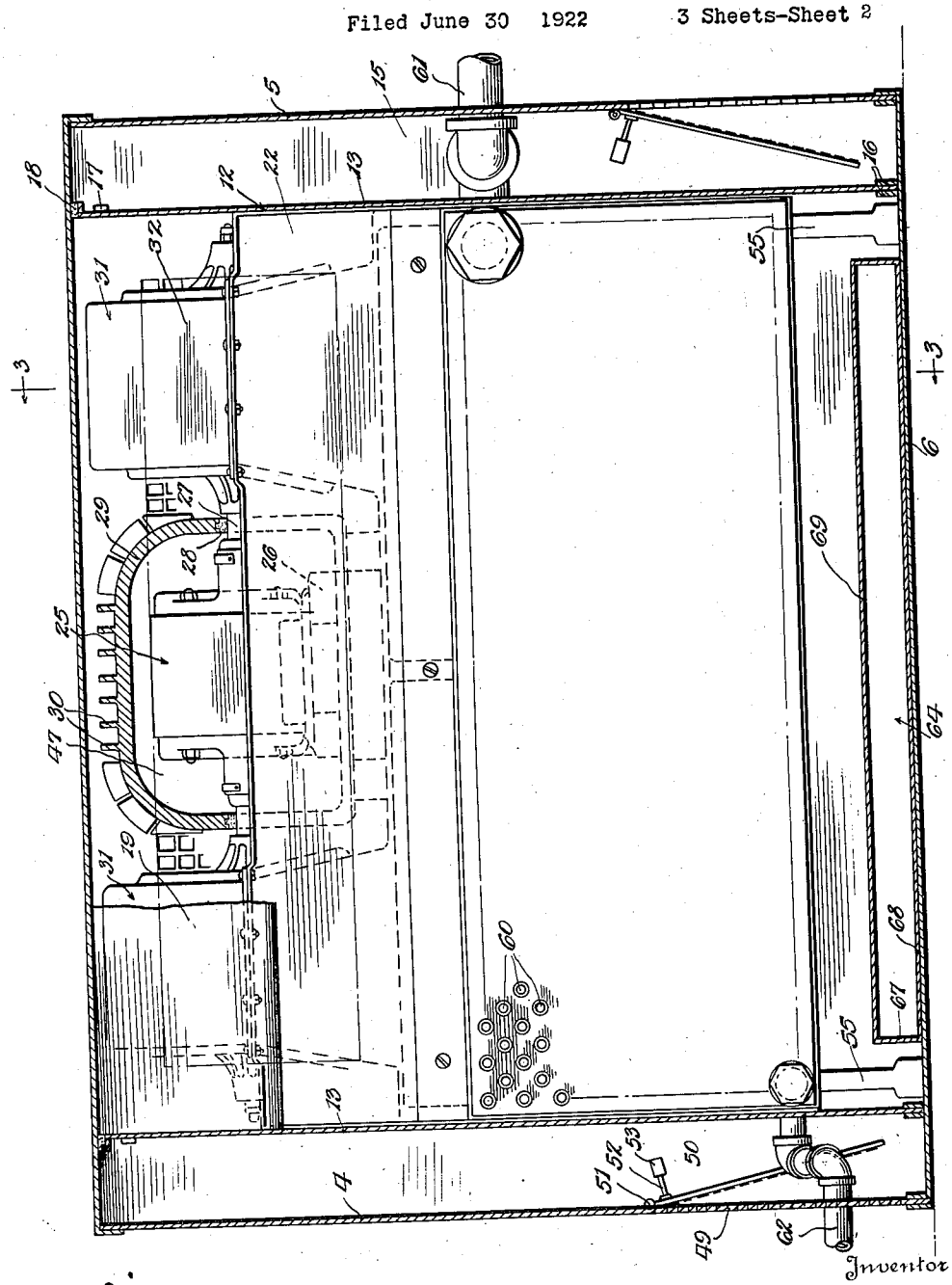


Fig. 2.

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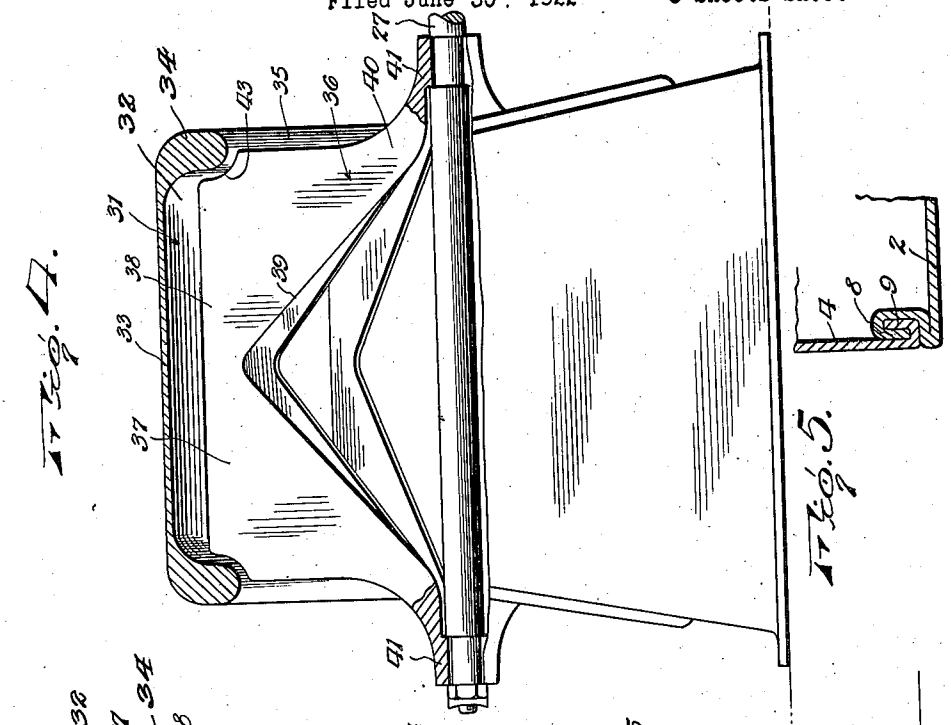


Fig. 4.

Fig. 5.

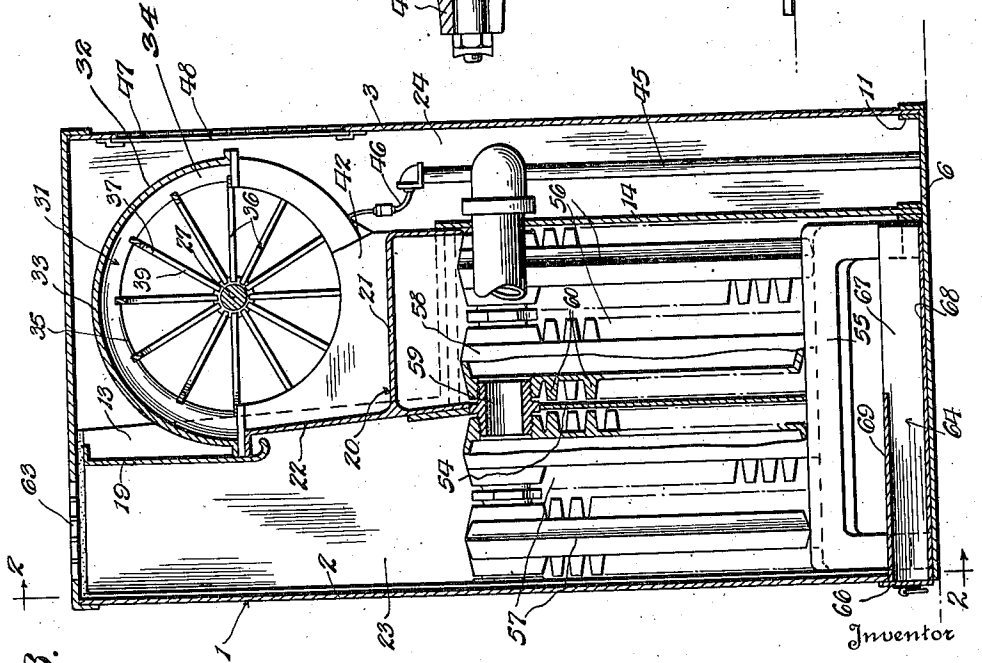


Fig. 3.

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UNITED STATES PATENT OFFICE.

CHESTER J. SCANLAN, OF BLOOMINGTON, ILLINOIS.

VENTILATING APPARATUS.

Application filed June 30, 1922. Serial No. 571,868.

To all whom it may concern:

Be it known that I, CHESTER J. SCANLAN, a citizen of the United States, residing at Bloomington, in the county of McLean and State of Illinois, have invented certain new and useful Improvements in Ventilating Apparatus, of which the following is a specification.

This invention relates to improvements in ventilating apparatus and has as its general object to provide an improved ventilating apparatus which will be especially adapted for use in school rooms and other places of public assemblage.

Practically the fundamental consideration in designing and operating a ventilating and heating apparatus is that of an equable diffusion of the air currents at higher and lower degrees of temperature so that a substantially uniform temperature may be obtained in the room heated and ventilated by the apparatus, and there will be no formation of drafts. In meeting this requirement it is practically essential that the air be delivered from the ventilating apparatus at a relatively high velocity and in a direction to establish a most perfect circulation of the air currents. It is therefore one of the primary objects of the present invention to provide an apparatus which will in operation satisfy all of these requirements.

Another important object of the invention is to provide in a ventilating apparatus, a novel construction of ventilating fan which will possess greater efficiency than the ordinary types of fans and will more effectively deliver the air currents from the apparatus. In this connection the invention contemplates so constructing the fan blades and so mounting the same within the casing of the fan that the losses usually incurred through impact of the heels of the blades with the air drawn into the casing will be eliminated and the efficiency of the fan thus materially increased.

Another object of the invention is to eliminate, practically, the disturbing noise usually created in the operation of the driving motor for the fans of such an apparatus and render the operation practically noiseless.

Another object of the invention is to provide means whereby the supply of air to the apparatus may be controlled so that air may be taken in from the outside of the building in which the apparatus is installed or from the interior of the room near the floor line, either as desired.

A further object of the invention is to provide an improved heating and air circulating means so constructed and arranged that maximum benefit will be obtained from the units of the heating system and a more perfect circulation of air through the apparatus will be effected.

A further object of the invention is to provide a novel construction and arrangement of dust tray, the same being so constructed as to most effectually collect and retain the particles of dust carried into the apparatus by the inflowing air currents and to provide for the removal of the accumulations without the necessity of resorting to the employment of brushes or brooms.

In the accompanying drawings:—

Figure 1 is a perspective view of the apparatus embodying the invention installed;

Fig. 2 is a vertical transverse sectional view therethrough on the line 2—2 of Fig. 3;

Fig. 3 is a vertical front to rear sectional view taken substantially in a plane with one of the fans on the line 3—3 of Fig. 2.

Fig. 4 is a longitudinal sectional view through one of the fans;

Fig. 5 is a detail horizontal sectional view substantially on the line 5—5 of Fig. 1.

The apparatus comprises a casing, which is indicated in general by the numeral 1 and which comprises a front 2, a back 3, ends 4 and 5, a bottom 6, and a removable top 7. The casing is preferably constructed of sheet metal and in order to provide for the assemblage of its several walls and particularly the front, rear and end walls, resort may be had to the structure shown in Fig. 5, in which, for example, the lateral edge portions of the front 2 may be formed with an overturned flange 8 with which is slidably fitted a flange 9 formed at the forward vertical edge of either end wall as for example the wall 4. This provides for shipment of the apparatus in a knocked down form, and this or similar means may be provided for connecting any or all of the walls. Preferably the bottom and the vertical or encompassing walls of the casing are united by the structure shown in the drawings in which the bottom 6 is provided with marginal upstanding

flanges 10 which engage against the outer sides of the walls 2, 3, 4 and 5 and which are interrupted at intervals whereby locking tongues or abutments 11 are provided, spaced inwardly from the flange 10 and engaging against the inner sides of said walls.

The casing above described constitutes the outer casing for the apparatus and there is arranged therein a second casing within which are housed the heating units which will presently be described. This latter casing is indicated in general by the numeral 12 and includes end walls 13 and a rear wall 14 which latter wall extends between the said walls 13. The walls 13 occupy planes parallel to and spaced inwardly from the planes of the end walls 4 and 5 of the casing 1 so as to provide air intake spaces 15. The said walls 13 may be arranged and fixed within the casing 1 in any suitable manner as, for example, by being seated at their lower edges between spaced retaining members 16 upstanding from the bottom 6 of the casing 1 and near their upper ends being seated against abutments 17 upon the inner side of the front wall 2 of the said casing 1. The walls 13 may be flanged or otherwise arranged to accommodate packing strips 18 to provide a substantially air tight connection between the said walls and the front and top walls of the outer casing. The wall 14 of the inner casing 12 terminates at its upper edge approximately midway between the top and bottom of the outer casing, and above this point the side walls 13 are cut back so as to provide for the unobstructed passage of air from the spaces 15 to the fan casings as will presently be explained. The casing 12 also includes an upper rear wall section 19 which depends from the plane of the top 7 of the casing 1 and extends transversely between the end walls 13 of the said casing 12. A base structure 20 is arranged between the upper portion of the wall 14 and the lower portion of the wall 19 and extends likewise between the end walls 13 and serves to support the fans of the apparatus and their casings and also the driving motor and its casing, and this base includes a substantially horizontally disposed supporting portion 21 and an upstanding wall 22 which meets the wall 19 and constitutes in effect a downward extension thereof. In this manner the walls 14 and 19 and the wall 22 and portion 21 of the supporting base 20 serve to close the rear side of the casing 12 and divide the interior of the casing 1 substantially into front and rear compartments indicated respectively by the numerals 23 and 24.

The driving motor for the fans of the apparatus is indicated in general by the numeral 25 and may be of any approved type, being in the present instance in the nature of an electric motor and being mounted upon a base block 26 which is in turn supported upon the portion 21 of the supporting base 20. This base block 26 is preferably of cork or some other material which will absorb the vibrations so that they will not be transmitted to any portion of the structure which would be liable to vibrate with noise. The shaft of the motor is indicated by the numeral 27 and projects at its opposite ends through openings 28, which if desired may be suitably packed and which are formed in the opposite ends of the casing for the motor, which is indicated by the numeral 29. This casing 29 is supported in any suitable manner to house the motor 25 and is preferably provided upon its exterior surface with fins 30 which serve to dissipate the heat generated within the casing during the operation of the motor. By housing the motor 25 within the casing 29 constructed as described, and by mounting this motor upon a vibration absorbing base such as the block 26, substantially all noise is eliminated in the operation of the motor and therefore the operation of the apparatus as a whole will not prove disturbing to those present in the room in which it is installed.

Preferably two fans are employed in the apparatus and are indicated in general by the numeral 31 and are disposed at opposite sides of the motor casing 29. Each fan 31 comprises a casing 32 having a circumferential wall 33 and side walls 34 provided with substantially centrally located openings 35. The projecting ends of the motor shaft 27 extend into the respectively adjacent ones of the casings 32 and each end of the shaft supports a series of fan blades indicated by the numeral 36. Each fan blade comprises an effective blade portion 37 having a substantially straight transverse outer edge 38 and a recessed inner edge or heel 39 providing diverging arms 40 which are united together in any suitable manner to provide hubs 41 fixed to the projecting ends of the shaft 27. The arms 40 of the blades diverge as stated and they extend through the openings 35 in the side walls 34 of the respective fan casings 32 so that by reason of this arrangement and the recessing, as at 39, of the heel portions of the blades, these said portions will be practically entirely spaced from the projecting ends of the shaft 27 except at points exterior to the respective fan casing with the result that the heels of the blades will offer practically no resistance to the inrushing currents of air, and the working or effective portions 37 of the blades will act in a most effective manner to draw in air through the openings 35 in the casing walls and discharge the air through the outlet of each respective casing which is indicated by the numeral 42. At this point it may be stated that the outlets 42 open through the portion 21 of the supporting base 20 and communi-

cate with the heater compartment 23 as will presently be explained. It is preferable that the marginal portions of the casing wall 33 which define the openings 35 be given the rounded contour illustrated in Fig. 4 of the drawings and that the outer corners of the blades 37 be cut away as at 43 along curved lines conforming to the cross sectional curvature of the said portions of the wall 33 and as best shown in Fig. 4 of the drawings. A suitable conduit 45 may be provided within the compartment 24 for leading the current conducting wires 46 to the motor 25.

The rear wall 3 of the casing 1 is provided with a grille or grating 47 so positioned that when the apparatus is disposed beside a window casing, air from the exterior of the building may be drawn therethrough into the compartment 24 of the said casing. Any suitable means, such for example as the damper plate 48, may be provided for controlling the passage of air currents through the grille or grating 47, and it will be understood that when this plate is properly positioned, air from the exterior of the building will be drawn into the compartment 24, in the operation of the fans, and will be delivered by the fans into the compartment 23. If a suitably located window is not available, the grille 47 may be disposed in registration with an opening formed in the building wall. While under some conditions it may be desired to utilize air from the exterior of the building, at other times it may be found desirable to merely create a circulation of the air contained within the room in which the apparatus is installed and for this purpose the end walls 4 and 5 of the casing 1 are formed with grilles or gratings 49 located near the floor line, and doors 50 are hinged at their upper sides, as at 51, within the spaces 15 and at the upper sides of the grilles 49 and are provided with projecting arms 52 carrying weights 53 through the medium of which the doors 50 are normally held closed by gravity. So long as the regulator 48 for the intake grille 47 is open, the doors 50 will remain closed, but when this regulator is closed, the suction created by the fans will cause an opening of the doors 50 upon their hinges 51 so that air will be drawn into the spaces 15 from points adjacent the floor line and will enter the fan casings and be delivered therefrom into the compartment 23.

The numeral 54 indicates a partition wall which is arranged within and divides the compartment 23 substantially in a plane with the upstanding wall 22 of the supporting base 20, the lower edge of the partition wall 54 terminating at a point above the plane of the bottom 6 of the casing 1. Suitable spaced supports 55 are arranged within the compartment 23 and upon the floor 6, and sets of heating units 56 and 57 are arranged respectively at the rear and forward sides of the partition wall 54. These heating units may be of any approved construction but preferably comprise sections 58 placed in communication by nipples 59 and provided upon their outer surfaces with heat dissipating lugs or pins 60. An inlet pipe 61 is placed in communication with the series or bank of heating units at one point and supplies steam or any other fluid heating medium to the said units, and an exhaust pipe 62 leads from the bank of units at a relatively opposite or remote point, as shown in Fig. 2. It will now be apparent that the air currents drawn into the fan casings and delivered therefrom through the outlets 42 will be caused to flow downwardly past the units 56 and through the space between the wall 14 and partition wall 54. The said air currents will then pass beneath the lower edge of the partition wall and will sweep upwardly about the units 57 located in front of said wall and between the same and the front wall 2 of the casing 1. In their passage the air currents will become heated, and they may be discharged through a grille or grating 63 formed or provided in the top 7 of the said casing 1. In this manner the air currents will be forcibly delivered from the apparatus in an upward direction which insures of a most thorough circulation of the air currents throughout the room in which the apparatus is installed.

In order that any dust particles contained in the air drawn into the apparatus may be collected in the most effective manner, a dust drawer or tray 64 is slidably removably fitted through an opening 65 provided near the bottom of the front wall 2 of the outer casing and when in place rests upon the bottom 6 of said casing between the supports 55 and beneath the heating units 56 and 57 and partition wall 54. This drawer is provided with a front 66, end walls 67, a bottom 68, and a top 69, the drawer being preferably open at its rear side and the top 69 extending over substantially the forward half of the drawer. It will now be evident that as the air currents sweep downwardly past the heating units 56 and take a course passing beneath the lower edge of the partition wall 54, any particles of dust carried with them will be directed into the drawer 64 and there collected. After the apparatus has been in operation for some time the drawer may be conveniently removed and the accumulation discharged therefrom and the drawer then replaced.

From the foregoing description of the invention it will be evident that there is provided a highly efficient ventilating apparatus which will operate with minimum

noise and which will constitute an effective means for heating the air currents and delivering them in a direction best calculated to establish a proper circulation and an equable distribution of the air in the room in which the apparatus is installed and without the creation of any annoying drafts.

Having thus described the invention, what is claimed as new is:

1. In ventilating apparatus, a casing divided into compartments and provided with an air inlet communicating with one of said compartments, freely movable means normally assuming by gravity a position closing said air inlet and automatically movable to open position upon creation of suction in said compartment, the other compartment being provided with an air outlet, the first mentioned compartment being provided with a second air inlet, means adjustable to close the second-mentioned air inlet, and means within the first-mentioned compartment for creating an inflow of air and discharging into the second-mentioned compartment.

2. In ventilating apparatus, a casing provided with an air inlet, means adjustable to close said air inlet, the casing having a second air inlet, means influenced by gravity to normally close the last-mentioned air inlet and operable upon the creation of suction within the casing induced by closing of the means associated with the first-mentioned air inlet to move to open position, the casing having an air outlet, and means within the casing for creating an inflow of air into the casing through the effective inlet and an outflow of air from the casing through the outlet.

3. In ventilating apparatus, a casing having an air inlet, means adjustable to close said air inlet, the casing having a second air inlet, a closure suspended for swinging movement and assuming by gravity a position normally closing the second-mentioned air inlet and adapted to swing to open position upon the inrush of air through the second-mentioned inlet upon the creation of suction influenced through closing of the first-mentioned inlet, the casing having an outlet, and means within the casing for creating an inflow of air into the casing through the effective air inlet and an outflow of air from the casing through the outlet.

4. In ventilating apparatus, a fan unit comprising a casing, a shaft rotatable therein, the casing having an air intake opening in one of its walls, and fan blades disposed about the shaft and having diverging heel portions connected to the shaft substantially exteriorly of the casing.

5. In ventilating apparatus, a fan unit comprising a casing, a shaft rotatable within the casing, the casing having air inlet openings in its opposite walls, and fan blades disposed about the shaft and having their heel portions cut away intermediate the ends of the blade and diverging laterally to their point of connection with the shaft and extending through said air inlet openings.

In testimony whereof I affix my signature.

CHESTER J. SCANLAN. [L. S.]