Oct. 17, 1939. E. L. ANDERSON 2,176,319

AIR CONDITIONER

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FIG. 2

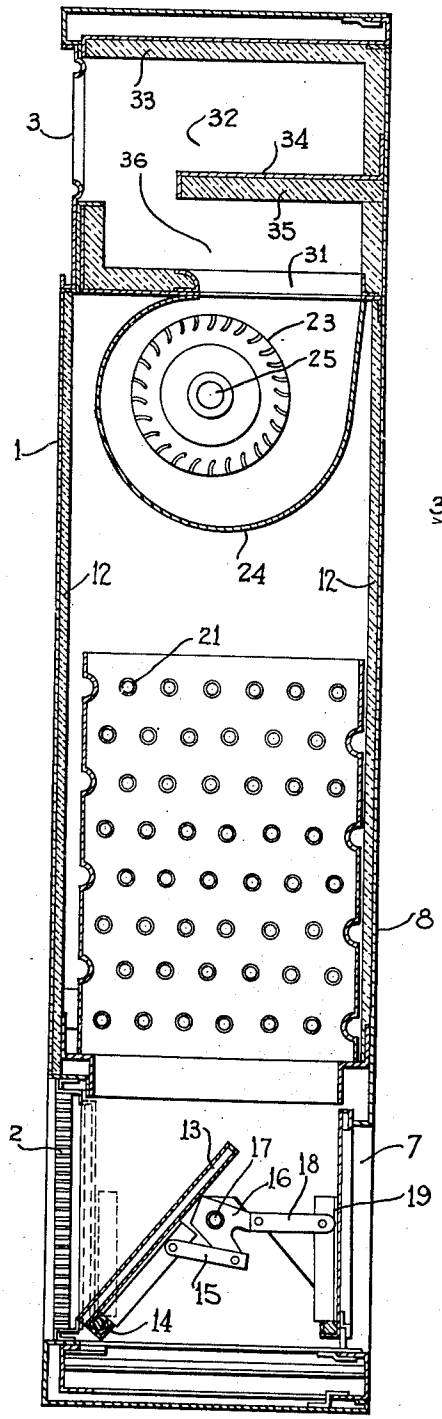
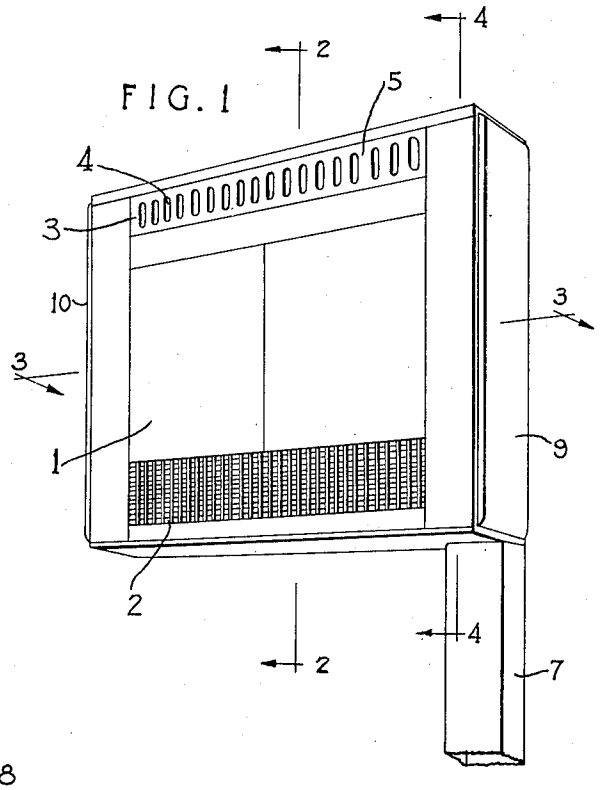


FIG. 1



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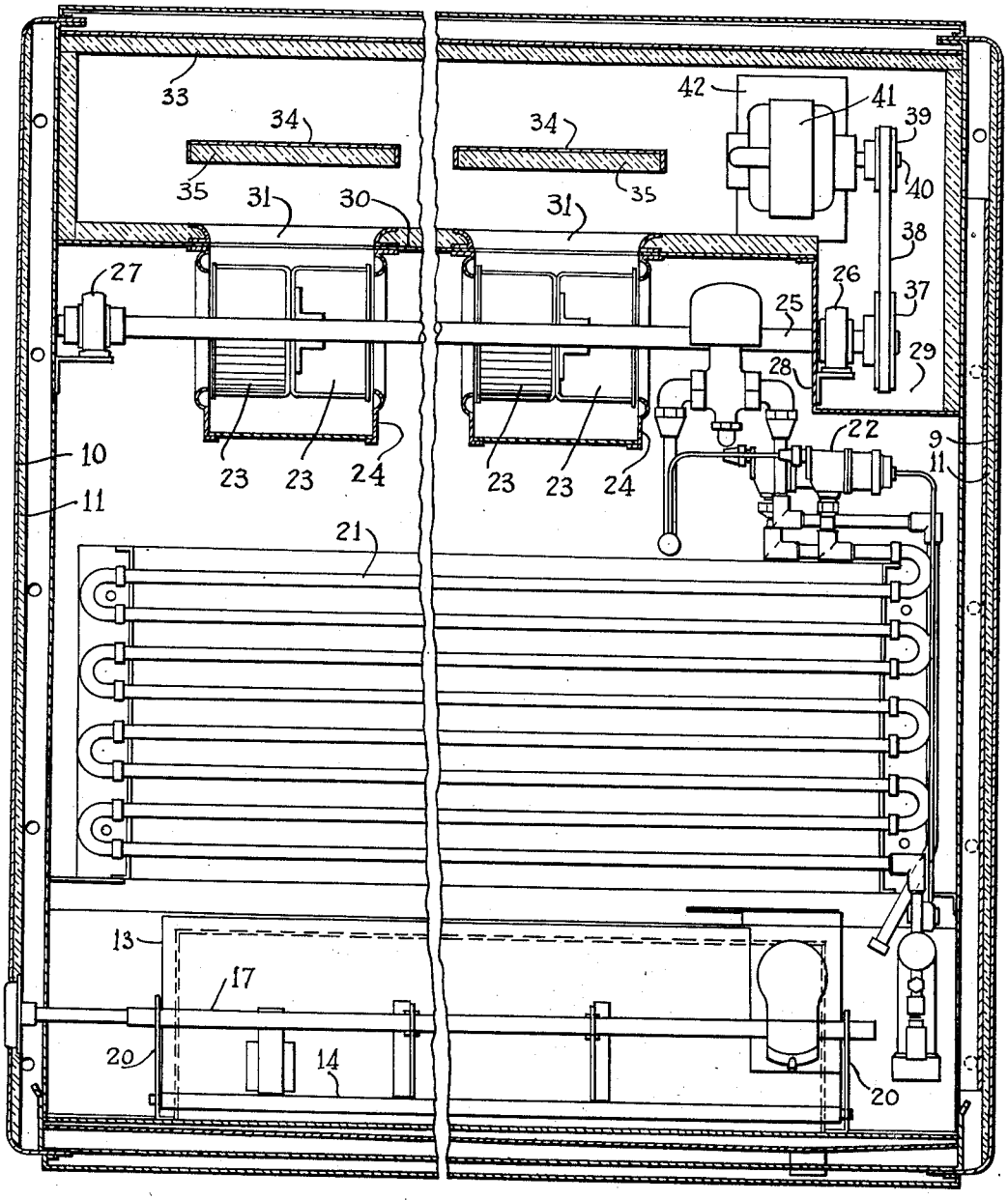
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FIG. 3



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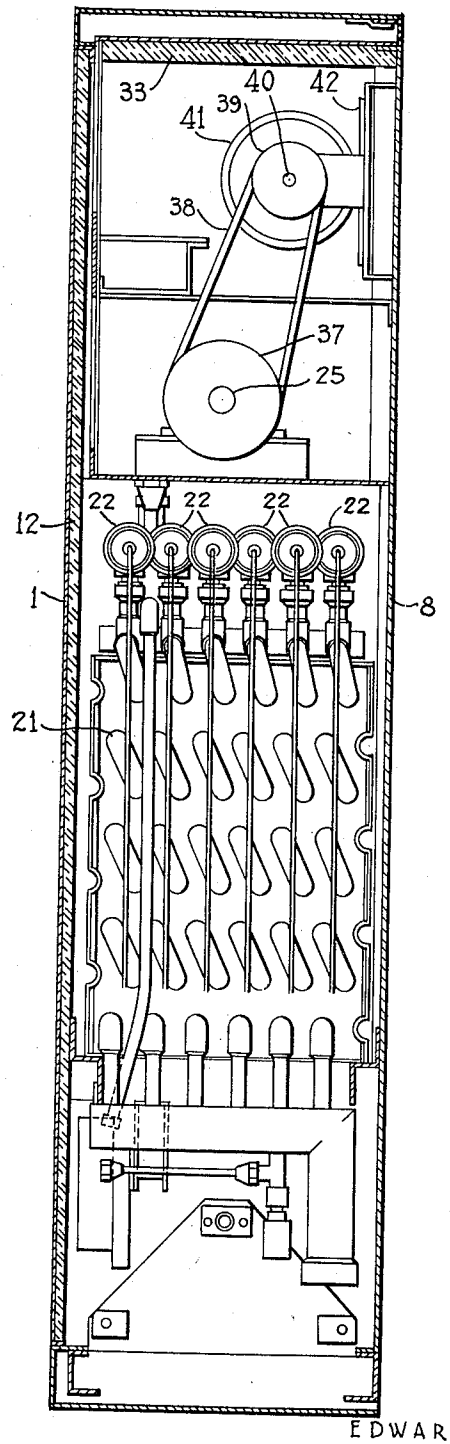
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FIG. 4



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FIG. 5

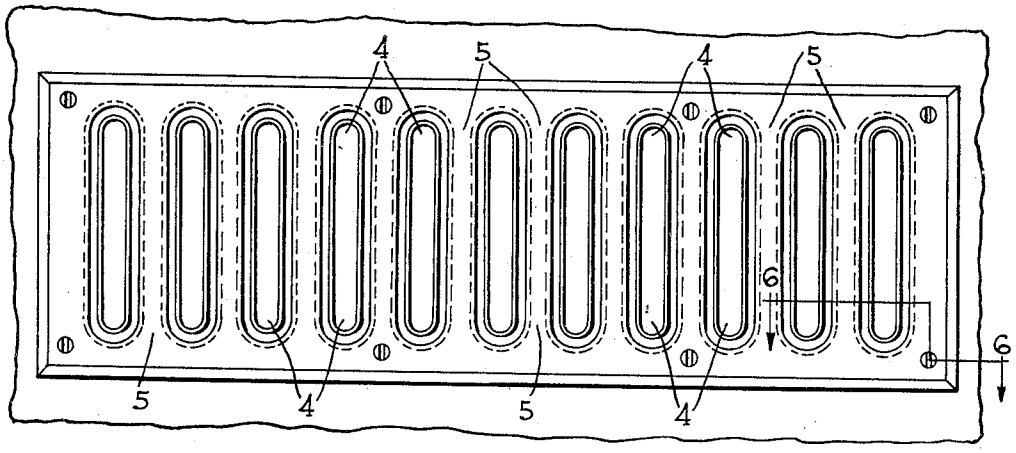


FIG. 6

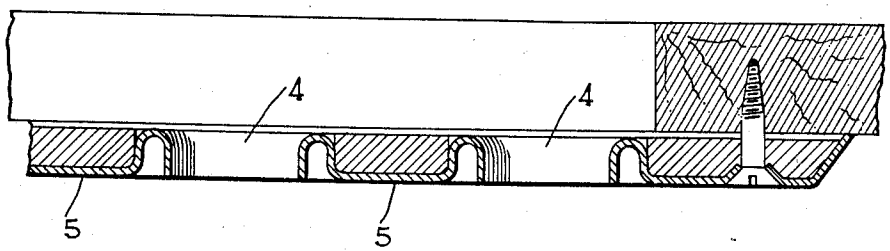
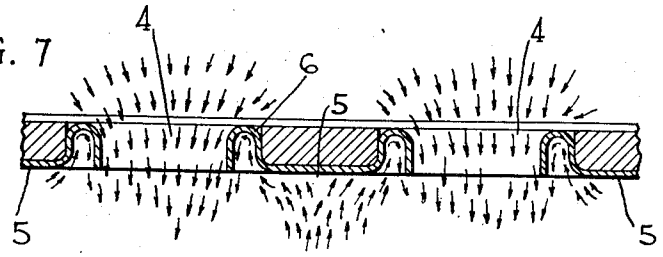


FIG. 7



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FIG. 8

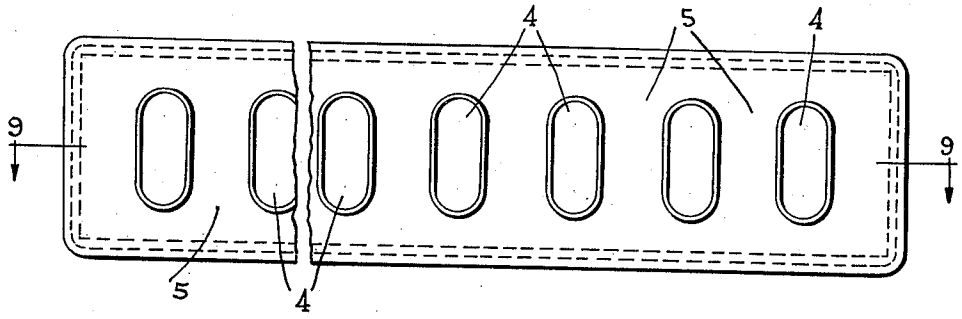
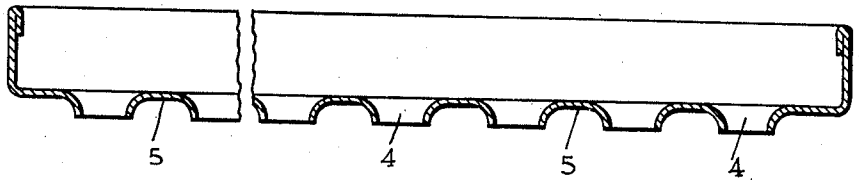


FIG. 9



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Patented Oct. 17, 1939 2,176,319

UNITED STATES PATENT OFFICE

2,176,319

AIR CONDITIONER

Edward L. Anderson, Grosse Isle, Mich., assignor to American Blower Corporation, Detroit, Mich., a corporation of Delaware

Application July 30, 1936, Serial No. 93,491

8 Claims. (Cl. 98—39)

My invention relates to air conditioning units.

It is a special object of my invention to provide an air conditioning unit adapted to condition "fresh" air or air from outside the room or enclosure in which the unit is disposed to condition "return" air or air returned to the unit from the room or enclosure, or to condition both "fresh" and "return" air and to further discharge the conditioned air into the room or enclosure in such manner as to cause it to co-mingle with the "room" air or air within the room or enclosure, while imparting movement to the "room" air in such manner as to provide for distribution of the body of tempered or conditioned air formed by the union of the conditioned air with the "room" air or air within the room or enclosure.

In particular it is my object to provide a sound insulated air discharge chamber and a system of baffles of sound insulated material in said chamber in order to provide adequate velocity for the distribution of the air with suitable volume thereof, but without noise.

Referring to the drawings:

Figure 1 is a perspective of the unit of 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 1.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a detailed front elevation of one form of a typical grill for the discharge of air.

Figure 6 is a section on the line 6—6 thereof.

Figure 7 is a diagrammatic view showing the operation thereof.

Figure 8 is a front elevation of an alternative grill construction.

Figure 9 is a section on the line 9—9 of Figure 8.

Referring to the drawings in detail, 1 is the front wall of the casing having a room air inlet opening 2 and a discharge grill 3 both of which communicate with the room or enclosure in which the unit is operatively disposed. This discharge grill is provided with a plurality of narrow, spaced, vertically disposed air discharge openings 4. The area between these openings as at 5 is the area in which the room air is entrained between the high velocity, vertically disposed, spaced columns or jets of conditioned air that are discharged through the openings 4. If desired, a grooved recess 6 can be provided on the face of the grill adjacent the openings 4 in order to direct the entrained air into paths parallel with the paths of conditioned air discharged through the openings 4 (as shown in Figure 7). Alternative forms of such grills are shown in Figures 5, 6, 8 and 9.

At the bottom of the unit is a fresh air inlet opening 7 in the back of the casing 8, which inlet opening is adapted to communicate with any suitable source of fresh or outside air. 9 and 10 designate the metal side walls of the casing. I provide sound insulation sheets 11 on the inside of the side walls 9 and 10. I provide similar sound insulation sheets 12 inside of the front and rear walls 1 and 8.

At the bottom of the cabinet is a damper 13 which is pivoted at 14 and which is connected with bell crank 16 on an operating shaft 17 by a pitman 15. This bell crank 16 is also pivotally connected to one end of a pitman 18 which is pivotally connected at its other end to a fresh air damper 19. An adjustment of the shaft 17 which is carried on the end plates 20 will adjust the position of the "room" air damper 13 and the "fresh" air damper 19 and determine the proportions of "fresh" and "room" or return air.

Above this damper is a cooling unit consisting of a plurality of coils 21 which are independently controlled by the valve 22.

Above the cooling unit is a series of fans 23 mounted in fan housings 24. The fans are driven from a common shaft 25 which is supported in bearings 26 and 27 on the wall 28 of a belt compartment 29 and one side wall of the cabinet respectively. The fan casings 24 are suspended from a transverse partition 30. The fans discharge upwardly through openings 31 in this partition 30. This discharge is vertical. The discharge is into an air discharge chamber 32. This chamber is lined with sound insulation material generally designated 33. There is provided a transversely disposed baffle plate 34 over each fan discharge. This baffle plate has a sound deadening insulation face 35.

The air, upon its discharge from the fan, strikes the lower surface of the sound-deadening material 35 and the adjacent inner surface of similar material secured to the wall 8. As a result, the direction of air is changed to the horizontal which causes it to impact with the vertical strip of sound-deadening material shown at the lower lefthand corner of the chamber 32 (Figure 2). The force with which the air impinges on this strip causes the air to bounce or otherwise to be reflected and to take a general diagonal direction to the right, past the baffle

34 into the chamber 32. On striking the sound-deadening layer secured to the upper and side walls of the chamber 32, the air is again redirected into a horizontal direction to pass through the grill 3.

The driving mechanism for the fan consists of a pulley 37 on the shaft 25, which pulley is located in the belt compartment 29. A V-belt 38 is mounted in the pulley 37 and in the small pulley 39 on the motor shaft 40 of the motor 41. This motor is mounted on a bracket 42 in the air discharge chamber. Thus any motor noises and any noises from the belt are also deadened by the single sound deadening air discharge chamber 32 with its sound deadening walls 33.

It will be noted that the sound deadening insulation is extended down into the bottom portion of the chamber 29. Motors and belts develop various noises such as belt squeaks, motor hum and brush squeaks, which are particularly annoying in enclosures where these units are employed, as in schools, hospitals and theatres. By placing the noise making apparatus, such as the belts, pulleys and motor, within the sound deadening chamber, the noise is not only deadened, but due to the expansion of the air in the chamber, there is a diffusion of the noise and its consequent elimination.

It will thus be seen that the air can be delivered by high speed fans in a constant volume, with the practical elimination of all noise, and it is so delivered that it will entrain with it a substantial proportion of the room air, thereby imparting movement to the room air to give adequate circulation and a diffusion of the cooler, conditioned air without the creation of drafts.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

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

1. In an air conditioning unit including a casing having air inlet and outlet openings and means to condition the air therein; a sound deadening chamber in direct communication with said outlet opening, means for moving air through the unit and discharging it into said sound deadening chamber and thence through the outlet opening of the unit, means positioned in said chamber for actuating said last-mentioned means, and a sound deadening baffle mounted in said sound deadening chamber transversely of the path of the discharge of the air for deadening the sound of the moving air and of said actuating means, said baffle serving to deflect the air so discharged into the sound deadening chamber.

2. In an air conditioning unit including a casing having air inlet and outlet openings and means to condition the air therein; a sound deadening chamber indirect communication with said outlet opening, means for moving air through the unit and discharging it into said sound deadening chamber and thence through the outlet opening of the unit, and means for driving said air moving means, said driving means being located wholly within said sound deadening chamber.

3. In an air conditioning unit including a casing having air inlet and outlet openings and means to condition the air therein; a sound deading chamber in direct communication with the outlet opening, means for moving air through the unit and discharging it into said chamber and thence through the outlet opening of the unit, a sound deadening baffle mounted in said sound deadening chamber transversely of the path of the discharge of the air and substantially in alignment with the direction of the air flowing through said outlet opening, said baffle serving to deaden the sound of the air and to deflect the air so discharged into the sound deadening chamber, and means for driving said air moving means, said driving means being located wholly within said sound deadening chamber.

4. In an air conditioning unit including a cabinet with controlled re-circulated and fresh air inlets, air conditioning means and a top outlet; fan means in said cabinet immediately adjacent said outlet, a sound deadening chamber superposed on said cabinet and communicating with said outlet for receiving the fan discharge, a vertical discharge opening in one side wall of said sound deanening chamber, horizontal sound insulating baffle means in said sound deadening chamber intermediate its height above said outlet, and with one end spaced from the discharge opening, said baffle means serving to direct air in a path toward said discharge opening below said baffle, then away from said discharge opening above said baffle and finally toward said discharge opening.

5. In an air conditioning unit comprising a casing having a bottom air inlet opening and a side discharge opening adjacent the top thereof, vertically discharging fans adjacent the top of said unit and adjacent the side discharge opening at the top of the unit, and spaced sound deadening means mounted directly over the discharge of said fans between said fans and said discharge opening in the path of said discharge and adapted to deflect the air so discharged in a tortuous path before passing out of the air discharge opening in the unit, means for operating said fans, said fan-operating means being surrounded by said sound-deadening means.

6. In combination, in an air conditioning unit, of a casing having air inlet openings at the front and back adjacent the bottom and an air discharge opening at the top of the front thereof, a transverse partition below the discharge opening, a plurality of fans suspended directly therebeneath and discharging vertically therethrough, driving mechanism for said fans, a sound insulated chamber formed at one end of said partition for receiving the driving mechanism for driving said fans, and a motor in said chamber above said partition, mounted on the wall of the casing, and in the path of said discharged air, for driving said fans.

7. In combination, in an air conditioning unit, a casing having an air inlet opening adjacent the bottom of the front thereof and an air discharge opening at the top of the front thereof, a transverse partition below the discharge opening, a plurality of fans suspended directly therebeneath and discharging vertically therethrough, driving mechanism for said fans, a chamber formed at one end of said partition for receiving the driving mechanism for driving said fans, a motor above said partition mounted on the wall of the casing for driving said fans and in the path of said discharged air, and horizontally disposed means spaced above the discharge of each of said fans comprising a sound deadening plate so arranged between said fan discharges and the air discharge opening as to cause the discharged air to follow a tortuous path before

it makes its exit through the air discharge opening in the unit.

8. In an air conditioning unit having a casing with an air discharge opening at the top thereof provided with narrow vertical slots and fresh air and return air inlet openings at the front and back of the bottom thereof, dampers for controlling said inlet openings, a plurality of separately controllable air conditioning coils arranged in vertical banks above said inlet openings, vertically discharging fan means located above said coils discharging through said air outlet opening on the face of said cabinet at the top thereof through a plurality of said vertically disposed narrow slots, a sound deadening insulation for the area within the casing above said fan discharge to form a sound deadened air discharge chamber, and sound deadened air discharge baffles located directly over the discharge of said fan to cause the air to move in a tortuous path before reaching the air discharge openings.

EDWARD L. ANDERSON.