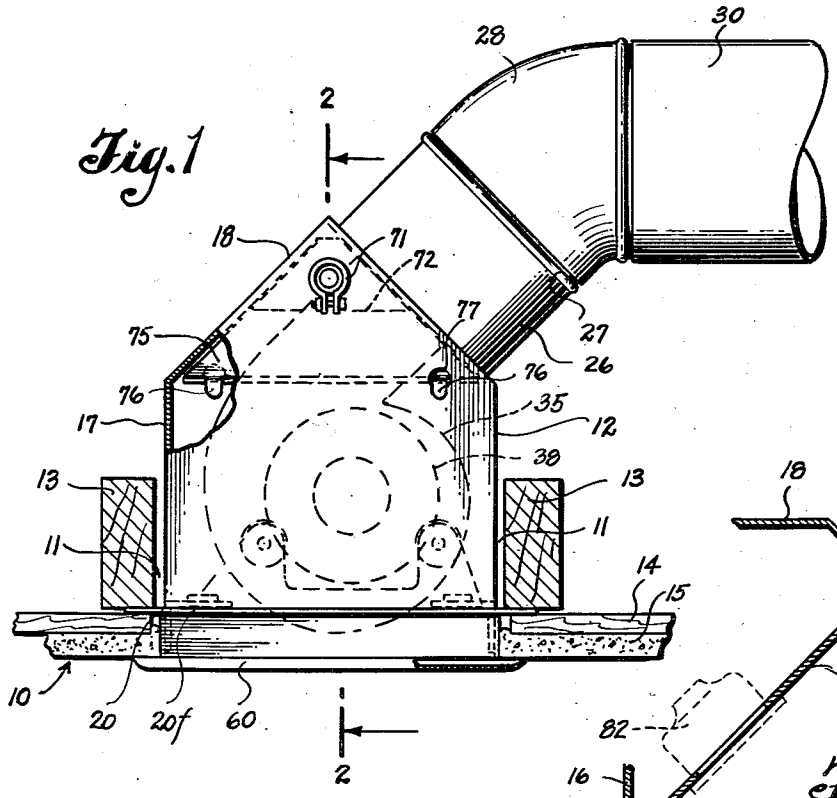
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Fig. 1



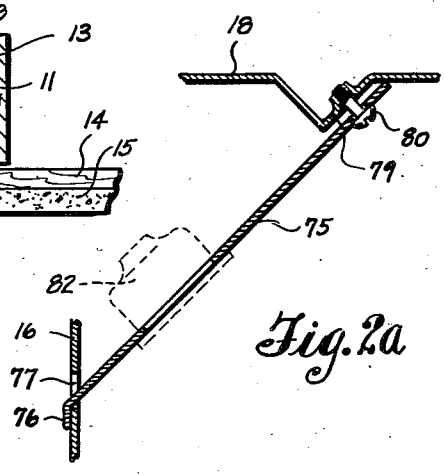
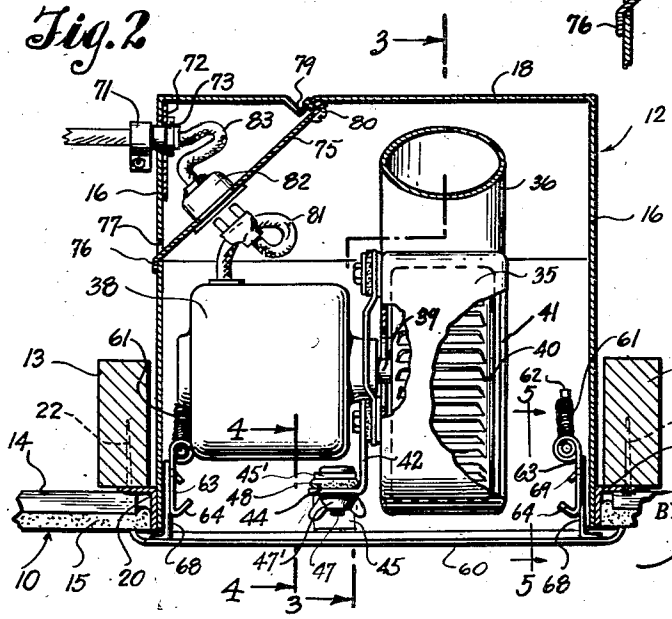


Fig. 2a

Fig. 2



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Fig. 3

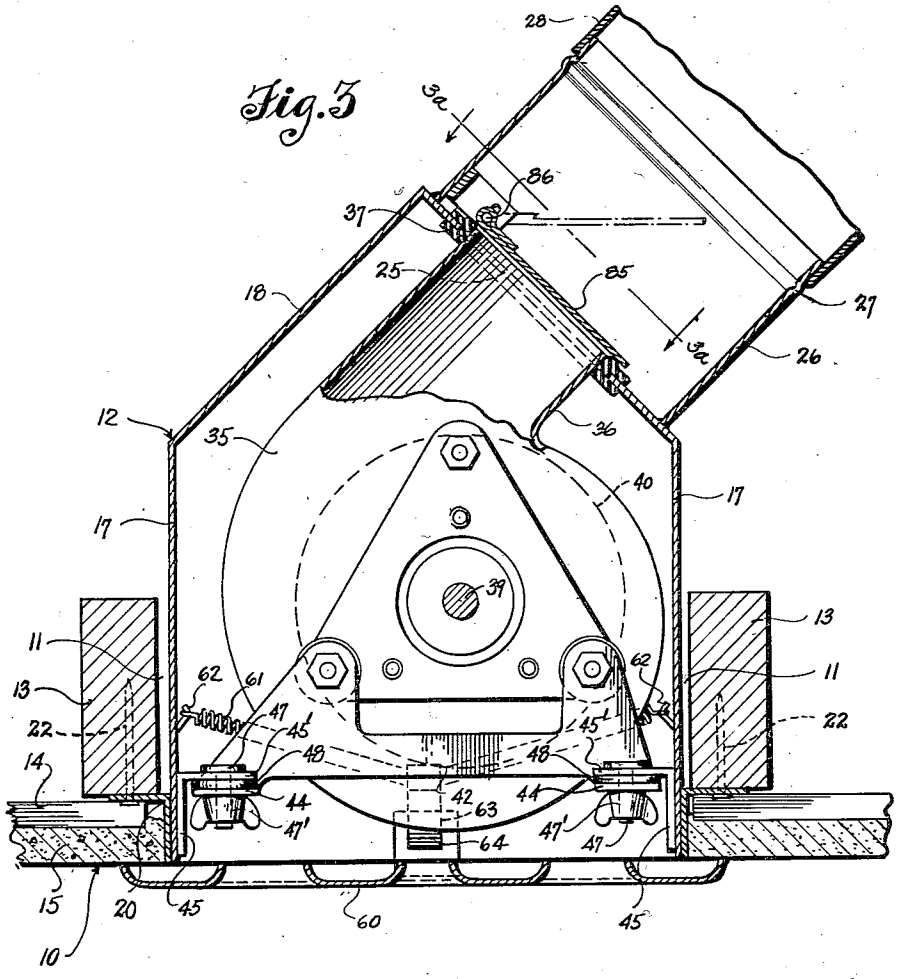


Fig. 3a

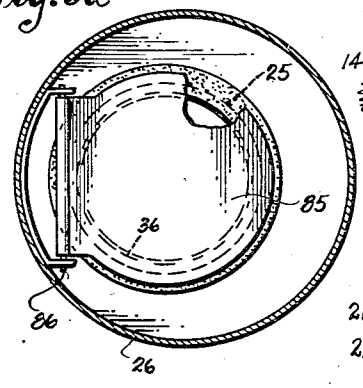


Fig. 4

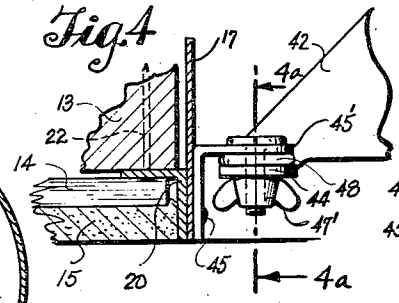


Fig. 4a

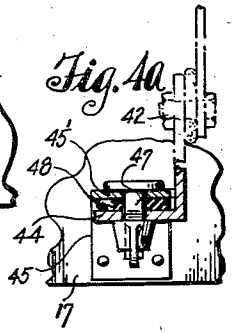
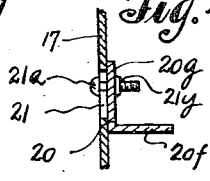


Fig. 4b



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Fig. 5

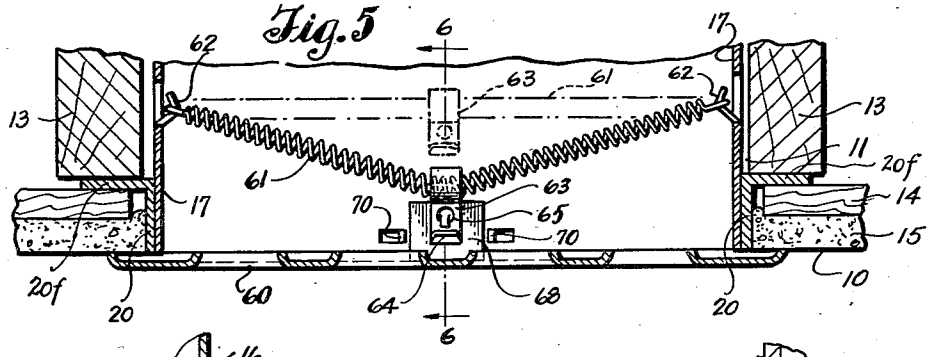


Fig. 6

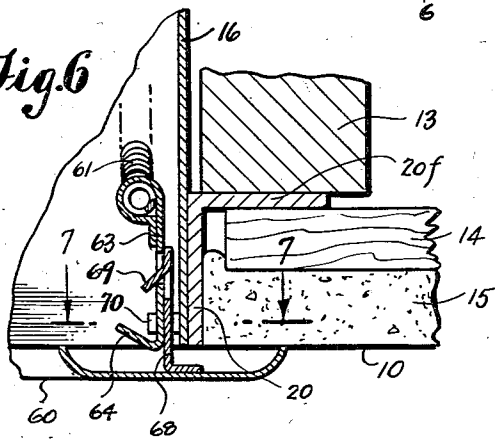


Fig. 7

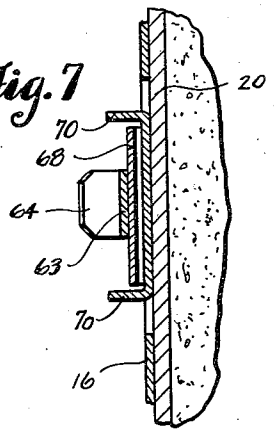


Fig. 8

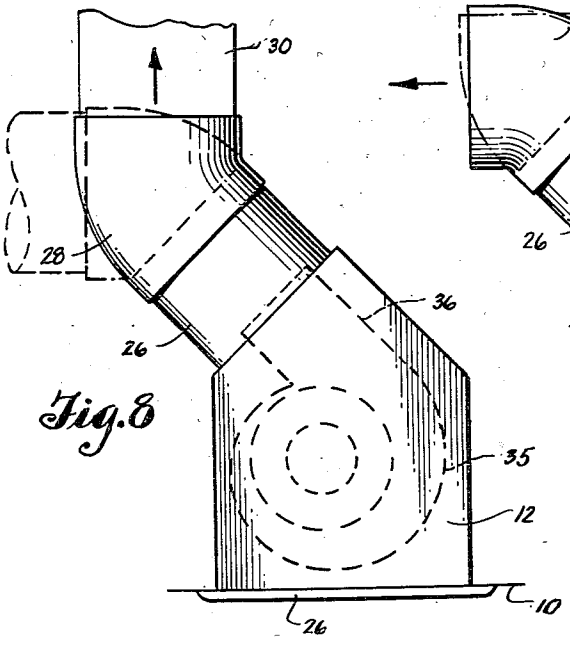
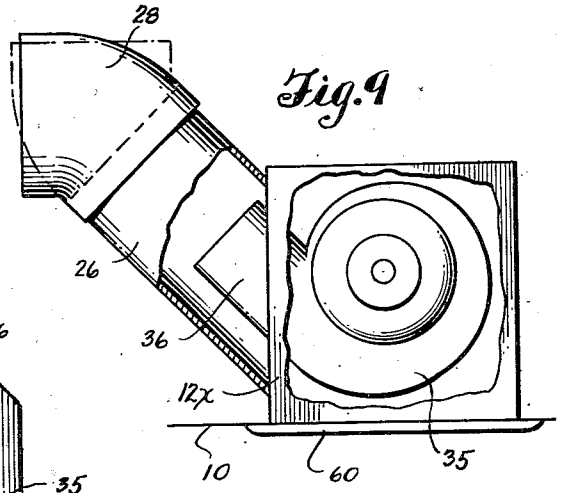


Fig. 9



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VENTILATING APPARATUS

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Application September 30, 1953, Serial No. 383,265

9 Claims. (Cl. 98—43)

This invention relates to ventilating apparatus and it has reference more particularly to improvements in apparatus as used for the drawing of air, smoke, vaporous material or other gases from an enclosure and forcibly discharging it to an outside area; such apparatus being especially adapted for ventilating kitchens, bathrooms, laboratories, work shops, and the like, where undesirable gases and odors are frequently encountered.

More specifically stated, the present invention has to do with ventilators of those types comprising a blower, or fan, that is contained, together with its driving motor, within a housing that is adapted to be set within a ceiling opening, or other wall opening, and which housing has an inlet communicating with the room to be ventilated, and has a discharge pipe or duct leading therefrom to an outside area.

It is the principal object of the present invention to provide an improved ventilating apparatus of the above character wherein the motor and blower containing housing is equipped with an angularly directed discharge spout about which an angularly directed elbow is mounted for rotary adjustment and for connection with a discharge duct; the elbow being easily and readily adjustable to adapt it for the extending of the discharge duct in a vertical or a horizontal direction or at various intermediate angular directions, if such should be desired or required.

It is a further object of the present invention to provide improved means for the support of an ornamental grill over the entrance or inlet to the blower and motor housing, and which permits the grill to be quickly and easily secured in position and easily and readily removed when it is desired to give access to the blower and its driving motor.

Further objects of the invention reside in those details of construction, and combination of parts whereby the cost of manufacture of such devices is rendered less expensive; whereby the quick and easy mounting or the dismounting of the fan and its motor in the housing is made possible; whereby greater rigidity and durability in the structure is attained and whereby an apparatus that is simple and relatively inexpensive is provided.

In accomplishing these and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Fig. 1 is an end view of a ventilating apparatus embodying the improvements of the present invention therein, and showing the application of the device to a ceiling opening.

Fig. 2 is a vertical section taken on line 2—2 in Fig. 1.

Fig. 2*a* is an enlarged sectional detail of parts of the housing and a partitioning panel that sets off an outlet box in the housing.

Fig. 3 is a somewhat enlarged vertical section taken substantially on line 3—3 in Fig. 2.

Fig. 3*a* is a cross-sectional detail taken on line 3*a*—3*a* in Fig. 3.

Fig. 4 is an enlarged sectional detail taken on the line 4—4 in Fig. 2 to show one of the motor and fan supports.

Fig. 4*a* is a vertical section taken on line 4*a*—4*a* in Fig. 4.

Fig. 4*b* is an enlarged view illustrating an alternative construction wherein the supporting strips are adjustable and reversible.

Fig. 5 is a somewhat enlarged sectional view, taken on the line 5—5 in Fig. 2, showing one of the paired springs that supports the grill which covers the housing inlet.

Fig. 6 is a vertical section taken on the line 6—6 in Fig. 5.

Fig. 7 is a horizontal section on line 7—7 in Fig. 6.

Fig. 8 is an end view of the present apparatus with discharge spout adjusted for connection with a vertical discharge duct.

Fig. 9 is a side view of a ventilator showing the discharge spout connected for horizontal discharge.

Referring more in detail to the drawings—

First, referring to the ventilating apparatus shown in Figs. 1 to 5, which is designed for application to an opening in the ceiling of a room or other area to be ventilated. In these views, the lath and plastered lower surface portion of a ceiling is designated generally by numeral 10 and the ceiling is shown to be formed with a rectangular opening 11 within which the lower end portion of the box-like sheet metal housing 12 of the present ventilating apparatus is fitted and secured.

As seen best in Figs. 1, 2 and 3, the ceiling opening 11 is bounded and defined by a rectangular arrangement of joists or headers 13 between which the lower end portion of the box-like housing 12 is disposed. As a detail of construction of the ceiling opening, the lath, designated at 14, are shown to be brought up to the housing, and the plaster, designated at 15, is trowled over the lath and brought flush with the lower end edges of the housing.

The housing 12 which encloses the fan and motor therein, is preferably made of light gauge sheet metal, and comprises the vertical and parallel opposite end walls 16—16; vertical and parallel opposite side walls 17—17 and a top forming portion 18 which is of ridge form and is integral with the side walls. Supporting strips 20, of right angle form, are spot welded or secured by screws to the four sides of the housing 12 about its lower end portion and these angle strips have horizontal flange portions 20*f* that are spaced about one-half inch above the lower end edges of the housing walls, disposed flatly against the under surfaces of the joists and headers 13, which bound the opening 11, with nails 22 applied therethrough to secure them to the headers. When applied to a ceiling opening, the housing 12 is disposed as shown in Fig. 1.

In Fig. 4*b*, I have illustrated a supporting strip 20*f*, which is reversible and adjustable so as to be adapted for securement where "dry wall" construction is used. The strips are joined at their respective ends to form a rectangular frame to be removably applied to the exterior of the housing about its lower end. A plurality of elongated slots 21 are formed in the housing walls near this lower edge and extruded and tapped holes 21*y* are provided in the flange 20*g*. To secure the frame to the housing, I employ machine screws 21*a*. With this construction it is possible to adjust flange 20*f* to a desired or required distance from the lower edge of the housing. By this adjustment, I am able to adjust the housing to the several types of building wall construction.

As illustrated in Fig. 3, there is formed in one of the sloping side portions of the ridge shaped top 18 of the housing a circular opening 25. Fixed to this portion of the top wall about the opening 25, is a short, cylindrical discharge spout 26 that near its outer end is formed with an encircling and outwardly extended bead 27. Rotatably fitted to the outer end portion of the spout that is beyond

the bead 27, is an elbow 28 of an angular form, here shown to be a 45° angle but may be varied somewhat without departing from the teaching hereof. The sloping wall section of the top 18 of the housing to which the spout 26 is attached slopes at an angle of approximately 45° relative to a vertical or horizontal plane, and the spout 26 is perpendicular thereto. The elbow 28 may be so rotatably adjusted on the spout that its discharge end may be directed vertically, horizontally or at any intermediate or required angle. However, it is generally the case that it is adjusted to accommodate a vertical or a horizontal discharge pipe or duct 30, which can be fitted thereto as indicated in Figs. 1 and 8.

The blower, or fan employed in the present apparatus comprises a housing 35 of volute form having a discharge spout 36 extended therefrom into the top wall opening 25. A rubber gasket 37 is fitted within opening 25 and encircles the end of the spout. Mounted rigidly on one side of the housing 35 is an electric motor 38, having its drive shaft 39 extended into the blower housing where it is equipped with a fan wheel 40 of squirrel cage type. The opposite side wall of the blower housing is formed with a relatively large air inlet opening 41. For purpose of assembly the opening is larger than the fan 40. Air that enters housing 12 through its open lower end is drawn into the fan housing 35 through the openings 41 by the action of the fan 40 and is discharged through the spout 36 into discharge duct 30.

A transversely directed supporting bracket 42 for the motor and fan is fixed to the fan housing at one side thereof as shown in Figs. 1, 2 and 3, and this is formed at its lower edge and opposite ends with out-turned, horizontal feet 44—44, which are so spaced as to directly underlie the horizontally turned upper end portions 45' of a pair of brackets 45—45 that are rigidly fixed to the opposite inside surfaces of the walls of the blower housing as shown in Figs. 3 and 4. Bolts 47 are applied downwardly through the registered feet 44 and 45', and wing nuts 47' are threaded onto their lower ends and tightened to clamp and secure the motor and blower functionally in place in the housing 12. Rubber gaskets 48 are interposed between the parts 44 and 45' to absorb vibration and reduce motor hum. When properly applied and secured, the motor and blower assume the position in the housing 12, as shown in Figs. 1 and 2, free of contact with the housing walls.

The lower end entrance to the housing 12 is normally covered by a grill plate 60. This grill is somewhat larger than the ceiling opening 11 and engages the ceiling about the opening. It is supported in place by a pair of coiled springs 61—61 that are disposed at the inside of each end wall of the housing, with their opposite ends secured to horizontally aligned hooks 62—62 that are cut and bent out from the opposite side walls of the housing, as shown in Fig. 5. The springs 61 are maintained under substantial tension and each has a downwardly directed hanger 63 applied thereto midway of its ends. The hanger comprises a flat metal plate that has its upper end looped about the spring and which terminates at its lower end in an upturned ear 64. Above the ear, the plate is formed with a hole 65 for a purpose presently explained.

Spot welded to the top side of the grill, nears its opposite edges, are upwardly directed supporting brackets 68—68, each bracket having an ear 69 struck inwardly therefrom to project in a downwardly pointed direction as shown in Fig. 6. These brackets are disposed parallel with and adjacent the opposite end wall of the housing 12, and each is adapted, when the grill plate is properly placed against the ceiling and over the entrance to housing 12, to be received between two horizontally spaced ears 70—70 that are inwardly struck from the corresponding end walls of the housing, as shown in Figs. 5 and 7, thus to properly position the grill.

After the grill has been disposed in closing position, over the entrance to the housing 12, the hanger plates 63 are pulled downwardly, from the dotted line position of Fig. 5 to such position that the ears 69 that are inwardly struck from the brackets 68 may be hooked into the holes 65 of the hanger plates 63. The parts then assume the full line position of Fig. 5, and the tension of the springs operates to hold the grill plate firmly against the ceiling. To release the grill, the operator extends fingers upwardly through a grill opening and pulls downwardly on the upturned ears 64 at the lower ends of the hangers 63, thus to disengage the hangers from the ears 69. The grill then is free of support.

Circuit wires are brought into the housing 12 through an electrical tubular fitting 71 that is applied through the upper portion of an end wall 16 of the housing as shown in Fig. 2. At the point of entrance of this fitting, the end wall of the housing is strengthened by an additional plate 72 that is applied flatly thereagainst at the inside of the housing. This plate is secured to the end wall 16 by spot welding and a knockout is formed therein through which the fitting 71 is inserted. A lock nut 73 is threaded onto the fitting 71 to retain the fitting in position.

Inside that upper corner portion of the housing 12 which is entered by the fitting 71, a partition plate 75 is disposed angularly to set off a closed compartment. The plate 75 is of triangular form, as shown in Fig. 1, and it is equipped near the opposite ends of its lower horizontal edge with downwardly extending ears 76—76 that extend outwardly through and are seated in holes 77—77 formed in the end wall of the housing as shown in Fig. 1. Near its upper, pointed end, the partition plate is adapted to engage the ridge of the housing and is secured to a downwardly formed transversely directed portion 79 of the top of the housing. This tranverse portion of the housing is formed with an extruded and tapped hole to receive a machine screw 80 which is passed through a hole in the partition plate and provides means for holding the latter in place.

Circuit connections for the electric motor extend from the motor through wiring 81 to a convenience outlet 82 in the partition plate 75. Wiring 83 extends from the convenience outlet out through the fitting 71 to a source of electrical current.

Mounted in the discharge duct 26, to close over the end of the discharge spout 36 of the blower housing 35, is a damper plate 85. This is hingedly supported at its top edge as at 86 to swing upwardly under lifting force of air discharged by the blower, and to close automatically by gravity when the blower stops operating. When in closed position the damper rests upon the gasket 37.

The device of Fig. 9 shows the blower housing 35 disposed in a square housing 12*x*, with its discharge spout 36 directed through a side wall of the housing into a discharge duct 26 which is equipped with a rotatably adjustable 45° elbow. This housing is less expensive than that of Fig. 1 and in some instances is quite satisfactory.

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

1. A room ventilator of the character described comprising a box-like housing, open at its lower end and adapted to be secured at that end in an opening in the ceiling of a room, and having a ridge shaped top, one side of which top is sloped at an angle of 45° relative to a horizontal plane and is formed with a circular opening, an air discharge spout fixed to said top about said opening, and extended outwardly therefrom at a 45° angle relative to a horizontal plane, a 45° elbow fitted to the discharge end of said spout and adjustable thereon to positions for connection with a vertical or with a horizontal discharge pipe, a blower means in the housing including a blower fan that is operable for the indrawing of air through the open end of the housing, a housing for the blower fan equipped with a tubular discharge spout extended with clearance through said opening in the top of the ventilator housing, a resilient gasket fitted within said opening about the blower spout to seal the

joint, and a damper plate hingedly mounted in the air discharge spout to close automatically under its own weight over the blower spout when the blower is not in operation and to open under pressure of air discharged from the blower housing spout.

2. A ventilator as recited in claim 1 wherein, the blower means includes an electric motor mounted in the blower housing and having a driving connection with the blower fan, a supporting plate fixed to the motor and blower housing for their support in the box-like housing; brackets fixed to opposite walls of the box-like housing adjacent its open end and having horizontally turned feet, and said supporting plate having feet turned horizontally therefrom and disposed beneath and register with the said bracket feet, and securing bolts applied through the registered feet of plate and brackets.

3. In a sheet metal box of the character described comprising a housing formed with a ridge shaped top and a vertical end wall; said end wall having laterally spaced holes formed therein approximately at the level of the base of the ridge, and said top having a transversely directed trough formed through the ridge portion thereof and spaced from the said end wall and providing an angularly inclined abutment wall, and a partition plate of triangular form fitted within the ridge shaped top of the housing, at an incline and transversely of the direction of the ridge to define an electrical outlet box in the said housing; said partition plate having tongues extended from its lower edge and projecting outwardly through said laterally spaced holes of the said end wall, to support the plate at that end, and the vertex portion of the said plate being engaged flatly against said abutment wall, and a securing screw applied upwardly through said plate and the abutment to secure the plate in fixed position.

4. In a room ventilator of the character described; a box-like housing that is open at its lower end; a grill plate applied to the housing over the said open lower end thereof, supporting brackets fixed to said grill plate at opposite sides and extended upwardly therefrom closely adjacent opposite walls of the housing, a latching means on said supporting brackets, coiled springs under tension attached at their ends to the housing above the grill plate brackets, latch plates secured to the springs between their ends and means on said latch plates to cooperate with the bracket latching means to support the grill plate over said open end of the housing by said springs.

5. A combination as in claim 4 wherein the grill supporting bracket latching means comprises a downwardly and outwardly projecting finger and the cooperating means on the latch plate comprises an opening therein adapted to receive the finger in latching relationship.

6. A combination as recited in claim 4 wherein each of the latch plates includes an upturned end serving as a finger hold for downward pull on the latch plate for releasing it from or applying it to the bracket finger.

7. A combination as recited in claim 4 wherein paired and horizontally spaced fingers extend outwardly from each of those housing walls adjacent which the said brackets are disposed, to receive the brackets between them as a means of preventing lateral displacement of the grill plate relative to the open end of the housing.

8. A room ventilator adapted for installation in an opening in the ceiling of said room, and comprising a box-like housing, open at its lower end and adapted to be contained at that end in the ceiling opening for the indrawing of air from the room, said housing including a top wall portion inclined at an angle of 45° relative to a horizontal plane, an air discharge spout extended from said top wall perpendicular thereto, blower means, including a blower housing, contained within the box-like housing and operable for the indrawing of air through the open side of the box-like housing, a blower spout integral with blower housing and aligned with the discharge spout for the forcible discharge of air therethrough and a 45° elbow fitted to the discharge spout and adjustable thereon to positions for direct connection with a vertical or with a horizontal discharge pipe.

9. A room ventilator as in claim 8 wherein said top wall which mounts the air discharge spout thereon has an opening therein of lesser diameter than the discharge spout, and said blower spout extends into the first mentioned spout through said wall opening, a gasket of resilient material fitted in said top wall opening about the blower spout to seal the joint and to dampen vibrations that may be induced by blower operation.

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