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2,212,050

VENTILATING SYSTEM

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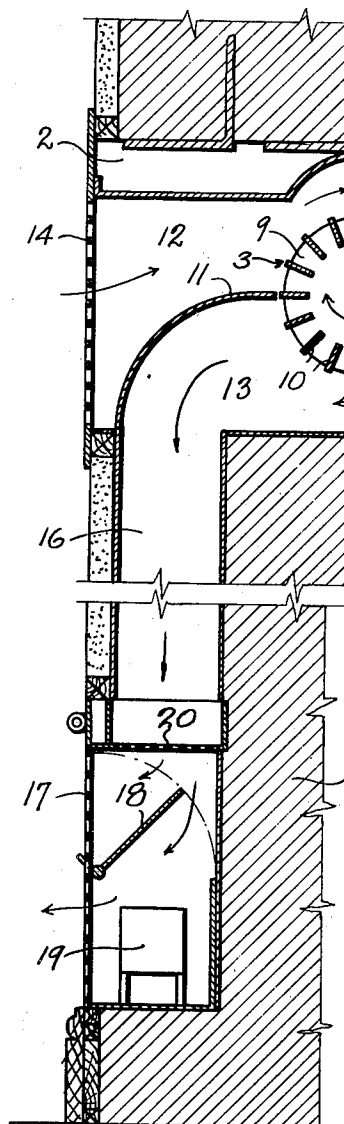


Fig. 1

Fig. 3

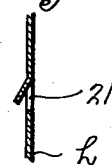


Fig. 2

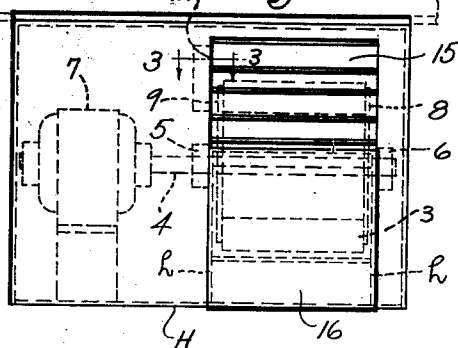
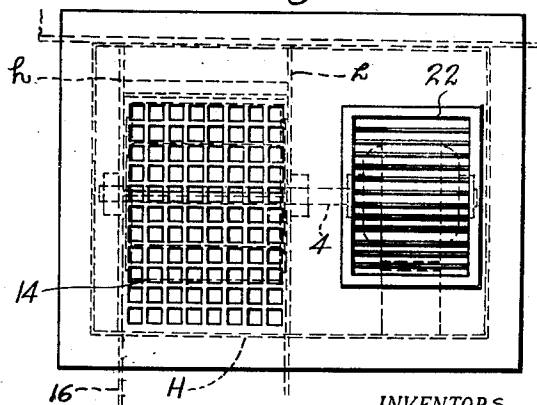


Fig. 4



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VENTILATING SYSTEM

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2 Claims. (Cl. 98—33)

This invention relates to improvements in ventilating and air circulating systems, and it has reference more particularly to fans and means associated therewith for the ventilation of rooms, or other enclosed areas.

Explanatory to the objects of the invention, it will here be stated that, at the present time, the ventilation of enclosed areas by the use of fans is quite common. The usual ventilating means for a room or area comprises a fan that is set within a wall opening, and is operable to either drive air into or draw air from the enclosure. This means, however, is not entirely effective or satisfactory for many reasons. In the first place, if a fan is operating in a manner to drive fresh or outside air into a room, there must be an outlet through which air may be exhausted from the room. Usually no special provision is made for the exhaustion of air, and as a consequence it is not only difficult to drive the fresh air into the room, but the air that is exhausted, which is usually used or foul air, is expelled through any existing cracks or openings in doorways or the like, into areas where it is not desired. In the second place, if a fan is operated to exhaust air from an area, the area must likewise be provided with openings for the inlet of air. Generally, no special provision is made for the admittance of air into the area, and therefore, the exhaustion of air is difficult, and it is generally the case that the intaken air is drawn from beneath doorways or through windows that are not tight, and as a result the intaken air is either too cold or too hot or is foul air that is not desired.

In view of the above mentioned and other disadvantages and objections that are incident to the use of fans in their general application, it has been the principal object of this invention to provide improved types of ventilating or air circulating means employing a single fan, associated with ducts arranged in a novel manner, whereby air may be both expelled from and driven into the enclosed area.

It is also an object of this invention to so arrange the ducts that fresh air driven into an area will expedite the withdrawing of foul air through the outlet duct, and will be delivered into the area at a location that it will not return immediately to the outlet duct.

It is a further object of the invention to provide novel features of construction in the types of fans employed so that a one-fan system will operate effectively for both the intaking and exhausting of air.

Still further objects of the invention reside in

the details of construction and combination of parts as hereinafter described.

In accomplishing these and other objects of the invention, we have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawing, wherein—

Fig. 1 is a vertical, sectional view through a wall of a room or area, provided with an opening within which an air circulating fan embodied by the present invention is located; this view particularly illustrating the location of air inlet and exhaust passages.

Fig. 2 is an outside view of the fan housing, and illustrating in dotted lines, the location of the fan and its driving motor.

Fig. 3 is a sectional detail on the line 3—3 in Fig. 2.

Fig. 4 is an elevation of the fan housing, as seen from the inside of the room.

Referring more in detail to the drawing—

In Fig. 1, 1 designates what may be the outside wall of a room, or other enclosed area to be ventilated. Formed through the wall, preferably at the top of the room, is an opening 2 within which is fitted a ventilating device, embodied by the present invention. This device comprises the fan 3, which is fixed on and supported by an axle on shaft 4, revolvably contained in bearings 5 and 6. The shaft also is operatively connected at one end with, or is a continuation of the drive shaft of an electric motor 7, which, as seen in Fig. 3, is located within the housing close to one of the side walls thereof.

The fan used in this system is of cylindrical form and might be considered to be a modification of the squirrel cage type of fan. It comprises closed, parallel opposite end walls 8 and 9, between which are extended air impeller vanes or fins 10. These fins are flat metal pieces set in planes radial of the shaft and equally spaced apart and arranged circularly about the shaft. The fan, the motor and bearings are contained within a housing H that is fitted within the opening 2. The fan 3 is contained operatively within a housing that is defined by two spaced, transverse partition walls h and h' within housing H and it is also located approximately midway between the upper and lower walls of the housing H and toward the outside of the wall 1. A partition 11 divides the housing into upper and lower sections, and also sets off two air passages, 12 and 13 within the housing.

The passage 12 opens at one end to the inside of the wall, and at that end is covered by a grill

14. At its inner end, the passage 12 opens to the outside of the wall, and in this end, there is arranged a plurality of shutters 15 or dampers, which may be manually adjusted to close or regulate the area of the opening, or they may be of the self-opening louver type. The passage 13 communicates directly at its inner end with a vertical air duct 16 which leads downwardly within the wall 1 and opens into the area or room to be cooled, near the floor line. The opposite end of the passage 13 communicates with an elbow member 16 opening downwardly and adapted to receive outside or fresh air. The fan 3, as here located, is set within an opening in wall 1 and extends equally into the upper and lower passages 12 and 13, and in operation, the lower half portion of the fan effects the intaking of air from the outside of the wall through elbow 16, and the propulsion of this intaken air through duct 16 and into the room or enclosure. The upper portion of the fan, extended above the partition 11 operates to draw air through the channel 12 from the upper portion of the enclosed area and to expel it to the outside of that area. The direction of flow, of course, is dependent upon the direction of rotation of the fan. However, with the fan rotating in a direction indicated by the arrow placed thereon, fresh air, or outside air, will be drawn from outside the wall and driven into the area while the air from the inside of the area will be drawn from and expelled to the outside of the area, as just described.

It is to be understood that the thickness or character of the wall is of no material consequence. If the wall should comprise merely a thin panel, then any suitable means would be provided for supporting the fan housing in an opening provided in the panel, and a suitable air duct would be provided, leading from the housing to the lower part of the area that is to be ventilated. The types of grills, or the types of dampers used at the ends of the air passages is of no particular consequence, but the arrangement as shown in Fig. 1 is desirable for the reason that it is believed to be the most practical for the most common types of building construction.

We have indicated, in Fig. 1, that the vertical channel 16 leading to the lower portion of the area to be ventilated may communicate with a grill, as designated at 17, and that a damper 18 may be provided whereby the air delivered may be regulated and delivered directly into the area or directed past a refrigerating unit 19, and then delivered through the grill 17 into the area to be ventilated. Incorporated in the vertical air channel 16 is an air filter 20, in the form of a drawer, so that it may be removed and cleaned or the filter removed periodically.

In order that the fan driving motor 7 may be kept in a properly cooled condition, we prefer that there shall be ventilating openings as indicated at 21 in the wall 1 in Fig. 3, from the

air passageway 12 into the enclosure containing the motor.

It is also preferred that at the inside of the housing, there be a removable panel as designated at 22, for giving access to the motor for repair or adjustment.

Assuming the device to be so constructed, it will be understood that the fan operates to effect both the exhaustion from and the delivery of air into an enclosed area. The arrangement also provides for injecting the fresh or outside air into an enclosure at a point remote from the point of exhaustion so as to avoid any direct recirculation. Each system is relatively simple to construct, inexpensive to manufacture and effective and efficient in use.

It is to be understood that different conditions under which such systems are to be used might require changes in details of construction. Therefore, it is not desired that the claims should be limited to details shown, but that they shall be given an interpretation that is commensurate with the scope of the invention disclosed.

Having thus described our invention, what we claim as new therein and desire to secure by Letters Patent is—

1. A ventilating system for an enclosed area having a wall opening, a housing contained in the opening, a partition dividing the housing into two compartments, a motor contained in one of the compartments, a second partition dividing the other of the said compartments into two air passages, each passage opening at its opposite ends respectively to the inside and to the outside of the wall; said last named partition having an opening therein, a cylindrical fan operatively mounted in the said opening and means connecting the motor with the fan to operate the latter to cause a flow of air through one of said air passages into the enclosed area and through the other of said air passages from the enclosed area.

2. A ventilating system for an enclosed area having a wall opening, a housing contained in the opening, a partition dividing the housing into two compartments, a motor contained in one of the compartments, a second partition dividing the other of the said compartments into two air passages, each passage opening at its opposite ends respectively to the inside and to the outside of the wall; said last named partition having an opening therein, a fan operatively mounted in the said opening and means connecting the motor with the fan to operate the latter to cause a flow of air through said passages in opposite directions; said first mentioned partition having openings providing communication between one of the said air passages and the motor containing compartment whereby to permit an air circulation in the motor containing compartment.

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