

April 10, 1945.

H. T. PAISTE, JR

2,373,497

VENTILATOR

Original Filed Sept. 8, 1941 3 Sheets-Sheet 1

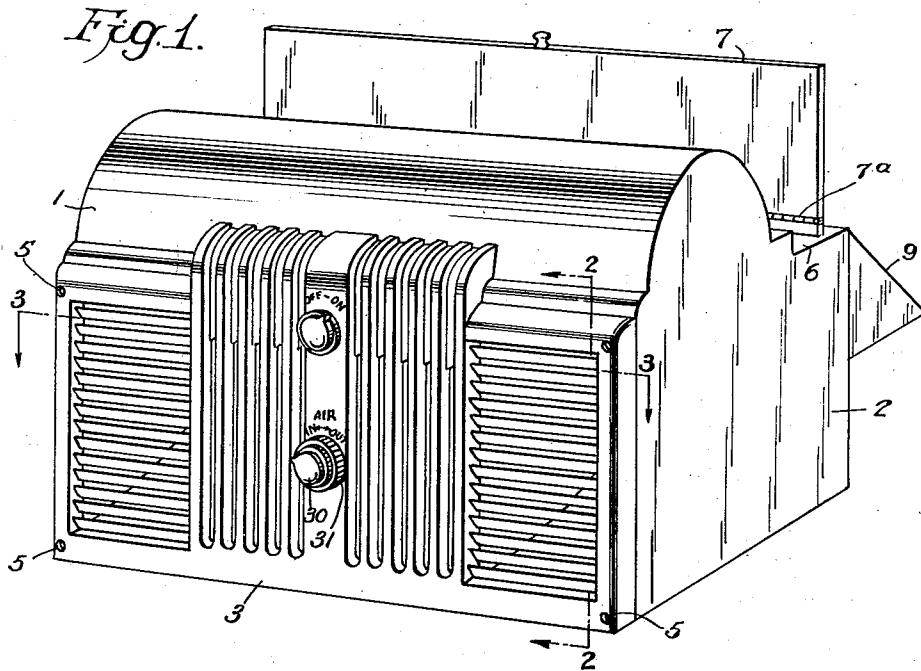
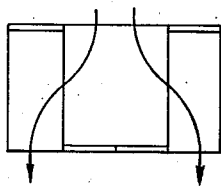


Fig. 6

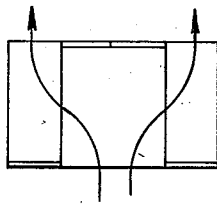
OUTDOORS



INDOORS

Fig. 7.

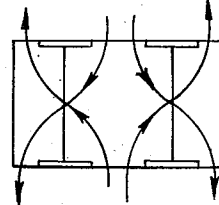
OUTDOORS



INDOORS

Fig. 8.

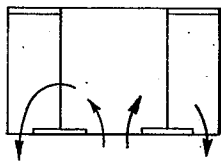
OUTDOORS



INDOORS

Fig. 9

OUTDOORS



INDOORS

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Fig. 2.

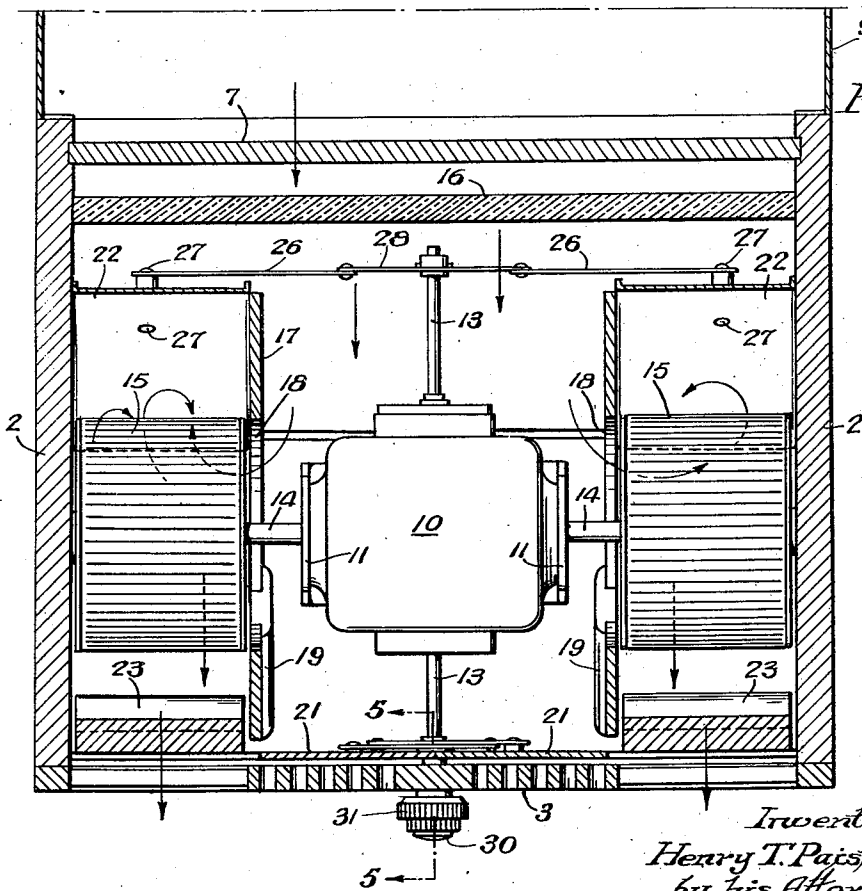
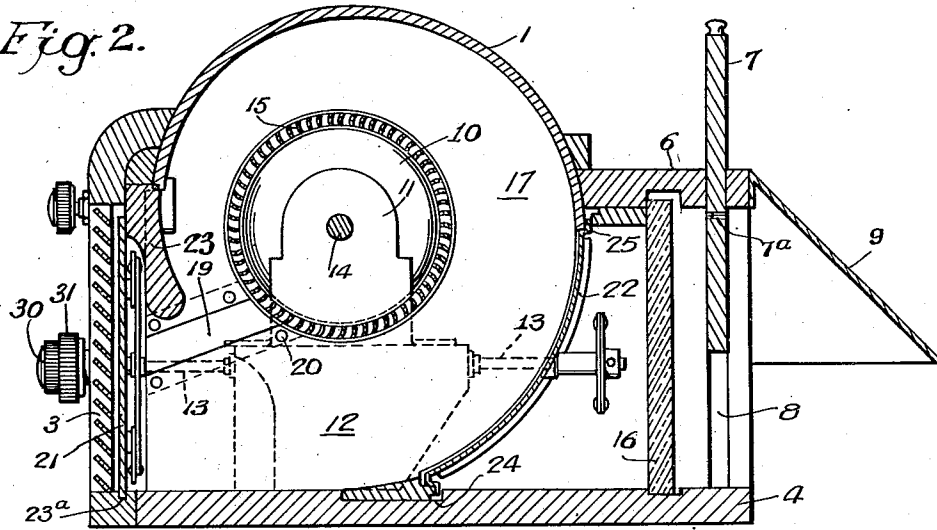


Fig. 3.

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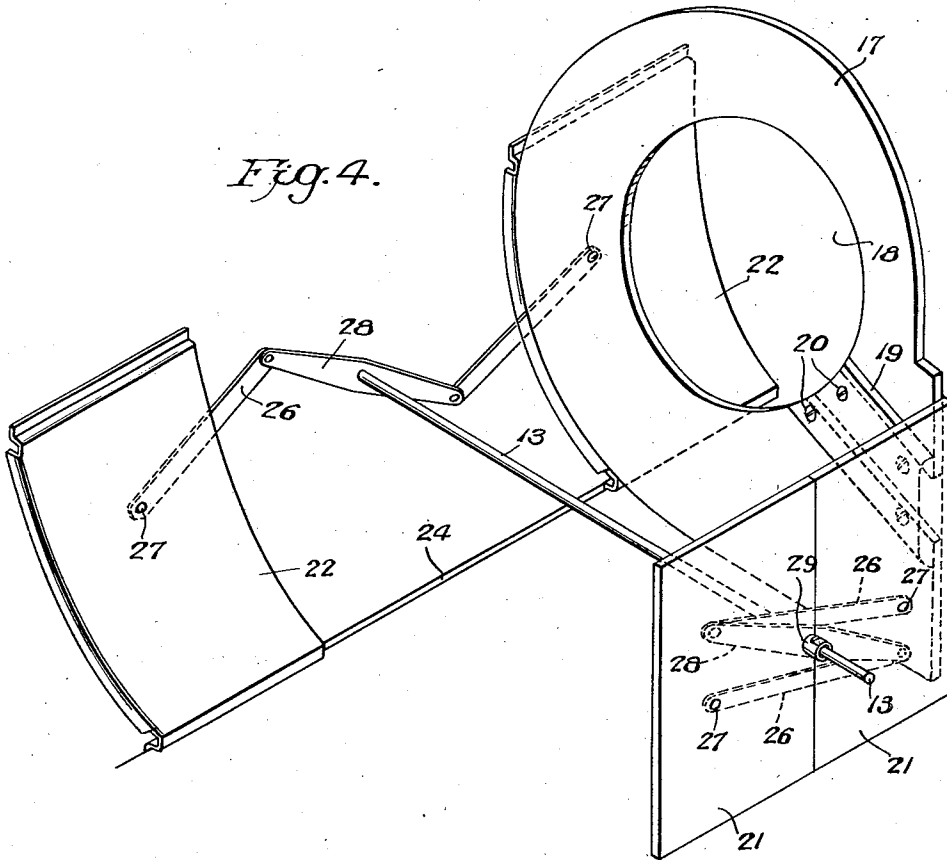
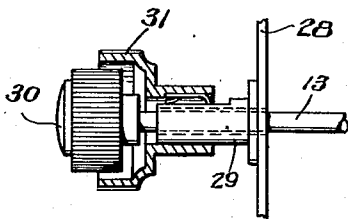


Fig. 5.



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UNITED STATES PATENT OFFICE

2,373,497

VENTILATOR

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Original application September 8, 1941, Serial No. 410,067. Divided and this application October 3, 1942, Serial No. 460,671

4 Claims. (Cl. 230—42)

This invention relates to ventilating units, and has especial reference to self-contained, portable units adapted for ready installation on a window sill. More particularly, the invention relates to ventilators of the above type which employ power driven fan means and provide for selective control of air circulation by the manipulation of dampers, and is a division of my co-pending application Serial No. 410,067, filed September 8, 1941.

It is the primary object of the present invention to improve and simplify the construction and assembly of such ventilators, and to provide a unit having novel air circulation control means, which is easy to operate and is constructed in such a way as to improve the fan efficiency.

Another object of the invention is to provide a ventilator in which the fan scroll is formed in part by the cabinet structure and in part by adjustable air-control dampers which are highly efficient and susceptible of easy and positive control.

A further object of the invention resides in the provision of a unified control means for the dampers, of such a nature that the direction and quantity of the moving air may be either simultaneously or independently varied.

A still further object of the invention is to provide a ventilator which may be easily assembled from relatively inexpensive materials, and which is of such a constructional arrangement that the motor and its associated fan units may be readily inserted into or withdrawn from the casing to effect installation, adjustments or repairs.

Other objects and advantages of the invention will be best understood by considering the following detailed description in the light of the accompanying drawings, in which:

Figure 1 is a perspective view of the ventilator showing the location of the control manuals;

Figure 2 is a vertical sectional view taken along the line 2—2 of Figure 1;

Figure 3 is a horizontal sectional view taken along line 3—3 of Figure 1;

Figure 4 is a perspective view of the air control doors or dampers and the control linkage therefor, and illustrates one of the scroll partitions;

Figure 5 is a detail sectional view taken along line 5—5 of Figure 3; and

Figures 6 to 9 are diagrammatic views showing the air flow resulting from different adjustments of the control dampers.

With particular reference to Figures 1, 2 and 3 of the drawings, it will be seen that the ventilator comprises a cabinet having a curved scroll-

forming roof portion 1, preferably formed of wood veneer. Suitably configured side panels 2, as shown, extend along the side of the ventilator from the front to the rear thereof. A unitary grill member 3 covers the front of the cabinet, and may be detachably fastened to the side panels 2 and base member 4, as by means of recessed screws 5.

Although the ventilator is portable, as pointed out above, and may be used wherever it is convenient to do so, it is particularly well suited to permanent installation, as on a window sill. For this purpose, there is provided a sash basing strip 6 which extends horizontally across the top of the cabinet immediately behind the curved scroll portion 1. The upper surface of this strip is adapted to cooperate with and support the lower edge of the window sash (not shown). A rear closure door 7 is slidably fitted in vertical tracks 8, inwardly of a suitable rain hood 9. As it appears in Figures 1 and 2, this sliding door is equipped with a suitable hinge 1a, which may be of the "piano-hinge" type. This hinge permits the door 7 to fold backward against the roof portion 1, when the door is in the open position. It will be obvious that the ventilator must be fixed with relation to the window frame or sill, and that side adaptor panels will be necessary if the window is wider than the ventilator. However, as this mounting is not a part of the present invention, and may be done in any convenient way, it is not necessary to illustrate it.

The interior construction of the unit will now be described with particular reference to Figures 2, 3 and 4 of the drawings. A motor 10, located centrally of the device, is supported by brackets 11 fixed to a pedestal block 12, through which passes a damper control rod 13. The motor is provided with short shaft extensions 14—14 to which are fixed a pair of fans 15—15. For efficiency and quiet operation a squirrel-cage fan is employed, that is, one in which air is supplied to the fan along the shaft axis, and is discharged outwardly through the blading, as indicated by the arrows in Figure 3.

An air cleaning filter 16, of spun glass or the like, is provided. The interior of the ventilator is divided into three compartments, one for the motor and the others for the fans, by a pair of partitions 17—17 of scroll shape. These partitions conform with the contour of roof member 1 and, as most clearly appears in Figure 4, are provided with a generally central aperture 18 of a diameter equal to that of the fans 15. As may be seen by a comparison of Figures 2 and 4,

these partitions define the general scroll shape which has been found highly efficient for use with fans of the type employed. Each partition is provided with a forward vertical edge which resides closely adjacent the front grill member 3. To facilitate assembly of the device, each partition member is further provided with a removable insert 19 adapted to be fixed thereto, as by means of screws 20. Reference to Figure 2 will show that with this type of construction the cabinet may be completely fabricated at one zone of an assembly line, after which the motor and its associated fans may be readily inserted as a unit at another zone of the line. At this later stage of assembly, with the motor already fastened to its mounting block, it is a relatively simple matter to insert the shafts 14 into the partition slots, move the motor up into place in the cabinet, and allow the mounting block to swing downwardly into position in contact with the floor plate 4. Fastening the block to said plate and screwing the inserts 19 into place completes the motor and fan installation.

Referring now to the air control means, it will be seen that the device is provided with pairs of front and rear damper doors 21—21 and 22—22 respectively. The vertically disposed front doors are mounted for horizontal sliding movement between grill member 3 and a pair of scroll filler pieces 23—23 as by means of a track 23a; while the rear dampers, shaped to the configuration of the scroll partitions, are mounted for horizontal sliding movement by means of tracks 24 and 25 (see Figure 2), and extend from the floor to the curved roof member, to close and complete the scroll shape. As will be clear from the description of operation, in at least two of their positions of adjustment, these curved rear doors cooperate with the roof member 1 to form a part of the fan scroll. Each of the four doors is equipped with a movable arm 26. The arms are pivotally connected to the doors as at 27, and have their other ends pinned to a door actuating lever 28 which, in the case of the curved rear doors, is fixed to the actuating shaft 13 (see Figure 4). The actuating lever of the forward pair of doors is fixed to a short hollow shaft 29 of larger diameter than shaft 13 and mounted concentrically therewith. As will be apparent from Figure 5, shafts 13 and 29 are provided with external control knobs 30 and 31, respectively, the knobs being positioned to permit either simultaneous or independent variation of the setting of the two shafts.

The various types of operation of which the device is capable will now be discussed, and will be best understood by considering Figures 4 and 6 to 9.

Figures 6 to 9 illustrate diagrammatically the four fundamental conditions of operation, and in discussing these figures, the upper edge of each diagram will be considered the outdoors side of the unit, while the lower edge represents the indoors side.

Turning of shaft 13 or shaft 29, will move the lever 28 associated with the particular shaft rotated, and thereby effect translational sliding movement of the front and rear pairs of dampers, as may be clearly seen in Figure 4. The dampers are movable between two terminal positions, as will appear from a comparison of Figures 6 and 7, and may be moved to any position of adjustment intermediate the terminal positions, as exemplified in Figure 8.

To bring the maximum amount of outside filtered air into the room, the motor control switch

knob on the front panel is turned to the "on" position, and both of the control knobs 30 and 31 are turned counter-clockwise until the pairs of damper doors reach the positions shown in Figure 6. In this position of adjustment (and with the vertical sliding door 7 open) air will flow through the filter into the central chamber, thence along the blower axis into each of the fan chambers, and will be expelled into the room through the side louvers in panel 3. It will be understood that the air is actually thrown outwardly through the blading (the motor always turns in the same direction), and is forced into the room by the cooperating scroll through an opening in either the back or the front thereof, depending upon the adjustment of the dampers.

To exhaust the highest possible amount of air from the room, the knobs 30 and 31 are turned in the clockwise direction until the control dampers have reached the position shown in Figure 7. As will be readily apparent from the figure, the room air enters the unit through the central part of the grillwork, flows along the axes of the blowers through the apertures 18 provided in the partitions 17, and is again expelled from the fan chambers.

Figure 8 illustrates the damper adjustment necessary to effect simultaneous two-way flow of the air. In view of the preceding explanations, further elucidation of this figure is not necessary, except to point out that the air coming from both sides of the unit is entering the central chamber, the fan chambers still being used purely for expulsion.

To effect recirculation of the room air, the doors are moved to the positions shown in Figure 9. When this adjustment has been made, and the sliding door 7 closed, the unit will cause a substantial circulation of air within the room.

From the foregoing description, it will be seen that the invention provides a novel ventilating device capable of a number of different types of operations in which the fan scroll is formed in part by the main structural elements of the cabinet itself, and in part by adjustable air-control dampers which are highly efficient and susceptible of easy and positive control. In addition, the damper control means is conveniently arranged, readily adjustable and positive in its action.

It will also be apparent that the invention provides a ventilating unit which, although portable and highly compact, may be easily assembled from relatively inexpensive materials, and the power unit of which is accessible and may be readily removed, should repairs be necessary.

The ventilator illustrated may be modified in certain respects without departing from the spirit of the invention. For example, the number and arrangement of the various chambers might be altered, the fans might be driven from some external source, rather than the motor shown, etc. Moreover, it will be clear that the invention is not to be understood as being limited to the use of scroll-shaped dampers in the rear of the ventilator only, but that this principle may be applied to the front damper doors as well, if such should be desired. However, it will be understood that the invention contemplates such changes and modifications as may fall within the scope of the appended claims.

I claim:

1. In a ventilator having a casing, a unitary partition providing separate chambers in said

casing, one of said chambers being adapted to serve as a motor housing and having motor mounting means arranged therein, and the other of said chambers being adapted to serve as a housing for a blower actuated by the motor, said partition having formed therein an aperture to accommodate a driving connection between the motor and the blower, said casing being provided with an aperture to afford access to both of said chambers, and said partition further having a slideway formed therein leading from an edge thereof into the partition aperture, whereby the ventilator may be readily assembled by introducing the motor and its associated blower through the said casing access aperture, passing the driving connection up through said slideway, and fixing the motor to said mounting means.

2. In a ventilator having a casing, a plurality of unitary partitions arranged in generally parallel planes providing separate chambers in said casing, one of said chambers being adapted to serve as a motor housing and having motor mounting means arranged therein, and the others of said chambers being adapted to serve as housings for blowers actuated by the motor, said partitions each having an aperture formed therein to accommodate driving connections from the motor to the blowers, said casing being provided

with an aperture to afford access to all of said chambers, and each of said partitions having a slideway formed therein leading from an edge of the partition into the partition aperture, whereby the ventilator may be readily assembled by introducing the motor and its associated blowers through the said casing access aperture, passing the driving connections up through said slide-ways, and fixing the motor to said mounting means.

3. A construction in accordance with claim 1, wherein the partition slideway is provided with a removable closure member.

4. In a ventilator, a casing, a motor driven blower unit disposed within said casing, including a driving shaft between the motor and the blower, and an apertured unitary partition between the motor and the blower, said partition serving to divide said casing into separate chambers housing the motor and the blower respectively, said partition having a slot therein extending from an edge of the partition to the aperture therein and adapted to accommodate said shaft, to permit the insertion or removal of the complete motor driven blower unit into or from said casing.

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