

Jan. 30, 1940.

T. L. ROBERTS

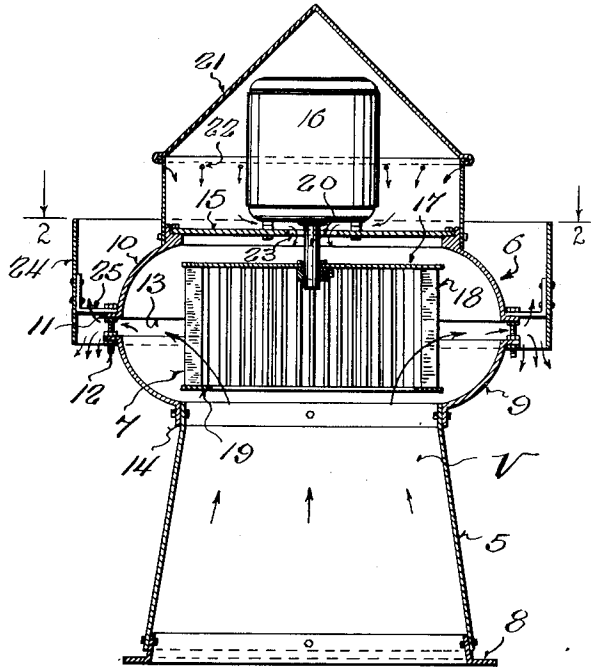
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POWER-OPERATED VENTILATOR

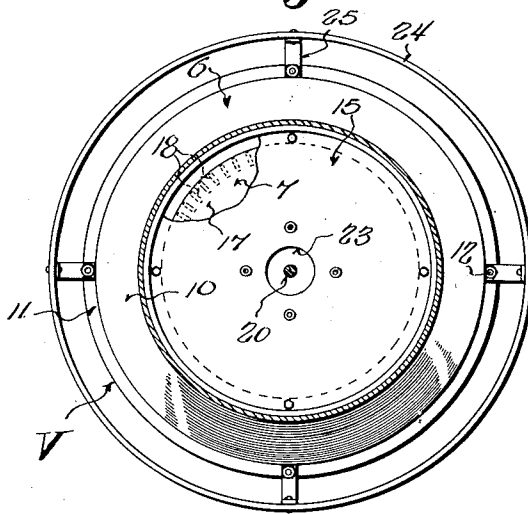
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*Fig. 1.*



*Fig. 2.*



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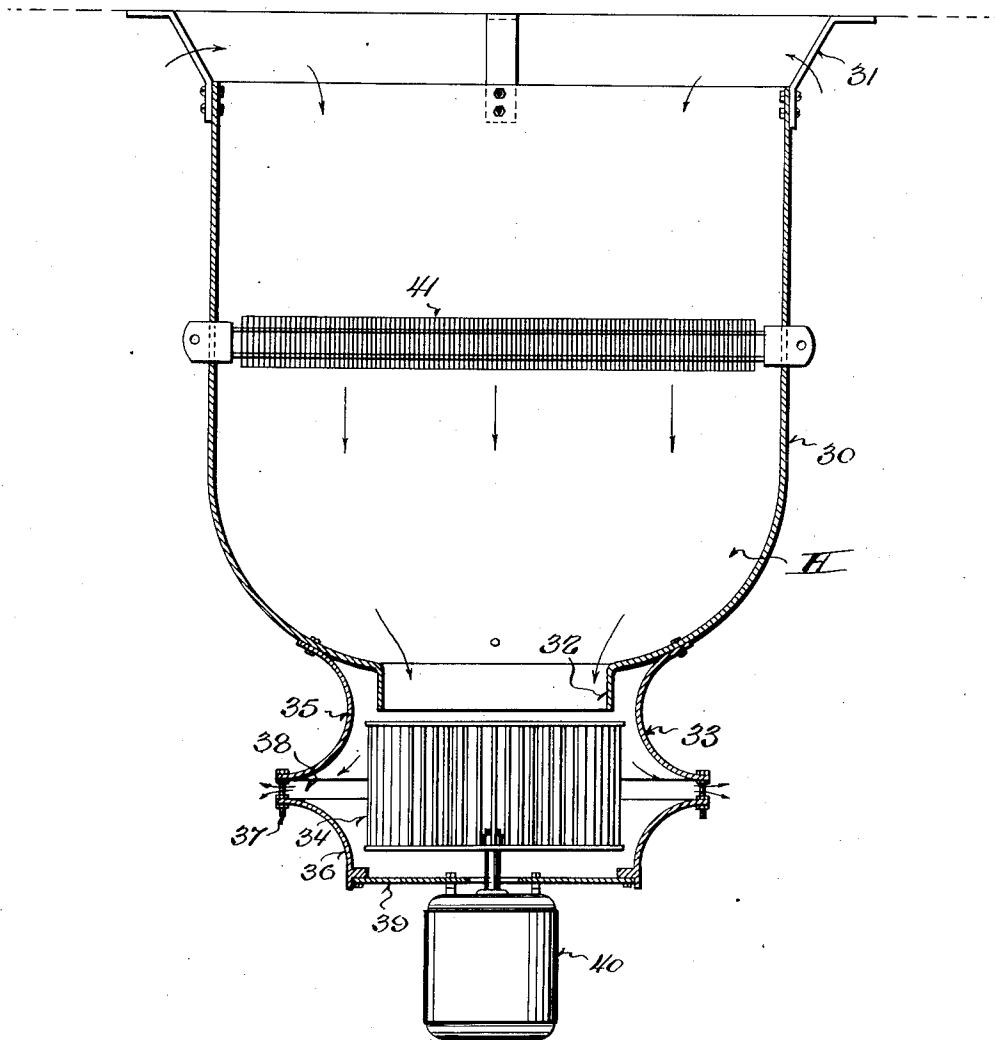
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*Fig. 3.*



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# UNITED STATES PATENT OFFICE

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## POWER-OPERATED VENTILATOR

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2 Claims. (Cl. 98—72)

This invention appertains to a novel device for facilitating the circulation of air, and more particularly to a power-operated ventilator.

One of the primary objects of my invention is to provide a ventilator of the natural draft type having incorporated therein a power-driven fan, which is so arranged and disposed relative to parts of the ventilator that a maximum amount of air can be moved in a minimum amount of time.

Another object of my invention is to provide a ventilator which is so constructed that no back-draft will be developed, irrespective of the direction of the wind.

Another salient object of my invention is to provide a ventilator embodying a casing or hood having a central air inlet, and an annular or circumferentially extending discharge outlet, and a multibladed fan of the so-called "turbine" or "squirrel cage" type, having its axis at the axial center of the ventilator casing or hood and its blades midway between the annular outlet, whereby the air will be drawn into the central part of the fan from the throat and forced outwardly equally in all directions from the ventilator through the annular discharge outlet.

A further object of my invention is the provision of an annular band disposed about the ventilator in spaced relation to the annular discharge outlet, whereby to provide a weather or wind guard for the ventilator and to permit the forming of a natural draft ventilator when the fan is not in use, the band extending a greater distance above the discharge outlet than below the outlet, whereby the greater portion of the air moved by the fan will be directed downwardly toward the roof of a building.

A further important object of my invention is to provide novel means for mounting the motor for the fan on the ventilator, whereby the motor will be unaffected by foul air or fumes from a building, and whereby the fan will be cooled by air taken from outside the ventilator.

A still further object of my invention is the provision of novel means for incorporating the fan and its casing with an air-heating device for a room or building, whereby to insure the maximum movement of air through the heater and room.

With these and other objects in view, the invention consists in the novel construction, arrangement, and formation of parts, as will be hereinafter more specifically described, claimed, and illustrated in the accompanying drawings, in which drawings:

Figure 1 is a vertical sectional view through my improved ventilator.

Figure 2 is a horizontal sectional view through the ventilator, taken on the line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a central, longitudinal sectional view, showing the principles of my invention incorporated with a heating device.

Referring to the drawings in detail, wherein similar reference characters designate corresponding parts throughout the several views, the letter V generally indicates my ventilator, which includes a tapering throat or flue 5 leading to the inlet opening or the casing 6 of the fan 7. The lower end of the throat or flue 5 is firmly secured to a base ring 8, whereby to facilitate the securing of the ventilator to a roof or cupola of a building.

The casing 6 for the fan 7 includes upper and lower companion sections 9 and 10. These sections have their adjacent edges provided with outstanding marginal flanges 11, through which extend holding bolts 12. The bolts rigidly secure the sections 9 and 10 in spaced relation to define an annular discharge outlet 13. By adjusting the bolts, the distance between the sections 9 and 10 can be varied, and thus the size of the annular discharge outlet 13 can be varied.

The extreme lower end of the section 9 has formed thereon a depending collar 14, which receives the upper end of the throat or flue 5, and the collar 14 and the upper end of the flue or throat 5 are rigidly secured together in any preferred manner. A cap plate 15 is rigidly secured to the upper section 10 and forms means for closing the upper section and for supporting the electric motor 16, which drives the fan 7.

The fan 7 is of the multiblade type, and of the character generally referred to as a "squirrel cage" or "turbine" fan. This fan 7 includes a top hub plate 17 from which depends a plurality of angularly extending vertically disposed blades 18. The lower edges of the blades are rigidly connected to a body ring 19. The axial center of the hub plate 17 is rigidly secured to the armature shaft 20 of the motor 16 in any preferred manner. By referring to Figure 1, it can be seen that the axial center of the fan is arranged at the axial center of the throat or flue 5, and that the ring 19 terminates adjacent to the upper edge of the throat or flue. The annular discharge outlet 13 is disposed midway between the blades of the fan.

By this construction and arrangement of parts, when the fan is in motion, the air to be vented

will be drawn up the throat or flue 5 into the center of the fan, and the blades of the fan will throw the air outward against the walls of the casing and through the discharge outlet 13 in all directions.

As the fan motor 16 is disposed above the ventilator, the motor is unaffected by the foul air or fumes exhausted from a building. In order to protect the motor against the elements, a housing 21 completely encloses the motor, and this housing is rigidly secured to the upper section 10 of the fan casing. To permit the cooling of the motor, the housing 21 is provided with an annular row of air inlet openings 22, and the cap plate 15 around the armature shaft 20 is provided with a discharge opening 23. The air being thrown out of the fan casing 6 through the discharge outlet 13 will create a draft through the housing 21, and the air flowing through the housing insures the cooling of the motor.

An annular band 24 surrounds the fan casing 6 in spaced relation to the annular discharge outlet 13, and this band forms an effective weather or wind guard. As illustrated, brackets 25 are employed for connecting the band to the casing 6, and these brackets can be held in place by the bolts 12. Attention is directed to the fact that the band 24 extends a greater distance above the outlet 13 than below the outlet, and hence the major portion of the air discharged from the outlet will be directed downward against the roof of a building.

The shape of the throat or flue 5, the casing 6, and the band 24 are such as to form a natural draft ventilator when the fan is not being used, and, obviously, the rush of air past the ventilator will create a partial vacuum or suction therein.

I lay great stress on the fan 7 and the position thereof in the casing 6, as by this construction and arrangement of parts a large quantity of air can be exhausted from a building in a minimum amount of time without the employment of a large, cumbersome expensive motor.

I can use the construction and arrangement of the fan to advantage in unit or like heaters, and in Figure 3 I have shown my invention incorporated with such a heater.

This heater is generally indicated by the reference character H, and includes an inverted

bell-shaped body 30, which can be suspended from the ceiling of a room by the use of suitable brackets 31. The lower end of the bell-shaped body 30 is provided with a depending outlet neck 32, which leads axially into the casing 33 for the multibladed fan 34. This casing 33 and the fan are similar to the casing 6 and the fan 7 illustrated in Figures 1 and 2. Hence, the casing 33 includes companion upper and lower sections 35 and 36 held in spaced relation by 10 bolts 37 to provide an annular discharge opening 38. The lower section 36 is closed by a cap plate 39, which supports the motor 40 for the fan. A suitable heater is arranged in the body 30, and, as shown, this heater is of the electric type.

In use of this form of my invention, the air is drawn from the top of the room into the body 30 by the fan 34. This air is pulled past the heater 41 and into the fan casing 33, where the same is discharged in all directions out of the annular outlet 38.

Changes in details may be made without departing from the spirit or the scope of my invention, but what I claim as new is:

1. In an air circulating device, a fan casing 25 having an annular discharge outlet and an axially disposed inlet, a multibladed power-driven fan disposed in said casing having its axial center coinciding with the axial center of the air inlet, the annular outlet being disposed midway 30 between the ends of the blades, and an annular band disposed around and in spaced relation to said outlet, said band entirely surrounding the outlet, but extending a greater distance above the outlet than below said outlet.

2. A ventilator comprising, a tapered flue leading from a building, a casing secured to and communicating with said flue having an annular discharge outlet, a multibladed fan disposed axially within said casing and directly above the 40 flue, said annular discharge outlet being disposed midway between the ends of the blades of the fan, and an annular band secured to the casing and disposed in spaced relation to the discharge outlet and entirely surrounding the same, the 45 band extending a greater distance above said outlet than below said outlet.

THOMAS L. ROBERTS.