Sept. 3, 1935. A. J. LA VERGNE 2,013,244

VENTILATOR

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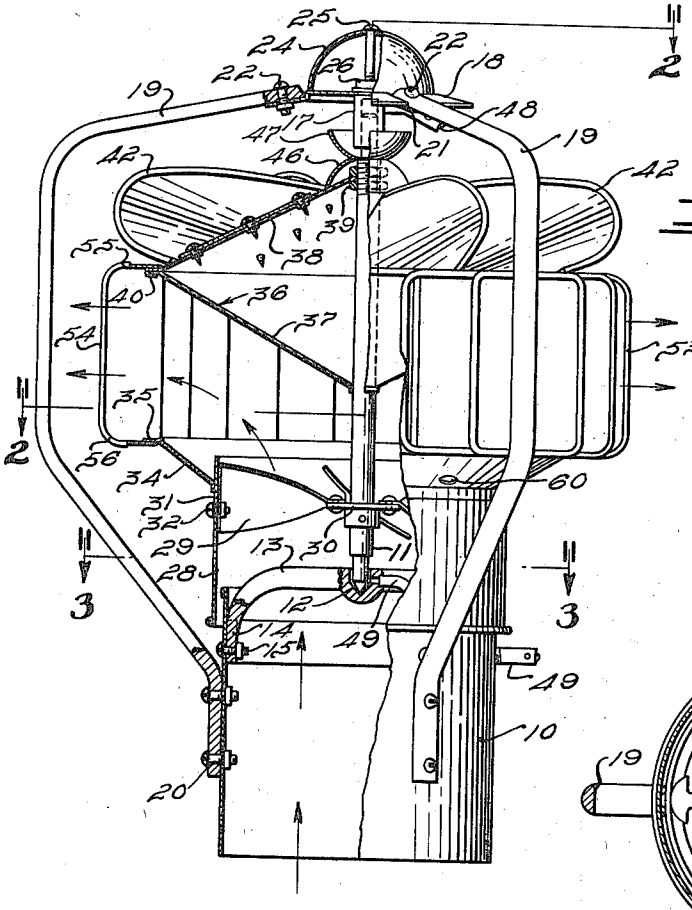

Fig. 1.

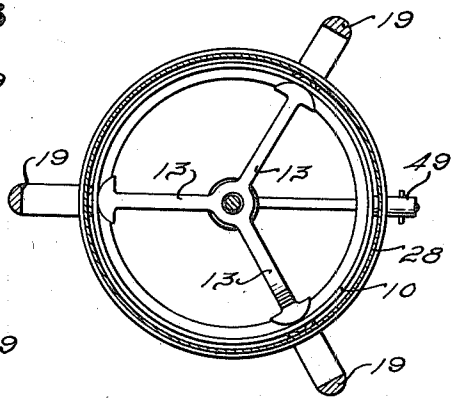

Fig. 3.

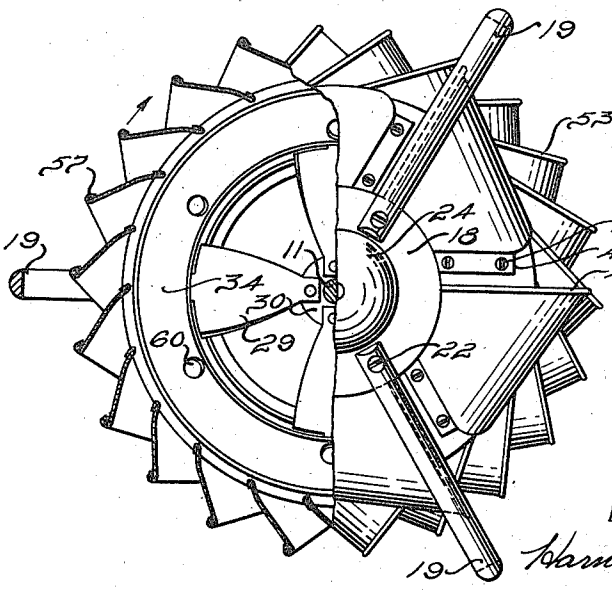

Fig. 2.

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VENTILATOR

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8 Claims. (Cl. 98—72)

The invention relates to ventilators and it has particular relation to a ventilator of the rotary type.

One object of the invention is to provide an inexpensive ventilator construction of the rotary type which can be rotated very easily by air currents and which creates a large suction for causing removal of impure air from rooms or the like.

Another object of the invention is to provide an improved ventilator wherein water is positively prevented from passing through the ventilator and downwardly through the stack and into the space from which the impure air is being removed.

Other objects of the invention will become apparent from the specification relating to the drawing and from the claims hereinafter set forth.

For a better understanding of the invention reference may be had to the accompanying drawing forming a part of the specification wherein,

Fig. 1 is an elevational view, partly in cross section, illustrating a ventilator constructed according to one form of the invention.

Fig. 2 is a cross sectional view taken substantially along the line 2—2 of Fig. 1.

Fig. 3 is a cross sectional view taken substantially along the line 3—3 of Fig. 1.

Referring to Fig. 1, the ventilator illustrated includes a lower stationary stack portion 10 adapted to be mounted in a stationary position and in communication with a lower room or space to be ventilated. A rotary shaft 11 projects above the stack 10 and at its lower end has a point bearing engagement 12 with a tripod 13 mounted in a ring 14 that in turn is secured by bolts 15 to the side wall of the stack. The upper end of the shaft is journalled in a sleeve bearing 17 that projects through and is secured to a plate 18 and the plate is supported by three bars 19 that are secured to the stack by bolts 20. The upper ends of the bars are disposed in recesses 21 formed in the plate and are secured to the latter by bolts 22. A covering dome 24 is releasably fastened on the upper side of the plate 18 by means of a bolt 25 which is threaded into a nut or head 26 secured to the upper end of the bearing 17. From this it will be appreciated that the shaft 11 is supported at its lower end by a point bearing 12 and therefore has maximum freedom of rotation while the upper end of the shaft is guided in a sleeve bearing which holds it in position.

The ventilator also includes a cylindrical sleeve 28 partially telescoping over the upper end of the stack 10 and which has sufficient clearance relative to the stock to permit rotation of the sleeve around the stack. Within the sleeve 28 a fan 29 is provided which comprises circumferentially separated blades secured at their inner ends to a ring 30 that in turn is secured to the shaft 11. The outer ends of the blades have flanged over-lips 31 that are secured to the sleeve by bolts.

At the upper end of the sleeve, an annular, conically shaped plate 34 is secured thereto and the lower edge of the plate has an annular axially directed flange which is soldered or otherwise secured to the sleeve at a point substantially spaced from the upper edge thereof. This arrangement provides a trough around the outside of the upper end of the sleeve. At its upper edge, the plate 34 terminates in an outwardly directed flange 35 which is employed for securing a series of vanes in place as will hereinafter be described.

The shaft 11 at its upper end and below the bearing 17, has an annular housing 36 secured thereto and this housing comprises a lower and upwardly open, conically shaped deflector 37 and a similar upper, but inverted member 38. Each of these members has an opening at its center for receiving the shaft 11 and the housing is locked to the shaft by means of nuts 39 threaded on the latter and engaging upper and lower sides of the member 38. At their outer and adjacent edges, the members 37 and 38 have short radial flange portions that are disposed in abutting relation and the flange portion on one of the members is folded over into embracing relation to the flange portion on the other member as indicated at 40, so as to provide a positive connection.

Circumferentially spaced and ear-shaped blades 42 are provided on the upper side of the conical member 38 and as best shown by Fig. 2 the blades are secured to the latter by means of flange portions 43 which are secured thereto by bolts 44. These blades are similarly disposed so as to provide a primary rotary means for the ventilator and the open edge of each blade is curled as indicated at 45 and preferably a wire is disposed within the curled edge for maintaining its shape as well as avoiding a sharp edge.

That portion of the shaft entering the bearing 17 is of slightly smaller diameter and at the lower end of this smaller portion oppositely open cup elements 46 and 47 are provided which are mounted on the shaft and secured thereto such as by soldering or welding. The lower cup serves to cover the upper end of the conical member 38 and prevent any water passing therethrough along the shaft and also serves to improve the

appearance of the ventilator. The upper cup 47 acts to catch any grease that may flow downwardly from the bearing 17. Grease is injected into the upper end of the bearing 17 by means of a conventional grease fitting 48 communicating with the interior of the bearing above the end of the shaft and which extends to a point suitably adapted for greasing purposes. In this connection it may be stated also that the lower end of the shaft and the bearing 12 are suitably greased by means of a grease fitting 49 that extends through the side wall of the stack 10.

A series of vertically disposed vanes 53 are provided between the flanges 35 and 40 and each of the vanes is disposed in a plane directed at an angle to a radius extending thereto. Each of the vanes comprises a vertically extending base portion 54 and in-turned ends or legs 55 and 56 which respectively overlap the flanges 35 and 40 and as shown by Fig. 2 the legs 55 and 56 on one vane overlap the legs of the vane at the side thereof opposite the direction of rotation or at the counter-clockwise side, and the overlapping portions are soldered or otherwise suitably secured together and to the flanges. These overlapping legs fit snugly one over the other and not only increase the stability of the vane arrangement but at the upper ends of the vanes jointly provide a closed upper end wall which prevents water draining off of the upper cone from flowing between the vanes. The trailing or lagging edges of the vanes preferably are curled around a wire 57 so as to avoid a sharp edge and at the same time to increase the rigidity of the edge of the vane, while the leading edge of the vane preferably is reversely folded to increase its rigidity. It will be appreciated that this method of constructing the blades avoids vibration during operation of the ventilator.

It will be apparent from Fig. 2 that when the ventilator is turning in the direction of rotation indicated, the inner or leading edges will cut into the air inside the ventilator and tend to draw it outwardly between the vanes. Some slight interference may be present at one side of the ventilator depending upon the direction of the wind but the larger portion of the vanes will have the wind directed past them without blowing thereinto and consequently most of the vanes serve to evacuate the air from within the ventilator.

Moreover it will be apparent that water, such as that resulting from rain, normally will not enter the ventilator between the vanes owing first to their arrangement and secondly owing to the rapidity of rotation of the ventilator and in any event, any moisture entering between the vanes will drain into the trough previously mentioned. For removing any water that may be deposited in the trough, the latter is provided with circumferentially spaced openings 60 that permit the water to drain at the outer side of the sleeve 28.

During operation of the ventilator, the blades 42 at the top thereof serve as the primary means for causing the ventilator to rotate as the wind blows. In an auxiliary way, a few of the vanes at one side of the ventilator will catch the wind and assist in causing the ventilator to rotate, but largely air is evacuated from the stack through the vanes. The fan 29 serves to positively draw the air upwardly through the stack end and as this air passes through the fans it is deflected by the lower cone 37 and outwardly through the vanes. The action of the vanes largely is to create a lower pressure within the ventilator and consequently assist the fan in drawing air upwardly through the stack. The ventilator will operate very easily and turn with the slightest movement of the wind and under ordinary wind velocity, the ventilator will rotate at a seemingly high rate of speed. In actual use the ventilator has proved to be very efficient in withdrawing impure air from rooms or the like and causing a high degree of circulation.

Although only one form of the invention has been illustrated and described in detail, it will be apparent to those skilled in the art that various modifications may be made without departing from the scope of the appended claims.

I claim:

1. A ventilator comprising a lower stationary stack portion, a rotary sleeve projecting above the stack portion and telescopically receiving the upper end of the latter, a rotary shaft projecting vertically through and above the sleeve bearing means secured to the stack portion and receiving the lower end of the shaft, a fan within the sleeve and secured at its center to the shaft and at its periphery to the sleeve, a hollow housing secured to the shaft above the sleeve and comprising a lower, upwardly open cone and an upper, downwardly open cone which are joined at the adjacent peripheral edges, vertically disposed and circumferentially separated vanes secured at their upper ends to the joined peripheral edges of the conical housing, an annular, upwardly and outwardly flared plate member secured to the upper end of the sleeve and to the lower ends of the vanes, cup shape blades on the upper side of the upper cone, an upper bearing for the shaft, and bracket means secured to the stack and extending vertically past the vanes and cup shape blades for holding the bearing in place.

2. A ventilator comprising a lower stationary stack portion, a rotary sleeve projecting above the stack portion and telescopically receiving the upper end of the latter, a rotary shaft projecting vertically through and above the sleeve bearing means secured to the stack portion and receiving the lower end of the shaft, a fan within the sleeve and secured at its center to the shaft and at its periphery to the sleeve, a hollow housing secured to the shaft above the sleeve and comprising a lower, upwardly open cone and an upper, downwardly open cone, which terminate in overlapping, radial flange portions at their adjacent peripheral edges, an annular, upwardly and outwardly flared member on the upper end of the sleeve and terminating at its upper edge in a substantially radial flange, vertical vanes extending between such flanges and having inwardly turned ends overlapping and secured to said flanges respectively, cup shape blades on the upper side of the upper cone, an upper bearing for the shaft, and bracket means secured to the stack and extending vertically past the vanes and cup shape blades for holding the bearing in place.

3. A ventilator comprising a lower stationary stack portion, a rotary sleeve projecting above the stack portion and telescopically receiving the upper end of the latter, a rotary shaft projecting vertically through and above the sleeve bearing means secured to the stack portion and receiving the lower end of the shaft, a fan within the sleeve and secured at its center to the shaft and at its periphery to the sleeve, a hollow housing secured to the shaft above the sleeve and comprising a lower, upwardly open cone and an upper, downwardly open cone, which terminate in overlapping, radial flange portions at their

adjacent peripheral edges, an annular, upwardly and outwardly flared member on the upper end of the sleeve and terminating at its upper edge in a substantially radial flange, vertical vanes extending between such flanges and having inwardly turned ends overlapping and secured to said flanges respectively, each of said vanes being disposed in a plane directed at an angle to a radius extending thereto and the inwardly turned ends on each vane being disposed in overlapping relation to the inwardly turned ends of the adjacent vane, cup shape blades on the upper side of the upper cone, an upper bearing for the shaft, and bracket means secured to the stack and extending vertically past the vanes and cup shape blades for holding the bearing in place.

4. A ventilator comprising a shaft, a sleeve secured to the lower end of the shaft, an upper housing on the shaft and comprising a lower upwardly open cone and an upper, downwardly open cone, said cones at their adjacent peripheral edges having substantially radial and overlapping flanges, one of which is folded around the edge of the other in embracing relation thereto to hold the cones firmly connected, a sleeve on the lower end of the shaft and terminating in a substantially radial flange at its upper edge, and circumferentially arranged vanes extending vertically between the flanges and disposed in planes directed at an angle to radii extending thereto respectively, each blade terminating at its ends in inwardly directed legs secured to and overlapping the flanges with the legs on one vane overlapping the legs on the vane next thereto.

5. A ventilator comprising a shaft, a sleeve secured to the lower end of the shaft, an upper housing on the shaft and comprising a lower upwardly open cone and an upper, downwardly open cone, said cones at their adjacent peripheral edges having substantially radial and overlapping flanges, one of which is folded around the edge of the other in embracing relation thereto to hold the cones firmly connected, a sleeve on the lower end of the shaft and terminating in a substantially radial flange at its upper edge, and circumferentially arranged vanes extending vertically between the flanges and disposed in planes directed at an angle to radii extending thereto respectively, each blade terminating at its ends in inwardly directed legs secured to and overlapping the flanges with the legs on one vane overlapping the legs on the vane next thereto, each vane having a wire along its trailing or outer edge, and the edge of the vane being folded around the wire to provide a rounded and rigid edge.

6. A ventilator comprising a lower and stationary stack portion, a rotary shaft projecting vertically above the stack, bearing means in the stack portion for receiving the lower end of the shaft, a sleeve secured to the shaft and telescopically projecting over the upper end of the stack, an outwardly flared and annular ring plate secured to the upper end of the sleeve and below its upper edge to provide a trough around the outer side of the sleeve, a housing secured to the upper end of the shaft and comprising an upwardly open lower cone and an upper downwardly open cone joined at their adjacent edges, vertically extending vanes extending between the joined edges of the cones and the upper edge of the ring plate and being disposed in planes directed at an angle to radii extending thereto so that each blade has its trailing edge circumferentially spaced from its leading edge, and means comprising openings in the base portion of the trough for allowing water to drain to the exterior of the stack.

7. A ventilator comprising a lower stack portion, a rotary sleeve projecting above the stack portion and telescopically receiving the upper end of the latter, a shaft projecting vertically through and above the sleeve bearing means secured to the stack portion and receiving the lower end of the shaft, a fan within the sleeve and secured at its center to the shaft, a hollow housing secured to the shaft above the sleeve and comprising a lower, upwardly open cone and an upper, downwardly open cone which are joined at their adjacent peripheral edges, vertically disposed and circumferentially separated vanes secured at their upper ends to the peripheral edges of the conical housing, upwardly and outwardly flared means extending from the upper end of the sleeve and secured to the lower ends of the vanes, and presenting a substantially closed wall, blades on the upper side of the conical housing, an upper bearing for the shaft, and bracket means secured to the stack and extending past the vanes and blades for holding the upper bearing in place.

8. A ventilator comprising a lower stack portion, a rotary sleeve projecting above the stack portion and telescopically receiving the upper end of the latter, a shaft projecting vertically above the sleeve, bearing means on the stack for supporting the lower end of the shaft, an annular, upwardly and outwardly directed wall member on the upper end of the sleeve and providing an upwardly open trough around the sleeve for preventing water entering the sleeve, a circumferentially arranged series of vanes secured to and projecting upwardly from the outer portion of the wall member, means connecting the upper ends of the vanes to the shaft, and means comprising an opening in the wall member for allowing water therein to drain to the exterior of the sleeve and stack.

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