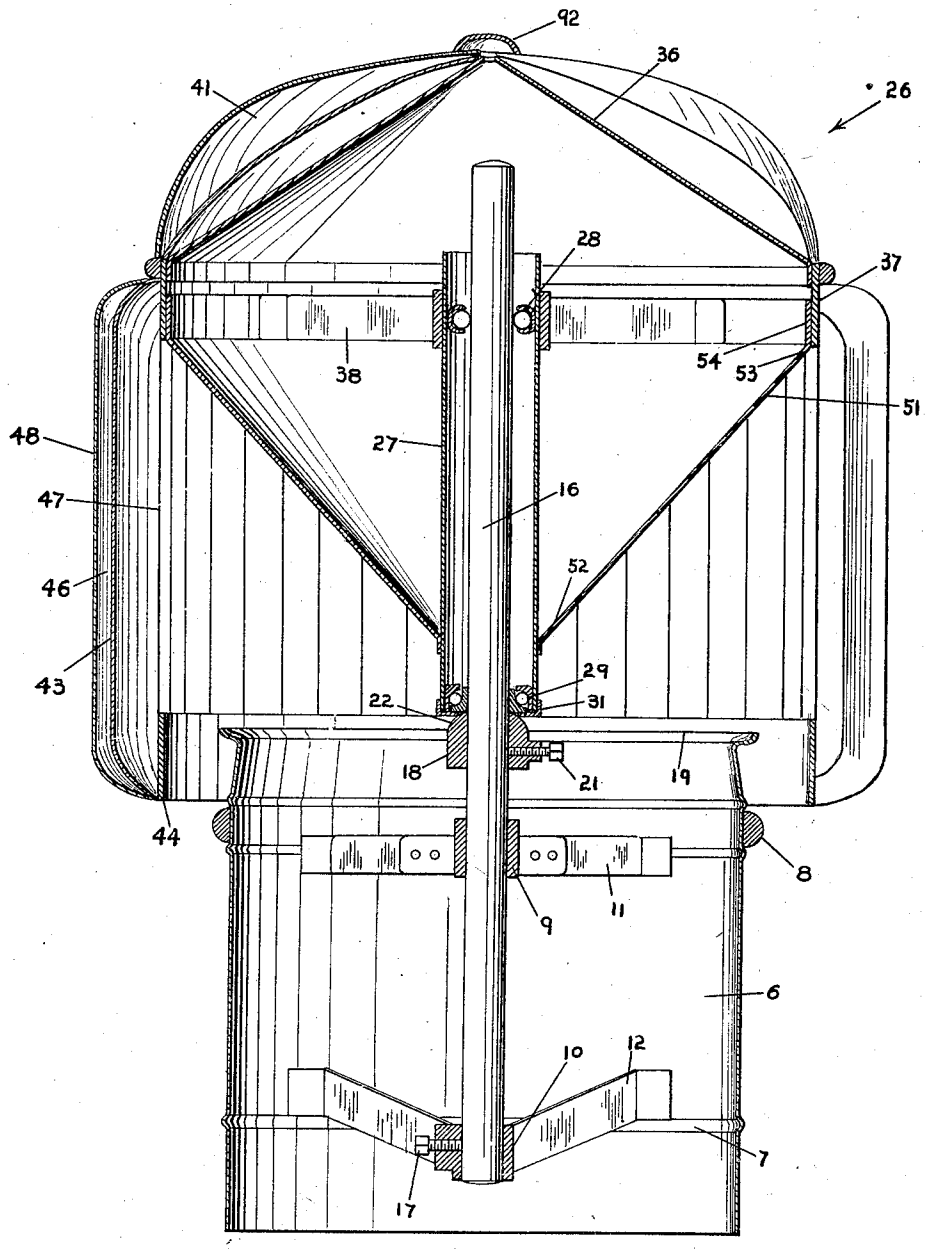
May 10, 1932. V. H. MEADOWS 1,857,762

ROTARY VENTILATOR

Filed Oct. 30, 1929



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Patented May 10, 1932 1,857,762

UNITED STATES PATENT OFFICE

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ROTARY VENTILATOR

Application filed October 30, 1929. Serial No. 403,523.

This invention relates to heating and ventilating, and has for an object the provision of an improved rotary ventilator.

A more detailed object is the provision of a rotary ventilator including a rotor head provided with a pluraltiy of driving blades adapted to impart rotation to the head by energy derived by air currents, and also having a plurality of draft vanes adapted to create a draft within the ventilator pipe upon the end of which the device of the present invention is mounted, by withdrawing the air or other gases from the associated end of the ventilator pipe, and discharging this withdrawn air laterally from the ventilator.

Another object is the provision of a rotary ventilator as described, which is also provided with a deflector plate capable of cooperating with the draft blades to increase their efficiency by acting as a baffle capable of altering the direction of the air leaving the ventilator pipe, into its new direction wherein it moves substantially perpendicularly to the direction in which it moved while within the ventilator pipe. In this manner, the deflector plate is capable of substantially eliminating eddy currents which so seriously hamper the efficient operation of ventilators not so equipped.

A further object is the provision of a rotary ventilator of the class described, provided with anti-friction bearings interposed between the rotor head and its supporting structure; with the result that wind and other air currents of very low velocity, are capable of imparting rotary movement to the head.

A still further object is the provision of a rotary ventilator as described, which is of an exceedingly simple nature, and which consequently, is relatively inexpensive to manufacture, and yet which is capable of operating with a high degree of efficiency in carrying out the functions for which it was designed.

The invention possesses other objects and advantageous features, some of which, with those enumerated, will be set forth in the following description of the invention's particular embodiment which is illustrated in the drawing accompanying and forming a part of the specification.

Referring to the drawing:

The figure is a vertical, medial, sectional view taken through a rotary ventilator constructed in accordance with the principles of the present invention.

Specifically describing the ventilator in the most practical embodiment thereof of which I am at present aware, it comprises a sleeve 6 of suitable dimensions to permit its being attached to the outer end of a ventilator pipe (not shown) in such a manner as to form a continuation thereof. The sleeve 6 may be provided with suitable beads 7 extending circumferentially thereof, and a binding ring 8 capable of adding materially to the inherent rigidity of the sleeve 6.

Upper and lower sockets 9 and 10 are positioned axially adjacent the upper and lower ends thereof respectively, by means of a plurality of radiating arms 11 and 12 respectively, one end of each arm being rigid with the inner wall of the sleeve 6, and the other end of each arm being rigidly connected to one of the sockets 9 or 10, as the case may be. In order to position the sockets 9 and 10 as far apart as practicable, the arms 12 associated with the lower socket 10, are deflected downwards at an angle with the axis of the sleeve 6, as clearly shown upon the figure.

A central shaft 16 is rigidly mounted within the sockets 9 and 10, so as to extend axially of the sleeve 6 and the ventilator pipe upon which it is mounted, the shaft 16 extending from the outer end of the sleeve 6. The parts are so proportioned that the shaft is slidable within the sockets 9 and 10, so as to effect proper adjustment thereof; and one of the sockets is provided with a set screw 17 whereby the shaft 16 may be rigidly clamped in selected position.

A collar 18 is rigidly secured upon the shaft 16 slightly above the upper socket 9 and preferably within the plane of the outer end 19 of the sleeve 6, a set screw 21 or its equivalent being employed to rigidly clamp the collar in adjusted position. Preferably the upper face 22 of the collar 18 is rounded into substantially conical configuration.

A rotor head indicated in its entirety at 26, is revolubly mounted upon the shaft 16. This rotor head 26 comprises a central tube 27 having anti-friction bearings 28 and 29 secured therein adjacent the upper and lower ends thereof respectively. Whereas the bearings 28 and 29 may be of conventional design, I prefer that the upper bearings 28 be a radial bearing, whereas the lower bearing 29 should be a thrust bearing capable of supporting the weight of the rotor head 26 upon the upper face 22 of the collar 18. A ferrule 31 or its equivalent, may be secured to the lower end of the tube 27, to retain the parts of the bearing 29 against inadvertent displacement during assembly of the device, or at any time that the rotor head 26 is lifted from its position upon the shaft 16.

A conical top plate 36 closes the outer end of the rotor head 26, and is provided with a peripheral flange 37 whereby the top plate 36 is rigidly mounted upon the central tube 27 through the expedient of a plurality of radiating arms 38, each of which is rigid with the inner face of the flange 37 at its outer end, and with the central tube 27 at its inner end. A plurality of driving blades 41 are secured upon the upper face of the conical top plate 36, these blades 41 being concave upon their under surfaces and attached to the top plate 36 in angularity therewith. The blades 41 are secured to the top plate 36 so as to extend radiallly in respect thereto, and each is secured thereto along that edge thereof which leads during rotation of the head 26, in that direction which will cause a draft of air to be drawn upwards through the sleeve 6 and ventilator pipe upon which it is mounted. It is apparent therefore, that the trailing edges of the plates are elevated above the top plate 36; with the result that when air is in motion past the ventilator of the present invention, it will become caught under the elevated trailing edges of the blades 41 upon one side of the head 26, regardless of the direction in which the air is moving. The air striking the blades upon the opposite side, will merely impinge against the forward faces thereof which incline upwards away from the direction of motion of the air, with the result that less rotational energy is received from the moving air on this side, than on the side of the ventilator where the wind catches under the elevated edges. Consequently, rotational movement will be imparted to the entire head 26. All the blades 41 are joined at the center of the head 26 by means of a more or less ornamental knob 42 which serves to add strength to the entire structure.

A plurality of draft vanes 43 extend downwards from the flange 37. Each vane 43 is rigidly attached at its upper end to the flange 37, and at its lower end to a ring 44 preferably of the same diameter as the flange 37, and in alignment therewith. Each vane 43 is disposed in angularity with a radius of the head 26 drawn from the axis of rotation to that vane, the leading edge of the vane being further from the axis than the trailing edge. Furthermore, the vanes 43 are so separated that there is a material space 46 between each pair of adjacent vanes 43; with the result that as the head 26 rotates, the leading or inner edges 47 thereof will cut into the air inside the head 26, and due to the inertia of the air thus engaged, which tends to hold it against rotation with the head, this air caught by the moving vanes 43, will be impelled radially outwards until it has passed the trailing or outer edges 48 of the vanes 43, passing through the spaces 46 between adjacent pairs of vanes 43. Obviously, this will create an area of low pressure inside the head 26, which will be conducive to a development of draft within the sleeve 6 and the ventilating pipe upon which it is mounted so as to draw air or other gases therefrom, to be discharged radially outwards from the rotating head 2.

Obviously, the vanes 43 also assist in imparting rotation to the head 26 by energy derived from air moving therepast, because air moving against the vanes 43, will be caught by the outermost edges 48 of the vanes 43 upon one side of the head 26, and merely deflected by the inclined outer surface of the vanes 43 upon the opposite side. Whereas the wind thus entrapped by the vanes 43, will tend to flow into the head 26, and counteract to a certain extent, the production of a draft of air outwards through the sleeve 6, it should be remembered that the wind will engage only a relatively few of the vanes 43, i. e., only two or three of the vanes 43 which open toward the direction from which the wind is approaching, whereas all of the vanes 43 throughout the entire periphery of the head 26, serve to pump the air outwards during rotation of the head.

A conical deflector 51 is disposed inside the head 26, and flares upwards away from the sleeve 6. In other words, the lower end 52 which is secured to the central tube 27, is lower than the larger upper end 53 which is provided with a flange 54 secured rigidly inside the flange 37. This conical deflector 51 cooperates with the vanes 43 in drawing air outwards from the sleeve 6, inasmuch as it facilitates the deflection of the moving column of air as it changes direction. In moving through the sleeve 6, the air moves vertically upwards, whereas in order to leave the head 26, this air must be changed in its direction of movement so that it flows between the vanes 43 in a substantialy horizontal path. If the air rising through the sleeve 6, were permitted to flow upwards and come into contact with the relatively dome-shaped interior surface of the top 36, or with a flat partition

across the head 26, eddy currents would be set up which would materially interfere with the unrestricted flow of air therethrough. Consequently, it is believed readily apparent that the presence of the conical deflector 51, will assist in altering the direction of movement of the air, with a material reduction or absolute elimination of eddy currents, and thus materially increase the efficiency of the entire structure.

It is to be understood that the details of the invention as herein disclosed, are subject to alteration within the spirit or scope of the appended claim.

I claim.

A rotary ventilator, comprising a shaft, means for mounting said shaft axially of a ventilator pipe and extending from an end thereof, and a rotor head comprising a sleeve journaled on said shaft, a top plate rigid with said sleeve and having a peripheral flange, a plurality of driving blades secured to said top plate and arranged radially of said rotor head and angularly with respect to said plate, a plurality of substantially vertical draft vanes rigid at their upper ends with said said flange, a ring secured to all of said vanes adjacent their lower ends, said ring being of substantially the same diameter as said plate and said vanes being substantialy straight and disposed substantially vertically, each of said vanes being disposed in angularity with a radius of said head drawn through the vane, an a conical deflector disposed inside said head and tapering downward and inwards to said sleeve from adjacent the upper ends of said vanes.

In testimony whereof I have signed my name to this specification.

VAUGHN H. MEADOWS.