Feb. 23, 1932. E. L. ANDERSON 1,846,379

APPARATUS AND METHOD OF CONTROLLING FANS

Original Filed March 29, 1929

Fig. 1.

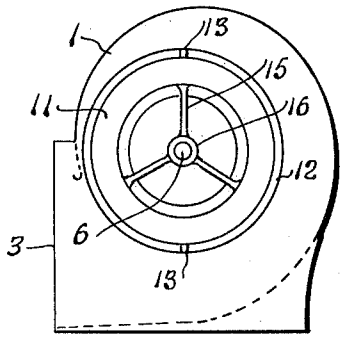
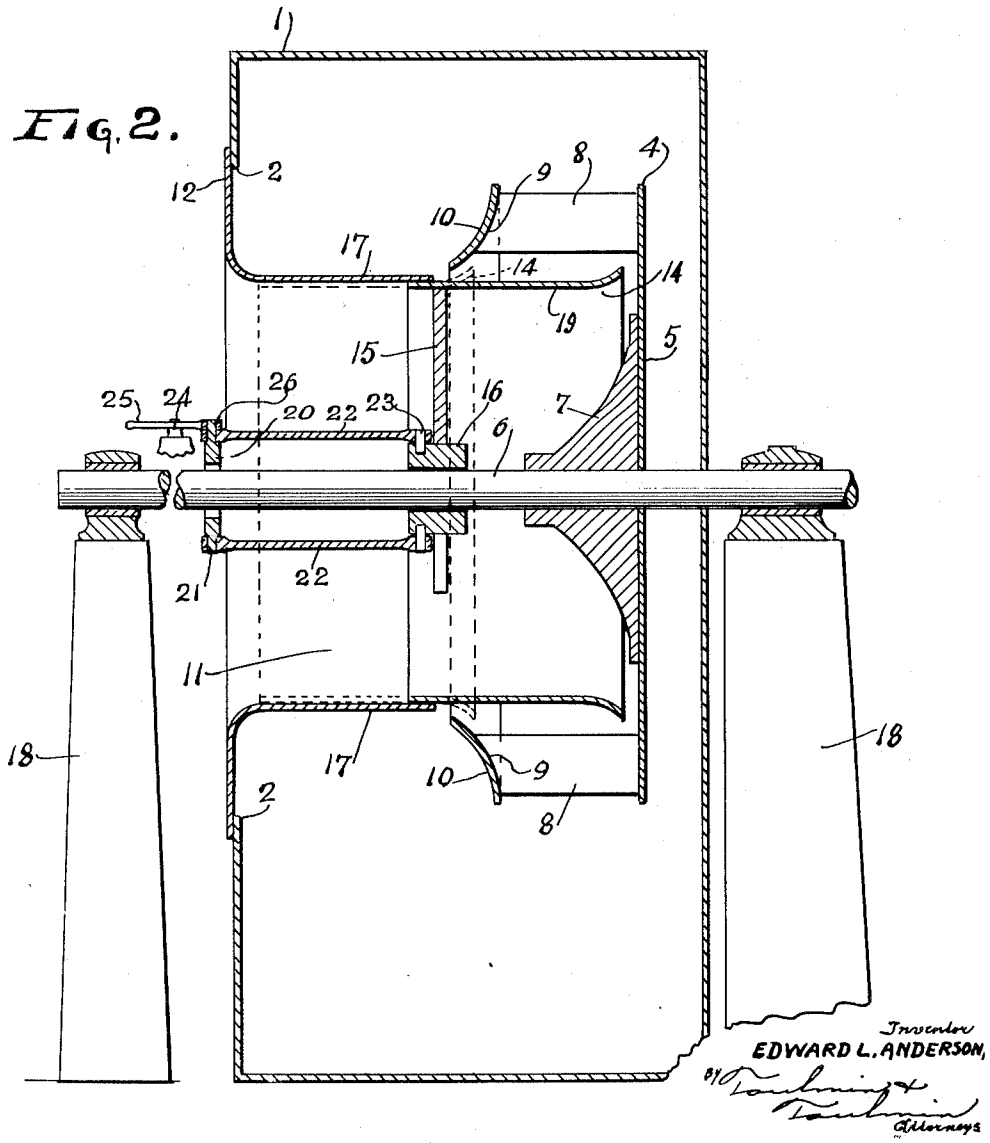


Fig. 2.



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APPARATUS AND METHOD OF CONTROLLING FANS

Original application filed March 29, 1929, Serial No. 351,080. Divided and this application filed June 12, 1930. Serial No. 460,619.

This application relates to improvements in rotary fans, and is a division of my application Serial No. 351,080, filed March 29, 1929.

It more particularly relates to improvements in the fan wheel and in the passageway for conducting air into the fan. It specifically relates to means for adjusting the passageway leading into the fan in such a way as to control and regulate the admission of air to the fan.

It is a particular object of this adjustment of the passageway to control the amount of air admitted to the fan and the direction the air takes as it is being admitted to the fan. It is also an object of this adjustable passageway to so control the entrance of air into the fan that the amount of air expelled from the fan through the exit will be controlled and regulated. It is also an object of this adjustable passageway to control and regulate and prevent the formation of eddies and cross currents in the fan blades in the operation of the fan.

From the foregoing, it is obvious that one of the objects of this invention is to provide a fan that will control the admission and the exit of air from the fan housing independent of any variation in the speed of the fan and independent of any change in the motive power used for operating the fan. There is thus provided a convenient, cheap and simple means for controlling the delivery of air from a fan which is operated by a constant speed motor.

For the purpose of illustration there is shown in the accompanying drawings preferred embodiments of this invention.

Referring to the drawings:

Figure 1 is a side elevation showing the fan casing and the air inlet passageway; and

Figure 2 is a vertical section through the casing, the fan and the adjustable passageway.

Referring to the drawings in detail, the numeral 1 is used to designate the fan housing, which is scroll shaped, and has on one side thereof a circular opening 2. It also has a suitable outlet opening 3 at right angles to the inlet. Rotatably mounted within the housing is a fan wheel 4, which has a rear disk member 5, which is suitably supported near one end of the shaft 6.

On the end of the shaft 6 and in engagement with the disk 5 is a cone member 7 which is rigidly attached to the shaft and the rear disk and forms part of the fan wheel. On the outer periphery of the disk 5 is a series of radially arranged blades 8, which serve as fan blades. While these blades are here described as being radially arranged, the arrangement of the blades may be varied so as to accomplish the better and more efficient delivery of air. The ends of the blades remote from the disk 5 are beveled, as indicated by the numeral 9, and have attached thereto a shroud member 10. This shroud member extends slightly beyond the lateral edges of the blades, and one edge of the shroud is adapted to extend over the inner end of the conical inlet passageway.

The conical inlet passage is indicated by the numeral 11, and fits within the circular opening in the side of the casing and has an outwardly extending flange 12 thereon which contacts with the face of the housing adjacent the opening. For the purpose of moving and adjusting the conical shaped passage there are hand holds 13. The inner end of the conical shaped passageway is flared out, as indicated by the numeral 14. This inner-flared-out part may be integral with or separate from and united with the other part of the passageway by any suitable means. In the present instance it is shown to be composed of a separate piece, suitably attached to the other part of the passageway. Extending from the inner flared section 14 are radially extending arms 15, which at their inner ends are attached to the hub member 16, which has a hole therethrough for the reception of the shaft 6. This shaft 6 is supported by supporting members 18.

In adjusting the conical shaped passageway the hand holds 13 are taken in the hands and the conical shaped passageway is moved as a whole. The dotted lines of Figure 2 show the passageway in open position with a large annular opening between the inner end

of the passageway and the shroud, while in closed position the restricted part of the shroud extends over the flared end of the passageway so that any air passing from the housing through the opening will enter substantially in the direction of the air moving in the fan, thereby producing no eddies and cross currents, but when the passageway is drawn out the opening between the flared end of the passageway and the shroud is of such a nature that the air will pass through said opening rather than go through the fan, thereby retarding the action of the fan and the amount of air delivered from the fan.

In Figure 2 of the drawings, there is shown a means for controlling the admission of air to the fan. In this form the conical shaped passageway gives way to a fixed sleeve 17, which has a broad flange 12 which engages the side of the housing. Slidably mounted within the fixed sleeve is a slidable sleeve 19.

It will be noticed from an inspection of Figure 2 that the fixed sleeve does not extend all the way to the shroud member, there being left an annular space between the two. The inner end of the slidable sleeve is flared, as indicated by the numeral 14. This flared end of the slidable sleeve normally rests within the outer and reduced portion of the shroud, leaving between them a small annular opening for the passage of air from the housing into the wheel of the fan and out through the fan blades.

For the purpose of supporting the slidable sleeve there are radially arranged arms 15 extending from the inner surface of the sleeve to a hub member 16, which has an opening therethrough for the reception of the shaft 6. This shaft 6 is carried by the supports 18.

Slidably mounted upon the shaft 6 is a ring 20 which has stud members 21 projecting therefrom engaged by one end of a link 22, while the other end of the link engages pins 23 fitting within the hub member 16.

Mounted upon some suitable support, as indicated by the numeral 24, is a lever 25, one end of which fits over a projection on one of the studs 21, as indicated by the numeral 26. The lever 25 rocks around the point 24 as a pivot, and being so rocked moves the ring 20, the links 22 and the hub 16, thereby moving the slidable sleeve 19. As shown in Figure 2, the slidable sleeve is in the extreme righthand position, substantially cutting off all admission of air to the fan. In dotted lines in this figure is shown the sleeve in its extreme lefthand position, which allows for the free admission of air from outside of the housing into and through the fan, and at the same time provides space between the inner end of the sleeve and the shroud for the passing of air in order to prevent any eddies, cross currents and interference with the delivery of air from the fan.

It is also noted that the cone member 7, immediately at the rear of the fan wheel, serves to divide and give direction to the air as it enters the fan wheel so that there will be as little interference and cross currents in the as possible at this point.

I desire to comprehend within my invention such modifications as may be clearly embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a blower, a casing, a fan, an inlet passageway, means of adjusting the point of delivery with respect to the fan blades of the inlet air for controlling the volume of air making its exit from the fan, said means comprising a tubular member slidably mounted within a side inlet of said fan within the fan blades, and a Venturi throat on the inner end of said slidable member, a shroud on said fan of corresponding Venturi shape, said shroud and said slidable member being arranged in spaced relationship of varying degree for controlling the effect of the back pressure air passing therebetween which induces the flow of inlet air and the distribution thereof over the fan blades.

2. In a blower, a casing, an inlet passageway, a fan mounted to rotate in said casing having a plurality of blades whose longitudinal axes are parallel with said inlet passageway, and an air guiding member slidably mounted on the inner end of said inlet passageway adapted to be positioned in varying positions relative to said fan blades parallel to the axis thereof for varying the distribution of air thereover and the quantity of air delivered therefrom.

In testimony whereof I affix my signature.

EDWARD L. ANDERSON.