

June 14, 1932.

E. L. ANDERSON

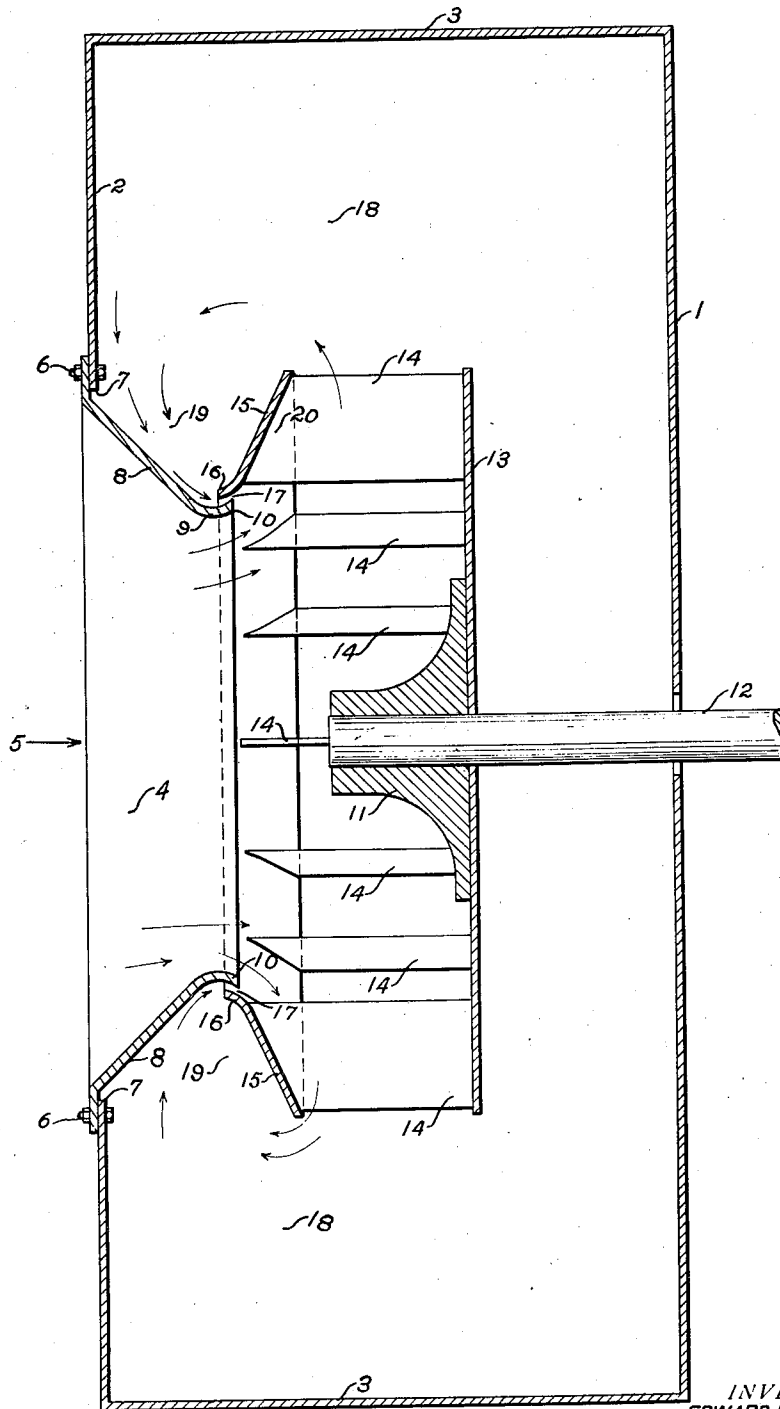
1,862,523

INDUCTION FLOW INLET FAN

Filed Oct. 28, 1929

2 Sheets-Sheet 1

FIG. 1.



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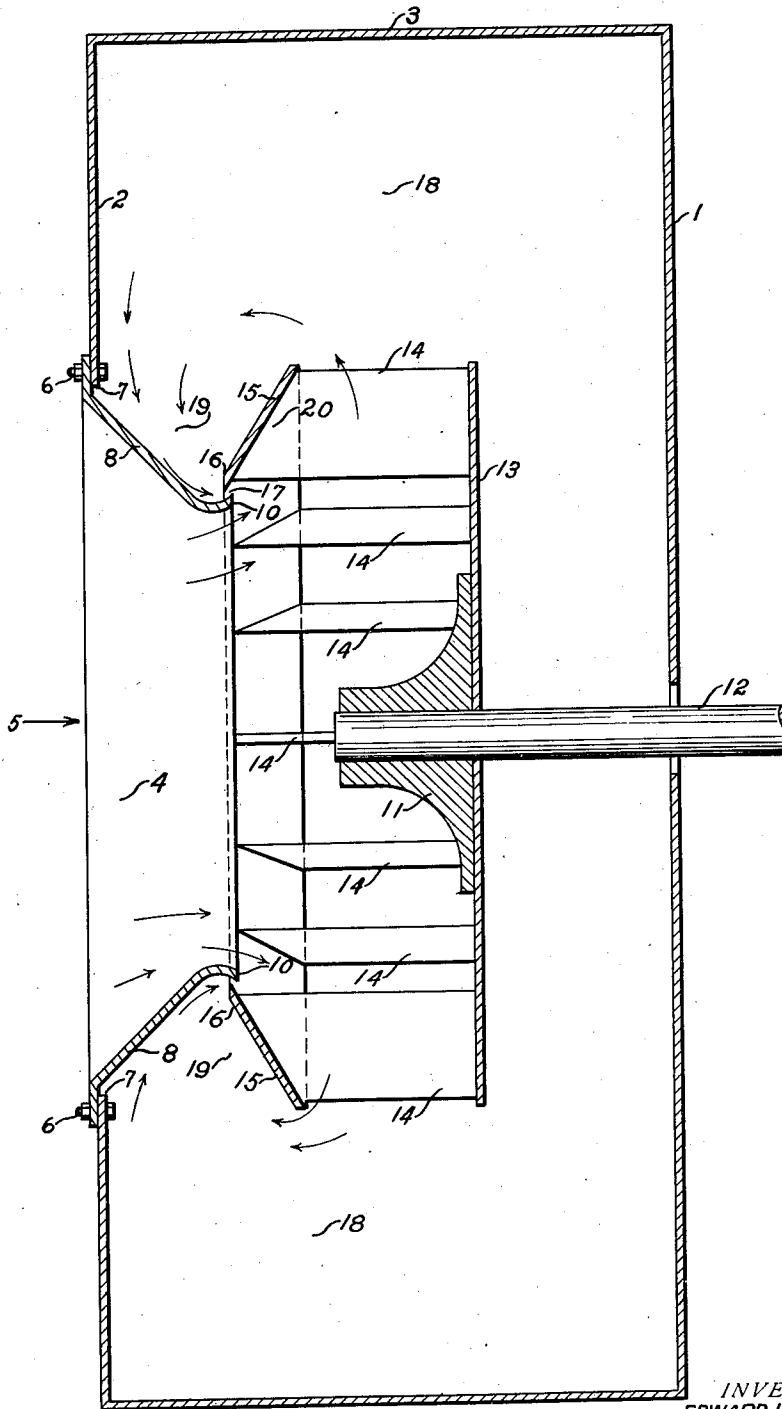
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FIG. 2.



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INDUCTION FLOW INLET FAN

Application filed October 28, 1929. Serial No. 402,883.

My invention relates to fans.

It is the object of my invention to provide such a construction that the internal pressure built up inside the fan will assist in drawing in air from outside of the fan and at the same time, will increase the efficiency of the fan by eliminating conflicting air currents and thereby increasing the effective area of the blades at or near the shroud of the wheel.

Heretofore, the leakage from the fan housing through the clearance gap between the inlet passageway of the housing and the fan wheel, due to the building up of pressure inside the housing, was either at right angles to the inflow of air from the inlet, or an angle greater than a right angle or an obtuse angle. Such a jet of air impinging upon the inflow air caused a change in direction of inflow air and prevented the inflowing air from evenly filling the root of the blade of the fan. This left an ineffective section of the fan blade in which, there being no air movement of great moment, unevenness of distribution across the root of the blade was caused with a consequent drop in the efficiency of the apparatus.

Such a condition further arose when the cross jet of air from the clearance gap between the inlet and wheel interrupted the flow of inlet air causing a sufficient leak of volume in the inlet side of the blade of the fan to permit of turbulence or reentry of the air.

It is the object of my invention to eliminate these conditions by providing such a construction so as to direct the air leakage, due to the necessary running clearance between the fan wheel and inlet, this air leakage being from the casing to the fan again in a direction parallel with the incoming air to induce the flow of incoming air. Therefore, I provide an injector action between the inside air and the outside air for inducing entrance of the latter into the fan and causing even distribution through the fan without turbulence.

The inlet shroud is so arranged that it can be detached from the casing and withdrawn bodily through the throat of the wheel

shroud without disassembly of the inlet passageway member.

Referring to the drawings:

Figure 1 is a section through the blower using a curved shroud on the wheel.

Figure 2 is a similar view using a straight shroud.

Referring to the drawings in detail, 1 is the rear wall of the fan casing, and 2 is the front wall. The numeral 3 designates the scroll side wall of the casing. The wall 2 is provided with an inlet vena contracta passageway member 4. This vena contracta inlet member defines a central air inlet passageway 5 which becomes the eye of the fan. The passageway 4 is detachably attached by the bolts 6 adjacent the edge 7 of the casing wall 2.

This inlet passageway member 4 forms a constricted mouth for the inlet of the air which has a wall 8 directed inwardly and laterally, a restricted curved throat 9 and a flaring inner end 10. The fan consists of a hub 11 mounted on the shaft 12 with a back plate 13 supporting a plurality of blades 14. These blades carry an angular shroud 15 that is directed inwardly and outwardly from the hub of the fan, (or if desired, a straight shroud normal to shaft) is directed inwardly and outwardly from the hub of the fan, terminating in an arcuate (or straight) lip lower edge 16, that is substantially parallel to the flared mouth 10 of the inlet tube 4, spaced from it and in overlapping relation to it.

Thus a passageway 17 is provided between the overlapping portions 10 and 16 through which air, thrown out from the periphery of the fan into the space 18, passes, having followed the path of the arrows. The path of the air through the passageway 17 is parallel to the incoming air through the restricted throat 9 and along the flaring mouth 10. Thus, any leakage from in the area 18 and 19 is utilized to free the fan blades of turbulence and eddies and to induce the flow of air from the inlet opening, while at the same time insuring distribution of the air in that area designated 20 of the fan blades, which has heretofore been a dead area in the fan blades

due to turbulence, low velocity and lack of air movement and air delivery to that portion of the fan blades.

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 is new and desire to secure by Letters Patent, is:

1. In a fan, a casing, an inlet passageway member in said casing, and a fan in said casing having blades and an overlapping portion extending toward the eye of the fan beneath the blades, and overlapping the inner end of said passageway member, said fan being located in the center of said casing with its front and back remote from the front wall and the rear wall so that a large recirculating space is provided.

2. In a fan, a casing, an inlet passageway member projecting into said casing, and a fan in said casing, said fan comprising a back plate remote from the back of the casing, a plurality of relatively short wide blades, each attached at one end to the back plate, and a shroud member attached to the other ends of the blades and extending at an angle toward the inlet and beneath the blades to form in conjunction with the inlet wall a funnel-shaped portion and overlapping the inner end of the passageway member but spaced therefrom to provide a passage for the recirculation of air.

In testimony whereof I affix my signature.

EDWARD L. ANDERSON.

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