Jan. 26, 1932. P. MINNARD 1,843,088

CENTRIFUGAL FAN

Filed Sept. 26, 1928

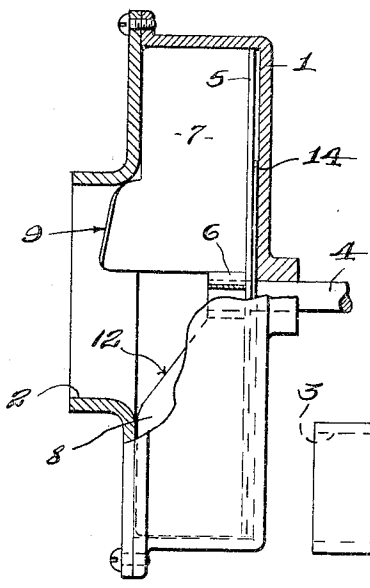


Fig. 1.

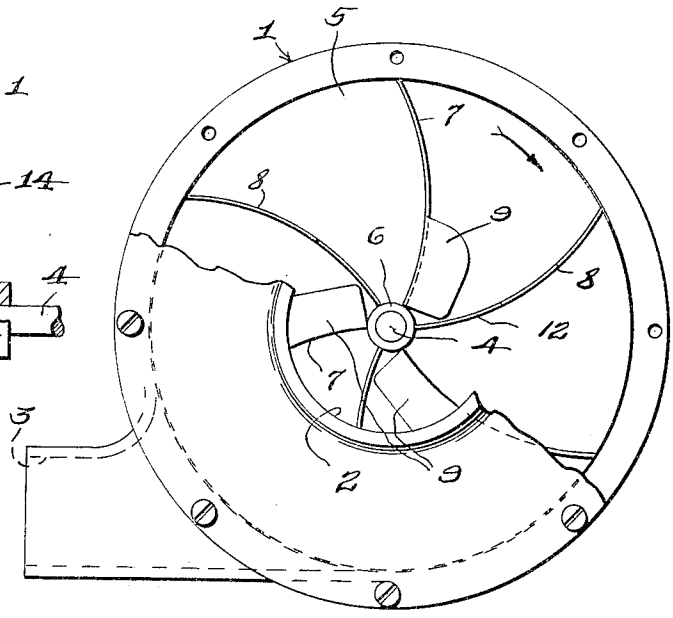


Fig. 2.

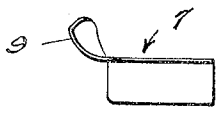


Fig. 3.

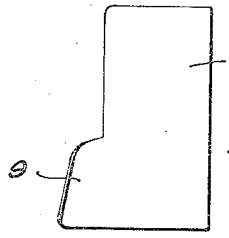


Fig. 4.

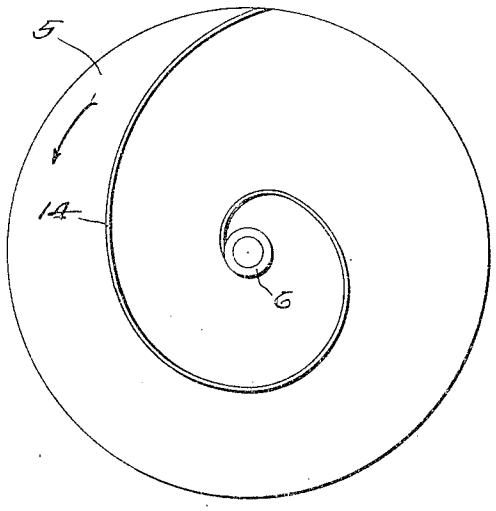


Fig. 6.

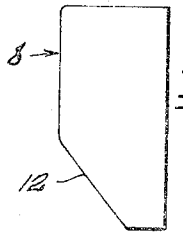


Fig. 5.

INVENTOR.
Paul Minnard
BY
Parsons & Bodell
ATTORNEYS.

Patented Jan. 26, 1932

1,843,088

UNITED STATES PATENT OFFICE

PAUL MINNARD, OF CHITTENANGO, NEW YORK, ASSIGNOR TO FREDERIC G. BODELL AND D. EMMETT THOMPSON, BOTH OF SYRACUSE, NEW YORK

CENTRIFUGAL FAN

Application filed September 26, 1928. Serial No. 308,485.

This invention relates to centrifugal fans wherein a fluid, gas or a liquid is taken in centrally of the fan and discharged centrifugally and has for its object a particularly simple and efficient construction of the impeller or rotor whereby the efficiency of the fan is greatly increased without requiring additional power and particularly whereby when used to pump air the pressure or the amount of air moved is greatly increased.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a side elevation of a fan embodying my invention, the casing being partly broken away.

Figure 2 is a front elevation, the casing being partly broken away.

Figures 3 and 4 are respectively an edge view and a side elevation of one of the vanes.

Figure 5 is an elevation of another vane.

Figure 6 is a rear elevation of the impeller.

This centrifugal fan comprises generally, a casing having a central inlet opening, an impeller rotatably mounted in the casing and having vanes arranged to discharge the air centrifugally, some of the vanes being formed with scoops toward their inner ends, that is the ends toward the axis of the fan, the scoops projecting into the inlet opening and being deflected forwardly with respect to the rotation of the impeller and extending into the inlet opening, the scoops also or the leading edges thereof inclining rearwardly from their inner forward ends toward their outer ends whereby the inner ends of the scoops project farther into the inlet opening than the outer ends of the scoops.

1 designates the casing of the fan having a central inlet opening 2 and a tangential discharge opening 3. The casing may be mounted in any suitable manner.

The impeller or rotor is mounted coaxially in the casing upon a suitable shaft 4. In the illustrated embodiment of my invention, the vanes are mounted upon a discoidal body or plate 5 having a hub 6 mounted on the shaft 4 to rotate with the shaft. The shaft 4 may be connected in any suitable manner to a source of power.

7 and 8 designate sets of vanes mounted edgewise on the discoidal body 5, these vanes preferably being curved from the hub 6 toward their outer ends in a direction opposite to the direction of rotation of the impeller, that is, if the impeller rotates clockwise in the direction of the arrow, the vanes are curved anticlockwise.

The vanes 7 alternate with the vanes 8 and are formed at their inner ends with scoops 9 extending into the inlet opening 2 and projecting or leading in the direction of rotation of the impeller.

These scoops 9 are located on the forward edges of the vanes 7, and in addition to their deflection or curvature in the direction of rotation of the impeller or their leading edges, incline rearwardly toward the discoidal body 5 from their inner ends toward their outer ends, as clearly seen in Figures 3 and 4, so that their inner ends toward the axis of the shaft 4 project farther into the inlet opening than their outer ends, in other words, the scoops gradually recede from their inner ends toward their outer ends as well as curve in the direction of rotation of the impeller.

The vanes 8 are formed with cut-outs at their inner ends, these cut-outs being formed by the inclined edge 12 at the inner ends of the vanes 8. The cut-outs form clearances for the air scooped or drawn in by the scoops 9. These vanes 8 also curve in a direction opposite to the direction of rotation of the impeller.

In order to prevent dust etc. from accumulating around the shaft at the rear side of the impeller, means is provided on the rear of the discoidal body 5 for throwing the air and hence the dust centrifugally outwardly. This means is here shown as a spiral vane or thread 14 extending outwardly from the hub 6 at the rear side of the impeller in the direction opposite to the direction of the rotation of the impeller.

Owing to the form of the scoops 9 and their

location relatively to the inlet opening 3, the capacity of the fan of a given size and requiring a given power is greatly increased, for instance, in one embodiment of my fan, a fan not provided with the scoops produced a pressure of four pounds while a fan of the same size with scoops and running under the same conditions produced a pressure of nine pounds.

What I claim is:

1. A centrifugal fan comprising a casing having a central inlet opening and an impeller rotatably mounted in the casing and having vanes arranged to discharge the air centrifugally, alternate vanes being formed with scoops at the forward edges of their inner ends, said scoops projecting into the inlet opening, the scoops leading in the direction of rotation of the impeller and the other vanes located between those provided with the scoops being of substantially the same radial length as the former vanes and formed with cut-outs at their inner ends forming clearances for the air drawn in by the scoops.

2. A centrifugal fan comprising a casing having a central inlet opening and an impeller rotatably mounted in the casing and having vanes arranged to discharge the air centrifugally, alternate vanes being formed with scoops at the forward edges of their inner ends, said scoops projecting into the inlet opening, the scoops leading in the direction of rotation of the impeller and the other vanes located between those provided with the scoops being of substantially the same radial length as the former vanes and formed with cut-outs at their inner ends forming clearances for the air drawn in by the scoops, the vanes being curved toward their outer ends in a direction opposite to the direction of rotation of the impeller, and the scoops inclining rearwardly from their inner forward ends toward their outer ends whereby the inner ends of the scoops project farther into the inlet opening than the outer ends of the scoops.

3. A centrifugal fan comprising a casing having a central inlet opening, an impeller rotatably mounted in the casing and comprising a discoidal body and vanes mounted on the front face of the discoidal body, alternate vanes being formed with scoops at the front edges toward their inner ends, the scoops extending in the direction of rotation of the impeller and extending into the inlet opening, the vanes being curved toward their outer ends in a direction opposite to the direction of the rotation of the impeller and the scoops inclining rearwardly from their inner forward ends toward their outer ends whereby the inner ends of the scoops project farther into the inlet opening than the outer ends of the scoops and the vanes between those provided with the scoops being of substantially the same radial length as the former vanes and provided with cut-outs at their inner ends forming clearances for the air drawn in by the scoops.

In testimony whereof, I have hereunto signed my name at Chittenango, in the county of Madison and in the State of New York, this 8th day of September, 1928.

PAUL MINNARD.