

No. 866,887

PATENTED SEPT. 24, 1907.

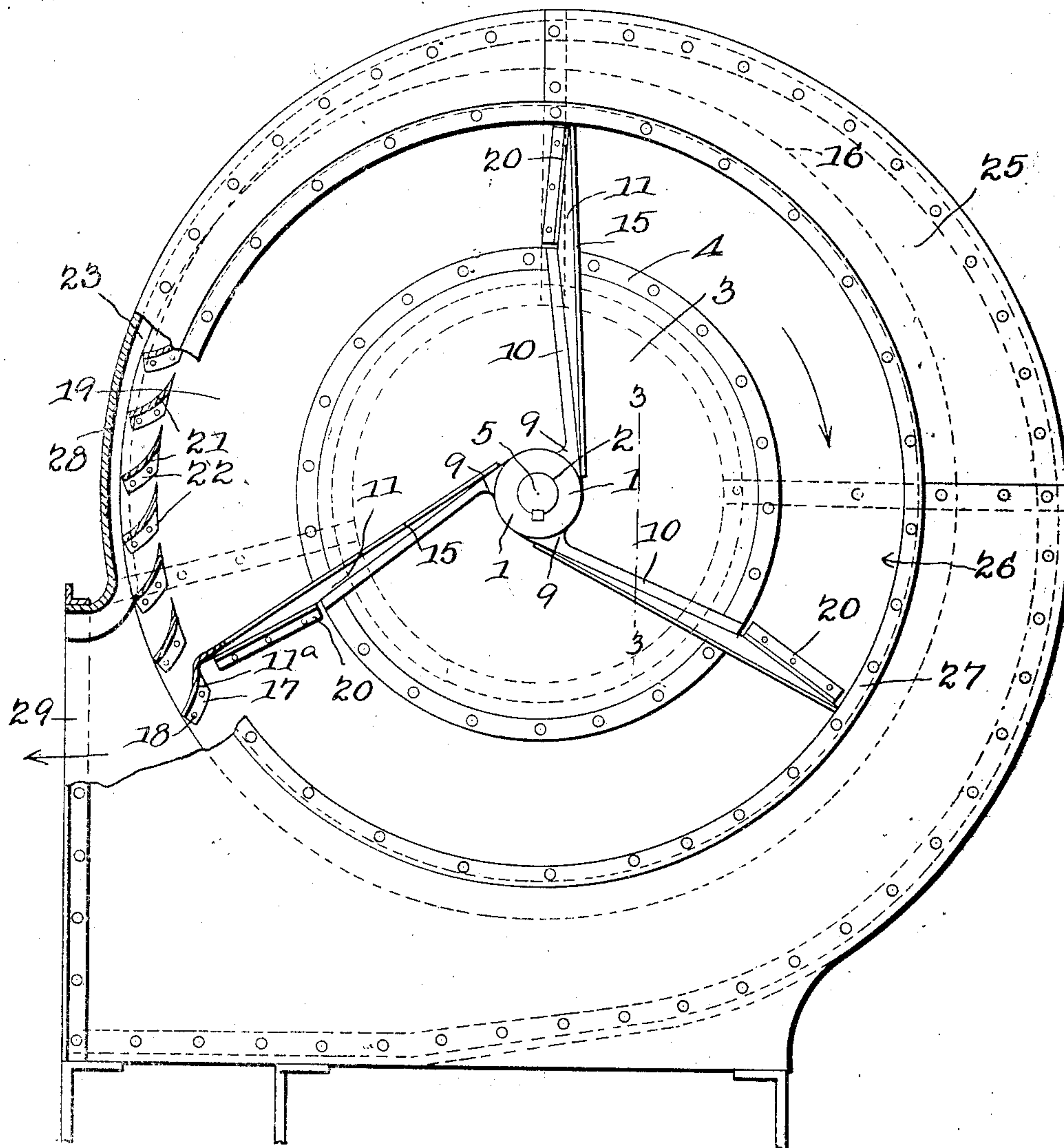
J. R. ROBINSON.

ROTARY FAN.

APPLICATION FILED APR. 11, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



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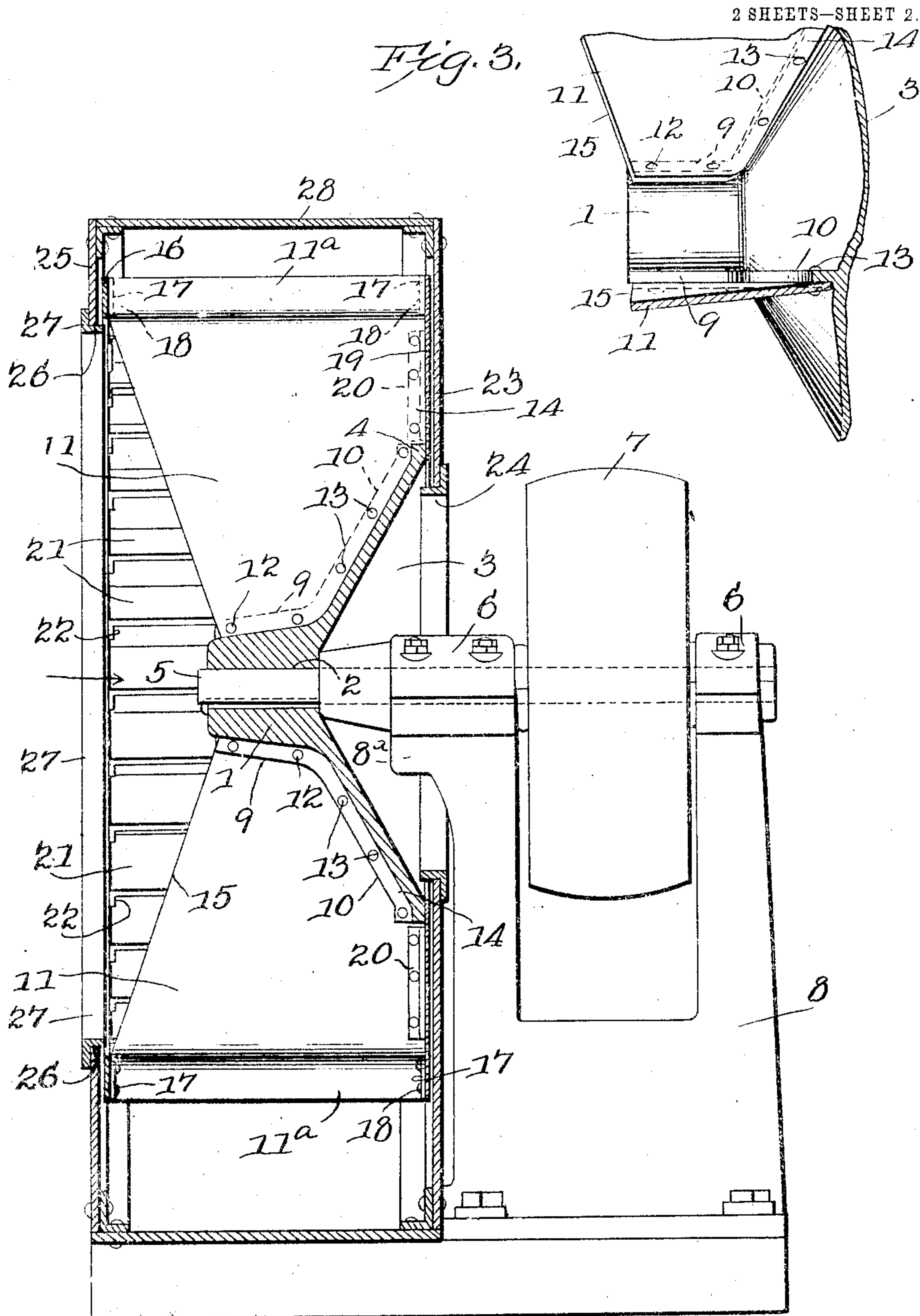


Fig. 2

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UNITED STATES PATENT OFFICE.

JAMES R. ROBINSON, OF PITTSBURG, PENNSYLVANIA.

ROTARY FAN.

No. 866,887.

Specification of Letters Patent.

Patented Sept. 24, 1907.

Application filed April 11, 1906. Serial No. 311,138.

To all whom it may concern:

Be it known that I, JAMES R. ROBINSON, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have
5 invented a new and useful Rotary Fan, of which the following is a specification.

This invention relates to rotary fans, and has for its object to provide an improved fan particularly designed for use in mines and other places where it is desired to
10 supply air under high pressure or to exhaust air where great suction is required.

It is furthermore designed to have the fan take the air in at the center thereof and discharge it through the periphery of the fan, and in this connection to have
15 one side of the fan closed, and the other side open in order that air may be taken in at one side only.

A further object of the invention is to provide a novel assemblage of the hub and the blades of the fan, whereby the number of full length blades may be reduced
20 to the minimum and at the same time maintain the desired strength and rigidity and to draw in the air through the open side of the fan, a plurality of short peripheral blades being employed between the full length blades for the purpose of discharging the air in a
25 powerful current through the periphery of the fan.

With these and other objects in view, the present invention consists in the combination and arrangement of parts as will be hereinafter more fully described, shown in the accompanying drawings and particularly
30 pointed out in the appended claims, it being understood that changes in the form, proportion, size and minor details may be made, within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings: Figure 1 is a side elevation of a fan of the present invention looking at the open side thereof, a portion of the casing being broken away to disclose the mounting of the peripheral blades. Fig. 2 is a
40 vertical cross sectional view of the fan. Fig. 3 is a detail fragmentary sectional view of the fan taken on the line 3—3 of Fig. 1.

Like characters of reference designate corresponding parts in all of the figures of the drawings.

The present fan includes a substantially cylindrical
45 hub 1 having a central shaft opening 2 and provided at one end with a conical flange 3 which flares outwardly and constitutes a head which is provided with an outer peripheral rim 4 disposed in a vertical plane. This hub is keyed or otherwise rigidly secured to a
50 shaft 5 which is mounted in bearings 6 at one side of the fan and carries a drive pulley 7. As disclosed in Fig. 2 of the drawings, the shaft is projected at the flanged end of the hub and the bearings 6 and 7 are carried by an upstanding bifurcated bracket 8, one
55 arm 8^a of which is extended into the conical flange or head 3 so as to bear against the adjacent end of the hub

and thereby prevent endwise play of the hub. Extending longitudinally upon the exterior of the hub is a series of integral ribs 9, three of such ribs being shown in Fig. 1 and spaced at regular intervals. Each
60 rib 9 is continued upon the flange or head 3, as shown at 10, and is disposed tangentially with respect to the hub. It will here be explained that the hub, which includes the body 1, the head or flange 3 and the ribs 9 and 10 is an integral casting and is mounted upon the
65 shaft as a whole.

Each full length blade 11, of which there are three, one for each rib 9, is of plate metal with its inner relatively narrow end connected to one of the ribs 9 by
70 suitable fastenings 12, that portion which engages the hub or flange 3 is inclined to engage the head throughout the length of the latter and is secured to the adjacent rib 10 by suitable fastenings 13. From the outer periphery of the head 3, the adjacent edge 14 of the
75 blade is disposed radially with respect to the shaft, while the longitudinal edge 15 of the blade inclines outwardly and extends beyond the adjacent end of the hub, the outer wide end of the blade projecting equally at opposite sides of the middle of the hub.

For the purpose of connecting the outer ends of the
80 blades, there is a ring 16 at the outer side of the wheel, and the outer edge portion of the blade is provided with a flange 17 which is rigidly secured to the inner face of the ring by means of suitable fastenings 18. At the inner side of the fan there is a ring 19 of consider-
85 ably greater width than the ring 16 and extending throughout the radial inner edge portion 14 of the blade, which edge portion of the blade is secured to a substantially radial flange 20 provided upon the inner face of the ring 19. By preference, the flange 20 is in
90 the nature of an angle bar which is riveted or otherwise rigidly connected to the ring 19.

By reference to Figs. 1 and 3 of the drawings, it will be noted that as one portion of the inner end of the blade is connected to the tangentially disposed rib 10,
95 and the other portion of the same edge is connected to the substantially radial flange 20, the blade is slightly bowed or twisted transversely, whereby said blade is stiffened without increasing its weight.

The blade is secured to what is the front sides of the
100 ribs 9 and 10 with respect to the direction of rotation of the fan, as indicated by the arrow on Fig. 1, whereby each full length blade presents a convexed front face to the air which is acted upon by the fan.

Upon reference to Fig. 1 of the drawings, it will be
105 noted that the portion 11^a of the fan which is connected to the ring 16 is bowed to present a front concaved face, and the flange 20, to which the inner edge portion of the blade is secured, terminates short of the outer edge of the ring 19 to permit of the concaved portion 11^a of
110 the blade being inclined rearwardly with respect to the direction of rotation of the fan.

Between successive full length blades, there is a series of short peripheral blades 21, corresponding in shape and size to the terminal portion 11^a of the full length blades, each short blade being provided at each end with a flange 22 bolted or otherwise rigidly secured to one or the other of the rings 16 and 19. These short peripheral blades are spaced at regular intervals throughout the periphery of the fan and operate to discharge the air centrifugally from the fan.

10 The fan is housed within the casing made up of an inner end 23 having a concentric opening to accommodate the shaft, the peripheral wall of said opening being reinforced by a flanged ring 24 suitably secured to said wall. The outer end 25 of the case has a concentric opening 26, the wall of which is reinforced by a flanged ring 27, the outer peripheries of the ends 23 and 25 being eccentric to the axis of the fan and connected by a peripheral wall 28.

20 It will now be understood that the fan is disposed eccentrically within the casing so as to provide a gradually increasing annular space between the periphery of the fan and the casing leading to the outlet 29 of the latter which is located at the bottom thereof and extends horizontally therefrom.

25 The present peculiar assemblage of the full length blades and the hub produces the desired strength and rigidity for the blades in a very simple and efficient manner, whereby arms radiating from the hub and other extraneous stiffening means are obviated, thereby producing a relatively light fan, while at the same time maintaining the necessary strength and durability thereof.

Having thus described the invention, what is claimed is:

1. A rotary fan comprising a hub having a head, longitudinal ribs upon the hub, ribs upon the head leading from the ribs of the hub and disposed tangentially with respect to the axis of the fan, a radial ring carried by the outer periphery of the head, flanges upon the ring and disposed radially and terminating short of the outer edge of the ring, and blades connected to the ribs of the hub and the head and to the flanges of the ring, the outer end portion of each blade beyond the flanges being inclined rearwardly with respect to the direction of rotation of the fan.

2. A rotary fan comprising a hub, full length blades carried by the hub, rings connecting the respective edges of the blades, and a series of short peripheral blades located between successive full length blades and carried by the rings.

3. A rotary fan comprising a hub having a head, full length blades carried by the hub and the head, rings connecting the outer portions of the respective longitudinal edges of the blades, and a series of short peripheral blades between successive full length blades and carried by the rings.

4. A rotary fan comprising a hub, substantially tangential blades carried by the hub, rings connecting the outer portions of the respective longitudinal edges of the blades, and a series of short peripheral blades disposed between successive tangential blades and carried by the rings, the peripheral and tangential blades being inclined rearwardly with respect to the direction of rotation of the fan.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JAMES R. ROBINSON.

Witnesses:

ADDISON BOREN,
REBEKAH RIDDLE.