

J. R. ROBINSON.

ROTARY FAN.

APPLICATION FILED MAR. 23, 1909.

956,781.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

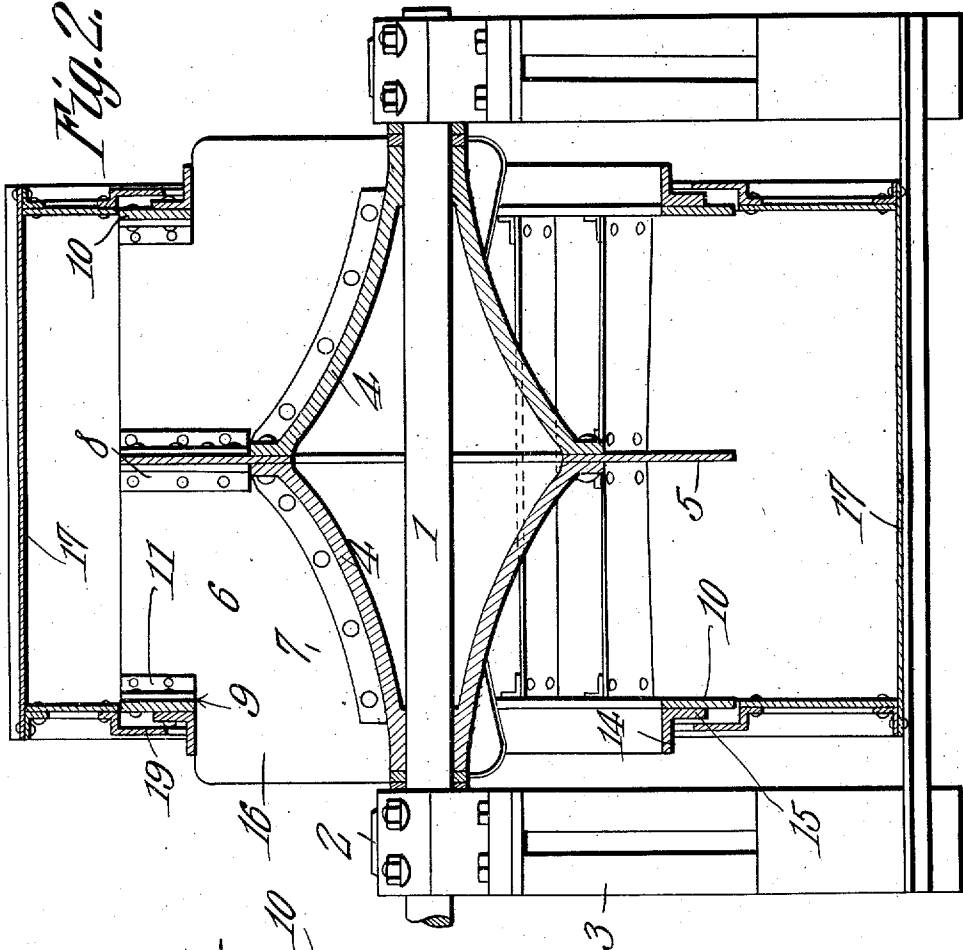
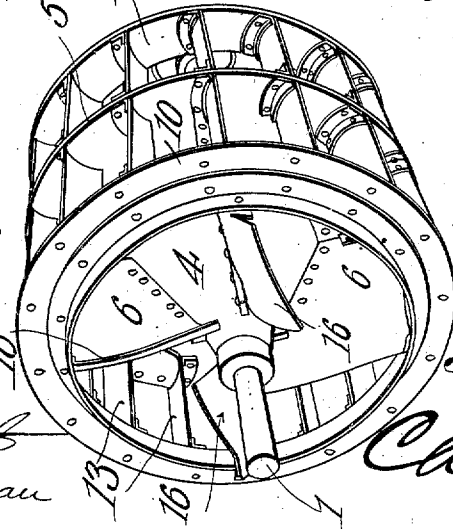


Fig. 1.



Witnesses

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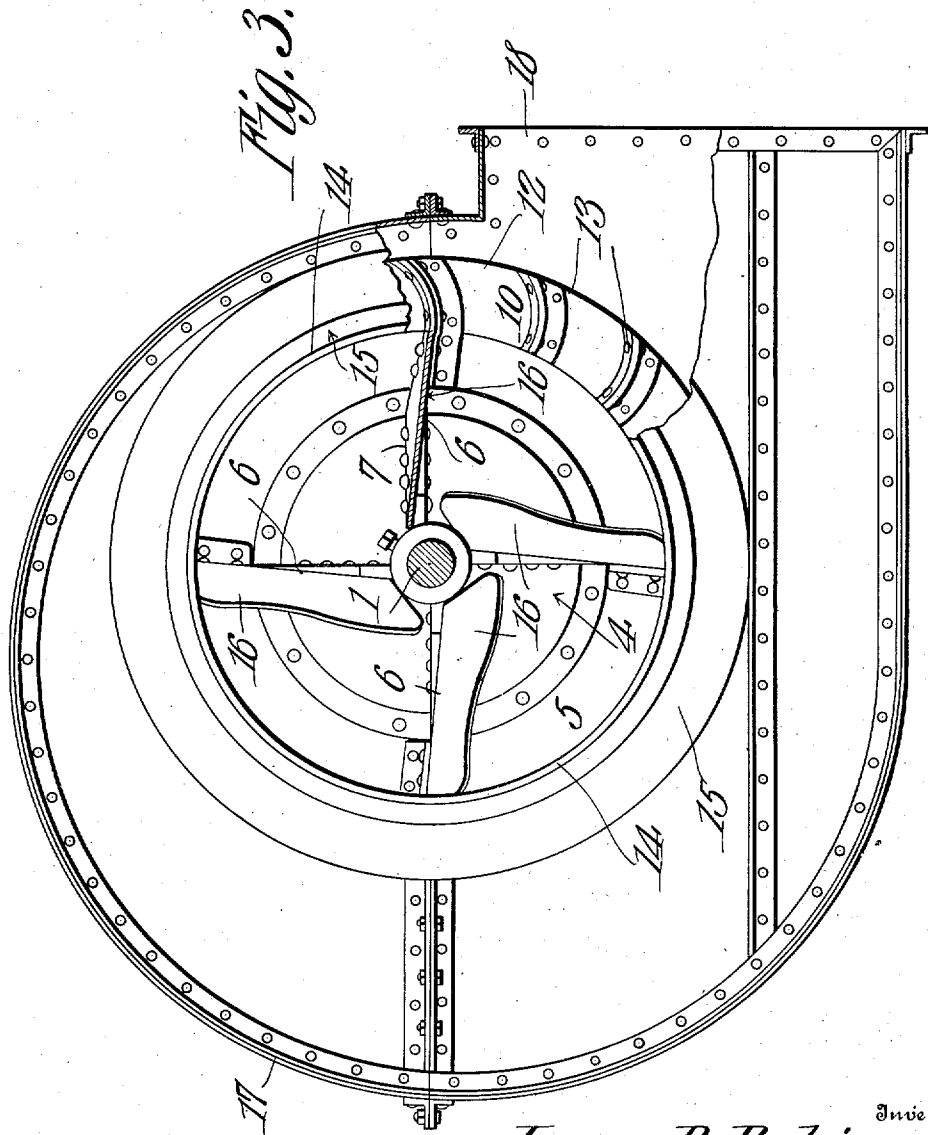
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UNITED STATES PATENT OFFICE.

JAMES REED ROBINSON, OF MOUNT LEBANON, PENNSYLVANIA.

ROTARY FAN.

956,781.

Specification of Letters Patent.

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To all whom it may concern:

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

This invention has reference to improvements in rotary fans and is an improvement upon the fans shown in Letters Patent No. 866,887, granted to me on September 24th, 1907, for improvements in rotary fans, and in Letters Patent No. 673,477, granted to me on May 7, 1901, for improvements in fans.

In accordance with the present invention the fan rotor is made double, that is the air is drawn in at each end of the fan and discharged at the periphery, there being a division plate or web intermediate of the length of the fan. The intake openings to the fan are made by providing the rotor with a sleeve which extends out through the opening in the casing, and the main fan blades which extend from the hub to the periphery of the fan are also extended out through and beyond the outer edge of the intake opening of the rotor and are there turned in the direction of rotation of the said rotor.

The invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, but it is to be understood that the invention is by no means confined to the exact form or proportions or size or to details of construction.

In the drawings:—Figure 1 is a perspective view of the rotor detached from the casing. Fig. 2 is a central section through the rotor and casing on a larger scale than shown in Fig. 1. Fig. 3 is an end elevation partly in section and partly broken away of the fan and its casing.

Referring to the drawings there is shown a shaft 1 mounted in journal bearings 2 upon suitable pedestals 3, but the particular mounting for the shaft shown in the drawings forms no part of the present invention and may be changed as desired. It is to be understood that the shaft is to be supplied with a suitable pulley for the application of power or may be directly coupled to an engine, electric motor, or turbine.

Fast on the shaft is a hub formed of two like conical members 4, 4, joined at their

bases and having their apices remote one from the other. The faces of the hub members may be curved. Clamped between the bases of the two members of the hub is an annular web 5 extending radially outward from the hub. The rivets which serve to secure the bases of the two members of the hub together also serve to secure the web 5 to the hub.

Each member 4 of the hub carries the inner end of a number of main fan blades 6, the inner edges of these blades being connected into the hub members 4 by suitable rivets extending through flanges 7 formed on the outer surface of the hub section. In the drawings four such blades are shown for each hub section and the flanges 7 are displaced so that the fan blades lie tangential to a circle about the diameter of the shaft or a little larger, and the said fan blades slant slightly as shown.

The blades 6 extend to the periphery of the rotor and along the web 5 are secured thereto by angles 8 riveted to the blades and to the said angles. That portion of the peripheral part of each blade 6 remote from the web 5, as indicated at 9, has fast to it a ring or annulus 10 parallel with but spaced from the web 5. Angle irons 11 serve to secure the ring 10 to the blades 6. For a distance coincident with the width of each ring 10 the blades are curved or dished as shown at 12 and this dished portion may be substantially radial as indicated in the drawings. Between the blades 6 the rings 10 carry a number of peripheral blades 13 similar to the dished portion 12 of the blades 6 and these short peripheral blades, are equi-distantly disposed between the several main blades 6.

Fast on the outer face of each ring 10 and coincident with the inner periphery of the ring is a sleeve 14 provided with a radial flange 15 by means of which the sleeve may be riveted to the corresponding ring 10.

The ends of the blades 6 projecting in the direction of the axis of the rotor extend through and beyond the sleeve 14 and are there curved in the direction of rotation as indicated at 16.

Surrounding the fan rotor is a casing 17 which may be shaped as usual and is provided with a discharge throat. An annular face plate 19 carried by the casing closes in the clearance space between the rotor and the side walls of the casing.

When the fan is in operation the forwardly curved projecting ends 16 of the main fan blades engage the air and direct it into the interior of the rotor where it is met by the conical hub section and thrown bodily outward to the periphery of the fan rotor and this outward movement of the air is further assisted by the tangential inclination of the fan blades. As soon as the outmoving body of air reaches the peripheral blades 13 it is caught by the latter and directed into the casing 17 to finally escape through the throat 18.

By providing the forwardly curved projecting ends 16 of the fan blades not only are all the advantages of the construction of the fan of the aforesaid Letters Patent retained in the fan structure of the present invention, but instead of depending on air pressure to supply the vacuum created by the outmoving air column within the fan rotor the air is directed into the interior of the fan rotor by the mechanical action of the curved blades 16 upon the air column. Experience has demonstrated that the efficiency of the fan is markedly increased by the addition of the curved blades 16. Also by extending the intake opening of the fan rotor well beyond the orifice of the casing the retarding effect of any air currents which may return through the clearance space of the casing is obviated.

What is claimed is:—

1. In a blast fan, a rotor having an axially extended intake orifice, a conical hub with the apex extending into the intake orifice, and main fan blades extending in a substantially direct line from the hub of the rotor to near the periphery thereof and from thence continued in a forward curve to the periphery, said main blades also extending axially beyond the axially extended intake orifice and there curved in the direction of rotation, the main fan blades at and beyond

the intake orifice being co-extensive with the distance from the hub to the periphery of the intake orifice. 45

2. In a blast fan, a rotor having an axially extended intake orifice, a conical hub with the apex extending into the intake orifice, main fan blades extending in a substantially direct line from the hub of the rotor to near the periphery thereof and from thence continued in a forward curve to the periphery, said main blades also extending axially beyond the axially extended intake orifice and there co-extensive with the distance from the hub to the periphery of the said intake orifice, said blades beyond the intake orifice being curved in the direction of rotation, and peripheral fan blades between the main fan blades. 50 55 60

3. In a blast fan, a rotor having at each end an axially extended intake orifice, a hub formed of two conical members joined at their bases and having their apices extending into the intake orifice, a central annular web extending radially from the joined bases of the hub members to the periphery of the rotor, main fan blades extending in a substantially direct line from the hub of the rotor to near the periphery thereof and from thence continued in a forward curve to the periphery and also extending axially from the web to a point beyond the axial extension of the intake orifice, said axial extensions of the main fan blades being co-extensive with the distance from the hub to the periphery of the said intake orifice and curved in the direction of rotation, and peripheral fan blades between the main fan blades. 65 70 75 80

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

JAMES REED ROBINSON.

Witnesses:—

M. ALICE McCOMBS,
FRED. C. GROTE.