

R. WARG.
CENTRIFUGAL FAN.
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1,019,385.

Patented Mar. 5, 1912.

Fig. 3.

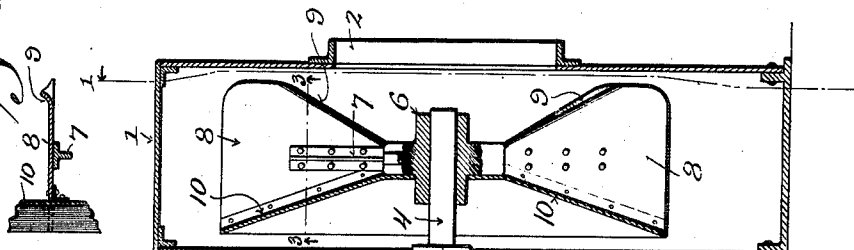


Fig. 2.

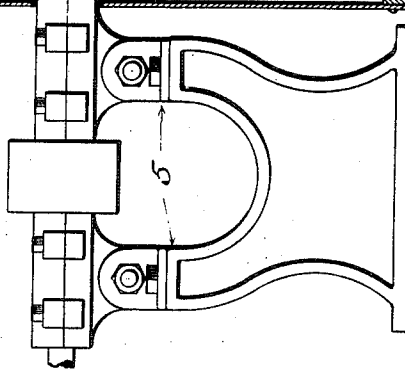


Fig. 4.

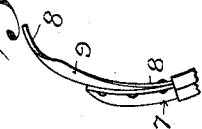
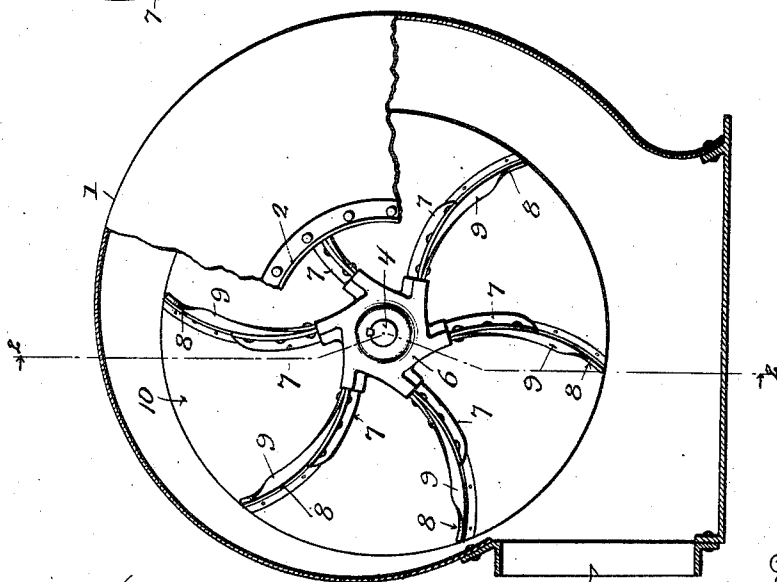


Fig. 1.



Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT WARG, OF MILWAUKEE, WISCONSIN.

CENTRIFUGAL FAN.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ROBERT WARG, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Centrifugal Fans; and I do hereby declare that the following is a full, clear, and exact description thereof.

10 The primary object of my invention is to provide a simple and economically constructed centrifugal fan capable of manipulating solids without impairing its efficiency, such efficiency being due to the peculiar curvature of the fan blades. Each fan blade is formed with a continuous concavo-convexed face which extends throughout the length of the blade from its hub end to its tip, the concave side being opposed to the resistance of the air with reference to rotation of the fan, whereby sudden shocks due to abrupt change of the direction of material as it is shed from the tip of the fan blade is eliminated, while at the same time said blades will freely receive and discharge solid material without snarling. It is also preferable, in some instances, to set the curved blades tangentially with reference to the fan axes with the tips following in the direction of rotation, whereby shock produced by striking the face of the blades at a right angle is avoided. In some instances I also contemplate curving or folding the edges of the blades which are disposed opposite the fan casing intake, by reason of which slight curvature or fold the air is more effectually pocketed and material coming against said edge adjacent to the fan hub will be deflected outwardly, the rear edges of the blades being secured to a backing disk. It is also desired to form the blades with their outer and inner side edges slightly tapered or flared outwardly from the fan axis, as shown in Figure 1, the outer or intake edge of said blades, as previously stated, being folded.

With the above objects in view my invention consists in what is herein shown, described and claimed.

50 In the drawings Fig. 1 represents a side elevation of a fan casing partly broken away and in section provided with a fan embodying the features of my invention; Fig. 2, a longitudinal sectional view of the same, the section being indicated by line 2—2 of Fig. 1; Fig. 3, a detailed cross-section

of one of the blades, the section being indicated by line 3—3 of Fig. 2, and Fig. 4, a slightly modified form of one of the blades embodying the features of my invention. 60

Referring by characters to the drawings 1 represents a fan casing having the usual circular air inlet 2 and discharge opening 3. A driven arbor 4 is axially aligned with the inlet opening 2 and is journaled in bearings of a bracket 5 of any desired type, the arbor being provided with a hub 6 that is rigidly secured thereto. Cast integral with the hub are arms 7, which latter are forwardly curved as shown and preferably disposed tangentially with relation to the arbor axis. Secured to the arms are fan blades 8 that are also forwardly curved from their hub ends to their outer tips, said curves forming gentle sweeps throughout the longitudinal area, the blades being preferably constructed from concavo-convexed plates presenting concaved faces to the force of the air, whereby said air that is received at the hub end of the fan is slightly pocketed, but is readily shed from the peripheral edge or tip of the blades without being subjected to an abrupt angular deflection that would otherwise occur were said blades straight for the major portion of their length and thereafter abruptly curved to form pockets at their tips. By this construction wherein the working faces of the blades are curved gradually from end to end, the air is confined slightly and is not at any time in its travel outwardly from the hub moved in a straight line, but is gradually cammed outwardly whereby the frictional resistance is reduced to a minimum, it being understood that the air so confined, forms a slight cushion and when finally shed from the tip of the blades it is thrown off freely describing a sweeping curve. The outer edge of each blade which is exposed to the inrush of air and material through the casing is, as shown, provided with a forwardly curved fold 9 with the greatest degree of dish or curl above a center line with respect to the length of the blade, the flare being merged abruptly into the straight edge of the blade below its tip. The fold is gradually straightened out toward the bottom end of the blade, forming a long rolling curve that is merged into the straight edge of the blade adjacent to its lower end. Thus the folds 9 serve to further confine the air and prevent shedding at the intake edge of the fan 110

blades. The facial contour of the blades is preferably triangular, having their intake and rear edges flared outwardly from the hub axis, as shown, and the flared intake edge, as previously stated, is also folded, whereby said intake edges of the blades will, by centrifugal force, deflect solid material outwardly that is taken in at the hub of the fan, thus insuring stringy material, which may be caught into the fan blades being freed therefrom. The rear flared edge of each of the fan blades is secured to a backing conical disk 10 by suitable angle iron strips, whereby said fan is closed for the purpose of opposing solid material that may be drawn therein between the blades.

The fan blades, as shown in Figs. 1 and 2, are described upon an arc of a circle throughout their length, but, in some instances, it may be desirable to form the curvature of the blades upon an arc of an ellipse, their tips being of slightly greater curvature than the major portion of said blades. I am aware that blades have been used in fans of this type, which blades, for the most part, starting from the hub, present straight faces in opposition to the air currents, said straight faces merging into abrupt curved tips. In this type of blade sudden shock as the material leaves the tip or face of the blades will result due to the abrupt change in the direction produced by this curvature. By curving the blade throughout its length as described, in practice it has been found that this abrupt shock is overcome, the gradual sweep producing the result desired to be obtained, while at the same time frictional resistance is reduced and shock is overcome.

I claim:—

1. A centrifugal fan of the character described comprising an incased fan-wheel having a hub, radially disposed curved spokes extending therefrom, concavo-convex faced blades carried by the spokes, the curvature of the blades starting from the hub end and extending outwardly to the tips in a gradual sweep to present a continuous concaved face in a direction of travel of the fan, the outer intake edges of the blades being flared for a portion of their length

outwardly from the hub axis, and a backing disk secured to the rear edges of said blades.

2. In a centrifugal fan having a casing provided with a centrally disposed intake and a peripheral discharge mouth; the combination of an arbor in axial alinement with the intake, and a spoked hub carried by the arbor a fan-blade secured to each hub-spoke, each fan-blade being curved from its hub end to its peripheral tip to present a concave face toward the direction of rotation, the front intake edge being flared outwardly from the hub and for the most part curved forwardly, the rear edge being flared in an opposite direction from the front edge, and a backing disk secured to said rear edge.

3. In a centrifugal fan having a casing provided with a centrally disposed intake and a peripheral discharge mouth; the combination of an arbor in axial alinement with the intake, and a spoked hub carried by the arbor a fan-blade secured to each hub-spoke, each fan-blade being curved from its hub end to its peripheral tip to present a concave face toward the direction of rotation, the front intake edge being flared outwardly from the hub axis toward the casing intake, the rear edge being flared in an opposite direction from said front intake edge, and a backing disk secured to said rear edge.

4. In a centrifugal fan having a casing provided with a centrally disposed intake and a peripheral discharge mouth; the combination of an arbor in axial alinement with the intake, and a spoked hub carried by the arbor a fan-blade secured to each hub-spoke, each fan-blade being curved from its hub end to its peripheral tip to present a concave face toward the direction of rotation, the front intake edge being provided with a forwardly curved fold the curvature being in the direction of travel of said fan.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

ROBERT WARG.

Witnesses:

MAY DOWNEY,
GEO. W. YOUNG.