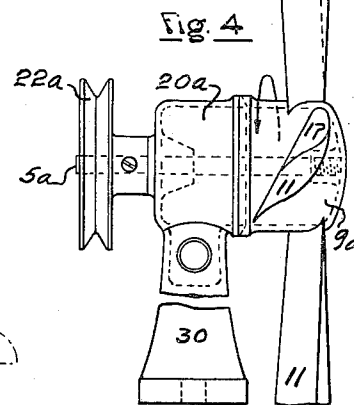
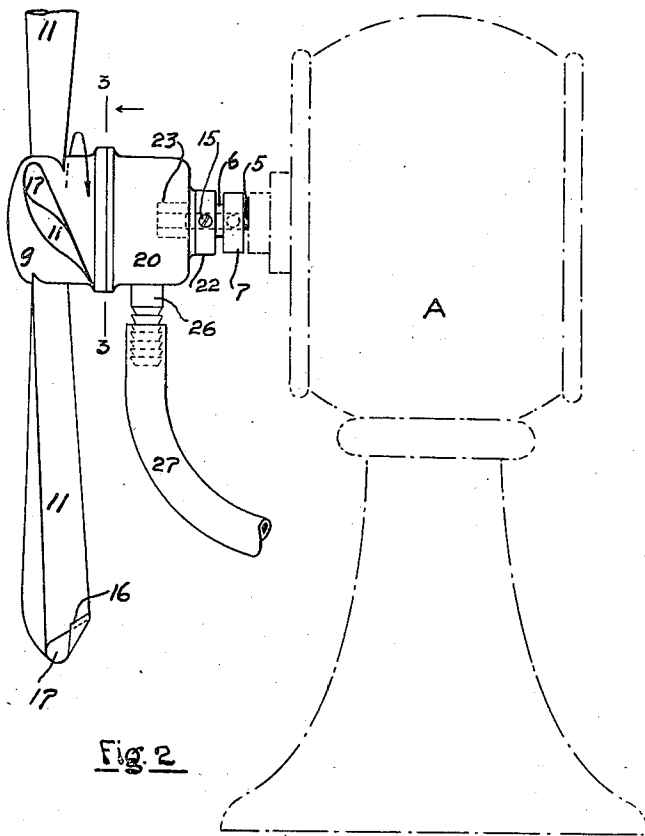
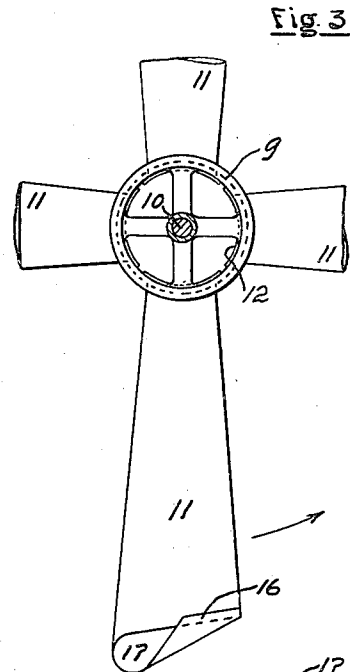
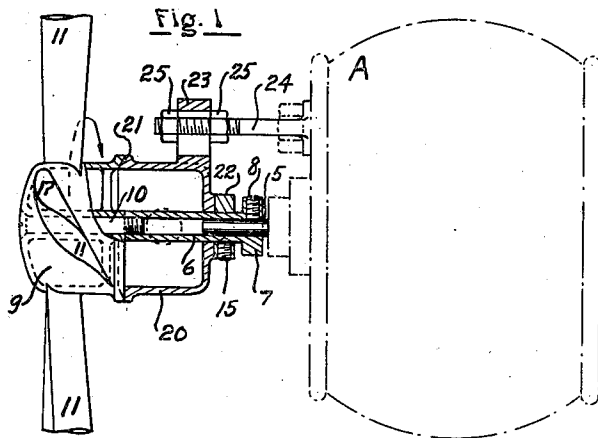


S. T. FORNANDER.
PROPELLER FAN.
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1,054,758.

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STEN TEODOR FORNANDER, OF NEW YORK, N. Y.

PROPELLER-FAN.

1,054,758.

Specification of Letters Patent.

Patented Mar. 4, 1913.

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To all whom it may concern:

Be it known that I, STEN TEODOR FORNANDER, a citizen of Sweden, and resident of the borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Propeller-Fans, of which the following is a specification.

This invention relates to improvements in propellers in general and more especially to propeller fans, such as are used in rooms for ventilation.

One of the objects of the invention is to enable propellers to act with better effect on the fluid in which they operate; and more especially the object is to provide a propeller fan which will give the maximum blast with the minimum dimensions and energy consumption.

A further object is to provide a simple efficient and low cost device for the purposes described, which will consist of the fewest number of parts.

A still further object is the production of a device by means of which an ordinary desk-fan may be utilized to produce a vacuum for cleaning or drying purposes.

Other objects and features will become apparent as the specification proceeds.

With these objects in view the invention comprises the improvements and combinations of parts hereinafter described and pointed out in the appended claims, reference being had to the accompanying drawings in which:—

Figure 1 is a plan view of the invention, partly in section; Fig. 2 is a front view of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 2 looking in the direction of the arrow; and Fig. 4 is a front view of a modified form of the invention.

The propeller herein shown comprises a hub 9 and helicoidally or obliquely arranged blades 11 set thereon. This particular propeller is designed as a fan. As is well understood the blades of a propeller force the fluid in an axial direction, and it is the primary aim of this invention to improve this action of the blades on the medium in which they operate. To this end the blades are hollow, so as to constitute conduits or passages, through which air is drawn from the

center of the fan and thrown out at the circumference by centrifugal action. This is found to give a stronger and more concentrated axially-moving blast, the reason for which is that the space at the central region of the fan where the air cannot be used to advantage, is used as an intake from which the air is carried outward and delivered where it is most needed, namely: at the outer part of the fan where the vacuum produced is the greatest. In this way more air is supplied to the most rapidly-moving portions of the blades, and moreover there is less tendency of the outer part of the axially directed blast to swerve outward because of the general movement of the air to fill the vacuum produced behind the outer part of the fan.

The hub 9 is hollow and serves as air intake or suction chamber from which the hollow blades draw in the air and force it out at the periphery. The discharge openings 17 at the outer ends of the blades are located at the rear sides thereof, with reference to the direction of rotation, so that the discharge of the air from the interiors of the blades is aided by the vacuum which exists behind the traveling blades. The latter are preferably formed of sheet metal, bent so as to present a sharp forward cutting edge, from which the blades widen to the rear edge, which is preferably rounded. Each blade may be made of a single sheet of metal folded over and the side edges united at the sharp cutting edge. At the end of each blade one of the side walls is made longer than the other and bent back over it, the edge 16 being suitably secured. The end wall thus formed extends from the sharp cutting edge backward part way to the rounded rear edge, and there ceases, leaving the discharge opening 17. The inner ends of the blades pass through the walls of the hub and are flanged to the inner sides thereof as shown at 12.

Suitable power means are provided for driving the propeller. In Figs. 1 and 2, a motor is indicated by the housing A, (shown in dash-and-dot lines.) In Fig. 4 a pulley 22^a is shown for application of mechanical power.

When embodied in a desk-fan or the like,

the invention may be utilized, not only to improve the blast effect, but also for various other useful purposes, such as suction cleaning, hair-drying, etc. The preferred embodiment of such an apparatus will now be briefly described.

The motor shaft 5 projecting from the housing A has a sleeve 6 removably secured to it, as by a set screw 8 threaded into a collar or annular flange 7 on the sleeve. The hub 9 of the fan is fixed to this sleeve so as to rotate therewith, by a bolt 10 which passes through the hub and is screwed into the sleeve. A cup-shaped casing part 20 is mounted on the rotating sleeve 6 and coöperates with the hub 9 to form a collecting chamber. The forward edge of said casing part is convexed as at 21 to fit the concaved rear edge of the hub, so as to form a tight working joint. The casing part 20 is held up against the hub by a collar 22 which may be fastened to the desired point on the sleeve 6 by means of a set-screw 15. The said casing part 20 is held against rotation by means of a radial slotted lug 23, which engages a simple form of bracket, projecting from the housing A, the same being shown as a bolt or stud 24 received in the slot and having nuts 25, 25 at opposite sides of the lug. Thus, the casing part 20 may be adjusted in or out or sidewise to compensate for any irregularities in the parts.

The casing part 20 is provided with a hose nipple 26, to which is attached a flexible suction conduit 27, to the end of which may be attached any suitable suction implement.

In the form of the invention shown in Fig. 4, the casing part 20^a is mounted on a post or standard 30. The driving pulley 22^a, which is set-screwed to the fan shaft 5^a holds the hub 9^a up against the front of the casing part 20^a.

By use of this device a person may clean the dust from any small compartment of a desk or book-shelf by inserting the end of the hose thereinto and facing the fan out of the window, so that the dust is blown out of the room. The device may also be used for hair-drying with beneficial effects.

Having described my invention what I desire to secure by Letters Patent and claim is:—

1. A propeller with means to drive the same and obliquely arranged hollow blades with sharp forward cutting edges and broad rounded rear edges having means for drawing in fluid at their inner ends and discharge orifices at the tips of their outer ends directed rearwardly of the direction of rotation.

2. A propeller fan with means to drive the same and helicoidally arranged hollow blades with sharp front edges and broad rear edges constituting air conduits with

discharge orifices at the junction between their rear and peripheral edges and means whereby they draw air into their interiors at the center of the fan.

3. A propeller having a hollow hub constituting a suction chamber and hollow obliquely arranged blades with straight rear sides and convexly curved front sides carried by the hub, their interiors being in communication with the interior of the hub and having discharge orifices at the junction between the straight and curved sides at the rear outer edges of the blades.

4. A motor driven propeller fan having a hollow hub and helicoidally arranged blades each made to present a straight rear side and a curved front side joined at the rear by a rounded edge and at the front by a sharp cutting edge, the sides meeting on an oblique outer edge and having a discharge orifice at the rear outer corner bounded by the rounded and oblique edges, in combination with a stationary casing part coöperating with said hub to form a collecting chamber and a suction conduit leading into said casing part and having a suction intake at its other end.

5. In a fan, the combination with a motor shaft and housing, of a propeller fan carried by an extension of the motor shaft having hollow blades with discharge orifices at the junction of the rear and peripheral edges and a hollow hub communicating with the inner ends of said blades, a stationary casing part coöperating with said hub to form a collecting chamber, a bracket projecting from said housing and holding said casing part against rotation while permitting axial adjustment thereof relatively to said hub, and a suction conduit leading to said chamber.

6. In a fan, the combination with a motor shaft and housing, of a sleeve removably secured to said motor shaft, a hollow hub secured to the outer end of said sleeve, hollow helicoidally arranged propeller blades carried by and communicating with said hub and provided with discharge orifices at the junction between their rear and peripheral edges, a stationary casing part carried by said motor housing and having a working joint with said hub to form a collecting chamber and a suction conduit leading into said casing part.

7. In a fan, the combination with a motor shaft and housing, of a sleeve having an annular portion, means coöperating with said portion for removably securing said sleeve to the motor shaft, a hollow hub, other means securing said hub to the sleeve, hollow helicoidally arranged propeller blades carried by and communicating with said hub and provided with rearwardly directed discharge orifices at the junction between their

rear and peripheral edges, a cup-shaped collecting chamber taking over said sleeve and forming a working connection with the hub, a suction conduit communicating with said chamber, a collar carried by the sleeve for holding the chamber against said hub, a lug extending radially from said chamber, a bracket carried by the housing engaging said hub to prevent rotation of the chamber,

and means coöperating with said bracket for adjusting the chamber axially on the sleeve.

Signed at the borough of Manhattan in the county of New York and State of New York this 15th day of July A. D. 1912.

STEN TEODOR FORNANDER.

Witnesses:

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