Oct. 21, 1924. 1,512,273

J. J. CALLAHAN

PROPELLER

Filed Oct. 28, 1922

Fig. 1.

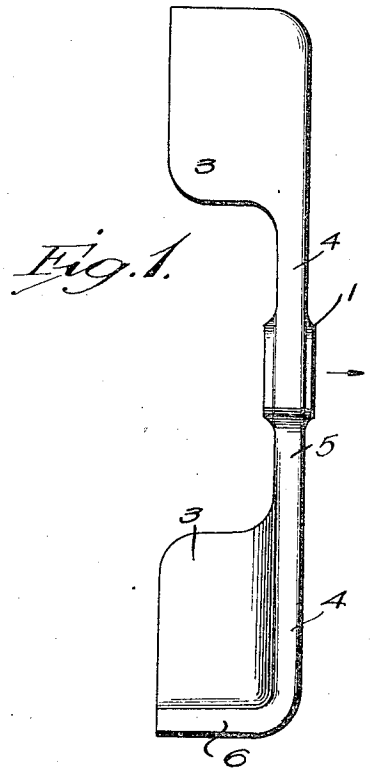



Fig. 3

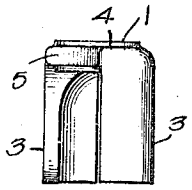



Fig. 4.

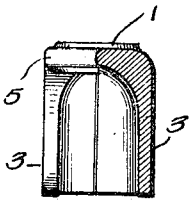



Fig. 2.

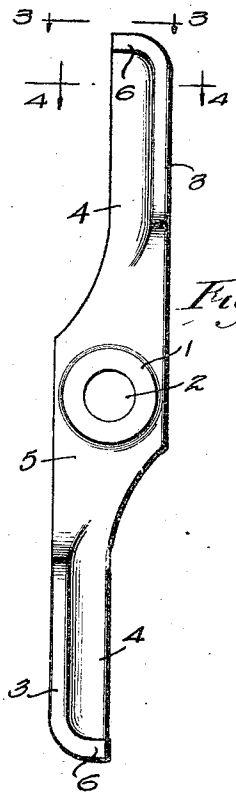



Fig. 5.

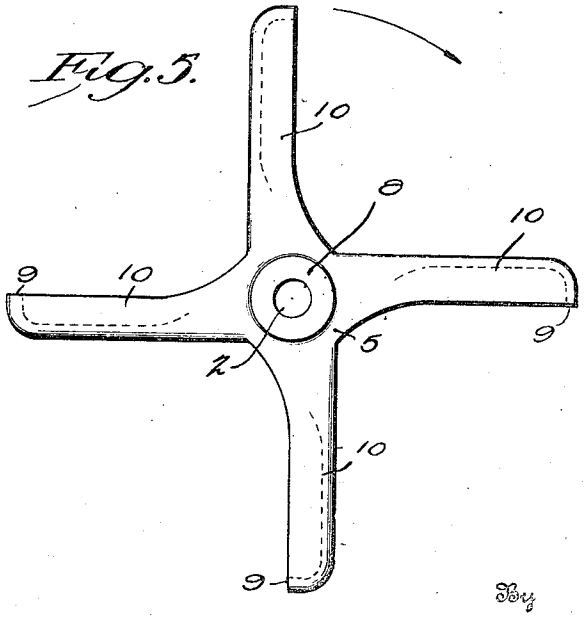
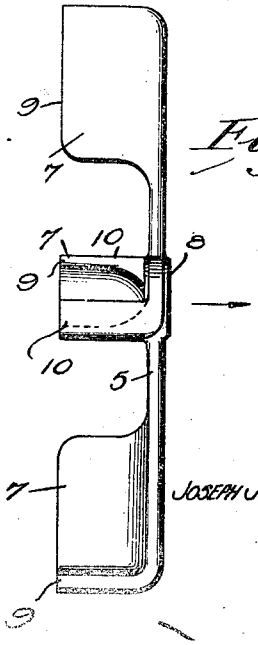



Fig. 6.




Inventor
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By

Patented Oct. 21, 1924. 1,512,273

# UNITED STATES PATENT OFFICE.

JOSEPH J. CALLAHAN, OF CORNWELLS HEIGHTS, PENNSYLVANIA.

## PROPELLER.

Application filed October 28, 1922. Serial No. 597,552.

*To all whom it may concern:*

Be it known that I, JOSEPH J. CALLAHAN, a citizen of the United States, residing at Cornwells Heights, in the county of Bucks and State of Pennsylvania, have invented certain new and useful Improvements in Propellers, of which the following is a specification.

This invention relates to propellers, and it comprises a propeller having a hub or axis and a plurality of radially disposed blades or wings, said blades or wings being provided with a substantially flat face at an angle to the direction of travel of the blade or wing when it revolves to compress a fluid when moved against it, and being provided with means at the end of the blade and on one side to prevent escape of compressed fluid.

In the present invention, I provide a propeller adapted to operate by compression. During the revolution of the propeller, the substantially flat blade or wing compresses a body of air in front of it and this body of air is prevented from escaping outwardly by a lip arranged on the end of the blade and is further prevented from escaping in one direction longitudinally of the axis by a flange arranged on the side of the blade. The compressed air is thus permitted to escape in only one direction, creating by reaction, a force against the propeller in the opposite direction.

The device may be used as a propeller for aeroplanes, as a suction fan for exhausts, vacuum pumps and the like, on windmills, or in any other manner in which the ordinary propeller or fan is employed.

In the accompanying drawings, I have shown several embodiments of the invention. In this showing:

Figure 1 is a side elevation of a two-bladed propeller,

Figure 2 is a rear elevation thereof,

Figure 3 is an end elevation on line 3—3 of Figure 2,

Figure 4 is a transverse sectional view of one of the blades on line 4—4 of Figure 2,

Figure 5 is a front elevation of a four-bladed propeller, and,

Figure 6 is a side elevation thereof.

Referring to the drawings, the reference numeral 1 designates a hub which is provided with an opening 2 for the passage of a shaft to which the propeller is attached. In the form of the invention shown in Figure 1 of the drawings, the propeller is provided with two blades 3, arranged in alinement with each other and on opposite sides of the axis. As shown, each of these blades consists of a relatively flat surface which is arranged at right angles to the direction of travel of the blade when it is revolved. The front edge of the blade is provided with a flange 4 which extends inwardly beyond the body portion of the blade, as at 5, and is connected to the hub. The outer end of the blade is provided with a lip 6.

In the form of the invention shown in Figures 5 and 6 of the drawings, a plurality of blades 7 are employed. In this instance, I have shown four blades arranged equidistant from each other around a hub 8. These blades are provided with lips 9 at their outer end, and flanges 10 at the front, similar to the blades shown in Figures 1 to 4 of the drawings.

The operation of the device will be apparent from the foregoing description. When the propeller is rotated, the air in front of the blade 3 or 7 is compressed, and this compressed air tends to escape into the surrounding atmosphere to cause the equalization of pressure. The body of compressed air is prevented from escaping outward by the lips 6 and 9, and the flanges 4 and 10 prevent it from escaping longitudinally of the axis in one direction. The body of air is thus forced to leave the blade at the unrestricted side. When the propeller is used on an aeroplane, the flanges 4 or 10 are arranged at the front, forcing the compressed air backwardly and by reaction, exerting a force to move the aeroplane forwardly. When used on a vacuum fan for exhausting air, the flanges are arranged on the inlet side of the fan and the air is forced out over the free edges of the blades.

It is to be understood that the form of my opinion herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. A propeller comprising a hub, a blade extending outwardly from said hub, said blade having a relatively flat surface substantially at right angles to the plane of ro-

tation of the propeller, means for preventing escape of air outwardly of said blade, and means for preventing escape of air in one direction transversely of said blade.

2. A propeller comprising a hub, a blade extending outwardly from said hub, said blade having a relatively flat surface substantially at right angles to the plane of rotation of the propeller, the end of said blade being extended at an angle to prevent escape of air outwardly, and means for preventing escape of air in one direction transversely of said blade.

3. A propeller comprising a hub, a blade extending outwardly from said hub, said blade having a relatively flat surface substantially at right angles to the plane of rotation of the propeller, the end of said blade being provided with a lip to prevent escape of air outwardly of said blade, and a flange formed on one edge of said blade to prevent escape of air over said edge.

4. A propeller comprising a hub, a plurality of blades extending radially from said hub and spaced at substantially equal distances from each other, each of said blades having a relatively flat surface disposed substantially at right angles to the plane of rotation of the propeller, means for preventing escape of air outwardly of said blades, and means for preventing escape of air in one direction transversely of said blades.

5. A propeller comprising a hub, a plurality of blades extending radially from said hub and spaced substantially equal distances from each other, each of said blades having a relatively flat surface substantially at right angles to the plane of rotation of the propeller, the outer end of each of said blades being provided with a lip to prevent escape of air outwardly of said blades, and a flange formed on one edge of each of said blades to prevent escape of air over said edge.

6. A propeller comprising a hub, a blade extending outwardly from said hub, said blade having a flat compressing surface substantially at right angles to the plane of rotation of the propeller, means for preventing escape of air outwardly of said blade, and means for preventing escape of air in one direction transversely of said blade.

In testimony whereof, I affix my signature in presence of two witnesses.

JOSEPH J. CALLAHAN

Witnesses:
TERESA M. MANGANO,
JOHN J. SULLIVAN.