Jan. 24, 1933. E. G. KONTOS 1,895,252

PROPELLER

Filed Jan. 23, 1931

Fig. 1.

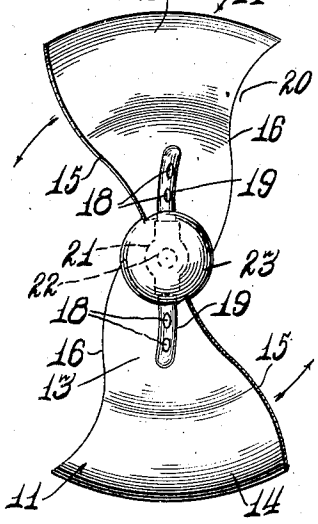


Fig. 2.

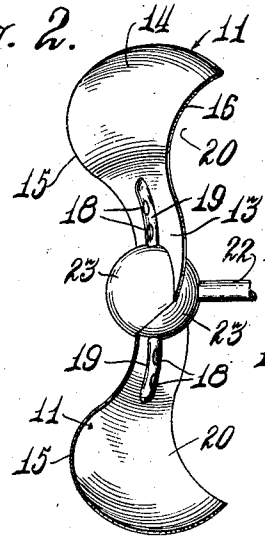


Fig. 6.

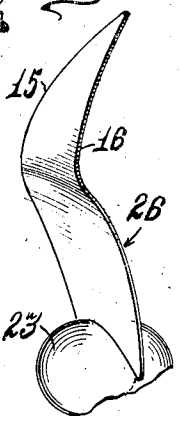


Fig. 4.

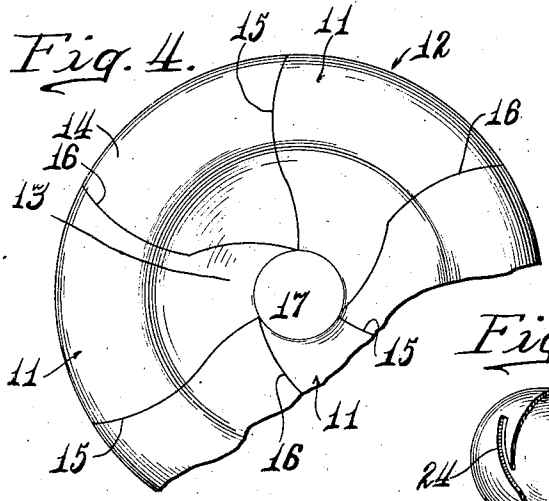


Fig. 5.

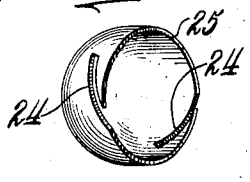


Fig. 3.

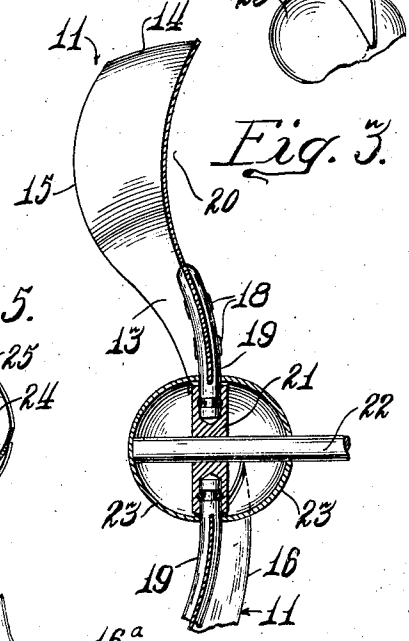


Fig. 7.

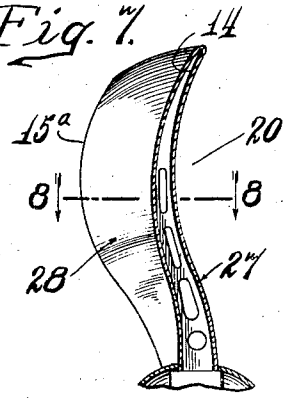
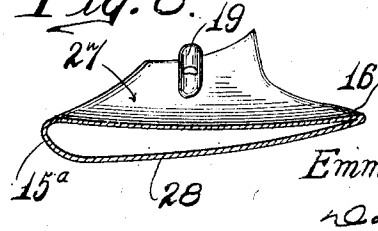


Fig. 8.



Inventor.
Emmanuel G. Kontos
Daniel Gunman
Attorney.

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UNITED STATES PATENT OFFICE

EMMANUEL G. KONTOS, OF CHICAGO, ILLINOIS

PROPELLER

Application filed January 23, 1931. Serial No. 510,663.

The invention relates to improvements in propellers and particularly to a propeller, for aeroplanes, having novel-shaped blades substantially triangular in outline.

An object of the invention is to provide an improved propeller with air pockets on the trailing side thereof to prevent loss of power.

Another object is to provide a propeller of such shape as to exert a greater force in axial direction than propellers now generally used.

Another object is to provide an improved propeller with means to prevent nose-diving of certain types of flying machines under such conditions, and minimize the possibility of such diving in other types of flying machines.

Another object is to provide an improved propeller for flying machines or toys with means to maintain said machine in its true course, without deviating therefrom, horizontally or vertically.

Another object is to provide a propeller with improved novelly shaped blades adapted for use on flying machines, helicopters, marine devices, fans, or ornaments.

Another object is to provide a propeller of the character referred to with means for adjusting readily the pitch of the blades.

The foregoing and such other objects of the invention as will appear hereinafter as the description proceeds, will be more readily understood from a perusal of the following specification, reference being had to the accompanying drawing, in which:

Fig. 1 is a front elevational view of the improved propeller.

Fig. 2 is a side elevational view.

Fig. 3 is a fragmentary enlarged sectional view, through the hub and one blade.

Fig. 4 is a fragmentary view of a disc from which the propeller blades are cut.

Fig. 5 is a perspective view of a modified form of hub cap.

Fig. 6 is a fragmentary side elevational view of a modified form of blade.

Fig. 7 is a fragmentary sectional view similar to Fig. 3, showing a modified form of blade.

Fig. 8 is a horizontal sectional view, taken on line 8—8 of Fig. 7.

The improved propeller is designed to reduce to a minimum, and in certain instances prevent, nose-diving of flying machines. The chief characteristics of the improved propeller reside in the novel shape and curvature of the blades.

The blades 11 preferably are cut from a suitable disc 12, formed with a depressed central portion 13, and a downwardly turned circumferential portion 14. The edge of the downwardly turned circumference of the disc 12 preferably terminates above the plane of the under side of the depressed central portion 13. As shown in Fig. 4 three improved substantially triangularly shaped blades are cut from each disc 12.

The entering edge 15 of each blade is cut substantially on a radial line on said disc, said cut being curved to conform substantially to a radial section of the disc. The trailing edge 16 of each blade is cut along a curved line extending to the circumference of the disc tangentially from a small circular opening 17 at the center of said disc. The circular opening 17 is provided to receive the mounting hub of the propeller. The edge 16 also is curved similarly to the entering edge, whereby a blade is provided which increases in width, measured circumferentially, from the hub portion to the outer circumferential edge 14.

A blade cut from such a disc in the manner described, curves forwardly in a radial plane from the relatively narrow inner end, or hub portion, to a diameter adjacent the circumferential edge, said edge being curved rearwardly to provide an air pocket 20 in the rear side.

When the improved blades are used on aeroplane propellers, it is preferable that only two be employed, but more blades may be provided particularly on propellers for use on helicopters, fans, ornaments, marine propellers, etc. Each blade preferably is fixedly secured in any approved manner, such as by rivets 18, to a split shaft 19, which provides means to secure the blades to a hub 21. The shafts 19 may be fixedly secured in hub 21 to provide a propeller having its blades fixed at a permanent pitch, or said shafts may be ad-

justably mounted in the hub 21, whereby the pitch of the blades may be varied readily to suit various requirements.

The hub 21 is fixedly mounted upon a shaft 22 connected with a suitable source of power, and hub caps 23, preferably in the form of cylindrical shells having their abutting edges cut to correspond to the pitch of the blades which extend therebetween, are placed one on each side of the hub 21, as shown in Fig. 3. To change the pitch of the blades it is only necessary to remove the hub caps 23 and replace them with hub caps having their abutting faces pitched at the desired angle.

In Fig. 5 a modified form of hub cap is illustrated, said cap having slotted angular openings 24 extending back from the face 25, to receive the end of the hub portion of the blade. The angular disposition of slots 24 determines the pitch at which the blades are held.

The blade 26 illustrated in Fig. 6 is formed substantially to conform to the curvature and contour of the wing of a sea-gull, or similar bird. This blade is substantially like the blade previously described, and may be employed successfully in every instance in which the other type of blade may be used. However, the pulling power of a propeller using this form of blade is slightly less, due to the reduction in area.

In Figs. 7 and 8 a stream line propeller blade is shown, said blade having its rear covering 27 cut from the curved disc 12, and its front covering 28 diverging from the tip toward the hub portion, and from the trailing edge 16*a* toward the entering edge 15*a*.

The peculiar curvature and contour of a blade, such as illustrated in Fig. 1 and 6, and of the rear covering or trailing side of the blade illustrated in Fig. 7, tend to create an air chamber or channel on the rear side of each blade, thus enabling the revolving blades to cut freely into the air and reduce the resistance normally offered by backwash. Because of the rearwardly turned circumferential edge 14, the air pocketed behind the blades cannot slip off circumferentially. Such circumferential slip of air as is common with known types of propellers reduces the pulling power of such propellers. By pocketing the air, it can escape only by the passing of the blade, whereupon said air slips off the trailing edge only of each blade.

The improved propeller, while rotating, has the appearance of an unbroken disc, similar to the disc from which the blades originally were cut, as shown in Fig. 4. This apparent formation is effected by the curved entering edge 15 of the blades on the revolving propeller. The effect of such a propeller since there is no air loss off the ends of the blades tends to maintain the stability of a flying machine and cause it to remain in its true course whether horizontally or vertically, unless diverted therefrom by outside influence.

I claim:

1. A propeller blade cut from a disc having a dished central portion and a downwardly curved circumferential edge, the entering edge of said blade being cut substantially on a radial line conforming to a radial section of said disc, and the trailing edge of said blade having a similar curvature.

2. A substantially triangular propeller blade cut from a disc having a dished central portion and a downwardly curved circumferential edge, the entering edge of said blade being cut substantially on a radial line conforming to a radial section of said disc, and the trailing edge of said blade having a similar curvature.

3. A propeller blade cut from a disc having a dished central portion and a downwardly curved circumferential edge, said edge ending above the bottom plane of said dished portion, the entering edge of said blade being cut substantially on a radial line conforming to a radial section of said disc, and the trailing edge of said blade having a similar curvature.

4. A propeller blade cut from a disc having a dished central portion and a downwardly turned circumferential edge, said edge terminating a short distance from the bottom plane of the dished portion, the entering edge of said blade being curved to conform to the shape of a radial section of said disc, and the trailing edge being curved similarly to provide a blade of greater width along its outermost edge.

5. In a propeller, the combination of a hub having blades secured thereto at different angles to the axis of said hub, the width of said blades, measured circumferentially, increasing rapidly from the hub to the outer circumferential edge of same, the portion of said blades adjacent the hub being curved towards the face of said propeller, and said blades being curved rearwardly adjacent the circumferential edge to provide an air channel behind each blade.

In testimony whereof I affix my signature at 10 South La Salle Street, Chicago, Illinois.

EMMANUEL G. KONTOS.