March 7, 1933. W. M. MINTO 1,900,839

PROPELLER

Filed Dec. 16, 1929

Fig. 1.

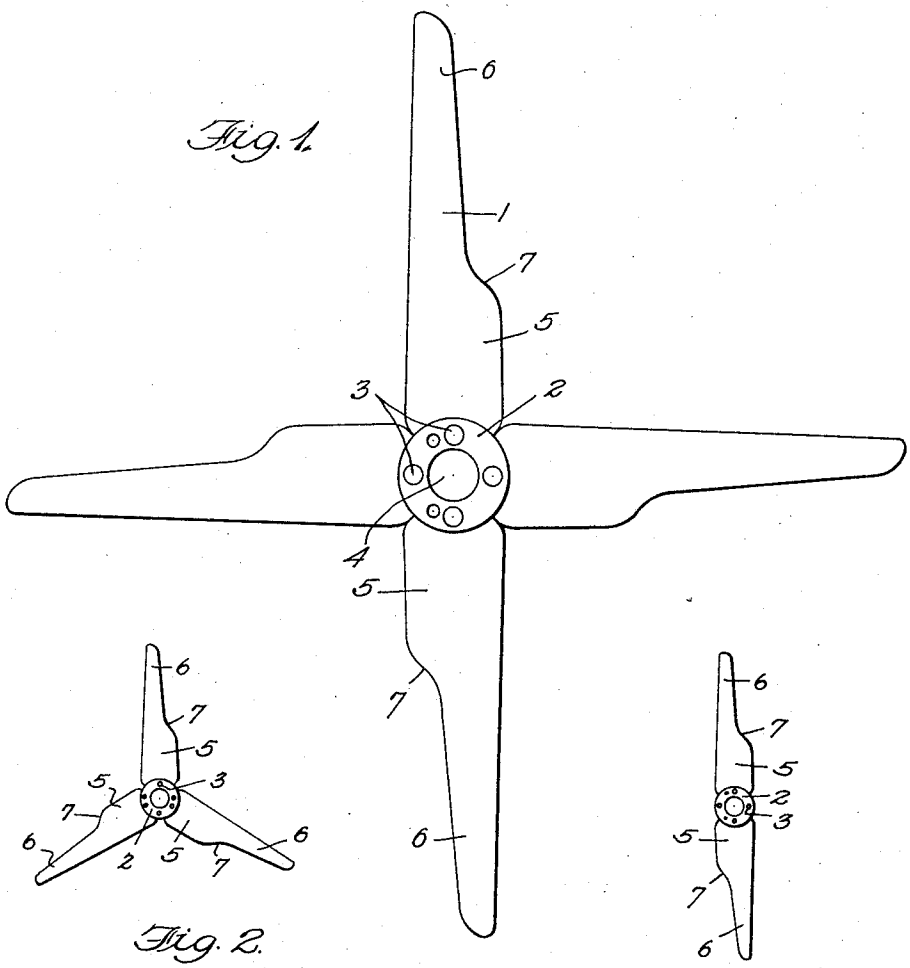
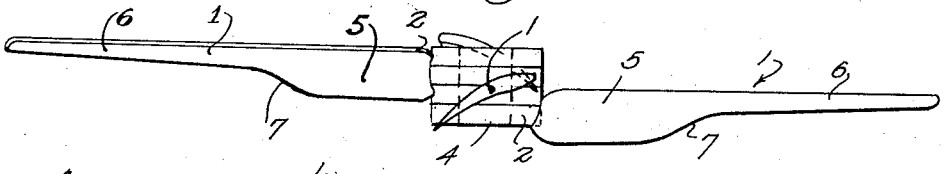


Fig. 2.

Fig. 3.

Fig. 4.



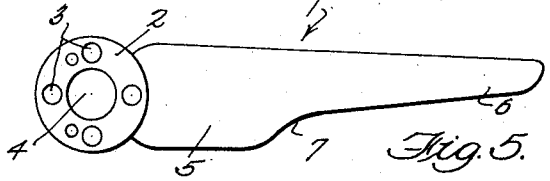


Fig. 5.

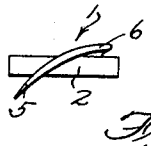


Fig. 6.

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UNITED STATES PATENT OFFICE

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PROPELLER

Application filed December 16, 1929. Serial No. 414,509.

The invention has relation to propellers designed particularly for aeroplanes, having for an object to provide a more efficient propeller wherein each blade bites on undisturbed air. Another object is to adapt the root portions of the blades where they intersect with the hub to better resist the increased strain transmitted thereto in the rotation of the propeller. Another object is to provide a propeller blade, the units of which can be assembled into a two, three or four blade propeller, by an unskilled person. Another object is to provide an aeroplane propeller having a plurality of single blades, the units of which are precisely alike and capable of assembly as stated, and wherein the major portion of the thrust is located within a circle described about the center of the blade hub and having a radius of about one half the length of the blade, thereby increasing the efficiency of the propeller.

The invention consists in the novel construction and combinations of parts as set forth in the appended claims.

In the accompanying drawing illustrating the invention Figure 1 is a plan view of the propeller shown as having four blades; Figure 2 is a similar view on a smaller scale of the propeller having three blades; Figure 3 is a similar view of a two blade propeller; Figure 4 is a side view of the four blade propeller, Figure 5 is a detail plan view of a single blade or unit, and Figure 6 is a detail end view of the same.

In this drawing, the numeral 1 designates a single blade or unit, the hub portion 2 of which has a plurality of bolt holes 3, which register with the bolt holes of the other blades assembled therewith, so that they can be made to fit different type hubs.

When the blade units are assembled, it will be noted by referring to Figure 4, that the blades assume a spiral arrangement around the drive shaft 4 being set successively forwardly of each other, so that each blade bites on undisturbed air, thereby greatly increasing the thrust. As a result there is greater strain transmitted to the root portions of the blades where they connect with the hub, which needs to be taken care of. By setting the blades successively forwardly of each other, the said root portions of the blades are also set successively forwardly of each other, thereby distributing the twisting strain upon the hub in the rotation of the propeller over a wider zone of said hub than where propeller blades arranged oppositely are longitudinally in line as customary.

Each blade has an inner broad root portion 5 of substantially constant width throughout and a narrow outer portion 6 of greater length than said root portion and of gradually decreasing width outwardly, and an intermediate portion of abruptly decreasing width outwardly and including an inclined shoulder 7, the forward edge of the blade being straight. Each blade is adapted to exert about sixty per cent of its thrust within a circle described about the center of the propeller and having a radius of about one half the length of the blade.

In case of damage to one or more of the blades, the damaged blade may be readily removed and a new one inserted by an unskilled person, so that blades can be carried as spares to be used when required. Obviously the blade units can be made of any suitable metal or material or of any of the synthetic materials. The diameter and length of blade surface will be based on the horse power of the motor and the number of blades used for a particular size plane.

As shown, due to the reduced size, little or no change appears in the pitch or angle of the blade, but in a propeller of actual size, the angle is greater at the hub and gradually decreases as it nears the periphery or outer end of the blade, thereby giving a true screw action which all propellers must have.

I claim—

1. In a propeller having blades arranged spirally around the hub thereof successively forward of each other; each blade having a straight forward edge located at right angles to the axis of rotation and the major portions of successive blades working in paths in rear of one another.

2. In a propeller having blades arranged spirally around the hub thereof successively forward of each other; each blade having a

straight forward edge and the rearmost blade being located as an entirety in rear of the foremost blade.

3. In a propeller having blades arranged spirally around the hub thereof successively forward of each other; each blade having a straight forward edge located at right angles to the axis of rotation and the major portions of successive blades working in paths in rear of one another, the rearmost blade being located as an entirety in rear of the foremost blade.

4. In a propeller having blades arranged spirally around the hubs thereof successively forward of each other; the root portions of the blades having throughout the widths thereof inclined intersections with the hubs thereof each overlapping the hub of an adjacent blade to resist strain upon said root portions in the rotation of the propeller.

5. In a propeller having blades arranged spirally around the hubs thereof successively forward of each other; the root portions of the blades having throughout the widths thereof inclined intersections with the hubs thereof each measuring approximately ninety degrees and overlapping the hubs of adjacent blades to distribute the strain thereon spirally around the hub and from front to rear of the hub.

6. A propeller for aeroplanes, each blade of which has an inner broad root portion of substantially constant width throughout and a narrow outer portion of greater length than said root portion and of gradually decreasing width outwardly, and an intermediate portion of abruptly decreasing width outwardly, the forward edge of the blade being straight.

Signed at Jersey City, in the county of Hudson, and State of New Jersey, this 12th day of December, A. D. 1929.

WALLACE M. MINTO.