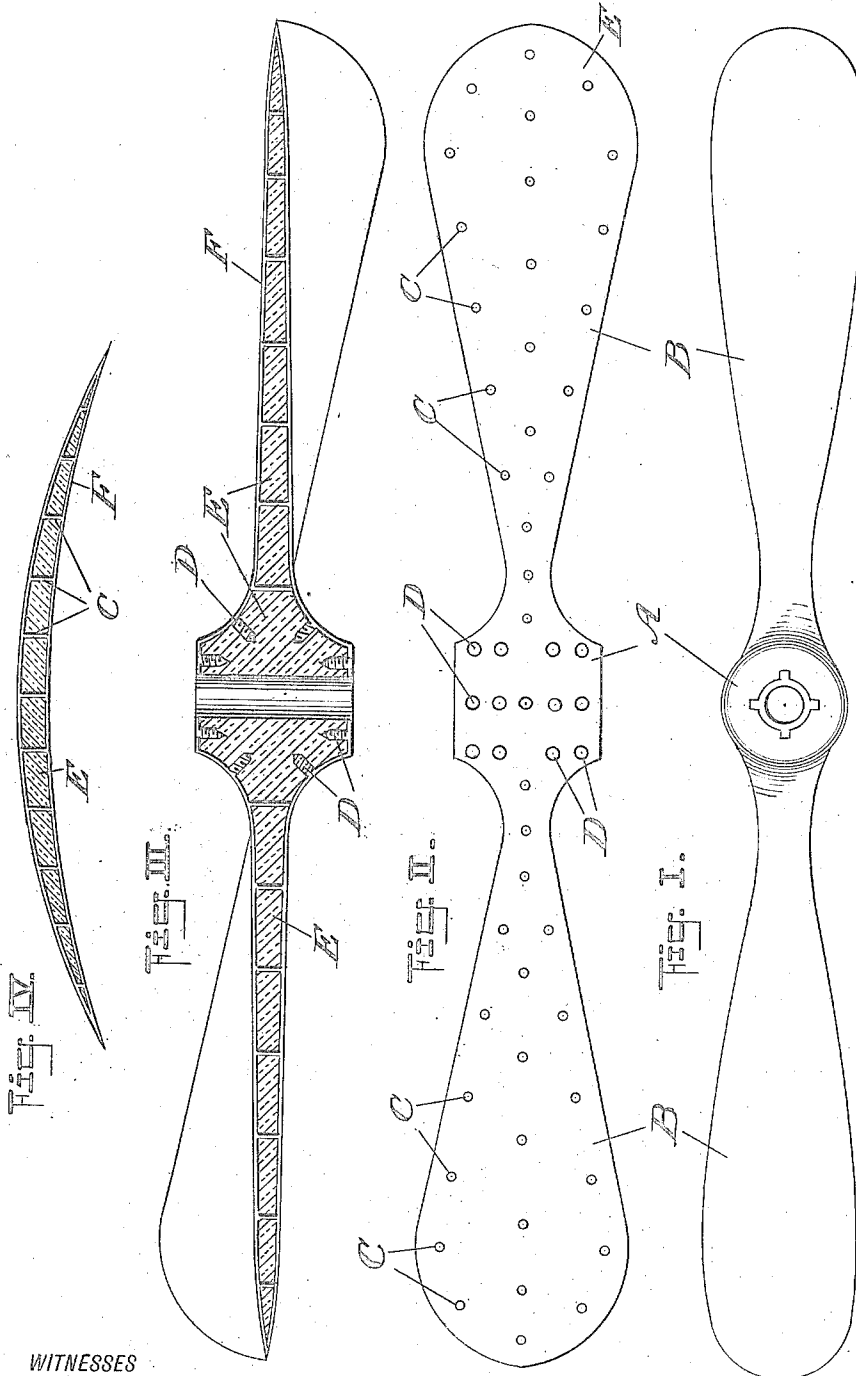


S. D. MOTT.
AIR PROPELLER.
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1,248,151.

Patented Nov. 27, 1917.



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AIR-PROPELLER.

1,248,151.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, SAMUEL D. MOTT, a citizen of the United States, resident of and whose post-office address is 130 Autumn street, in the city of Passaic, county of Passaic, and State of New Jersey, have invented certain new and useful Improvements in Air-Propellers, of which the following is a description, reference being had to the drawings forming a part hereof.

The above invention relates to propellers, and in particular such as are used for aeroplanes or other air-craft. Among the principal objects is the production of a very strong propeller to resist the great strain to which they are subjected, particularly with the now marked increased in size as used for aeroplanes for greatly increased power. A further object is to maintain more than is now possible, the true shape as predetermined; and to attain these advantages within the limits of weight permissible, and at the same time produce a portable article which will not splinter or crack, and has other advantages as will hereinafter appear.

While my invention may be variously practised, an embodiment which I will now particularly describe, for purpose of illustration, is shown in the accompanying drawings in which:

Figure I is an end view of a propeller on the line of the axis of the hub.

Fig. II is a side view.

Fig. III is a longitudinal section in the plane of the axis of the hub.

Fig. IV is a conventional cross section of a concavo-convex blade body.

In the drawings A is the hub, B—B the blades of a two-blade propeller, while in Fig. II the stud ends C are shown protruding at the surface of the propeller blades, while studs D represent screws secured into the body of the propeller E at and about the hub, F is the sheathing covering the entire surface of the propeller, as will hereinafter be more particularly described.

The body E of the propeller, which may be made of wood or other suitable material, is formed to the exact pitch and other curvature, as to surface, to meet the particular conditions for which the propeller is designed. In numerous places in the thin blades of the propeller studs C are inserted, penetrating the body of the blade in such

manner as may be desired to meet the particular conditions presented in any case. While I have shown them as substantially normal to the surface in Fig. III, it will be seen that in Fig. IV the studs C near the lateral extremities, are inclined to the surface. These studs, however, may be substantially inclined and adjacent ones projected through the blade body in opposite inclinations, to effect resistance to strains and stresses in the best manner as may prove desirable in any particular case. At and about the hub A, the structure in many cases will not permit studs passing entirely through the body of the structure, and where such is the case I screw studs D firmly into the material.

The studs D and C are left flush with the surface of the propeller blade and hub, or slightly projecting for the purpose of better engagement with the coating or sheathing, and thereupon the entire surface to be sheathed is suitably treated, in manner as is well known, to receive and hold electrolytically deposited metal. The process of depositing or electro-plating the entire propeller then takes place and a metallic sheathing applied in this manner to a thickness predetermined for the purpose of strength, and the other considerations hereinbefore mentioned. I vary the thickness of the coating by, longer or shorter emersion of different parts of the propeller in the electro-plating bath. As, for instance, when it is required to have greater thickness for greater strength at the hub and a predetermined distance from the hub, with lighter sheathing at the tips, the propeller is suspended at its hub in the solution, and by rotation the predetermined length of each blade end is kept above the surface the required time to effect the differential deposit. Likewise when for wear a greater thickness is required about the edges or tips, they are subjected to a longer emersion in the bath.

While the plating may be effected with different materials as the electro-plating art may offer as most effective for the purpose, the result is a sheathing F of desired thickness, consolidated with the transverse studs C or the lag studs D, thereby forming a complete shell with integral interlacing studs or lattice members forming a structure of great strength to resist the transverse bending or

twisting strains to which an article of this character is subjected.

It will be seen that the sheathing likewise forms a protector preventing splintering of the ends, which today is a frequent and dangerous accident experienced with wooden propellers. Present day attempts to attach copper sheathing about a portion of the propeller blade, serve in a limited way to prevent wear, hail, or other material encountered, or from cracking or splintering, but such tacked-on sheathing is dangerous and adds materially to the weight without increasing the strength resistance to transverse and twisting strains.

My complete shell propeller affords great strength to resist the centrifugal force owing to its continuity from hub to tip, which additional advantage, it will be seen, further emphasizes the marks of superiority of the braced shell propeller, which in substance is the essence of my invention.

It is well known that a demand has suddenly developed for propellers of large size suitable to absorb at high velocity very large horse-power, and the strength of materials heretofore used has been taxed to the limit when attempting to meet these conditions with the heretofore designs, and a solution has been sought to meet the emergency.

My propeller construction permits the forming of the blades accurately and easily to the configuration desired, while the completed propeller embodies the increased strength necessary to maintain shape and pitch under the increased conditions of stress far exceeding what the ordinary propeller structure could as made today.

Considering the transverse section of the propeller, when such is in any sense a modified concavo-convex section, it will be seen from Fig. IV that the ties C—C securing the surface sheathing F, form a structure of greater strength for weight, which, with the interior E, whether of wood or other suitable material, as a backing to the sheathing, support the sheathing between struts against local denting, thereby preserving the true surface and likewise support the struts in a manner effecting the great increase of consolidated strength.

While my invention may be embodied in various forms, and changes may be made without departing from the spirit of my invention, what I claim and desire to secure by Letters Patent is:

1. An air propeller comprising a body

portion readily formable and formed into the blade configuration, a plurality of studs traversing said blades from surface to surface and a complete metallic sheathing enveloping the surface of the blades and consolidated with the transverse studs.

2. A propeller comprising a wood body portion conforming to the desired blade configuration, a plurality of studs penetrating said wood body portion and firmly embedded therein, a rigid metallic shell enveloping the wooden surface and secured to the hub end of the blade and extending outward therefrom and consolidated with the outer ends of the studs.

3. A propeller comprising a sub-surface body material readily formable to the desired configuration of blade, a plurality of metallic members projected at frequent intervals through said blade from surface to surface, a sheathing deposited on the opposite surface and consolidated respectively with the oppositely projecting transverse members, whereby a trussed structure is formed about the body portion and consolidated therewith.

4. An air propeller comprising a body portion of readily formable material and formed into the blade configuration, a hub portion, a sheathing for said body portion at the hub portion and extending outwardly therefrom and a plurality of independent studs penetrating the hub portion and consolidated with said sheathing.

5. An aeroplane propeller comprising a wooden body portion having hub and blade portions, a plurality of independent studs traversing the blade portion and studs penetrating the hub portion and a sheathing intimately confined to the surface of the body portion and consolidated with said studs.

6. In a propeller, a blade having a portion of outwardly radially increasing circumference, a sheathing extending completely around the circumference of the propeller at this portion and outwardly therefrom toward the tip, a plurality of studs embedded in the body portion of the propeller and united with said sheathing.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of November 1915.

SAMUEL D. MOTT.

Witnesses:

DANIEL J. GUINAN,
H. MUCHMORE.