

Dec. 1, 1931.

C. B. BAUGHN

1,834,888

PROPELLER

Filed Jan. 9, 1931

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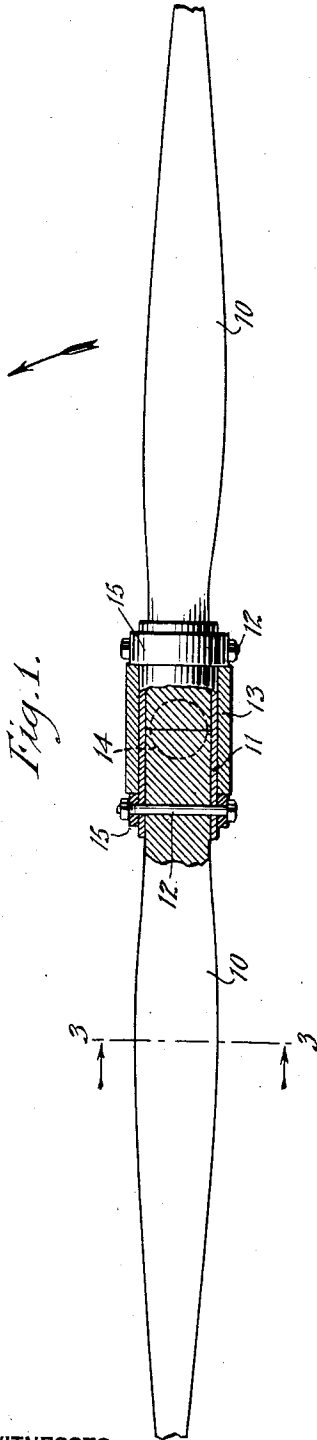


Fig. 2.

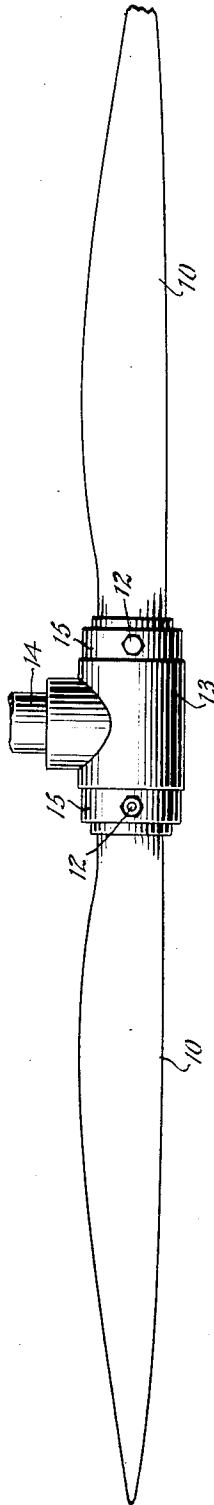
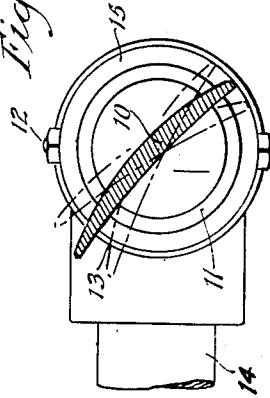


Fig. 3.



WITNESSES

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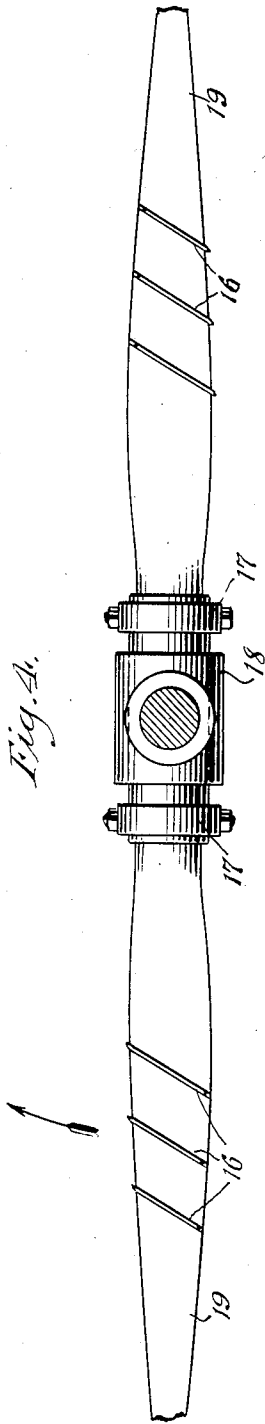
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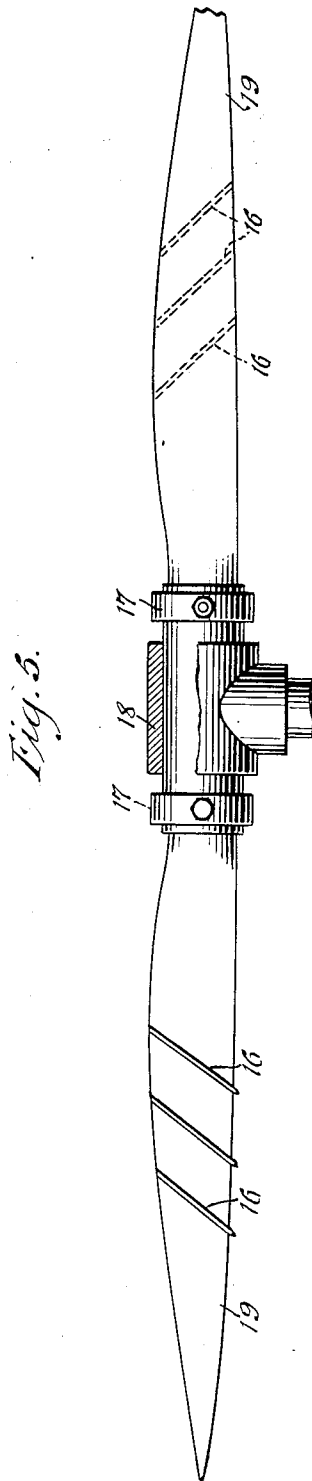
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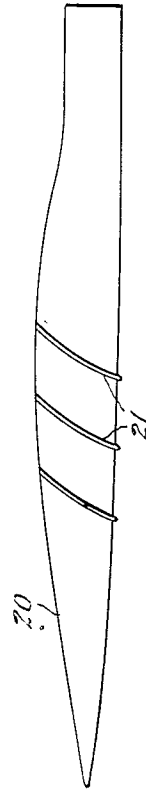
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*Fig. 4.*



*Fig. 5.*



*Fig. 6.*

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# UNITED STATES PATENT OFFICE

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## PROPELLER

Application filed January 9, 1931. Serial No. 507,738.

This invention relates to a propeller for aircraft.

One of the objects of the invention is to increase the aerodynamic efficiency, pull or effective thrust of a propeller of the indicated character by automatically varying the pitch of the blades by the action or pressure of air while the propeller is in motion.

Another object of the invention is to provide novel means on the blades of a propeller, and to so mount the blades that the blades will be automatically balanced for centrifugal force by the action or the pressure of air while the propeller is in motion.

The invention also resides in the particular provision, construction and functions of the parts hereinafter fully described and illustrated in the accompanying drawings, in which

Figure 1 is a front view partly in section of a propeller embodying the features of the invention;

Figure 2 is a top view of the propeller;

Figure 3 is an enlarged side view showing one of the blades in section;

Figure 4 is a rear view of a propeller showing a modification;

Figure 5 is a plan view partly in section of the propeller shown in Figure 4;

Figure 6 is a plan view of a still further modified form of the propeller blade.

Referring now more particularly to Figures 1, 2 and 3 of the drawings, it will be apparent that a propeller constructed in accordance with the invention may include similar blades 10 having any desired geometrical pitch and area. Each blade 10 is rigidly secured in any suitable manner to a tubular element or sleeve 11. In the present instance, this is accomplished by the use of a securing element such as a bolt 12 or the like. The sleeve together with the blades 10 constitute an assembly which floats or has turning movement in a hub 13 rigidly secured to the propeller shaft 14. The assembly is prevented from moving axially in relation to the hub 13 by collars 15 which are secured in place by the bolts 12, respectively, there being one collar 15 at each end of the hub 13. From the foregoing it will be apparent that

the blades 10 are so mounted that they may turn about their axes while the propeller is rotating or in motion. The provision and arrangement is such that the blades 10 will turn on their axes under the action or pressure of air while the propeller is in motion, thereby increasing the aerodynamic efficiency, pitch, or effective thrust of the propeller. A variable pitch of the blades will be obtained automatically by the pressure of air. If the pull on one blade is greater than the pull of the other blade, the blade assembly will turn in the hub 13 to a position in which the pull of one blade will be equal to that of the other blade.

On reference to Figure 3, it will be apparent that the trailing edge of each blade curves so as to extend further than the leading edge from the axis of rotation of the blade assembly. The center of the blade pull is therefore back of or follows the center of the driving force. This prevents the blade assembly from rotating completely around in the hub 13 which would reverse the action of the propeller.

Referring now more particularly to Figures 4 and 5, it will be apparent that a propeller may have the same features set forth hereinabove, and in addition thereto may be provided with means for balancing for centrifugal force and increasing the efficiency of the propeller by the provision of fins 16. In the form of the invention shown in Figures 4 and 5, collars 17, which are similar to the collars 15, are spaced sufficiently to allow the blade assembly to have a limited amount of axial movement in relation to the hub 18. Any suitable number of fins 16 are arranged on the thrust or driving face of each of the blades 19. The fins 16 on each blade are straight and arranged parallel to each other. The fins 16 in relation to their blade are disposed at an angle to the longitudinal axis of the blade and are directed outwardly from their leading edge to their trailing edge, so that the air striking the forward or working faces of the fins will exert inward pressure on the blade. In this form of the invention the blade assembly may turn in hub 18 and may also move axially with respect thereto.

The fins 16 will lower the atmospheric pressure or wind resistance in front of the fuselage of an airplane when the propeller is mounted thereon and in motion, and will also increase the atmospheric pressure under the wings thereby giving them a greater lifting power. The fins 16 will also help to balance the blade assembly as the air forces will help overcome the centrifugal forces causing the blade assembly to revolve in the air balance.

If desired, each blade 20 may be provided with curved fins 21, as shown in Figure 6, instead of straight fins. It is also to be understood that the blade assembly may be mounted in the propeller hub for axial movement only in relation thereto, and that the blade assembly may be turnable only in relation to the propeller hub.

It is to be understood that the invention is not restricted to the precise arrangement of parts shown and described, as details of construction may be modified and rearranged without departing from the spirit of the invention, the scope of which is limited only by the terms of the appended claims.

Claims:

1. A propeller having the combination of a rotary hub, a blade assembly rotatable with the hub and also axially movable with respect thereto, and means acted on by the air while the propeller is in rotation to cause the axial movement of said assembly to a position in relation to the axis of rotation of the propeller to maintain the air balance of the propeller, by reason of the extended blade catching more air and being moved toward said axis against its greater centrifugal force.

2. A propeller having the combination of a rotary hub, a blade assembly rotatable with the hub and also axially movable with respect thereto, and fins on the blades of the assembly directed outwardly from the leading edge to the trailing edge of the blade, said fins being adapted to be acted on by the air while the propeller is in rotation to cause the axial movement of said assembly to a position in relation to the axis of rotation of the propeller to maintain the air balance of the propeller, by reason of the extended blade catching more air and being moved toward said axis against its greater centrifugal force.

3. A propeller having the combination of a rotary hub, blades, a sleeve, said blades being rigidly secured to the sleeve, said sleeve being free to turn in said hub so that the blades will turn on their own axes, said sleeve being rotatable with the hub, means to allow the sleeve to have a limited amount of axial movement in the hub, and fins on each of said blades directed outwardly from the leading edge to the trailing edge thereof,

whereby to vary the pitch of the blades by the pressure of air and to maintain the air balance of the propeller while it is in rotation.

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