June 17, 1930. L. MORRIS 1,765,091

AUTOMATIC VARIABLE PITCH PROPELLER BLADE FOR AIRPLANES

Filed March 11, 1929

Fig. 1.

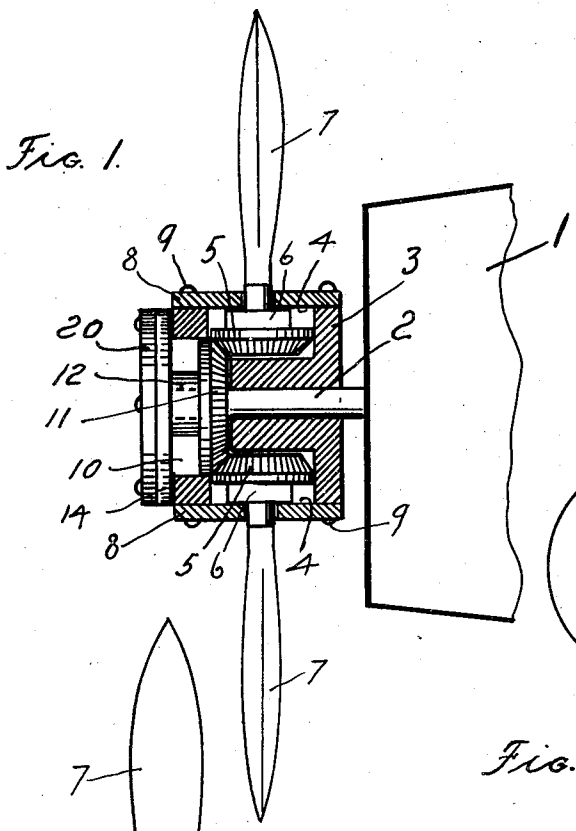


Fig. 2.

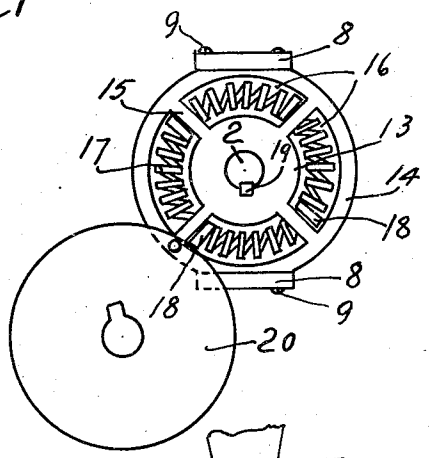


Fig. 3.

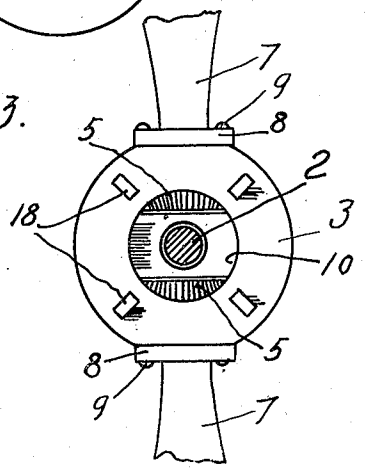


Fig. 4.

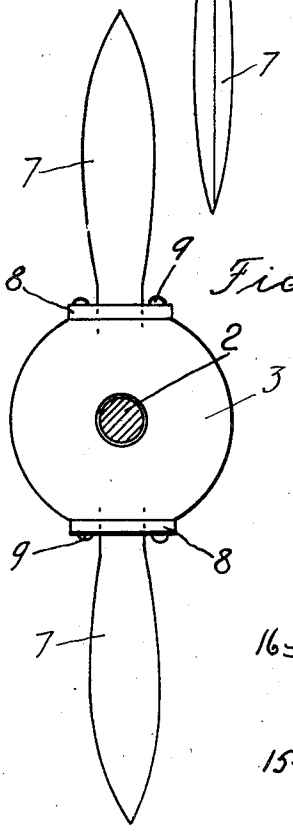
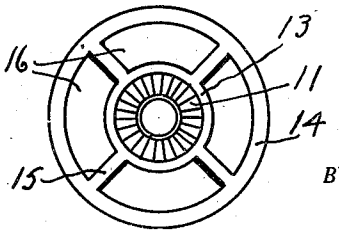


Fig. 5.



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UNITED STATES PATENT OFFICE

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AUTOMATIC VARIABLE-PITCH PROPELLER BLADE FOR AIRPLANES

Application filed March 11, 1929. Serial No. 346,033.

My invention relates to automatic variable pitch propeller blades for airplanes, and the object of the invention is to provide propeller blades for airplanes having facility for automatically changing the pitch of the blades relative to the speed of the motor to thereby regulate the resistance of the blades to the air pressure.

I attain these objects and other advantages by means of the mechanism illustrated in the accompanying drawing in which—

Figure 1 is a vertical section of a propeller hub embodying my invention, and showing the means for changing the pitch angle of the propeller blades.

Figure 2 is a front end view of the propeller hub, and showing the springs for regulating the propeller blades, the blades being omitted.

Figure 3 is a front end view of the propeller hub with the springs removed, and showing the lugs for limiting the rotation of the spring housing.

Figure 4 is a rear end view of the propeller hub in operative position.

Figure 5 is a plan view of the inner side of the spring housing member.

Similar numerals of reference refer to corresponding parts throughout the several views.

Referring to the drawings, the numeral 1 designates the front portion of an airplane motor. On the motor shaft 2 is idly mounted a circular hub 3 having circumferentially of the body of the hub oppositely disposed recessed gear pits 4 in which are rotatably mounted beveled gear wheels 5 having hubs 6 to which are secured in any suitable manner propeller blades 7. Pit covers 8 are secured on the body of the hub and over the gear pits, the body of the hub at these places being reduced to a plane surface for seating the covers. The covers are secured in place by screws 9 which are extended through the covers and penetrate the body of the hub. The covers are provided with holes to receive the lower portions of the blades. A gear pit 10 is recessed in the front end of the hub and in which is rotatably mounted a beveled gear wheel 11 in mesh with the gear wheels 5. Said gear wheel 11 has a central hub portion 12 which is united with a hub 13 of a wheel 14. The motor shaft is extended longitudinally through the gear wheel 11, hub portion 12, and keyed into the hub 13 of the wheel 14. The wheel 11 has four spokes dividing its peripheral margin into four sections or compartments 16 and adapted for receiving and housing four spiral springs 17. On the front end of the hub 3 are four forwardly projecting lugs 18 and which are located in near relation to the peripheral edge of the hub and upon radial lines, so that the lugs shall project respectively into the respective sections of the wheel 14 provided for the reception of the springs 17 and thereby limit the rotation of the wheel 14. The wheel 14 is keyed on the motor shaft by a key 19. A disk cover 20 is secured on the outer side of the wheel 14 to protect the springs 17.

When the motor is driven the motor shaft rotates the wheel 14 and the spokes of the same act against the springs to compress the same against the lugs 18 thereby imparting motion in the same direction to the propeller hub proper. As the speed of the motor increases the air resistance to the propeller blades also increases and thereby the rotary movement of the hub proper is retarded correspondingly and it being idly mounted on the motor shaft greater compression of the springs is effected and a rotation of the gear wheels 5 by the movement of the gear wheel 11 results in decreasing the pitch angles of the propeller blades. When the speed of the motor decreases the air resistance to the propeller blades decreases and thereby allowing the springs to react sufficiently to cause the gear wheel 11 to turn the gear wheels 5 on the propeller blades to effect an increase in the pitch angles of the blades. The actions described are entirely automatic and are effective throughout the motor speeds. The automatic variable pitch angle of the propeller blades is an advantage over the rigid propeller and effects greater efficiency in flying an airplane. The lugs 18 on the end of the propeller hub also form seats for the one end of the springs 17, the opposite ends of the springs being seated on the spoke divisions 15 of the wheel 14 which carry the springs.

The motor shaft revolves the wheel 14 and compresses the springs sufficiently to rotate the propeller hub. Said wheel functions very much like a clutch in starting rotation of the propellers and, at the same time, regulating the pitch angle of the propeller blades according to the air resistance against the same.

Having described the invention what I claim is—

In an automatic variable pitch propeller blade for airplanes, the combination with the motor shaft, of a propeller hub mounted free on the shaft, a plurality of propeller blades journaled in said hub and having gear wheels on their inner ends, a clutch wheel mounted on the shaft and adapted to revolve said hub and having axially a gear wheel enmeshed with the gear wheels on said blades, and compression springs carried by said clutch wheel and engaging said propeller hub.

Dated Kansas City, Missouri, March 6th, 1929.

LOUIS MORRIS.