Jan. 6, 1931. W. S. WILLIAMS 1,788,263

VARIABLE PITCH PROPELLER

Filed April 12, 1929 2 Sheets-Sheet 1

Fig. 1.

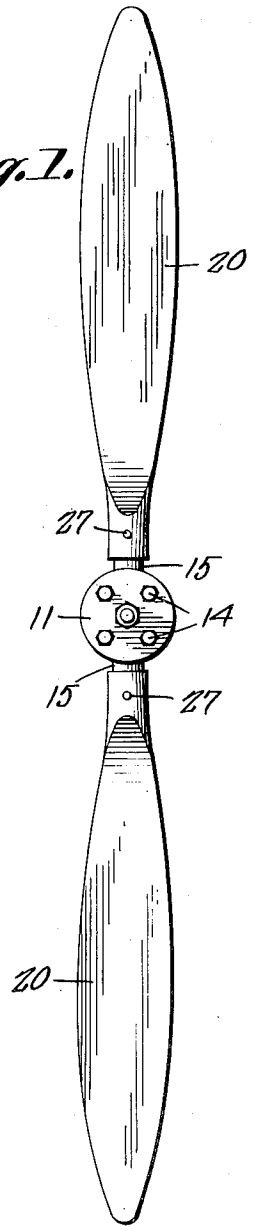
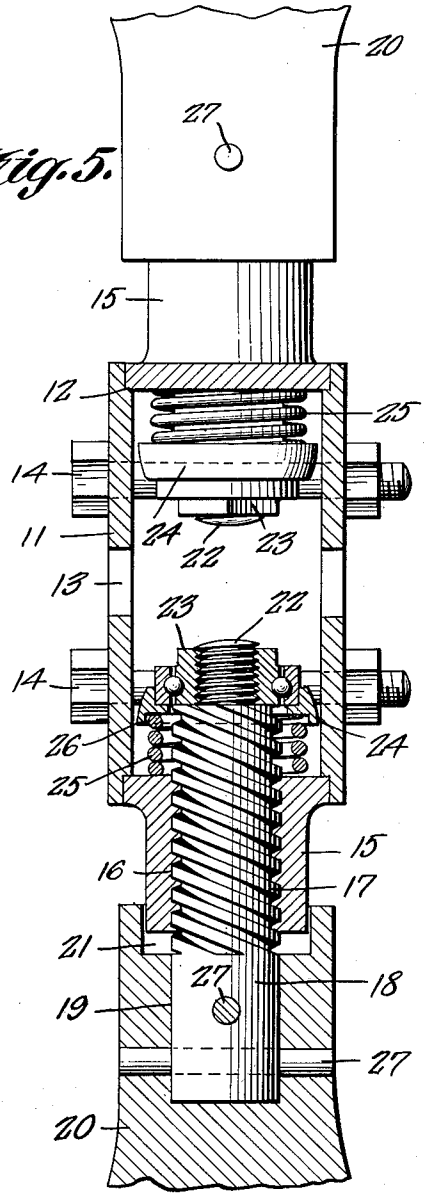


Fig. 5.



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Fig. 2.

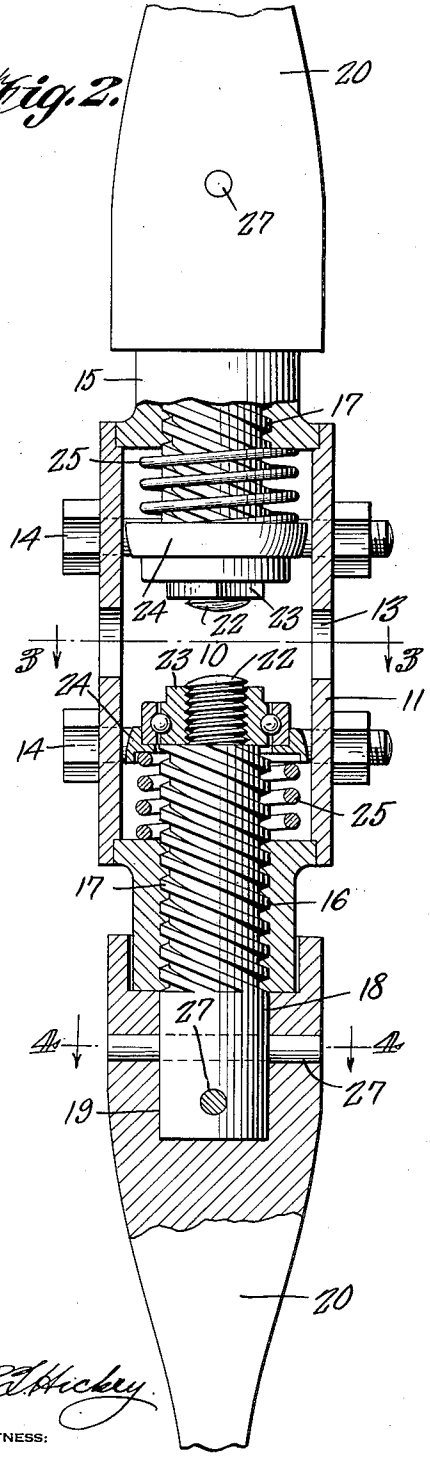


Fig. 3.

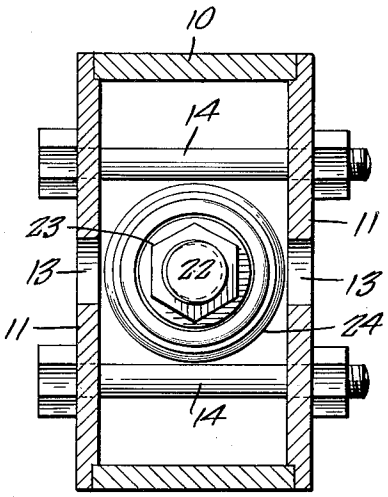
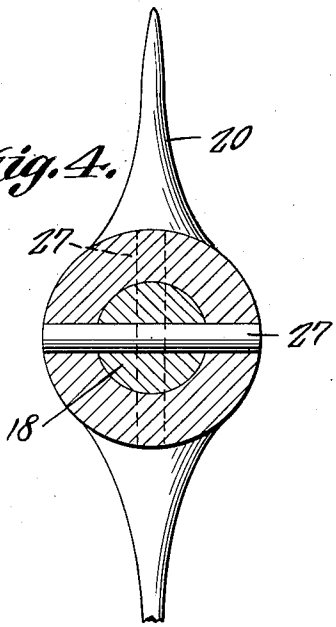


Fig. 4.



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UNITED STATES PATENT OFFICE

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VARIABLE-PITCH PROPELLER

Application filed April 12, 1929. Serial No. 354,597.

This invention relates to mountings for propeller blades and the like.

An object of the invention comprehends twist mountings for the blades whereby the latter in and of themselves will vary their own pitch commensurate with the driving velocity and centrifugal force attained.

Another object of the invention contemplates means for retracting the blades when the velocity and centrifugal force is decreased.

More specifically stated the twist mountings and retracting means are separated by bearing members to relieve binding action therebetween.

With the above and other objects in view, the invention further consists of the following novel features and details of construction, to be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the appended claim.

In the drawings:—

Figure 1 is an elevation of my improved type of propeller.

Figure 2 is a fragmentary longitudinal sectional view taken therethrough.

Figure 3 is a horizontal sectional view taken on line 3—3 of Figure 2.

Figure 4 is a detail sectional view taken on line 4—4 of Figure 2 and illustrating the connection of the blades with the twist mountings.

Figure 5 is a view similar to Figure 2 illustrating the extended position of one of the blades when the twist mountings are called into use.

Referring to the drawings in detail, wherein like characters of reference denote corresponding parts, the reference character 10 indicates generally the hub for the propeller in the nature of a drum and having closure plates 11 upon the sides thereof. Annular shoulders, provided upon the inner sides and adjacent the peripheries of the closure plates 11, are adapted to accommodate the peripheral edges of the drum, substantially as illustrated in Figures 2, 3 and 5 of the drawings. The closure plates 11 are furthermore provided with central apertures 13 adapted to accommodate the forwardly projecting end of a crank or other shaft, not shown. Fastening elements 14 are employed to join the closure plates and drum and to prevent weaving action of the completed structure.

Sleeve members 15, laterally projected in oppositely disposed relation upon diametrically opposite sides of the drum, are interiorly threaded, as indicated at 16, to accommodate the squared spirally arranged threads 17 upon the innermost projecting ends of shaft members 18. The outermost ends of the shaft members are projected within openings 19 axially aligned with the longitudinal centers of blade members 20 and upon the innermost ends thereof. The openings 19 are centrally located within socket openings 21 in the aforementioned ends of the blades 20 and which accommodate the outermost projecting ends of the sleeves 15 in the manner illustrated in Figures 2 and 5 of the drawings.

Reduced extensions 22, formed upon the innermost ends of the shaft members 18 within the drum 10, are adapted to carry bearing members 23 which abut the shoulder portions defined between the shaft members proper and said extensions. Collars, such as indicated at 24, lying flush against the bearing members 23, are adapted to receive the innermost end convolutions of compression springs 25 within seats 26 formed within the outer sides thereof, the springs 25 having contacting engagement at their opposite and outer ends with the inner side walls of the drum.

Cross pins 27, horizontally disposed through the innermost ends of the blades 20, are adapted for spaced intersecting relation within the outermost ends of the shaft members 18 within the openings 19.

At the outset, I desire to make it clear that I do not limit myself to the embodiment of the invention shown, for aeroplanes, inasmuch as the present construction could be effectively employed upon fan members for the cooling systems of internal combustion engines, screw propellers etc.

In the application of the present invention upon the hub constructions for aeroplane propellers, it is to be noted that initially, the

two blades are disposed nearly straight whereby the pilot's mechanician may stand directly in front of the propeller to crank same instead of standing to one side of the blades and require a helper to grasp his other hand and pull him out of the way when the blade is pushed down and the motor kicks over.

At idling speed, the springs 25 will be strong enough to prevent changing of the blade pitch and the entire fuselage will remain stationary.

When taking off, the motor is accelerated to greater than that of idling speed while taxiing down the runway and the centrifugal force attained through the velocity of the engine crank shaft will cause the shaft members 18 in conjunction with the blades 20 to twist and move outwardly against the compression of the springs 25. The greater the velocity, the greater the centrifugal force and greater the pitch of the blades with resulting acceleration of speed.

When employed for automobile use, that is, for the cooling systems therefor, it is to be noted that the advanced speed of the motor will in turn increase the pitch of the fan blades whereby more air will be drawn and thrown against the engine commensurate with the speed.

In either case, whether the invention is employed upon the blades for aeroplanes or for the cooling systems of internal combustion engines, it is noted that overheating of the engines incident to acceleration will be avoided inasmuch as in the instance of aeroplane use, the changing of the blade members will increase the speed which could not ordinarily be attained unless the motor was actuated more R. P. M.; whereas greater draft would be developed upon the increased acceleration of the internal combustion engine.

The invention is susceptible of various changes in its form, proportions and minor details of construction, and the right is herein reserved to make such changes as properly fall within the scope of the appended claim.

Having described the invention, what is claimed is:—

A propeller construction comprising a hub having sleeve members laterally projecting in oppositely disposed relation upon diametrically opposite sides thereof, shaft members spirally threaded within the bores of the sleeves, blade members having openings within their innermost ends to accommodate the outwardly projecting ends of the shaft members, said blades being further provided with socket openings within their innermost ends adapted to receive the outwardly projecting ends of the sleeves, bearing members carried upon the innermost free ends of the shaft members within the hub, collars arranged upon each of the bearing members, and compression springs encircling those portions of the shaft members within the hub and having contacting engagement at the opposed end convolutions thereof with the collars and adjacent portions of the sleeves.

In testimony whereof I affix my signature.

WILLIAM S. WILLIAMS.