June 21, 1932. B. F. KELLOGG ET AL 1,864,045

VARIABLE SPEED PROPELLER

Filed Nov. 2, 1931

Fig. 1

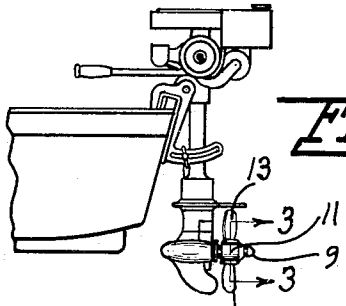


Fig. 2

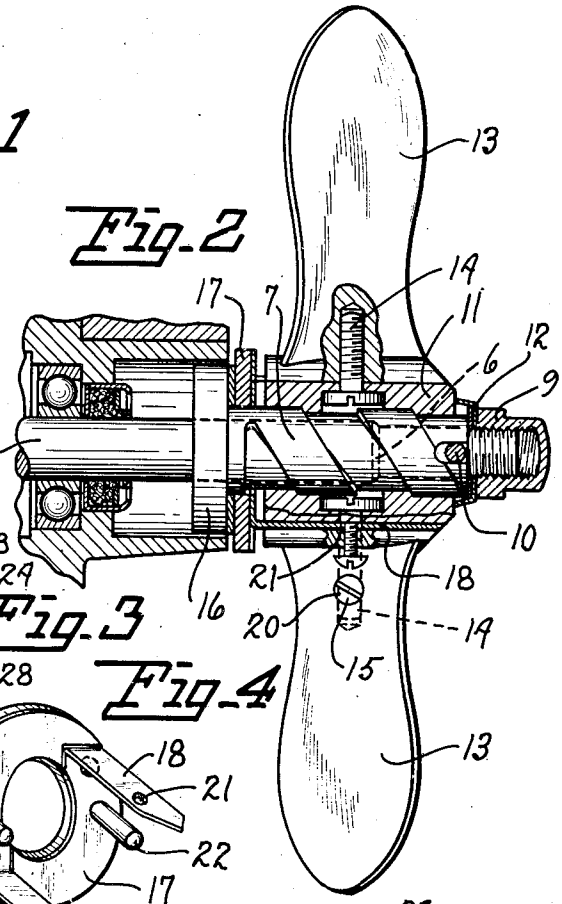


Fig. 3

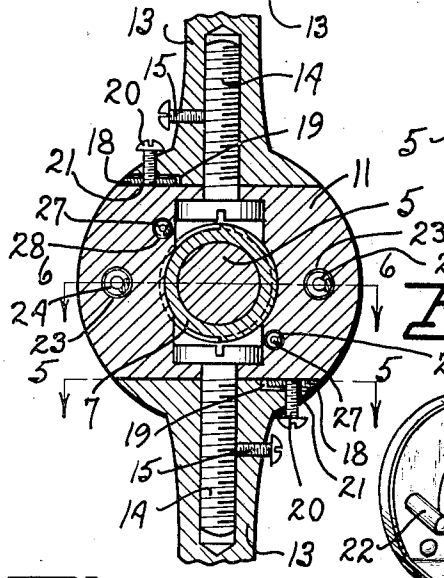


Fig. 4

Fig. 5

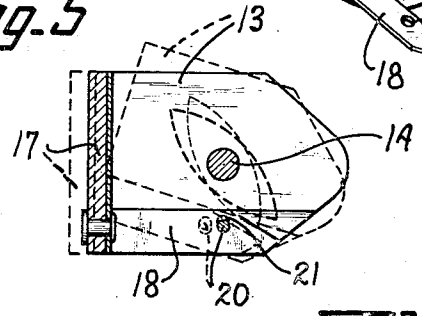


Fig. 6

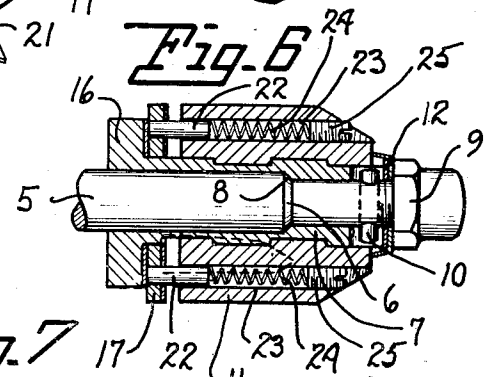
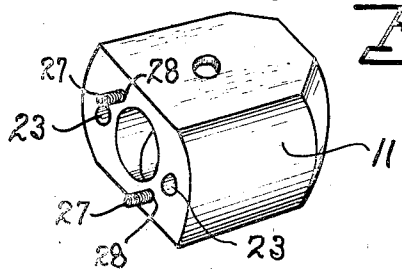


Fig. 7



Inventor

Bert F. Kellogg

Forrest M. Kent

By Glenn L. Fish

Attorney

Patented June 21, 1932

1,864,045

UNITED STATES PATENT OFFICE

BERT F. KELLOGG AND FORREST M. KENT, OF SPOKANE, WASHINGTON

VARIABLE SPEED PROPELLER

Application filed November 2, 1931. Serial No. 572,574.

Our invention relates to variable speed propellers and certain objects of the invention are to provide a propeller comprising means whereby the resistance to its rotary movement caused by its engagement with water or air automatically changes the pitch of its blades and whereby the pitch is directly increased or decreased in proportion to its rotary movement.

With the above and other objects in view which will appear as the description proceeds, the invention consists of the novel construction, adaptation, combination and arrangement of parts hereinafter described and claimed. These objects are accomplished by devices illustrated in the accompanying drawing; wherein:—

Figure 1 is a general view in side elevation showing the device installed on an outboard motor that is connected to the stern of a boat; Fig. 2 is a view in longitudinal vertical section of the propeller; Fig. 3 is a view in transverse vertical section taken substantially on a broken line 3—3 of Fig. 1; Fig. 4 is a detail view in perspective of the speed regulating member; Fig. 5 is a view in horizontal section taken on a broken line 5—5 of Fig. 3; Fig. 6 is a view in horizontal section taken on a broken line 6—6 of Fig. 3; and Fig. 7 is a detail view in perspective of the hub member.

Referring to the drawing throughout which like reference numerals indicate like parts, the numeral 5 designates a propeller shaft which may be for a marine engine, an outboard motor, or an air craft. The end portion of said shaft is reduced to form a male shoulder 6 and a wormed sleeve 7 is installed on said shaft with a female shoulder 8 therein which shoulder is held against the male shoulder by a nut 9 installed on the end of the shaft thus preventing thrust movement or play of the sleeve. A pin 10 is passed through said sleeve and shaft and prevents axial movement of the sleeve.

A hub member 11 is internally wormed to receive the wormed sleeve 7. The nut 9 also serves to retain said hub on the sleeve and a plurality of washers 12 are interposed between said nut and hub. Said hub is flat on two opposite faces and the flat inner ends of two propeller blades 13 are pivotally connected thereto by screws 14 installed from the interior of the hub and with their heads countersunk in the hub to clear the worms as will be understood. Set screws 15 may be used to keep the screws 14 from turning.

The wormed sleeve 7 has an enlarged shoulder 16 formed on its inner end and a speed regulating disc member 17 is revolubly installed on said sleeve between said enlarged shoulder and the inner end of the hub 11. Said disc member has a pair of diametrically opposite flat arms 18 fixed thereto and extending rearwardly into grooves 19 formed in the inner flat ends of the propeller blades 13. Said flat arms are pivotally and eccentrically connected to the flat ends of the propeller blades by screws 20 passing through holes therein and threaded into holes 21 in the flat arms. The speed regulating disc member is further provided with diametrically opposite pins 22 extending rearwardly and slidably into holes 23 in the hub 11 and against springs 24 installed within said holes. The rear ends of said holes are closed by screws 25 which are used for regulating the tension of said springs.

The hub 11 also has a pair of small pins 26 extending into holes in its forward end and against small springs 27 installed within said holes and said pins are arranged to be threaded into holes 28 in the disc member 17. It will thus be apparent that said small springs together with the larger springs 24 are adapted to normally retain the speed regulating disc member 17 away from the hub 11 in which position the arms 18, fixed to said disc, hold the propeller blades 13 in the position indicated in dotted lines in Fig. 5 of the drawing. This normal position of the propeller blades will prevail as long as they are at a standstill or revolving very slowly.

When the propeller shaft 5 is set in rapid motion the resistance of the propeller blades to rotary movement caused by their frictional engagement with the water or air causes the hub 11 to move forward by reason of its worm connection with the sleeve 7. In other words, the resistance of the water or air retards the

rotary movement of the propeller blades causing them to rotate slower than the propeller shaft. The propeller shaft will therefore, by reason of the worm sleeve fixed thereto, draw the wormed hub 11 forward and toward the speed regulating disc 17.

The propeller blades 13 are concentrically pivoted to the hub 11 and eccentrically pivoted to the arms 18 which are fixed to the speed regulating disc 17 as hereinbefore set forth. Therefore when said hub moves forward said arms cause the propeller blades to turn on their pivotal connections with said hub, which are the screws 14, thus changing the pitch of the propeller blades as indicated in full lines in Fig. 5. The pitch of the propeller blades will therefore be increased or made greater as they move forward and the faster the propeller shaft rotates the further forward the propeller blades will move and the greater their pitch will be increased. The tension of the springs 24 and 27 will also be increased and when the propeller shaft and blades cease their rotary movement said springs will move the hub back to the normally retracted position whereby the pitch of the blades will be again decreased to their original pitch.

Having thus described our invention, it being understood that minor changes in its construction and arrangement may be resorted to without departing from the scope and spirit of our invention, what we claim and desire to secure by Letters Patent of the United States is:—

1. A variable speed propeller comprising in combination a wormed shaft, a wormed hub mounted on the shaft, propeller blades concentrically pivoted to the hub, and a disc member revolubly mounted on the shaft and having arms eccentrically pivoted to the propeller blades.

2. A variable speed propeller comprising in combination a wormed shaft, a wormed hub mounted on said shaft, propeller blades concentrically pivoted to the hub, a disc member mounted on the shaft, spring means interposed between said disc member and the hub whereby said hub and its propeller blades are normally retained in a retracted position away from the disc member, and arms fixed to the disc member and eccentrically pivoted to the propeller blades.

3. A variable speed propeller having in combination a shaft, a wormed sleeve fixed on said shaft, a wormed hub mounted on said sleeve, propeller blades concentrically pivoted to said hub, a disc member revolubly mounted on the sleeve adjacent the hub, springs arranged to normally hold the hub away from the disc member, arms fixed to the disc member, and said arms eccentrically pivoted to the propeller blades whereby said blades are turned on their concentric pivots when the hub is moved toward the disc member.

In testimony whereof we affix our signatures.

BERT F. KELLOGG.
FORREST M. KENT.