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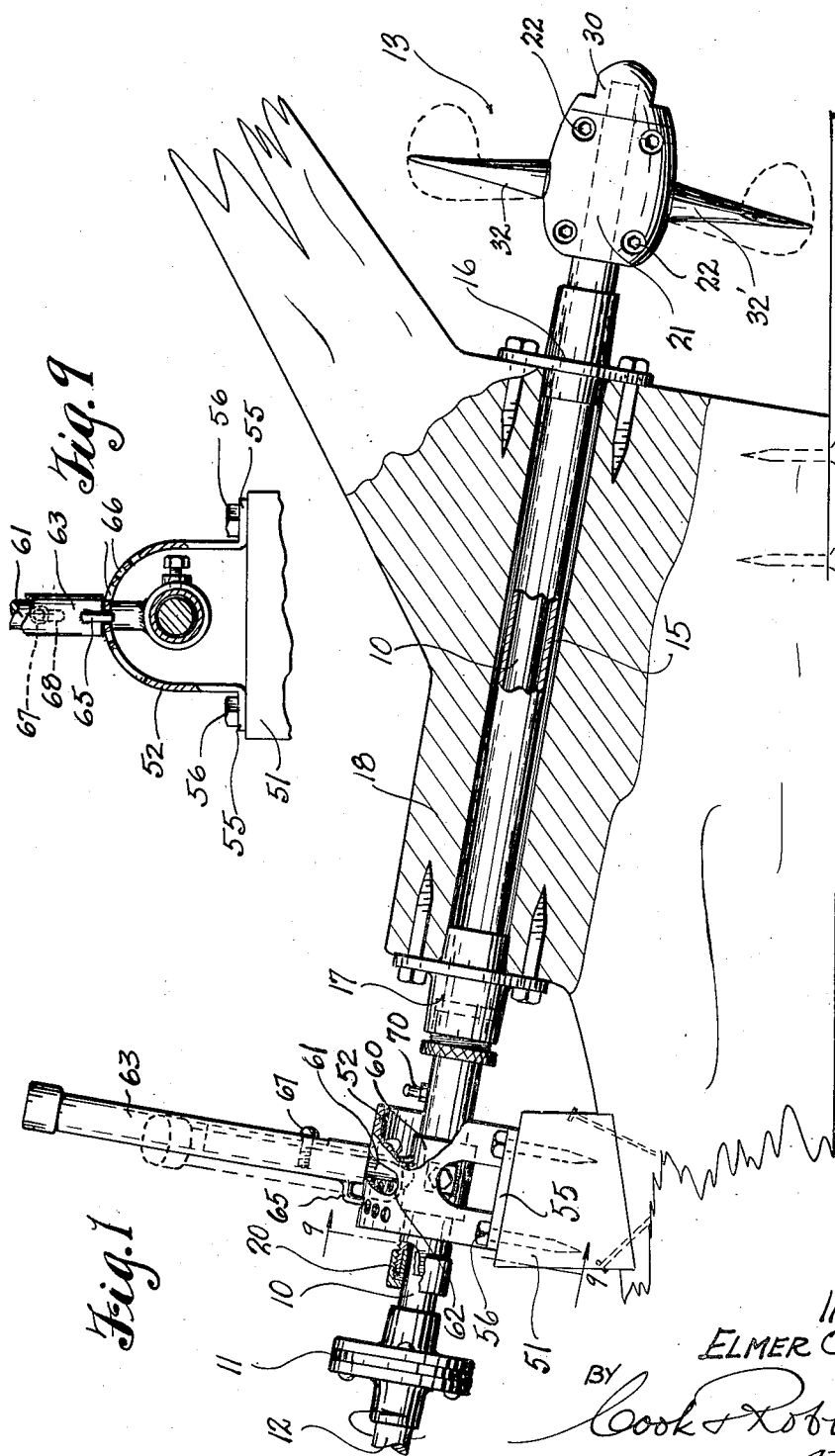
E. O. PEARSON

2,582,559

VARIABLE PITCH PROPELLER

Filed April 14, 1947

3 Sheets-Sheet 1



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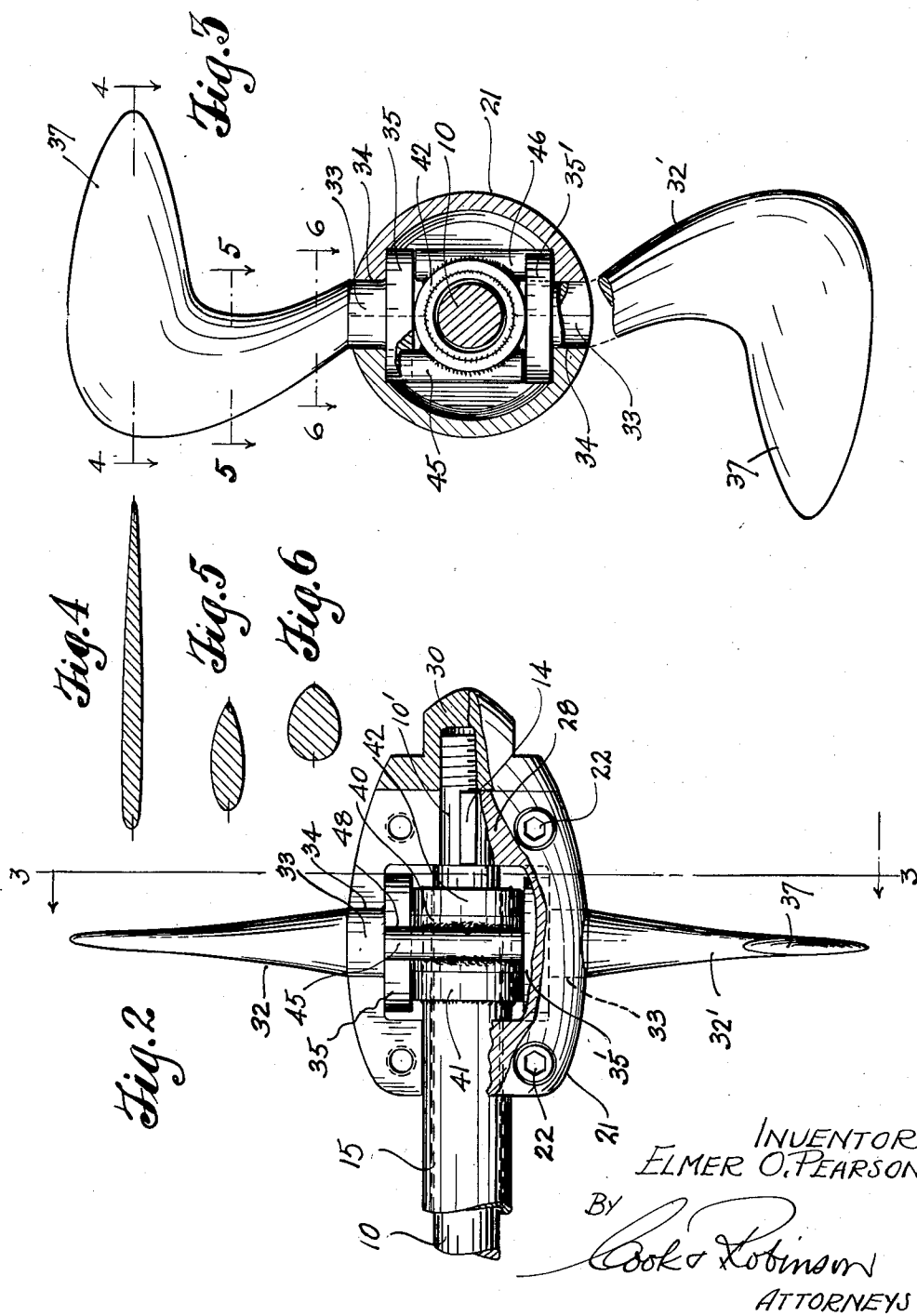
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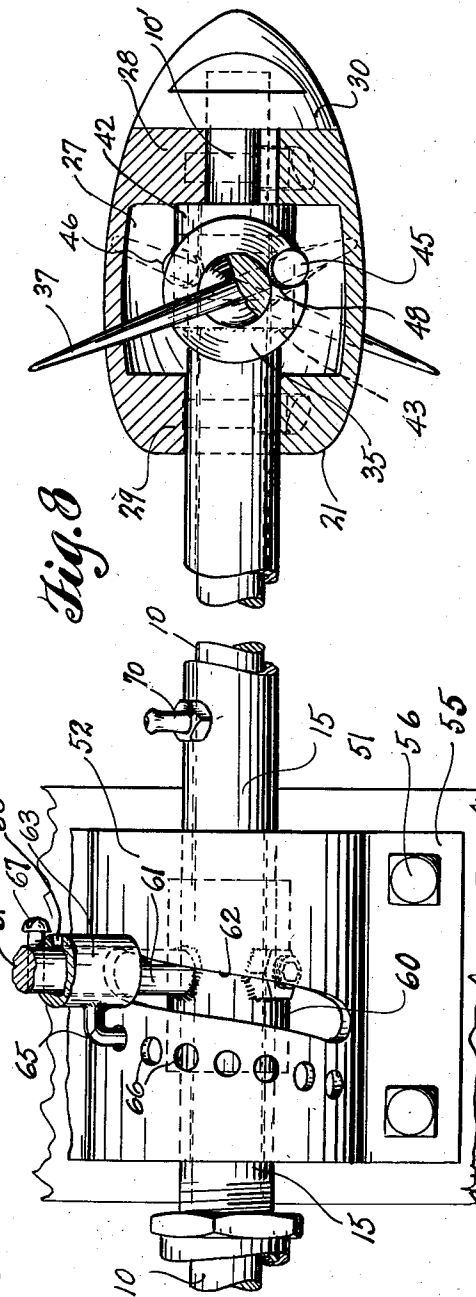
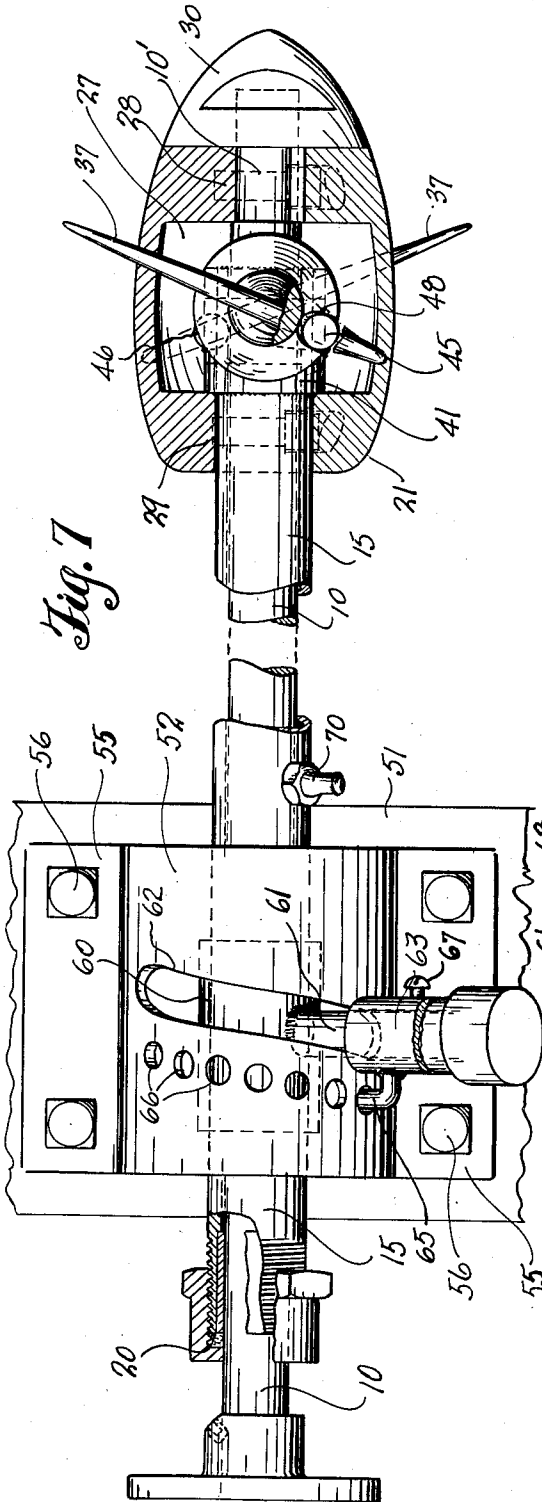
E. O. PEARSON

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INVENTOR
ELMER O. PEARSON
BY *Cook & Robinson*
ATTORNEYS

UNITED STATES PATENT OFFICE

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VARIABLE PITCH PROPELLER

Elmer O. Pearson, Burton, Wash.

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3 Claims. (Cl. 170—160.47)

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This invention relates to propellers and it has reference more particularly to reversible, variable pitch propellers of a type especially advantageous and desirable for the propulsion of pleasure and fishing boats although not to be limited to any particular kind, type or size of boat.

It is the principal object of this invention to provide a propeller of the above stated kind and adjusting means therefor, that embodies novel features and a minimum of parts; that has blades of novel design that may be easily and readily adjusted for either forward or reverse driving or placed in a neutral setting at which they run free and avoid driving the boat in either a forward or reverse direction.

It is also an object of this invention to provide a propeller of the character above stated having blades that are symmetrically formed, that is, blades that will produce the same propelling effect in either forward or reverse setting, and which at a neutral setting have no propelling effect.

Another object of the invention is to provide novel means for the mounting of the propeller blades and novel means for effecting their adjustment by a person controlling the boat.

Still further objects of the invention reside in the details of construction of parts that simplifies and lessens the manufacturing costs, and facilitates assembly, or disassembly if repair is required.

In accomplishing the above mentioned and other objects of the invention, I have provided the improved details of construction, the preferred forms of which are illustrated in the accompanying drawings wherein—

Fig. 1 is a side elevation of a propeller embodied by the present invention, together with its drive shaft and its pitch changing and retaining means, certain parts being broken away for better illustration.

Fig. 2 is a side view of the propeller, showing it as set in a neutral propelling position; a part of the blade mounting housing being broken away for better illustration of parts enclosed therein.

Fig. 3 is a cross sectional view, taken substantially on the line 3—3 in Fig. 2.

Figs. 4, 5 and 6 are sectional views taken, respectively, on lines 4—4, 5—5 and 6—6, in Fig. 3, illustrating the propeller blade design.

Fig. 7 is a top view of the propeller and its pitch reversing, adjusting and retaining means, parts being shown in section for better understanding of details.

Fig. 8 is a view similar to that of Fig. 7, but showing the propeller in a reversed position.

Fig. 9 is a cross section taken on the line 9—9 in Fig. 1.

Referring more in detail to the drawings:

In Fig. 1, 10 designates the propeller drive

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shaft; this being connected by means of a suitable coupling means, designated at 11, with a driving shaft 12 which may be an engine shaft or an extension from an engine shaft.

The propeller embodied by this invention, is designated in its entirety in Fig. 1, by reference numeral 13 and it is shown in Fig. 2 as having a keyed connection, designated at 14, with the propeller shaft. Fitted about and extended along the drive shaft 10 in such manner that the latter may revolve freely therein, is a tube or sleeve 15. This sleeve also is mounted for endwise movement along the shaft 10 and is slidably contained near its opposite ends, respectively, within a stern bearing 16 and a stuffing box 17; these parts being fixed, respectively, to the outer and inner ends of the shaft log 18 contained in the stern end of the keel. The tube, or sleeve 15, extends somewhat beyond the stuffing box within the boat and at its inner end is equipped with a packing gland 20 as noted best in Fig. 7, through which the drive shaft 10 extends.

The propeller 13 is shown best in Figs. 2 and 3 as comprising a hub housing 21 made up of complementary opposite side portions which are fitted together and secured by bolts 22, as shown in Fig. 1. The hub housing thus provided, is formed with an interior chamber 27 and there are bearing portions 28 and 29 at its opposite ends. The bearing 28 is fitted about a slightly diametrically reduced end portion 10' of the drive shaft 10 and is secured against turning thereon by the key 14 previously mentioned. A nut 30 is threaded onto the end of the shaft 10 against the housing and holds it secure. The bearing portion 29 is fitted in a close joint about the sleeve 15 and permits the hub to revolve freely about the sleeve.

Mounted in the housing and extending radially in opposite directions therefrom are the propeller blades which are designated by numerals 32 and 32', each blade is like the other and has a short mounting journal 33 at its inner end. These journals are revolvably fitted in openings 34 located in diametric alignment in opposite walls of the hub as shown best in Fig. 3, and at their inner ends the journals are equipped with flat circular head portions 35—35', disposed in planes that are parallel to each other and to the shaft and are fitted flatly against opposite inside surfaces of the chamber 27, as noted in Figs. 2 and 3.

Beyond their journal portions, the propeller blades extend outwardly and in a somewhat leading direction and at their outer ends are formed with trailing fins or wings 37 of substantial length. It is shown in Figs. 4, 5 and 6 that the outer portion of each blade, including the fin portion, provides a thin elongated portion that will cut easily through the water and give an extended pressure surface. Also it is to be observed by the several sectional views, that each

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blade is symmetrically formed on forward and rearward sides so that it will have a like propelling action in its forward and reverse setting.

The sleeve 15 terminates at its rearward end within the hub chamber 27 and there has a nut 40 fitted revolubly thereon. This nut is held closely between two spaced collars 41 and 42 that are welded to the sleeve. Also, welded to the nut at opposite sides as shown best in Fig. 3, are pins 45 and 46, disposed in parallel relationship. The pin 45 extends at one end into a radial, outwardly opening slot 48 formed in the periphery of the head portion 35 at the inner end of the blade 32 and the other pin extends in the opposite direction and is likewise contained within a radial slot 48 formed in the head portion 35' of the blade 32'.

By reason of the pin and slot connections with the heads 35 and 35', the shifting of the sleeve 15 longitudinally, will effect rotative adjustment of the blades equally and in opposite directions. The longitudinal adjustment of the sleeve 15 from a neutral position, as seen in Fig. 2, to its limit of travel in one direction, will cause the blades to be set for forward propelling of the boat at a maximum speed and when adjusted in the opposite direction from neutral setting will shift the blades to their position for reverse propelling at maximum speed. At the neutral or intermediate position, the propeller blades will be held at their neutral setting, at which the propeller turns freely without propelling action. Thus, by the adjustment of the sleeve 15, the propeller blades may be adjusted between forward and reverse driving positions, and also adjusted to various degrees to effect any desired propelling speed between the neutral and maximum speed in either direction as provided for by the propeller and engine.

In order to effect the adjustment of the sleeve, for the change in direction and amount of propelling force, I provide a hand control mechanism within the boat in connection with the sleeve.

Referring now more particularly to Fig. 1, it is therein shown that a block 51 is fixed upon the boat bottom forwardly of the shaft log, and mounted upon this block, is an upwardly arched metal housing 52 through which the inner end portion of the tube 15 and the enclosed shaft 10 extend with clearance, as understood best by reference to Fig. 9. The upwardly arched portion of the housing 52 is curved about the axial line of the sleeve and shaft and at its opposite sides has extended flanges 55 through which bolts 56 are extended to secure the housing to the block 51.

Fixed about the sleeve 15 within the housing 52, is a collar 60 and extended perpendicularly from the collar in an upward direction, is a rigid post 61. This post passes through and is movable along a slot 62 that is formed in the arched portion of the housing 52, transversely directed with respect to the axial line of the shaft and also extended in a spiral direction relative thereto, as will be understood best by reference to Figs. 7 and 8.

The post 61 co-acts with the slot in such a manner that upon its being shifted from one side of the housing toward the other, it will cause the sleeve 15 to be shifted endwise on the drive shaft 10 and, by reason of this shifting, causes the blades of the propeller to be adjusted accordingly. The setting of parts is such that when the post is in an upright position, the pro-

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peller blades will be held in neutral setting. By swinging the post toward one side, the propeller blades will be simultaneously and equally adjusted toward their maximum pitch for forward propelling action. When the post is adjusted in the opposite direction from a neutral setting, the blades will, likewise, be adjusted toward maximum reverse propelling direction.

In order that the post 61 may be easily shifted and also held at any set position, I have applied a tubular extension member 63 thereto. This extension post is tubular and is telescopically slidable on the post 61 and is extended to a suitable length for easy handling as shown in Fig. 1. At the inner end of the extension post 63 is a laterally offset and downwardly directed finger 65 that may be selectively disposed in any one of a series of holes 66, formed in the housing 52 in a line parallel with the slot 62 so as to hold the post against shifting from any setting of the propeller. When it is desired to change the setting of the propeller, the post extension 63 is merely pulled outwardly on the post 61 to disengage the finger 65 from the hole in which it may be engaged and the adjustment to either side is made as desired.

The extension post 63 is held against turning on post 61, and also against displacement therefrom by a holding and guiding screw 67 that is passed through a short longitudinal slot 68 in the lower end portion of the extension post and is fixed in the post 61 as best shown in Figs. 1 and 9. This limits the in and out shifting of the post and also by preventing rotation, eliminates any binding action that would interfere with easy release of the finger from a hole.

It is illustrated in Fig. 1, that a grease fitting 70 is applied to sleeve 15 through which a lubricant may be injected into the sleeve to keep parts in good working order.

Assuming the parts to be so constructed and assembled, it will be understood that the propeller 13 is driven directly through the shaft 10 in the usual manner, and that the shifting of the sleeve 15 may be accomplished easily and readily merely upon lifting the post 63 and disengaging the finger 65 at its lower end from the housing 52, then pushing the post toward one side or the other, as desired or required to provide the change in degree and direction of pitch of the propeller blades. The present propeller is a very advantageous and desirable form for use in trolling operations as it permits the operator to vary his speed at will and even to reverse the direction of travel when this is advisable.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:

1. In a boat, a shaft log having bearings at inner and outer ends thereof, a sleeve mounted in said bearings for rotation and longitudinal shifting, a propeller shaft passing through the log and contained revolubly in the sleeve without longitudinal movement, a propeller hub fixed to the outer end of the shaft to rotate therewith, propeller blades mounted on the hub and adjustable thereon for change in direction and degree of pitch, means operatively connecting the sleeve at its outer end with said blades whereby shifting it along the shaft in opposite directions from a neutral setting will simultaneously adjust the blades from a neutral setting for forward and reverse propulsion, respectively, to a degree corresponding to the extent of shifting, a housing fixed in the boat and having a cylindrically curved

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wall portion extending about a portion of the said sleeve coaxially thereof and formed with a cam slot that is directed spirally of the sleeve, a lever arm fixed rigidly to the sleeve and extended through said cam slot and shiftable therealong in opposite directions from a neutral setting to effect the longitudinal shifting of said sleeve in opposite directions, a latch device on the lever arm engageable with the housing to retain the arm at set positions of adjustment.

2. A structure as recited in claim 1 wherein a row of holes is formed in said housing along the said cam slot, and wherein the said latch device comprises a sleeve that is longitudinally movable on the lever arm, and having a finger extended therefrom at its inner end and adapted to be selectively engaged in said holes to retain the lever arm at a set position of adjustment.

3. A combination as recited in claim 1 wherein the propeller hub is hollow and said propeller blades have mounting stems rotatably mounted in the hub wall and extended to the inside thereof, each with a disk-like securing head at its inner end formed with a radial slot, and wherein the said sleeve extends into the hollow hub

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and has a collar rotatably fixed thereon, and pivot pins extend from the collar into the radial slots of said securing heads to effect an operating connection between the sleeve and blades for rotatable adjustment of the latter.

ELMER O. PEARSON.

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