BEST AVAILABLE COPY

Oct. 18, 1938. A. P. HUNTER ET AL 2,133,519

REVERSIBLE PROPELLER

Filed Nov. 3, 1936

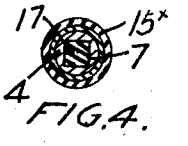


FIG. 4.

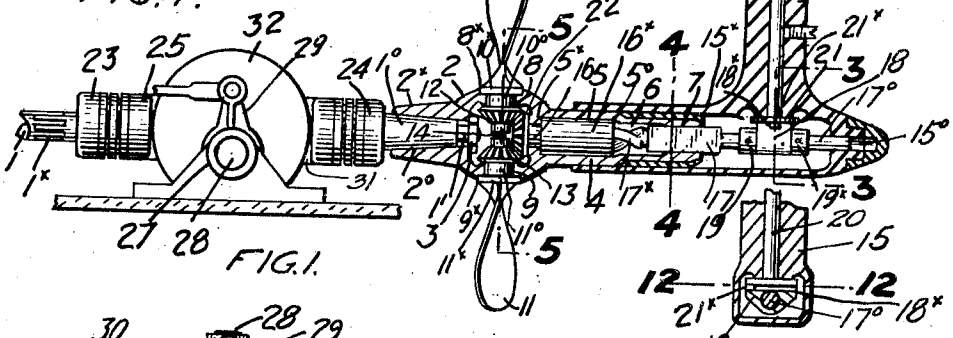


FIG. 1.

FIG. 3.

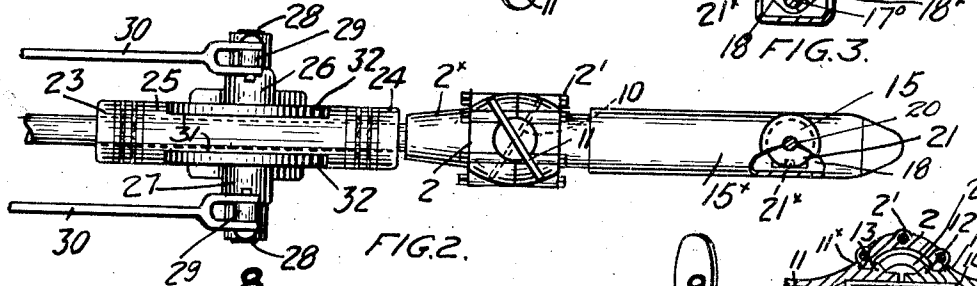


FIG. 2.

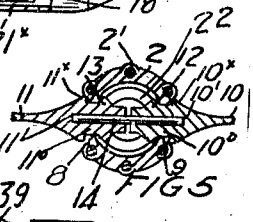


FIG. 5.

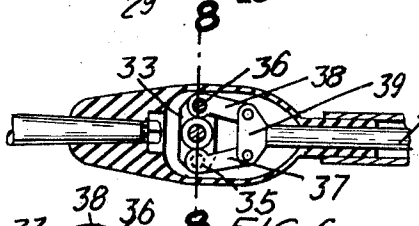


FIG. 6.

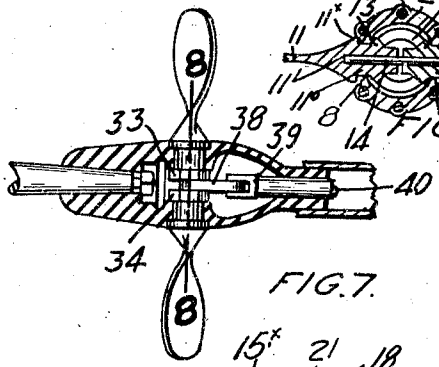


FIG. 7.

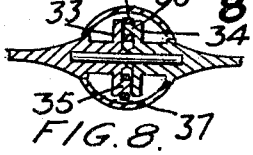


FIG. 8.

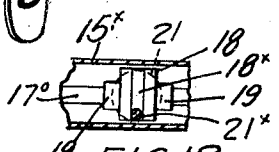


FIG. 12.

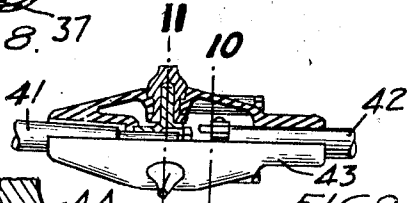


FIG. 9.

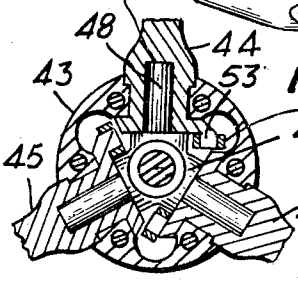


FIG. 11.

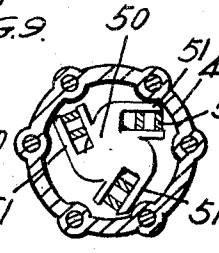


FIG. 10.

INVENTORS
A. P. HUNTER
A. E. PEARSON.
BY
ATTORNEYS.

Patented Oct. 18, 1938 2,133,519

UNITED STATES PATENT OFFICE

2,133,519

REVERSIBLE PROPELLER

Alastair Peter Hunter, Orillia, Ontario, and August Eric Pearson, Toronto, Ontario, Canada

Application November 3, 1936, Serial No. 108,984

1 Claim. (Cl. 115—34)

Our invention relates to improvements in reversible propellers, and the object of the invention is to devise a propeller of this type in which the propeller shaft is divided into two members and is actuated by the longitudinal movement of either member in relation to the other to give the blades the required set, and in which the blades, when set, are more rigidly held in their set position, and it consists essentially of the arrangement and construction of parts as hereinafter more particularly explained.

Fig. 1 is a longitudinal section through our device.

Fig. 2 is a plan view of our device.

Fig. 3 is a sectional detail on line 3—3 Fig. 1.

Fig. 4 is a sectional detail on line 4—4 Fig. 1.

Fig. 5 is a sectional detail on line 5—5 Fig. 1.

Fig. 6 is a sectional view of a modified construction.

Fig. 7 is a sectional plan view of the construction illustrated in Fig. 6.

Fig. 8 is a sectional detail on line 8—8 Figs. 6 and 7.

Fig. 9 is a view partially in elevation and partially in section of a further modification.

Fig. 10 is an enlarged transverse sectional view on line 10—10 Fig. 9.

Fig. 11 is a similar view to Fig. 10 on line 11—11 Fig. 9.

Fig. 12 is a sectional detail on line 12—12 Fig. 3.

In the drawing like characters of reference indicate corresponding parts in each figure.

1 indicates the engine shaft on which the propeller body 2 forming a gear housing is mounted at one end. The body 2 is divided centrally, the divided parts being secured together by bolts 2^1. In order to connect the engine shaft 1 to the body 2 one body portion is provided with a sleeve portion $2^\times$ having an inwardly tapered orifice 2^0 into which the tapered end 1^0 of the engine shaft 1 is driven. The inner end of the portion 1^0 is provided with a reduced threaded stem 1^1 on which a nut 3 is screwed to bear against the inner end of the sleeve portion $2^\times$.

4 is a sleeve portion extending from the other body portion diametrically opposite and in axial alignment with the sleeve portion $2^\times$. Internally the sleeve portion 4 is provided with a cylindrical enlargement 5 forming end shoulders $5^\times$ and 5^0, an intermediate cylindrical portion 6 and a squared portion 7. 8 and 9 are diametric orifices centered on the dividing line between the members of the body 2 and provided at their outer ends with annular concentric recesses $8^\times$ and $9^\times$.

10 and 11 are the propeller blades provided with circular inner ends $10^\times$ and $11^\times$ turnably fitting the recesses $8^\times$ and $9^\times$ from which extend studs 10^0 and 11^0 turnably fitting the orifices 8 and 9. The opposing ends of the studs 10^0 and 11^0 carry bevel gears 12 and 13 which are held in axial alignment by a pin 14 fitting in axially aligned orifices 10^1 and 11^1 (see Fig. 5).

15 is a supporting strut which depends in the usual manner at the stern of the boat and is provided at its lower end with a bearing sleeve $15^\times$ in which the sleeve portion 4 of the propeller body turnably fits.

16 is a control shaft divided into two portions one of which is journalled in the sleeve 4 and provided with an internally threaded sleeve enlargement $16^\times$. The other portion of the control shaft forms a thrust member and comprises a squared portion 17 slidably fitting the squared portion 7 of the sleeve 4 from one end of which extends a worm $17^\times$ engaging the internal thread of the sleeve $16^\times$ and from the other end of which extends a reduced portion 17^0 mounted at its opposite end in a bearing orifice 15^0. 18 is a block carried on the reduced portion 17^0 between two collars 19 and $19^\times$ and provided with a transverse groove $18^\times$. 20 is a control spindle, to the lower end of which is secured a disc 21 having a projection $21^\times$ extending into the groove $18^\times$.

By turning the spindle 20 the projection $21^\times$ engages the groove $18^\times$ exerting through the block 18 a longitudinal thrust on the portions 17^0, 18 and $17^\times$ forcing the worm $17^\times$ longitudinally of the sleeve $16^\times$ rotating the same by its engaged thread together with the gear 22. The gear 22 meshing with gears 12 and 13 rotates them in opposite directions together with the blades 10 and 11 to set them either for forward or rearward direction drive as required.

If it is desired to operate the reversing mechanism from a position forward, we divide the engine shaft and provide a slidable connection between the divided parts as indicated at $1^\times$. 23 and 24 are thrust bearings. 25 is a sleeve mounted on the engine shaft between the thrust bearings 23 and 24. 26 and 27 are bearings located at each side of the sleeve in which are mounted shafts 28 to each of which is secured a crank 29 connected by links 30 to a suitable operating lever not shown. The opposite sides of the sleeve are recessed as indicated at 31 in which recesses fit discs 32 eccentrically mounted on the shafts 28 to engage the opposite ends of the recesses 31. By swinging the cranks 29 forward or back the eccentrics engage the ends of the recesses to force the sleeve 25 in a correspond-

ing direction against the thrust bearings carrying the movable portion of the engine shaft longitudinally together with the propeller body carried thereby and forcing the cylinder **16** longitudinally of the worm **17**× to rotate the gear **22** and thereby adjust the blades **10** and **11** to the forward and reverse positions.

In Figures 6, 7 and 8 we have shown a modified structure in which the gears **12** and **13** of Figures 1–5 are replaced by crank arms **33** and **34** provided with crank pins **35** and **36**. Links **37** and **38** are mounted at one end on the crank pins **35** and **36** and pivoted at the opposite end to a head **39** formed integral with the control shaft **40** which is operated in a similar manner to that above described in connection with Figures 1 to 5.

In Figures 9 to 11 we show a triple bladed propeller to which the construction of Figures 6 to 8 is applied. In Figures 9 to 11, **41** is the engine shaft and **42** the control shaft journalled in the propeller body **43**. **44**, **45** and **46** are the stub ends of the propeller blades journalled in the body **43** in a manner similar to that previously described with the exception that instead of the pin **14** we employ a spider **47** having pin projections **48** extending into orifices **49** formed axially in the stub ends and the head **50** corresponding to the head **39** of Figs. 6 and 7 is provided with three jaws **51** instead of two connected by links **52** to the cranks **53** of the propeller blades **44**, **45** and **46**.

What we claim as our invention is:—

The combination with the depending stern strut of a boat and the rotatable propeller, the blades of which are adjustable around their axis, of a longitudinally movable member, means operated thereby for imparting the required set to the propeller blades, a vertical control spindle mounted in the strut, a disc secured to the lower end of the strut, a projection extending from the lower face of the disc, a block mounted freely on the longitudinally movable member, a collar secured to such member at each side of the block, and a groove formed in the upper face of the block into which the disc projection slidably fits.

ALASTAIR PETER HUNTER.
AUGUST ERIC PEARSON.