United States Patent

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[54] **PROPELLER ASSEMBLY**
1 Claim, 8 Drawing Figs.

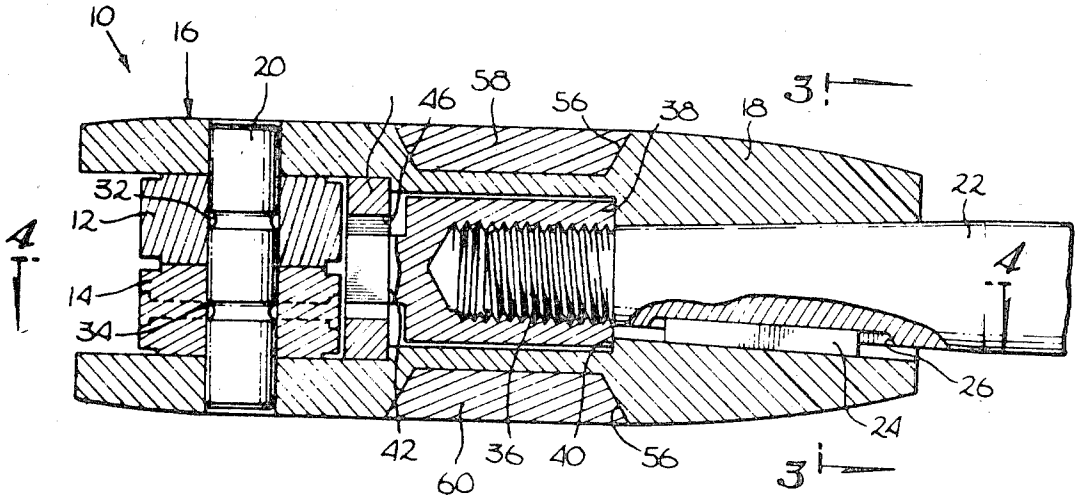
[52] **U.S. Cl.** **416/142**
[51] **Int. Cl.** **B63h 1/24**
[50] **Field of Search** 416/142, 244, 134, 135, 146

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ABSTRACT: A boat propeller having a pair of foldable propelling blades which are connected to the engine drive shaft through a dual-nut assembly comprising a first nut about the drive shaft and a locking nut about the first nut. The foldable propelling blades are connected to the drive shaft through a bolt which is slidable within a drive shaft sleeve.



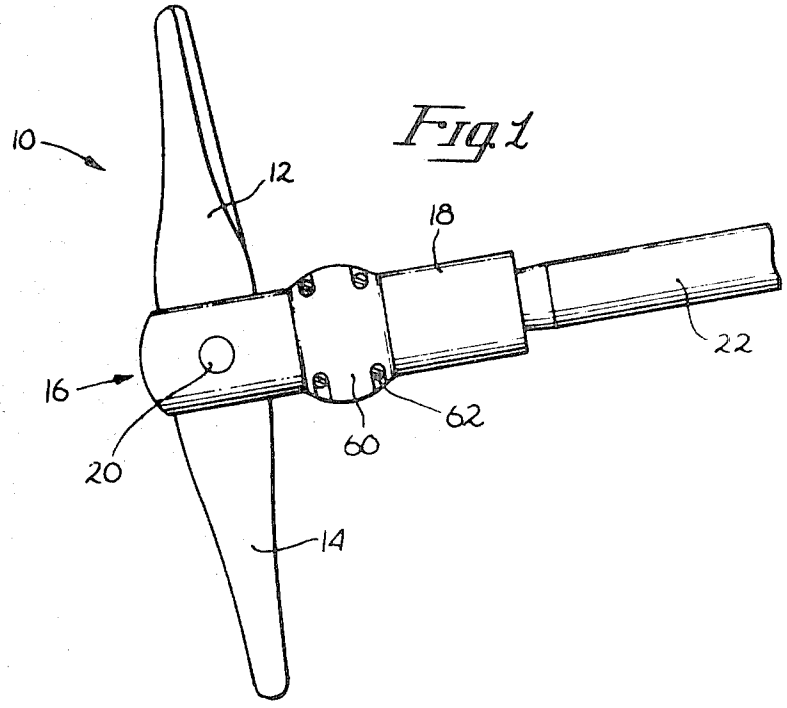


Fig. 1

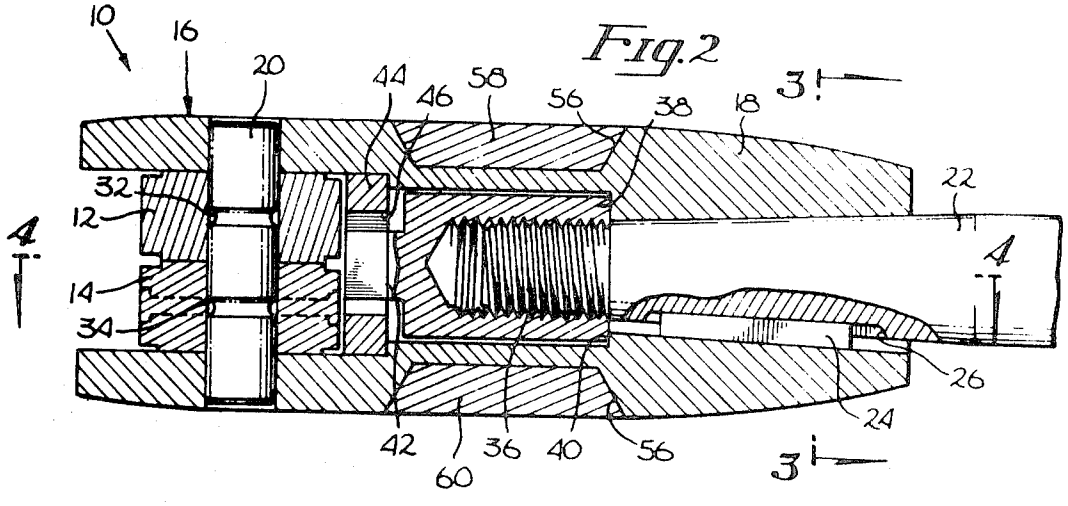


Fig. 2

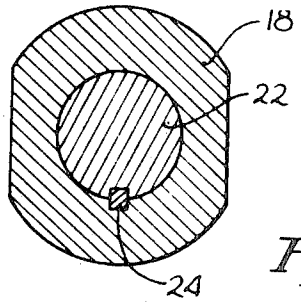


Fig. 3

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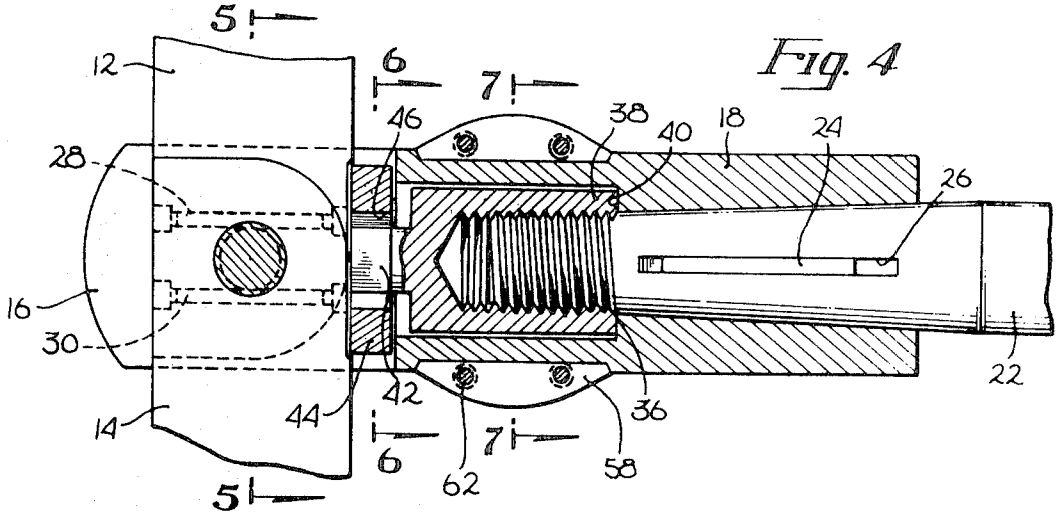


Fig. 4

Fig. 5

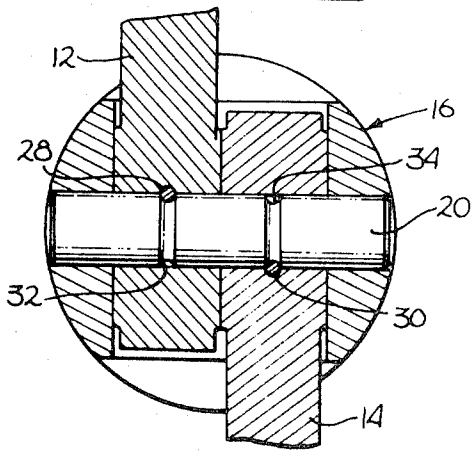
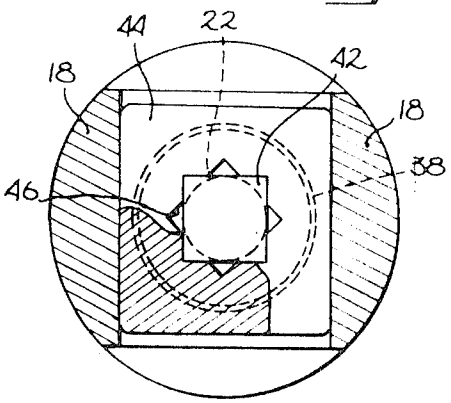


Fig. 6



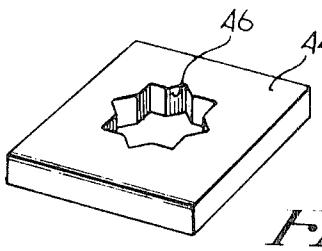


Fig. 8

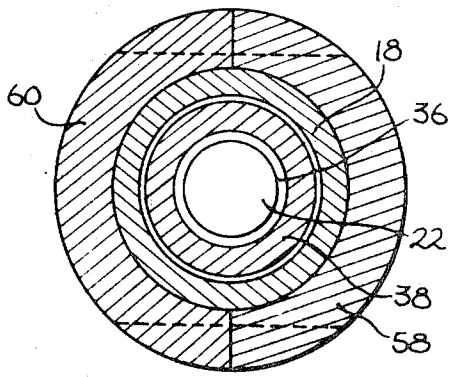


Fig. 7

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PROPELLER ASSEMBLY

BACKGROUND OF THE INVENTION

The field of this invention relates to the moving of a physical mass through a fluid and more specifically to the employment of a propeller assembly to effect movement of the mass against the fluid.

The apparatus of this invention has been found to be especially useful wherever the propeller is not the primary means of motivation as, for example, in sailboats. A propeller-driven motor is employed only occasionally as into and out of ports, yet the mounted propeller exhibits substantial drag when the sailboat is being sailed. Previously, the problem of drag has been solved by detaching the propeller and keeping it on board until needed. However, the inconvenience, besides the time lost in reinstalling the propeller, makes this procedure most undesirable.

Heretofore, there has been designed a propeller assembly which would overcome the above-noted problems. However, even though the propeller is collapsible, thereby decreasing drag, such assemblies tend to be complex in design and not the most positive connection is achieved between the propeller and the drive shaft.

SUMMARY OF THE INVENTION

The propeller assembly of this invention relates to the mounting rotatably of a pair of propeller blades so that they are capable of assuming either an open or a folded position. In the open position the blades are in the same plane, and in the folded position the blades are in substantial alignment with the drive shaft. In this folded position the blades are in abutting relationship and substantially blend with the drive shaft to minimize drag. More specifically, the propeller assembly of this invention includes a first nut attached to the drive shaft with the first nut having a wrench member fixedly attached thereto. A second nut is to cooperate with the wrench member to secure the first nut with respect to the propeller blades.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an overall side view of the propeller assembly of this invention showing how it would look as installed;

FIG. 2 is a longitudinal sectional view of the propeller assembly of this invention;

FIG. 3 is a sectional view taken along line 3–3 of FIG. 2;

FIG. 4 is a longitudinal sectional view taken along line 4–4 of FIG. 2;

FIG. 5 is a sectional view taken along line 5–5 of FIG. 4 showing the propeller blade attachments;

FIG. 6 is a partly in section view taken along line 6–6 of FIG. 4 showing the locking nut in position;

FIG. 7 is a sectional view of the first nut taken along line 7–7 of FIG. 4; and

FIG. 8 is an overall perspective view of the locking nut employed in this invention.

DETAILED DESCRIPTION OF THE SHOWN EMBODIMENT

Referring particularly to the drawings, there is shown in FIG. 1 a propeller assembly 10 having a pair of propeller blades 12 and 14. Each of the blades 12 and 14 is rotatably supported by a pivot bolt 20 between the bifurcated end 16 of a sleeve 18. The blades 12 and 14 are permitted to rotate 90° from a position in an abutting relationship with each other to a position approximately 180° apart. The blades 12 and 14 are rotatably fixed to the pivot rod 20 by cotter pins 28 and 30, respectively, passing through their respective rotating end of the blades 12 and 14 and coming into contact with annular grooves 32 and 34, respectively, of the pivot rod 20.

The free end of sleeve 18 is connected to a motor drive shaft

22 through a key 24 and slot 26. Drive shaft 22 has a threaded end 36 which is to cooperate with a first nut 38. First nut 38 is adapted to come into contact with annular flange 40 of sleeve 18. First nut 38 includes a polygonal wrench 42 extending from its free end and in substantial axial alignment with drive shaft 22. A locking nut 44 is to cooperate with wrench 42 through socket 46 and be capable of retaining first nut 38 against rotational movement. Socket 46 is shown as being octagonal in shape with wrench 42 being square. However, it is to be understood that the design of each is a matter of choice and not of limitation, as any polygonal relationship would suffice.

Locking nut 44, once in position about wrench 42 with first nut 38 being positioned firm against flange 40, retains the wrench 42 against any angular movement with respect to sleeve 18 due to the cooperative relationship of nut 44 with the bifurcated end 16 of sleeve 18. Locking nut 44 is capable of a slight longitudinal movement once installed but substantial movement is prevented due to the confining relationship of the nut 44 between the sleeve 18 and the blades 12 and 14.

The sleeve or housing 18 which mounts the propeller is preferably constructed of bronze or similar material. The drive shaft 22 is separate from and attached to housing 18 and can also be constructed of similar material. Sleeve 18 includes an exterior annular recession 56 at its approximate midpoint, which is to matingly cooperate with a pair of collar members 58 and 60 having surfaces continuous with the sleeve surface. Collar members 58 and 60 are held together by fasteners 62, and the members are preferably constructed of zinc alloy or similar material. The purpose of collar members 58 and 60 is to prevent electrolysis from attacking the bronze material of the housing 18 and of the shaft 22. It is not necessary that the collar members be inserted in a recess in the housing, since the housing surface could be continuous and the collar members could be simply secured around the outside of the housing.

Prior to operation of the motor (not shown) and rotation of drive shaft 22, the propeller blades 12 and 14 should be in an abutting relationship and in substantial axial alignment with drive shaft 22 to reduce drag. Upon operation of the motor and rotation of drive shaft 22, centrifugal forces and the reaction force of the blades against the water cause the propeller blades to move outward in substantial planar alignment. The torque from the drive shaft 22 is transmitted smoothly and positively to the propeller blades 12 and 14 through the positive connection established by the first nut 38, the locking nut 44 with the wrench 42 and the connection of locking nut 44 with sleeve 18.

I claim:

1. A propeller assembly comprising:

a housing being secured to a drive shaft, said housing being constructed of a bronze or similar material;

collar means in contact with said housing and constructed of zinc alloy or similar material for the purpose of preventing electrolysis from attacking the material of said housing and said drive shaft;

first and second propeller blades, said propeller blades being capable of rotation about a single pivot rod from an abutting position to an operating position, said pivot rod being fixed to said housing;

said drive shaft being capable of rotation, a first nut being connected to said drive shaft, a locking nut being attached to said first nut and capable of transmitting power therefrom, said locking nut being capable of being rotatingly fixed in position in relation to said drive shaft;

said first nut includes a polygonal socket being capable of cooperating with said wrench in a torque-transmitting manner thereby forming the attachment of said first nut to said locking nut; and

said first and second propeller blades are rotatingly held in position upon said pivot rod by first and second pins, each of said pins to cooperate with a first and second annular groove respectively upon said pivot rod.