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FEATHERING REVERSIBLE PROPELLER

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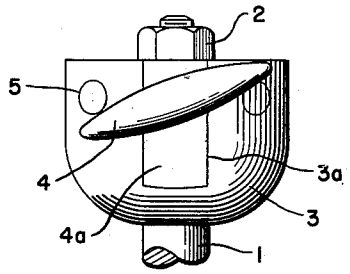


FIG. 1

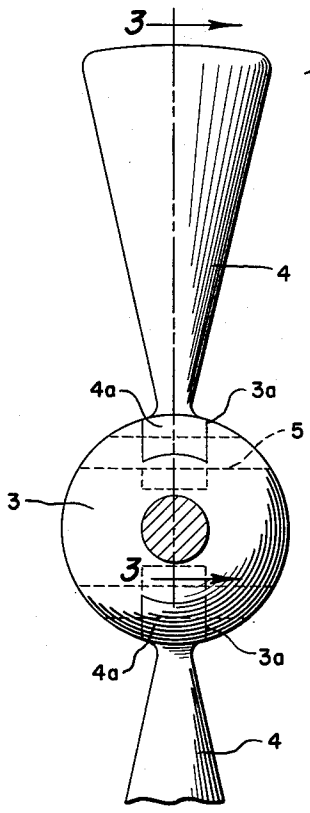


FIG. 2

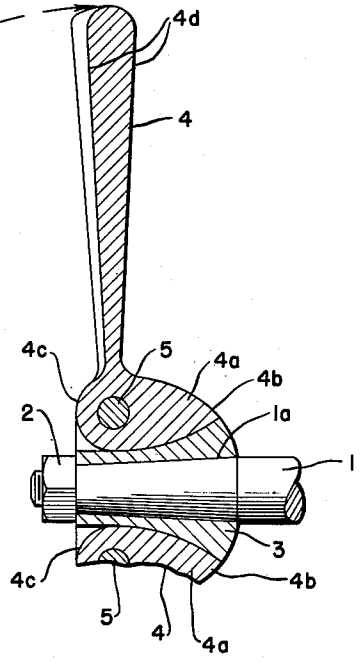


FIG. 3

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FEATHERING REVERSIBLE PROPELLER

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5 Claims. (Cl. 170—160.12)

1

My invention relates to a feathering reversible propeller, more particularly adapted for use in marine propulsion, and the objects of my invention are:

First, to provide a feathering reversible propeller of this class which may be fully feathered for passing through kelp beds or the like, whereupon the seaweed is not gathered on the propeller blades;

Second, to provide a feathering reversible propeller of this class in which the reverse operation of the propeller propels the boat in connection therewith by thrust directly proportional to the centrifugal force of the pivoted blades of said propeller which are pivoted substantially parallel to the axis of the drive shaft when feathered;

Third, to provide a propeller of this class in which the blades thereof are pivoted and provided with a stop limiting the forward movement thereof when thrust in the water tends to force the same forward on the driving shaft;

Fourth, to provide a propeller of this class in which the pivoted blades are pivotal on an axis close to the drive shaft, greatly reducing the extension of the blades so that the boat in connection therewith may pass over sandbars, kelp beds or the like without injuring or entangling the blades of the propeller;

Fifth, to provide a propeller of this class in which the center of gravity of each of the pivoted blades is nearer the outer ends thereof than the inner pivoted end whereby maximum centrifugal force of the blades is attained when revolved about the axis of the drive shaft, creating maximum thrust when operated in the reverse direction; and

Sixth, to provide a propeller of this class which is very simple and economical of construction, efficient in its action, and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon forming a part of this application in which:

Figure 1 is a top or plan view of my feathering reversible propeller; Fig. 2 is a fragmentary end view thereof showing a part in section; and Fig. 3 is a fragmentary sectional view taken from the line 3—3 of Fig. 2, showing parts in elevation.

2

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

The shaft 1, nut 2, hub 3, blades 4, and pins 5 constitute the principal parts and portions of my feathering reversible propeller.

The shaft 1 is a substantially conventional revolving drive shaft having an externally tapered portion 1*a* at the end of which is screw-threadedly connected the nut 2 holding the hub 3 on said tapered portion 1*a*, all as shown best in Fig. 3 of the drawings. This hub 3 is provided with radially disposed slotted portions 3*a* in which the boss portions 4*a* of the blades 4 are pivotally secured by the pins 5 which extend through the hub 3 in chordal disposition as shown by dash lines in Fig. 2 of the drawings. The normally forward end portion 4*b* of each of the blade boss portions 4*a* provides a pivotal stop for the blades 4 when thrust forwardly during forward operation thereof. The heel portion 4*c* of each of these boss portions 4*a*, is provided with a constant radius concentric with the axis of the pins 5, permitting the blades 4 to pivot freely in a rearward direction in the slotted portions 3*a* of the hub 3 for full feathering thereof relatively to the drive shaft 1.

The operation of my feathering reversible propeller is substantially as follows:

When the drive shaft 1 is operated in connection with a boat or the like, the propeller blades 4 are immersed in the water. During forward thrust rotation of the blades 4, the stop portions 4*b* of the boss portions 4*a* of the propeller blades 4 engage the bottom portions of the slots 3*a* of the hub 3 providing a positive stop for the blades 4 whereby forward thrust is taken by the shaft 1 in the conventional manner. When passing over sand bars or kelp beds the power is shut off permitting the drive shaft 1 to stop rotation and the boat may then coast over the sand bars or kelp beds while the blades 4 are pivoted backwardly in the moving water to a plane substantially parallel with the axis of the drive shaft 1. Thus, the sand bar clearance is greatly improved and the blades 4 do not become entangled in kelp or other objects. When it is desired to reverse the drive shaft 1 for reverse directional operation of the boat in connection therewith, the drive shaft 1 is operated in the reverse direction which causes a rearward thrust on the blades 4 tending to pivot the same backwardly. These blades 4, however, are provided with an outwardly diverging tapering cross section portion 4*d* which maintains the center of gravity of each

of the blades 4 nearer the outer end than the pivotal connection thereof with the hub 3. As the speed of the drive shaft 1 increases in the reverse direction, centrifugal force of the blades 4 causes the blades 4 to pivot outwardly on the pins 5 and the rearward thrust created by the blades 4 in connection with the shaft 1 is directly proportional to the centrifugal force of the blades 4 which pivot outwardly to a certain predetermined angle according to the speed of the drive shaft 1. In actual practice, it has been found that these pivoted blades having an extended center of gravity are very efficient in reverse thrust application to the drive shaft 1.

Though I have shown and described a particular construction, combination and arrangement of parts and portions, I do not wish to be limited to the particular construction, combination and arrangement but desire to include in the scope of my invention, the construction, combination and arrangement substantially as set forth in the appended claims.

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

1. A feathering reversible propeller, consisting of a drive shaft, a hub on said drive shaft, blades having outwardly diverging thickness toward the tips thereof pivotally connected to said hub and extending radially therefrom, said blades having a stop portion arranged to limit the pivotal movement thereof in one direction longitudinally of said drive shaft, the center of gravity of said blades being nearer the tip portion than said hub portion.

2. A feathering reversible propeller, consisting of a drive shaft, a hub on said drive shaft, blades having outwardly diverging thickness toward the tips thereof pivotally connected to said hub and extending radially therefrom, said blades having a stop portion arranged to limit the pivotal movement thereof in one direction longitudinally of said drive shaft, the center of gravity of said blades being nearer the tip portion than said hub portion, said blades tapering in thickness toward the tip portions thereof in diverging relation from said hub on said shaft.

3. A feathering reversible propeller, consisting of a drive shaft, a hub on said drive shaft, blades

having outwardly diverging thickness toward the tips thereof pivotally connected to said hub and extending radially therefrom, said blades having a stop portion arranged to limit the pivotal movement thereof in one direction longitudinally of said drive shaft, said hub provided with slotted portions in which the inner end portions of said blades are pivotally mounted.

4. A feathering reversible propeller, consisting of a drive shaft, a hub on said drive shaft, blades having outwardly diverging thickness toward the tips thereof pivotally connected to said hub and extending radially therefrom, said blades having a stop portion arranged to limit the pivotal movement thereof in one direction longitudinally of said drive shaft, said hub provided with slotted portions in which the inner end portions of said blades are pivotally mounted, and pins extending through said hub, said blades and the slotted portions in said hub.

5. A feathering reversible propeller, consisting of a drive shaft, a hub on said drive shaft, blades having outwardly diverging thickness toward the tips thereof pivotally connected to said hub and extending radially therefrom and having a center of gravity nearer the tip than the hub thereof, said blades having a stop portion arranged to limit the pivotal movement thereof in one direction longitudinally of said drive shaft, said blades arranged to pivot backwardly into substantially parallel relation with the axis of said drive shaft and arranged to pivot outwardly by centrifugal force during reverse operation thereof due to predominant weight near the tips thereof.

WERNER H. PETERSEN.

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