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MARINE PROPELLER

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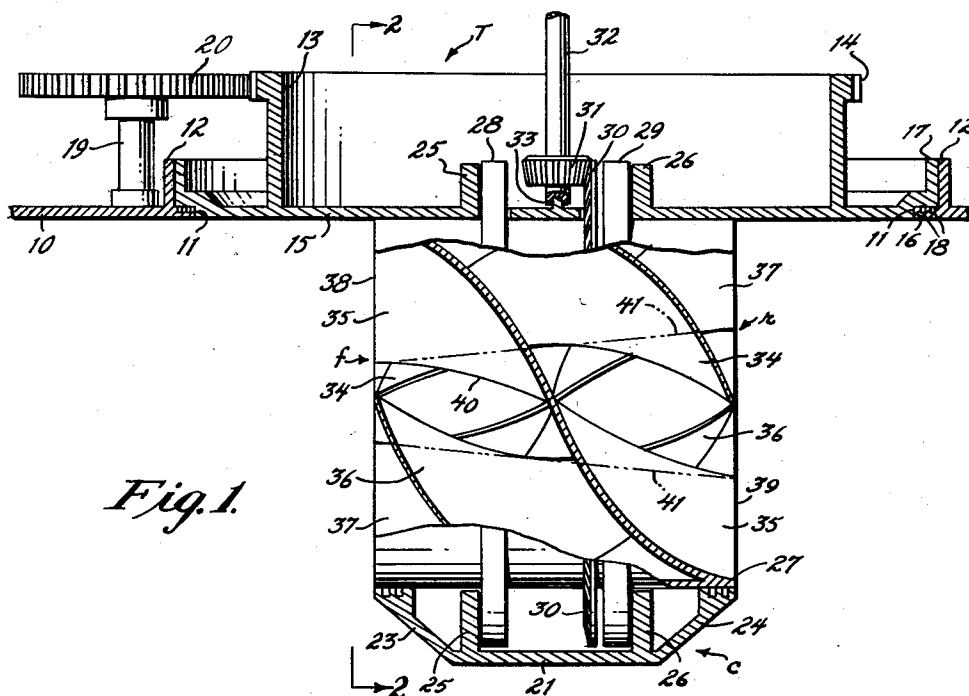


Fig. 1.

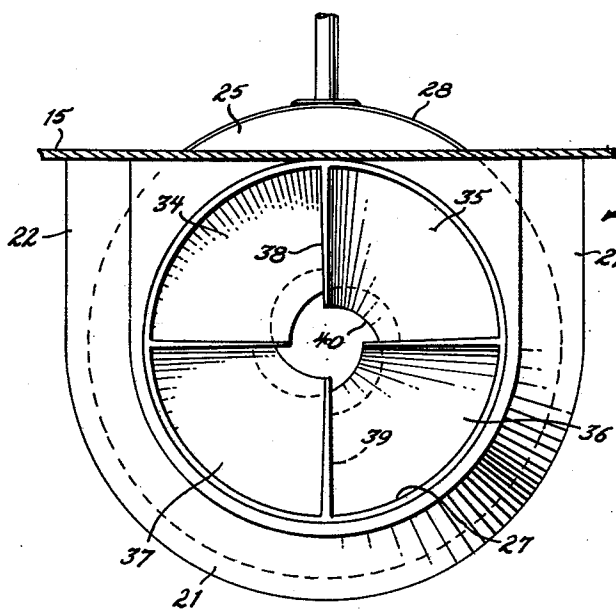


Fig. 2.

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MARINE PROPELLER

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2 Claims. (Cl. 170-176)

The present invention relates to propellers and is concerned primarily with marine propellers that are designed for operation in water.

An important object of the present invention is to provide a propeller of such a structure that its design is flexible to meet all requirements of pitch-to-diameter ratio and at the same time substantially eliminate cavitation.

In accordance with the present invention, a plurality of helical blades are mounted within the bore of a tube that is driven from an appropriate power source. Each of the blades has an inner edge which recedes from the forward to the rear end thereof. Thus the front end of the blade is wider than the rear end. These receding inner blade edges define what is in effect a conical passage for water and, due to the fact that the passage gradually increases from the front end, cavitation is substantially eliminated.

When a propeller following the above-noted principle is engineered to meet the requirements of any particular installation, the length and diameter of the tube will be determined by the requirements aforesaid. This is equally true of the width of the blade and the pitch or angle of the inner receding edges thereof.

A further object of the invention is to provide, in a propeller of the character aforesaid, a plurality of helical blades of the type noted with each blade being curved through a distance corresponding to 180°. Thus the front end of each blade is located substantially diametrically opposite to the rear end of each blade.

A further object of the invention is to provide a propeller of the character aforesaid, together with means for driving the tube, with the driving installation being so arranged that the propeller may also function as a rudder or steering means. Thus, in accordance with the present invention, the tube is drivably mounted on a turntable, with the driving means for the tube being carried by the turntable. The turntable is operatively connected to the helm of the vessel so that by rotating it the direction of the propeller is altered for steering purposes.

Various other more detailed objects and advantages of the invention, such as arise in connection with carrying out the above-noted ideas in a practical embodiment, will in part become apparent and in part be hereinafter stated as the description of the invention proceeds.

The invention therefore comprises a propeller in the form of a tube that is drivably mounted on a turntable, with the bore of the tube being provided with a plurality of helical blades having receding inner edges which together define a water passage that gradually increases in diameter from the front to the rear end of the tube.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawing, wherein:

FIGURE 1 is a view taken as a vertical section through a propeller designed in accordance with the precepts of this invention, and with certain parts shown in elevation; and

FIGURE 2 is another vertical section, taken normal to the showing of FIGURE 1, about on the plane represented by the line 2-2 of FIGURE 1.

Referring now to the drawing, wherein like reference characters denote corresponding parts, a portion of the

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hull of a vessel is represented at 10. The hull is formed with a circular opening at 11, and extending upwardly and inwardly in spaced relation to the edge of the opening 11 is a circular flange 12. A turntable is referred to in its entirety by the reference character T. It comprises a main cylindrical wall 13 the upper edge of which is provided on its exterior with gear teeth 14 which cooperate to define a large ring gear. Integrally joined to the lower end of the cylindrical wall 13 is a circular bottom wall 15 which substantially fills and closes the opening 11 in the hull 10. This bottom wall 15 is formed with a recess at 16 on its outer corner or edge, with the recess receiving that portion of the hull 10 which extends inwardly of the flange 12. Extending upwardly from the peripheral edge of the bottom wall 15 is an annular flange 17 which is in engagement with the flange 12. Grooves shown at 18 accommodate gaskets or packing rings which provide a watertight seal for the turntable T in the opening 11.

A bearing sleeve, shown at 19, is mounted on the hull and houses a shaft (not illustrated) on which is drivably mounted a pinion 20 which is in engagement with the ring gear 14. This pinion 20 is operatively connected to the helm or wheel of the vessel. Inasmuch as these connections are not a particular part of the present invention, they are not illustrated.

Referring now for the moment more particularly to FIGURE 2, a U-shaped supporting casing is referred to in its entirety by the reference character C, and is mounted on the underside of the bottom wall 15 of the turntable T. This connection may be achieved in any preferred manner, such as by welding. The casing C has an outer wall portion 21 which is curved at the bottom and which blends in with the straight sides 22. At the front end of the straight cylindrical portion 21 is a conical wall 23, and at the rear end is a similar conical wall 24. It will be understood that the conical walls 23 and 24 also blend in with the straight sides 22.

Extending inwardly from the cylindrical curved portion 21, to which it is integrally connected, is a front thrust-bearing ring 25 which is continued through a full 360°. Thus, it extends up into the turntable T. A rear thrust-bearing ring 26 is similarly mounted in the casing C and turntable T.

Journalled in the casing C is a propeller tube 27. The tube 27 carries on its exterior two thrust-bearing rings 28 and 29. The ring 28 is in effective engagement with the ring 25; while the ring 29 is in effective engagement with the ring 26. Also mounted on the exterior of the tube 27 and in driving relation with respect thereto is a bevel gear 30. Meshing with this bevel gear 30 is a complementary bevel gear 31 mounted on a shaft 32. One end of the shaft 32 is journaled on the bottom turntable wall 15 as indicated at 33; while the other end is connected to an appropriate source of power such as a marine engine. Thus, it is evident that the tube 27 is susceptible of being rotated under power from the engine of the vessel on which it is mounted.

The front end of the tube 27 is identified at *f*, and the rear end at *r*. Carried by the bore of the tube 27 are four helical blades 34, 35, 36, and 37. Each of these blades extends through 180°. Thus the front end of the blade 35, which is indicated at 38, is substantially diametrically opposite to the rear end, which is represented at 39. It will be noted that the front edge 38 lies in the front face *f* of the tube, while the rear edge 39 lies in the rear face *r* of the tube. However, disregarding this offset relation, the two edges are substantially diametrically opposite to one another. This same arrangement holds for each of the other blades 34, 36, and 37.

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It is further noted that the front edge 38 of each blade has an extent that is greater than the rear edge 39. Thus the inner edge of the propeller blade 35 which is shown at 40 gradually recedes from the axis or center line of the tube 27. This same arrangement holds true for the inner edge of each of the other blades.

These receding inner edges cooperate to define what is in effect a conical water passage, which is represented by the broken lines 41 in FIGURE 1. This water passage has its smaller end at the front *f* and its larger end at at the rear *r*.

It will be understood that the propeller of this invention will be engineered to meet the requirements of any particular installation. Thus, the dimensions of the tube 27, and particularly the length and diameter thereof, are subject to variation depending on the engineering requirements. This is equally true of the widths of the blades and the angle of the inner receding edges.

When the tube 27 is driven from the power shaft 32, the blades are rotated; and the effect thereof is to force the water through the passage depicted by the broken lines 41. Due to the design of this passage, cavitation and the formation of voids is completely eliminated; and the efficiency of the propeller is not in any way impaired by these features.

While a preferred specific embodiment of the invention is hereinbefore set forth, it is to be clearly understood that the invention is not to be limited to the exact constructions, designs, and dimensions illustrated and described, because various modifications of these details may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a marine propeller, intended for use in an incompressible medium, such as water, a power-driven cylindrical tube having a bore, a front end and a rear end, and a plurality of blades mounted in the bore of

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said tube with each blade having a forward edge lying in the plane of the front end of the tube and a rear edge lying in the plane of the rear end of the tube, the front and rear edges of each of said blades being substantially diametrically opposed and the rear edge being of smaller extent than the front edge, each blade having an inner receding edge, with the several receding edges defining an unrestricted conical water passage, each of said blades having an outer edge engaging said bore throughout the entire extent of said outer edge.

2. In a marine propeller, intended for use in an incompressible medium, such as water, a power-driven cylindrical tube having a bore, a front end and a rear end, and four blades equiangularly spaced apart and mounted in the bore of said tube with each blade having a forward edge lying in the plane of the front end of the tube and a rear edge lying in the plane of the rear end of the tube, the front and rear edges of each of said blades being substantially diametrically opposed and the rear edge being of smaller extent than the front edge, each blade having an inner receding edge, the several receding edges co-operating to define an unrestricted conical water passage, each of said blades having an outer edge engaging said bore throughout the entire extent of said outer edge.

References Cited in the file of this patent

UNITED STATES PATENTS

649,065	Martens	May 8, 1900
2,230,398	Benjafield	Feb. 4, 1941
2,425,423	Donaldson	Aug. 12, 1947
2,656,809	Frasure	Oct. 27, 1953

FOREIGN PATENTS

20,904	Finland	Jan. 31, 1946
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