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PROPELLER ASSEMBLY

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FIG. 1

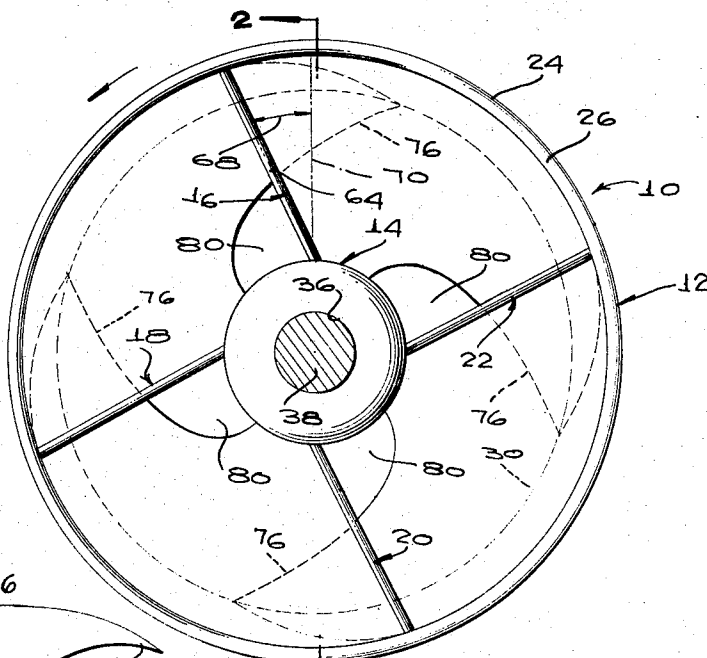


FIG. 3

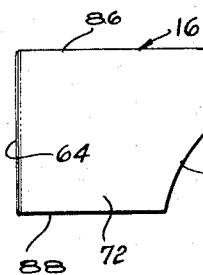
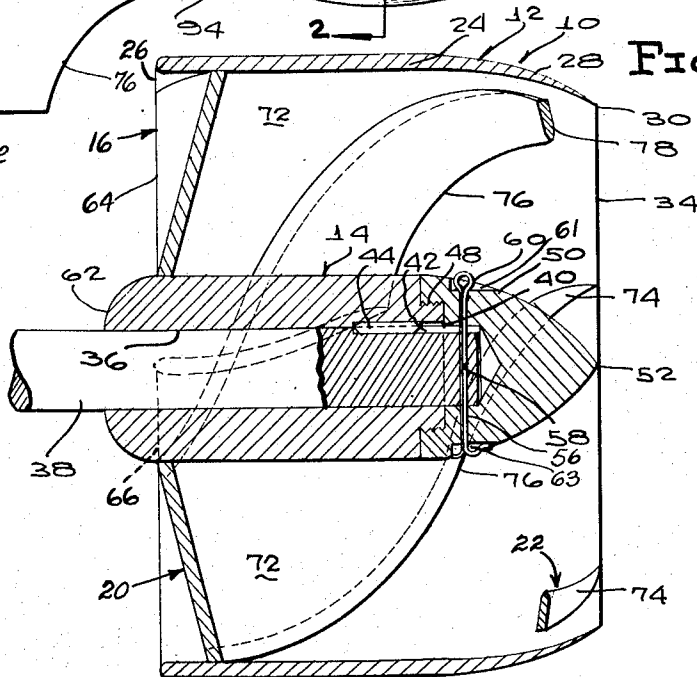


FIG. 2



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## PROPELLER ASSEMBLY

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4 Claims. (Cl. 170—168)

This invention relates generally to improved propeller assemblies of the propeller wheel type, for propelling watercraft, aircraft, and the like.

The primary object of the invention is to provide a more efficient and rugged propeller assembly of this kind which involves an axially elongated annular housing, which is reduced in diameter at its trailing or rear end so as to accelerate by venturi action the passage of fluid therethrough, and a screw propeller component within the housing which involves a propeller shaft mounted hub, and blades secured thereto and to the inner side of the housing which are helically curved and which are offset from the radial in the direction of rotation of the assembly, and formed to provide free fluid passages through the assembly in the region of the hub, the pitch of the blades being increased from the hub toward the housing.

Another object of the invention is to provide a propeller assembly of the character indicated which can be readily and economically manufactured, and is highly satisfactory for the purpose intended.

These together with other objects and advantages which will become apparent reside in the details of construction and operation as more fully hereinafter described in claims, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout the several views, and in which:

Figure 1 is an end elevational view of a propeller assembly of the invention, partly in vertical transverse section;

Figure 2 is a longitudinal sectional view taken substantially on line 2—2 of Figure 1, with portions broken away in section, and

Figure 3 is a plan view, on a reduced scale, of a blade of the propeller component of the assembly prior to being formed to a helical configuration.

Referring in detail to the drawings, the illustrated propeller assembly, indicated generally at 10, comprises an elongated annular housing 12, a screw propeller component within the housing 12 involving a central hub 14, and a plurality of identical blades 16, 18, 20 and 22, which are uniformly spaced around the hub 14, and are fixed to the hub 14 and to the housing 12.

The housing 12 has a cylindrical body portion 24 having a rounded forward or leading edge 26, as seen in Figure 2, and a rearwardly tapered rear portion 28 on the rear end of the body portion 24, which has a feathered trailing edge 30. The body portion 24 of the housing 12 is of uniform diameter. By virtue of the tapered rear end portion 28, fluid movement rearwardly through the housing 12 is speeded up by venturi effect, so as to provide increased effective thrust of the assembly when in operation.

The hub 14 is elongated and cylindrical in form and has a central bore 36 therethrough receiving the rear end of a propeller shaft 38, the bore 36 and the shaft 38 having facing longitudinal key grooves 40 and 42, respectively, at their rear ends in which is secured a key 44. The hub 14 has on its rear end a reduced threaded boss

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48 on which is threaded a dome-shaped cap 50 which tapers rearwardly and terminates in a point 52 which is in substantial coplanar relation to the feathered trailing edge 30 of the housing 12, and aids in decreasing turbulence of fluid passing through the propeller assembly. The external diameter of the cap 50 conforms to that of the hub 14. The cap has therethrough a transverse bore 56 which is aligned with a transverse bore 58 in the propeller shaft 38, and a cotter pin 60 extends through the bores 56 and 58 and has its opposite ends exposed in recessed portions 61 and 63 in opposite sides of the cap 50.

The hub 14 has a forward rounded end portion 62 which extends forwardly beyond the leading edge 26 of the housing 12, which serves to reduce resistance of the propeller assembly when the same is serving forwardly, as in water.

The hub 14 is positioned concentrically or axially within the housing 12. Each of the blades 16 through 22 on the hub 14 includes a straight forward or leading edge 64, which is rounded for the purpose of reducing resistance to movement of the assembly through water, for example, said forward leading edge 64 being in the same plane as the leading edge 26 of the housing 12 and the imaginary leading edge 66 of the hub 14. As clearly seen in Figure 1, the leading edges 66 of the blades extend from the hub 14 at acute angles 68 to radii indicated by dotted lines 70. The lean of the leading edges 66 of the blades is in the direction of rotation of the propeller components and has a tendency to offset centrifugal force exerted by fluid passing rearwardly through the propeller assembly, so as to reduce pressure within the housing 12.

Each of the blades includes a generally rectangular body portion 72 which is helically curved around the hub 14 and extends to the inner side of the housing 12, the pitch of the portions 72 increasing from the hub 14 toward the housing 12, and the pitch from the leading edge 64 of the blades increases toward the trailing edges of the blades.

The body portions 72 of the blade have on their rear ends rearwardly tapered trailing end portions 74 which terminate at the trailing edge 30 of the housing 12 and merge therewith. The portions 74 of the blades include arcuate concave edges 76 which extend to the hub 14 at points spaced forwardly from the trailing edge 30 of the housing 12. The concave edges 76 are tapered or feathered, as seen at 78 in Figure 2, for minimizing resistance offered by the blades in fluid attacked by the propeller assembly.

The blades are disposed and helically convoluted so as to provide free or clear passages 80, see Figure 1, extending longitudinally through the entire length of the propeller assembly and providing clear passages adjacent to the hub 14 so that passage of fluid through the propeller assembly is aided.

In Figure 3 is shown a blade 16 prior to being curved and installed in the propeller assembly. The blade 16 includes the body portion 72 whose edges 86 and 88 are secured to the inner side of the housing 12 and to the hub 14, respectively.

The foregoing is considered as illustrative only of the principles of the invention. Since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, as fall within the scope of the appended claims.

What is claimed as new is as follows:

1. A propeller assembly comprising an elongated propeller shaft receiving hub having a forward end and a rear end, an elongated annular housing concentrically spaced from and surrounding said hub, said housing hav-

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ing a uniformly cylindrical portion having a forward end and a rearwardly tapering rear portion having a rear edge, the forward end of the hub extending forwardly beyond the forward end of the housing and the rear end of the hub being spaced forwardly from the rear end of the housing, a rearwardly tapered cap on the rear end of the hub reaching to the rear end of the housing, and propeller blades around said hub and extending between said hub and said housing.

2. A propeller assembly according to claim 1, wherein said blades have straight forward edges which are substantially coplanar with the forward end of the housing.

3. A propeller assembly according to claim 1, wherein said blades have straight forward edges which are substantially coplanar with the forward end of the housing, said blades being curved relative to the axes of the hub and the housing, and the forward edges of the blades being acutely angled relative to radii of the hub in the direction of rotation of the propeller assembly.

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4. A propeller assembly according to claim 1, wherein said blades have straight forward edges which are substantially coplanar with the forward end of the housing, said blades being curved relative to the axes of the hub and the housing, and the forward edges of the blades being acutely angled relative to radii of the hub in the direction of rotation of the propeller assembly, said blades having rearwardly tapered rear end portions having rear ends which reach substantially to the rear end of the tapering rear end portion of the housing.

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