April 6, 1943. E. V. RIPPINGILLE 2,316,022

PROPELLER HUB AND RUDDER POST CONSTRUCTION

Filed Nov. 27, 1941

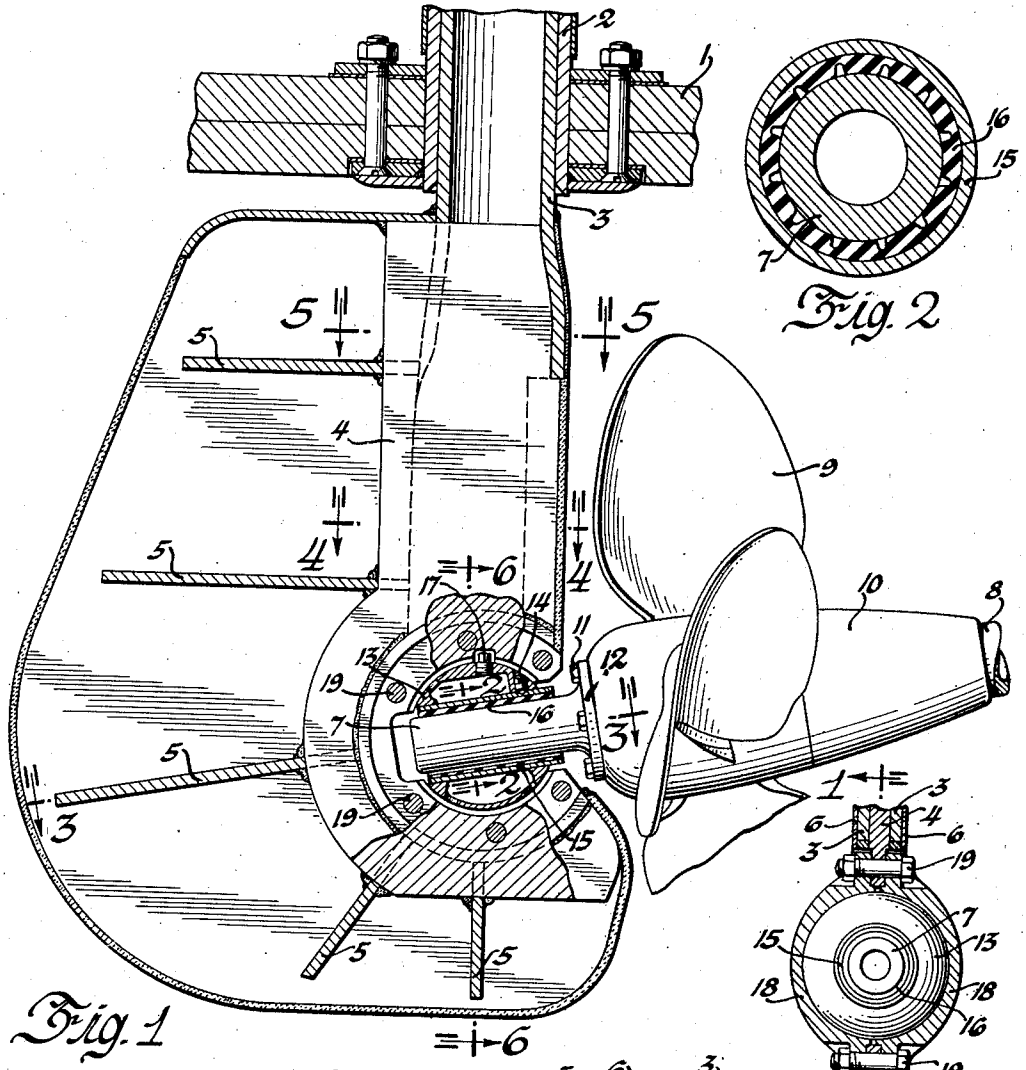


Fig. 1

Fig. 2

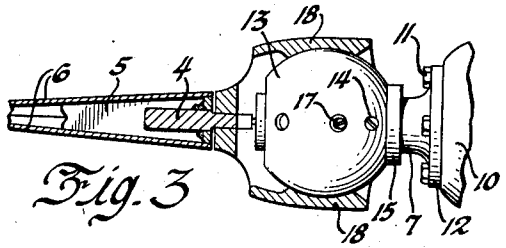


Fig. 3

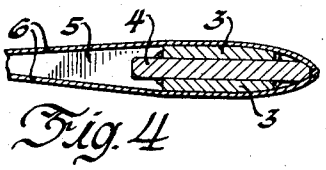


Fig. 4

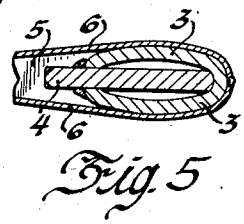


Fig. 5

Fig. 6

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PROPELLER HUB AND RUDDER POST CONSTRUCTION

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Application November 27, 1941, Serial No. 420,607

4 Claims. (Cl. 115—35)

This invention relates to power boats and more particularly to an improved arrangement of steering and propulsion mechanism.

It is an object of the invention to provide a rudder mounted for turning in a journal bearing carried by the boat hull and constructed to incorporate a bearing support for the motor driven propeller positioned immediately ahead of the rudder.

A further object is to provide a propeller shaft bearing beyond the bladed propeller and supported in the adjustable rudder assembly which facilitates shaft and rudder post alignment and affords uniform shaft alignment under all operating conditions and which offers no interference to the normal functioning of the submerged rudder and its swinging adjustment to various angular positions within the usual range required for maximum maneuverability and which, furthermore, holds the propeller shaft against vibration and whipping forces without the use of a separate stern post. The elimination of the stern post reduces drag and enables the use of a smaller and better balanced rudder to further minimize drag. Because of the substantial bearing support afforded the structure is especially adapted for use with reversal pitch blades and is amply able to take care of the extra weight of an enlarged hub and pitch control mechanism.

Additional objects and advantages will become apparent during the course of the following specification having reference to the accompanying drawing wherein Figure 1 is a vertical sectional view of a rudder and the propeller shaft bearing according to a preferred embodiment and may be considered as taken on line 1—1 of Figure 6; Figures 2 to 6, inclusive, are detail sectional views taken, respectively, on lines 2—2, 3—3, 4—4, 5—5 and 6—6 of Figure 1.

In the drawing a portion of the boat bottom or hull is represented at 1 through which projects and is secured in any proper manner a bearing sleeve or journal 2 for the rudder post 3. The post 3 at its lower end is split and tapers from circular outline into flat fork-like cheeks, as best seen in Figures 4 and 5. Welded or otherwise secured to and between the flat forks of the split end of the post 3 is a vertically disposed plate 4 from which extend outwardly at spaced intervals, a series of tapered stiffening webs 5 to form a frame, sheathed or enclosed by a pair of relatively thin light weight and complementary pressings 6 which when welded together and to the frame, constitute the skin or rudder surface for steering the boat by the angular setting of the rudder assembly through the turn post 3. Near its lower end the central plate 4 is formed to substantially C-shape or more particularly is provided with a circular hole extending transversely therethrough and opening through the front edge of the plate. Projecting into the opening with its axis intersecting the axis of the rudder post 3 is the stub or tailpiece 7 of a longitudinally and downwardly inclined power shaft 8 of the propeller assembly.

The engine driven shaft 8 preferably consists of a hollow tube and when employed with a variable pitch propeller encloses the operating rod for the hub enclosed control gearing through which blade angle is set. Inasmuch as the pitch control mechanism per se forms no part of the present invention it is not illustrated in the drawing and it will be understood that the series of blades, such as 9, are to be pivoted in the hub 10 for turning about their longitudinal axes under control of the boat operator. At its rear end the hub 10 has secured thereto by bolts 11 the forward flange 12 of the pilot or stub shaft 7 rotatably supported in the rudder assembly.

The bearing joint between the propeller shaft and rudder includes a hollow ball member 13, preferably of bronze, whose center is coincident with the point of intersection of the axes of the rudder and the propeller shaft. Projected diametrically across the interior of the ball 13 and secured as a subassembly therewith, as by means of a set screw 14, is a cylinder or sleeve 15 having a bearing liner 16 of a known type to receive the shaft 7. The illustrated bearing liner 16 is a bushing of rubber or the like having a series of circumferentially spaced axial grooves (see Figure 2), which among other things provide flow channels for the water in which the parts are submerged, to lubricate the bearing surfaces.

As evident from the drawing the bearing ball is pocketed within the circular opening in the plate 4 and accommodates free turning of the rudder assembly. To confine relative movement about the axis of the rudder and to hold the ball against rotation with the propeller shaft, a plug 17 threaded into the ball 13 has an outwardly projecting tip located loosely within a keeper notch formed in the plate 4 on the rudder turning axis. A pair of bearing caps 18—18 secured by bolts 19 to the plate 4 on opposite sides of the opening therethrough cooperate to form a vertically split spherical socket embracing and seating the bearing ball 13. At their front and rear, the walls of the bearing caps 18—18 are cut away, as best seen in Figure 3, to insure passage of

lubricating and cooling water through the joint and between both the spherical bearing surfaces of the ball and its socket and the cylindrical surfaces on the rotatable shaft and its supporting bushing.

I claim:

1. In combination, a rudder having a transverse opening near the bottom thereof, a pair of bearing caps secured to the rudder on opposite sides of the opening for cooperation in forming a split spherical bearing socket whose center is on the axis of the rudder, a bearing ball seated within said socket and a propeller shaft pilot journaled within the bearing ball on an axis passing through the center of said spherical socket.

2. In combination, a rudder having a spherical socket, a bearing ball journaled within the socket, and a propeller shaft journaled in the bearing ball, said socket having front and rear openings for passage therethrough of liquid to cool and lubricate the journal bearing surfaces.

3. In combination, a rudder having a spherical socket whose center is on the rudder axis, a bearing ball contained within the socket, means keying the ball in the socket to constrain relative movement between the rudder and ball about the rudder axis and a propeller having a stub extension journaled within said ball.

4. In combination, a rudder post having a cylindrical bearing portion terminating in an axially split and flat forked portion, a flat cheek plate secured between flattened side walls of said axially split portion as a part of a stiffener frame for a rudder blade, a ball member received within a circular opening in said cheek plate and formed with a propeller shaft pilot bearing, and a pair of side caps secured to and on opposite sides of the plate over the circular opening therein to retain the ball in bearing engagement therewith and with its center coaxial with the cylindrical bearing portion of said rudder post.

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