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SPEED INDICATING MEANS FOR OUTBOARD PROPULSION UNIT

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Fig. 1

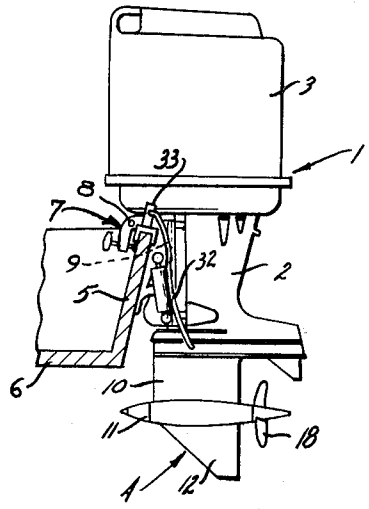


Fig. 2

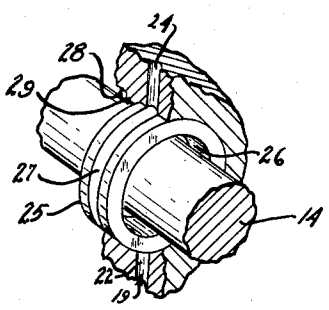


Fig. 3

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SPEED INDICATING MEANS FOR OUTBOARD PROPULSION UNIT

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1 Claim. (Cl. 73—182)

This invention relates to outboard propulsion units for watercraft and more particularly to speed indicating means therefor.

Speed indicating means sensitive to pressure which varies in accordance with the speed of the watercraft have long been employed in the operation of water craft. The indicating means generally comprise a gauge mounted on the propulsion unit or watercraft and graduated in knots or miles per hour and adapted to be actuated by water pressure as picked up by an impact tube extending into the water and having an orifice opening in the direction of travel of the watercraft.

Sometimes the impact tube for the speed indicating means are mounted on the watercraft and extend beneath the hull. Such installations, however, are generally inoperative when mounted on a hydroplaning boat which is frequently airborne for brief periods when traveling at high speed. The impact tube may also be incorporated integrally in the propulsion unit structure in the manner of applicant's earlier Patent No. 2,627,181. However, with the orifice disposed above the gear case as shown in the noted patent, the impact tube is generally inoperative for racing propulsion units which operate under surface pitch conditions wherein the gear case may be wholly out of the water with only a portion of the propeller engaging the water. It is generally an object of this invention to provide a water pressure pickup or impact tube which will be effective at all speeds and regardless of the position of the watercraft hull relative to the water surface.

According to the invention, an impact tube is provided in the lower portion of an outboard propulsion unit and communicates with a suitable speed indicating gauge mounted conveniently for the operator on the watercraft or on the propulsion unit. The orifice for the impact tube is disposed beneath the gear case in the leading or forward edge of the skeg where it can be effective at all speeds of the unit when moving forwardly. The impact tube further includes means for conducting the speed indicating pressure through the gear case and around the propeller shaft rotatably disposed in the gear case.

The drawings furnished herewith illustrate the best mode of carrying out the invention as presently contemplated and described hereinafter.

In the drawings:

FIGURE 1 is a side elevation of an outboard motor provided with the speed indicating means of this invention;

FIG. 2 is an enlarged partial side elevation of the motor of FIG. 1 and with parts broken away and sectioned shows certain details of the speed indicating means of the invention; and

FIG. 3 is an enlarged perspective view of a portion of the outboard motor gear case and shows means for conducting the speed indicating pressure through the gear case and around the propeller shaft.

Referring to the drawings, the invention is illustrated as applied to an outboard motor 1 having a drive shaft housing 2 supporting at the upper end thereof an engine, not shown, enclosed within a cowl 3 and at the opposite end thereof a lower housing 4. The motor 1 is removably secured to the transom 5 of a watercraft 6 by means of a bracket assembly 7 providing for tilt movement of the motor unit in a generally vertical plane on the generally horizontal tilt pin 8 and steering movement in a generally horizontal plane on the generally vertical swivel pin 9.

The lower housing 4 includes the vertical strut portion 10 adapted at its upper end for securement to the drive shaft housing 2, a gear case 11 beneath the strut portion, and a skeg 12 beneath the gear case. The drive shaft 13 extends downwardly within the housing 2 and strut portion 10 and drivingly connects the engine with the generally horizontal propeller shaft 14 rotatably disposed in gear case 11 through meshing bevel gears 15 and 16 in gear case chamber 17. The propeller shaft 14 projects rearwardly through an opening in the ear case and carries the propeller 18 rearwardly thereof to propel the watercraft.

According to the invention, a water pressure pickup or impact tube 19 is provided in the lower housing 4 and comprises a generally horizontal fore-and-aft extending bored tubular passage 20 disposed in skeg 12 adjacent to and spaced from the lower extremity thereof. The tubular passage 20 extends rearwardly from the leading edge of the skeg 12 and provides a mouth opening or orifice 21 facing in the direction of forward travel of the watercraft. Passage 20 extends rearwardly within skeg 12 a given distance and the end thereof is intercepted by a generally vertical bored tubular passage 22 extending from the lower edge of skeg 12 into the gear case chamber 17. The lower extremity of passage 22 beneath tubular passage 20 is threaded and closed by the threaded sealing plug 23 to render the passages 20 and 22 a continuous unitary passage.

A bored tubular passage 24 axially aligned with passage 22 and constituting a continuation thereof extends from gear case chamber 17 through the vertical strut portion 10 of the outboard motor and opens into the interior of the drive shaft housing 2.

To carry the speed indicating pressure through gear case chamber 17 and around the propeller shaft 14 from tubular passage 22 to passage 24, conducting means in the form of an annular ring member 25 is disposed in the gear case chamber around propeller shaft 14. The diameter of the opening 26 in ring member 25 exceeds the diameter of the propeller shaft 14 so that the shaft is spaced radially from the ring member in its assembled position. Intermediate its length, ring member 25 is provided with a pressure conducting groove or recess 27 in the outer periphery thereof. In assembled relation, the ring member 25 is placed within the cylindrical bore portion 28 of gear case chamber 17 with the recess 27 aligned respectively with tubular passages 22 and 24 to establish a fluid connection therebetween. The ring member 25 is slightly oversized with respect to bore portion 28 and is forced therein with a press fit so that the peripheral surfaces of the ring member to either side of the recess 27 sealingly engage the wall of bore portion 28 to contain the fluid pressure column. Means such as an annular shoulder 29 may extend inwardly from the wall of bore portion 28 for engagement by the ring member 25 to assure proper alignment between recess 27 and the respective passages 22 and 24 of the impact tube 19.

The upper end portion of tubular passage 24 may be enlarged and threaded at 30 to threadedly receive the conduit fitting 31 and flexible conduit 32 connects the fitting with the calibrated gauge 33 which is shown in FIG. 1 as being conveniently mounted on the transom 5 of the watercraft. Thus, when the watercraft is moving forwardly at a given speed, the pressure of the water in passages 20, 22, 24 and in flexible conduit 32 will reflect a reading of the given speed on gauge 33.

With the impact tube 19 provided as an integral part of the outboard motor 1, it is neither vulnerable to break-

age on contact with a submerged or floating object nor will it materially affect the speed of operation of the watercraft as would be expected if the impact tube were mounted on the watercraft and projected beneath the hull. With the orifice **21** for the impact tube **19** being located in the leading edge of the skeg **12**, it remains remote from the propeller **18** so that water entering the orifice is relatively undisturbed thereby during forward travel of the watercraft. The skeg location of orifice **21** assures that the impact tube **19** will be effective at all speeds of the propulsion unit when moving forwardly, even when the propulsion unit is operating under surface pitch conditions with the gear case **11** substantially or wholly out of the water.

Various modes of carrying out the invention are contemplated as being within the scope of the following claim particularly pointing out and distinctly claiming the subject matter which is regarded as the invention.

I claim:

In an outboard propulsion unit for watercraft; said unit having a lower portion including a vertical strut, a gear case beneath said strut for rotatably supporting a generally horizontal propeller shaft and having a cylindrical bore portion defining a cylindrical wall, and a skeg beneath said gear case; said vertical strut having fluid pressure conducting passage means communicating with an opening in the gear case wall; said skeg having an orifice opening forwardly in the leading edge thereof and spaced beneath the gear case, and fluid pressure conducting passage means communicating respectively with said orifice and with an opening in the gear case wall generally aligned with the opening of the strut passage means; a fixed annular member disposed coaxially in the gear case bore portion generally in alignment with the openings for the strut passage means and skeg passage means and spaced radially from said propeller shaft and with the outer periphery of said member in sealing engagement with the wall of said bore portion, said annular member and the wall of said bore portion having a circumferential recess therebetween defining fluid pressure conducting passage means connecting the strut passage means and skeg passage means to form an impact tube integral with the lower portion of the propulsion unit.

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