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INSULATED OUTBOARD MOTOR HOUSING

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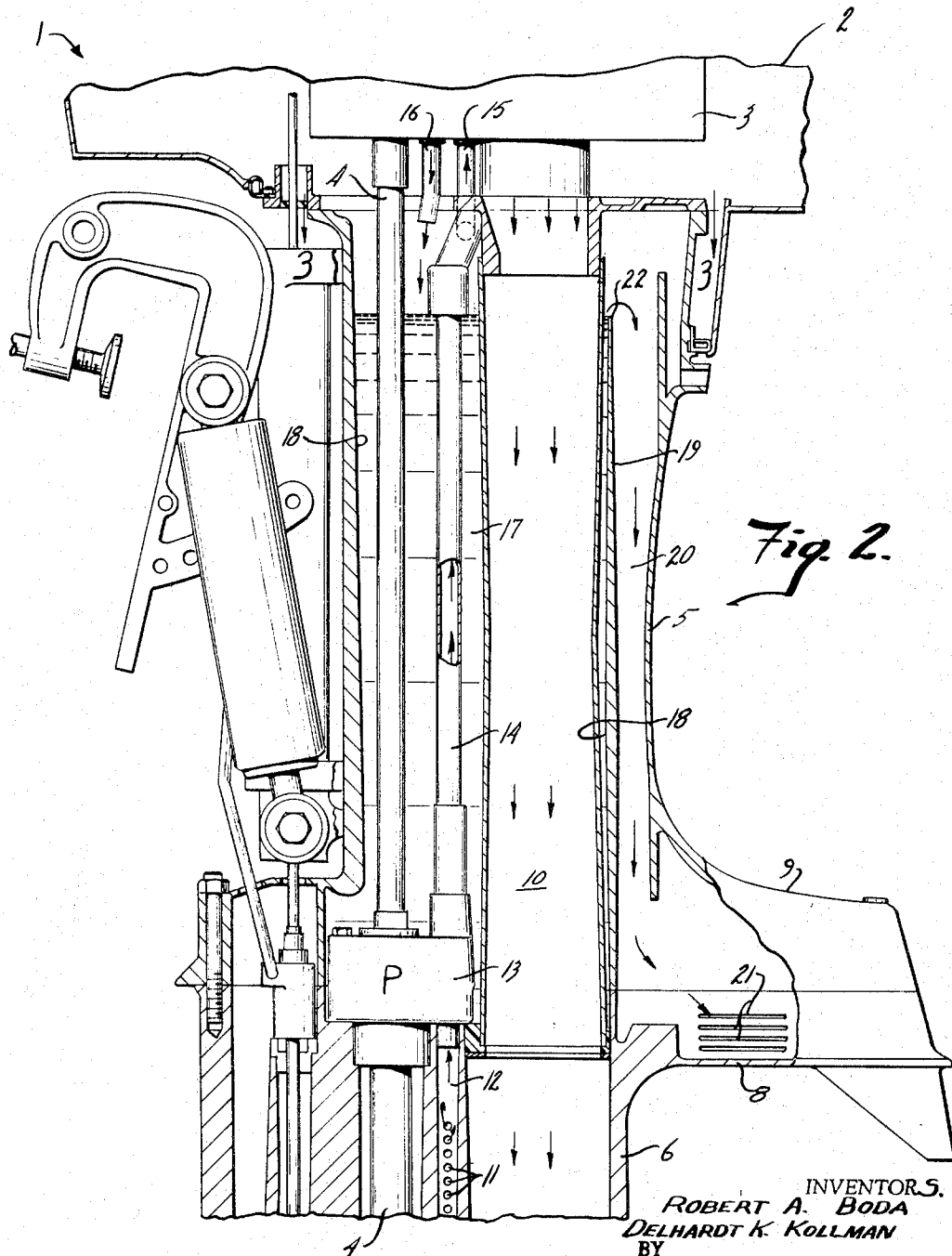


Fig. 2.

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INSULATED OUTBOARD MOTOR HOUSING

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4 Claims. (Cl. 60—31)

This invention relates to an insulated outboard motor housing, and more particularly to a structure wherein a silencing means is provided to prevent noise and vibration from radiating from the surface of the lower housing.

In an outboard motor, the drive shaft and exhaust system customarily pass downwardly from the engine power head and through a generally hollow lower drive shaft housing. Noise and vibrations are set up thereby, and which are transmitted to the housing walls which causes an unpleasant sound to emanate from an operating motor.

The present invention is based on the discovery that this particular operating sound can be effectively silenced by separating the housing outer wall from the drive shaft and from the exhaust system by a "blanket" of water. More particularly, water discharging from the engine cooling system is utilized and is retained in surrounding relationship with the drive shaft and exhaust system.

The accompanying drawings illustrate the best mode presently contemplated by the inventors for carrying out the invention.

In the drawings:

FIGURE 1 is side elevational view of an outboard motor embodying the concept of the invention;

FIG. 2 is a generally schematic vertical central section through a portion of the outboard motor of FIGURE 1; and

FIG. 3 is an enlarged horizontal transverse section taken on line 3—3 of FIG. 2.

As shown in the drawings, the invention is adapted for use on an outboard motor 1 having a power head 2 which encloses an internal combustion engine 3 of suitable type. Engine 3 is provided with the usual rotatable drive shaft 4 which extends downwardly through a lower unit which includes a hollow drive shaft housing 5 and into a lower gear housing 6. Suitable means are provided in housing 6 to drive a propeller 7 from shaft 4. Housing 5 is provided with the usual anti-cavitation plate 8 at its lower end and housings 5 and 6 are curved outwardly adjacent plate 8 to form a rearwardly extending portion 9.

For purposes of discharging exhaust from the engine exhaust port, a vertical exhaust passageway or tube 10 is disposed within drive shaft housing 5 and extends vertically therethrough and connects with a suitable passage in lower gear housing 6. Exhaust is thus discharged through housing 6 beneath the water, such as through the propeller hub.

In accordance with the invention, engine 2 is of the water-cooled type. For this purpose, a plurality of water intake holes 11 are provided in the wall of gear housing 6 and which are connected through a suitable passageway 12 to the intake of a pump 13 mounted concentrically of and driven by drive shaft 4 adjacent the connection between housings 5 and 6. The pump output connects through a water conduit 14 which extends upwardly through housing 5 between shaft 4 and exhaust tube 10 and connects to the water inlet 15 of engine 3.

Noise and vibration from the rotating drive shaft 4 and from tube 10 would normally be transmitted to the outer wall of housing 5. In accordance with the invention, the transmittal of such undesirable noise and vibration is substantially reduced. For this purpose, the engine cooling water discharge outlet 16 is positioned adjacent the top of housing 5 so that water 17 is discharged downwardly into the housing.

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Tube 10 and pump 13 are sealed to the lower portion of housing 5 so that the hollow space within the housing forms a closed-bottom chamber 18 of considerable elongated vertical extent which retains the discharged water 17.

When engine 3 is started, water will gradually fill chamber 18 and provide an insulating "blanket" surrounding drive shaft 4 and exhaust tube 10, and disposed between them and the walls of housing 5. Continued operation of engine 3 will cause continuous discharge of water into chamber 18 so that the chamber will fill up. Further in accordance with the invention, means are provided for the water in chamber 18 to flow over so that the excess water is dispensed with. For this purpose, a vertical partition 19 extends across chamber 18 toward the rear side of housing 5, and joins the housing wall portions, thus forming a vertical rear discharge passage or chamber 20 which communicates with the hollow interior of rear housing portion 9. A plurality of slot-like outlet openings 21 are disposed in the wall of portion 9 to permit water to flow freely outwardly there-through at a level below the top edge 22 of partition 19.

When chamber 18 is full and water continues to be fed thereto from the engine, water will spill over the top edge 22 of partition 19 into chamber 20, since edge 22 is disposed below the upper end portion of housing 5. The water will then flow downwardly through the passage formed by chamber 20 and hence through openings 21.

While the water being discharged from engine 3 has been warmed somewhat by the engine, this water is still cooler than the exhaust gases passing through tube 10. The outer walls of the tube and gases therein will thus be cooled and contracted by the surrounding water, thus reducing the back-pressure of the exhaust on the engine.

The structure shown provides that the exhaust passageway formed by tube 10 extends downwardly from engine 2 and through chamber 18. In addition, the passageway is spaced from openings 21, as well as from edge 22 and chamber 20.

While the structure shown in the drawings illustrates one embodiment of the invention, other embodiments are possible without departing from the spirit of the invention. For example, excess water may be discharged directly from chamber 18 to the outside at a level substantially higher than rear portion 9.

The invention provides a novel means for insulating the drive shaft housing of an outboard motor against undesirable sounds. Furthermore, when the engine exhaust passes through the insulating means, the exhaust is cooled, thereby increasing the efficiency of the engine.

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

We claim:

1. In an outboard motor having a power head with a water-cooled internal combustion engine therein:

- (a) a hollow housing extending downwardly from said power head and forming a closed-bottom chamber,
- (b) a rotary drive shaft extending downwardly through said chamber from said engine,
- (c) means for introducing cooling water into said engine and for circulating said water therethrough,
- (d) means for discharging said water from said engine downwardly into said chamber to fill the same to provide a blanket of water between said shaft and the wall of said housing to reduce radiation of undesirable operating sounds outwardly from said wall,
- (e) a partition extending across said chamber and forming a second chamber,

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- (f) said partition having an upper edge disposed below the top portion of said hollow housing so that water will overflow thereover from said first-named chamber into said second chamber,
- (g) and means for freely discharging water from said second chamber. 5
2. The outboard motor of claim 1 which includes:
- (a) a passageway extending downwardly into said first-named chamber from said engine for carrying hot engine exhaust gases away from said engine, 10
- (b) said passageway being disposed to be adjacent the water in said first-named chamber so that water cools and contracts the exhaust gases therewithin.
3. In an outboard motor having a power head with a water-cooled internal combustion engine therein: 15
- (a) a hollow housing having a wall extending downwardly from said power head and forming an elongated closed-bottom chamber,
- (b) means for introducing cooling water into said engine and for circulating said water therethrough, 20
- (c) means for discharging said water from said engine downwardly into said chamber to fill the same,
- (d) a partition extending across said chamber and joining wall portions of said housing to form a second chamber,
- (e) said partition having an upper edge disposed below the top portion of said hollow housing so that water will overflow thereover from said first-named chamber into said second chamber,
- (f) means for freely discharging water from said second chamber, 30
- (g) and an exhaust passageway extending downwardly from said engine through said first-named chamber, with said passage way being spaced from said partition.
4. In an outboard motor having a power head with a water-cooled internal combustion engine therein:

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- (a) a lower unit including a hollow housing extending downwardly from said power head and forming a closed-bottom chamber,
- (b) means for introducing cooling water into said engine and for circulating said water therethrough,
- (c) means for discharging said water from said engine downwardly into said chamber to fill the same,
- (d) water outlet means disposed in said lower unit below the top of said chamber,
- (e) overflow means disposed between top of said hollow housing and said outlet means,
- (f) passage means disposed in said housing and connecting said overflow means with said outlet means for conducting water which has overflowed from said chamber downwardly to said outlet means,
- (g) and an exhaust passageway extending downwardly from said engine through said chamber, with said passageway being spaced from said water outlet means and from said overflow means and said passage means.

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