Dec. 29, 1942. H. SCOTT-PAINE 2,306,664

STERN TUBE CONSTRUCTION

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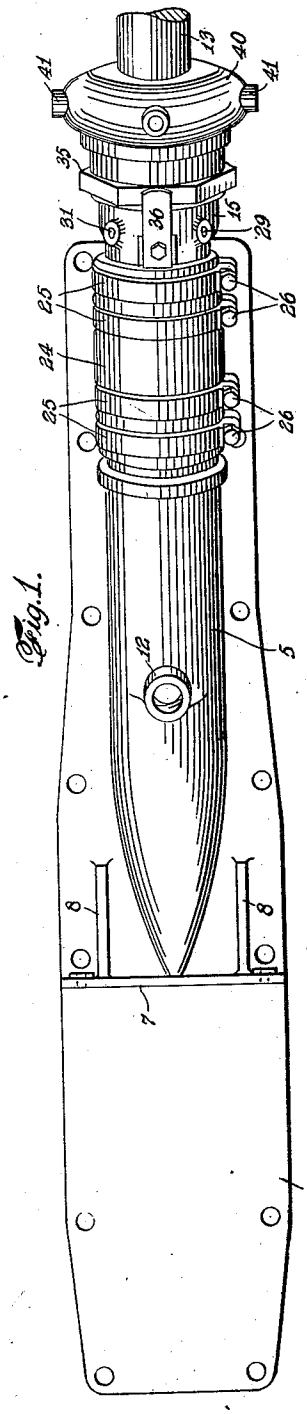


Fig. 1.

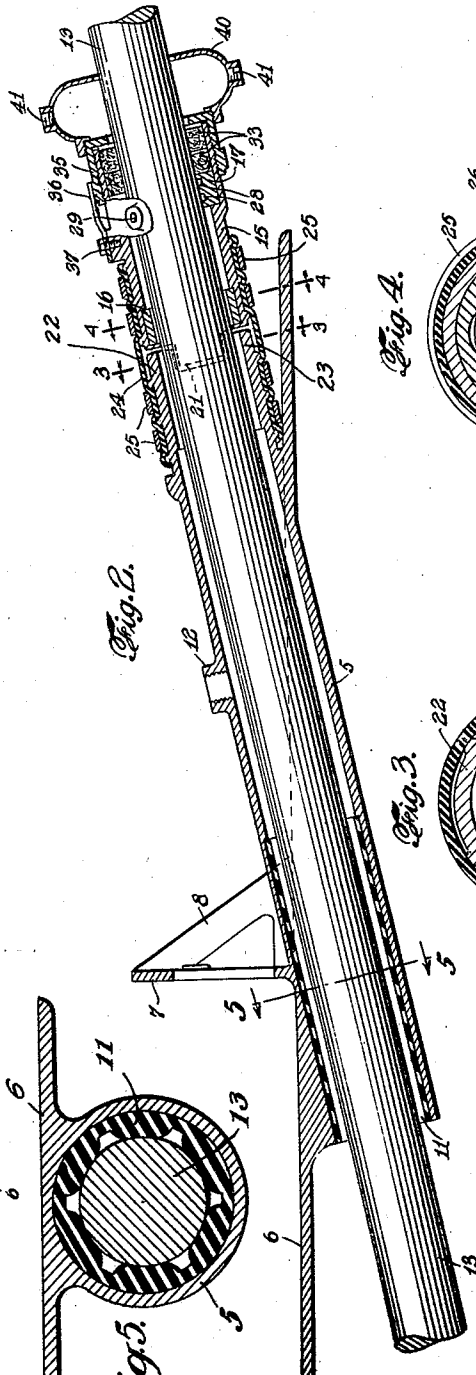


Fig. 2.

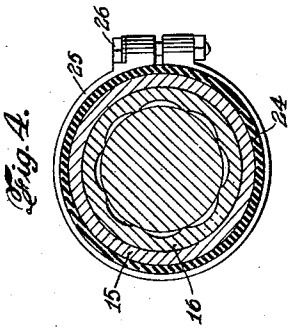


Fig. 4.

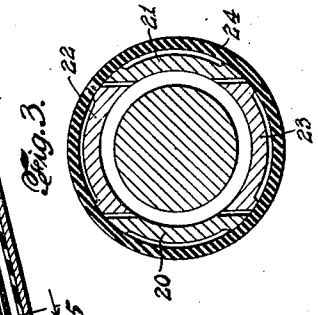


Fig. 3.

Fig. 5.

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STERN TUBE CONSTRUCTION

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3 Claims. (Cl. 308—26)

This invention relates to a stern-tube construction adapted for use with a propeller shaft of a high-speed motor boat.

Originally, in the building of motor boats, the propoller-shaft where it projected through the skin of the boat was housed in a stern-tube containing a propeller-shaft bearing and provided at its inboard end with a packing and a gland through which the propeller shaft passed. Such stern-tubes were built into the actual structure of the boat and were lined up meticulously with the inboard propeller-shaft bearings, thus becoming rigid parts of the boat structure. When lighter and faster motor boats were built, the problem of providing satisfactory stern-tubes containing propeller-shaft bearings became increasingly difficult of solution. During the last thirty years, particularly in connection with very light boat hulls for racing and other purposes, various devices have been used in attempts to properly support the propeller-shaft where it passes through the skin of the boat, and to maintain satisfactory alignment of the propeller-shaft bearings in spite of the flex of the weaving of the hull structure itself. Such devices, however, have been unsatisfactory, and many high-speed motor boat races have been lost because, due to flexing and weaving of the hull structure, the propeller-shafts seized in the stern-tube or the whole stern-tube itself was loosened or carried away.

The present invention is based upon a recognition of the fact that exact alignment of propeller-shaft bearings is difficult to achieve when the boat is built, and is impossible to maintain under all conditions at which high-speed motor boats operate. The general object of the invention is to provide a new and improved stern-tube construction, adapted for use with the propeller-shaft of a high-speed motor boat, which will properly support the propeller-shaft in spite of flexing and weaving of the hull structure or the rippling of the skin of the boat.

The characteristic novel features of this stern-tube construction will be understood from the following description, taken in connection with the accompanying drawing in which Fig. 1 is a plan view of the stern-tube construction embodying the invention; Fig. 2 is a side sectional elevation thereof; Fig. 3 is a section on line 3—3 of Fig. 2; Fig. 4 is a section on line 4—4 of Fig. 2; and Fig. 5 is a section on line 5—5 of Fig. 2. The same parts are referred to throughout the various figures by the same reference characters.

As will be apparent from the drawing, one of the elements of the stern-tube construction is the stern-tube itself which comprises a tube portion 5, a plate portion 6, and an upwardly standing lug 7 braced by fins 8. It will be understood that the plate portion 6 is secured to the bottom of the boat, and that the upwardly extending lug 7 is bolted to a transverse frame member located between the engine supports within the boat, thus tying together the stern-tube and the engine unit, so as to reduce as much as possible the relative movement of the engine unit and the stern-tube which causes flexing of the propeller-shaft. Secured within the stern-tube 5, at its end which projects below the skin of the boat hull, as best shown in Figs. 2 and 5, is a propeller-shaft bearing 11, of any usual form made of yielding material such as rubber grooved to permit water lubrication and cooling. As shown in Fig. 2, the stern-tube 5 is provided with a boss 12 containing a threaded opening through which water may be drawn from the space within the tube 5 around the propeller-shaft 13.

Cooperating with the inboard end of the stern-tube 5, is a tubular member 15 in which are metal bearings 16 and 17 which are spaced apart and cooperate with the propeller-shaft 13. The stern-tube 5 and tubular member 15 are provided with interlocking means which permits flexing movement of the tubular member 15 with reference to the stern-tube 5, but prevents rotational movement of said tubular member. As best shown in Figs. 2 and 3, such interlocking means may consist of lugs 20 and 21 projecting from the tubular member 15 into spaces between lugs 22 and 23 projecting from the inboard end of the stern-tube 5. It will be noted that lugs 20—21 and 22—23 have a loose-fitting engagement with one another by reason of the fact that said lugs are somewhat smaller than the spaces into which they fit. The tubular member 15 is secured to the stern-tube 5 by means of a flexible tubular connection 24 made of rubber or other suitable material, which is tightly secured around the adjacent ends of the stern-tube 5 and the tubular member 15, by means of metal straps 25 the ends of which are drawn together by bolts 26. It will be noted that the outer surfaces of the stern-tube 5 and tubular member 15 are provided with ribs over which the tubular connection is flexed by the compression exerted on it by the straps 25; thereby increasing the frictional grip of the flexible connection 24. The forward bearing 17 is preferably provided with grease grooves 28 (as shown in Fig. 2) to which grease may be fed through an opening 29 in the tubular member 15. The tubular member 15 is

also provided with an opening 31 through which water may be forced into the space within the tubular member 15 around the propeller-shaft 13 and between the bearings 16 and 17, for the purpose of cooling the bearing 16 which is provided with grooves (Fig. 4) through which the water passes into the space drained through the opening in the boss 12 in the stern-tube. The tubular member 15, at its inboard end, is preferably provided with a space for suitable packing material 33 which is compressed against the bearing 17 and around the propeller shaft 13 by a gland nut 35 having threaded engagement with the inboard end of the tubular member 15, as shown in Fig. 2. Said gland nut 35 is held in any position to which it may be adjusted by means of a finger 36 secured to the tubular member 15 by means of a cap screw 37, as will be obvious from Figs. 1 and 2. Secured to the gland nut 35, preferably by screw threaded engagement therewith, is a water-drip catcher 40 which surrounds the propeller shaft 13 and is preferably of the form shown. Said water-drip catcher 40 is provided with openings 41 any one or more of which may be connected to a pipe which leads to a drain tank or overboard.

From the foregoing description, it will be apparent that the tubular member 15 carrying the bearings 16 and 17, is secured to the stern-tube 5 in such a manner that some movement of the tubular member 15 and said bearings 16 and 17 is permitted, if the propeller shaft 13 is flexed. That is, the bearings 16 and 17 are not required to be in exact axial alignment with the bearing 11. It will also be understood that the tubular member 15 and its associated parts prevent water from getting into the bilge of the boat. Any such water leakage is substantially prevented by the grease in the grooves 28, and by the stuffing material 33 compressed by the gland nut 25; but if any water does succeed in passing inboard it will be caught by the water-drip catcher 40.

What is claimed is:

1. A stern-tube construction adapted for use with the propeller-shaft of a high-speed boat, comprising in combination a stern tube adapted to be rigidly mounted in the bottom of the boat and containing a propeller-shaft bearing of yielding material such as rubber, a tubular member adapted to surround the propeller-shaft at the inboard end of said stern-tube and containing a pair of bearings spaced apart and adapted to engage the propeller-shaft, said stern-tube and tubular member being provided with interlocking means preventing rotational movement of said tubular member but permitting angular movement of the latter with reference to said stern-tube, and means for preventing axial movement of said tubular member with reference to said stern-tube comprising a flexible tubular connection secured around the adjacent ends of said stern-tube and tubular member.

2. A stern-tube construction as defined in claim 1, wherein said stern-tube and said tubular member are provided with openings and wherein the bearing in said tubular member nearest said stern-tube is provided with grooves, whereby water may be circulated through said openings in the stern-tube and tubular member so as to cool said grooved bearing.

3. A stern-tube construction as defined in claim 1, provided with a gland and packing at the inboard end of and carried by said tubular member and adapted to surround the propeller-shaft, and a water-drip catcher secured to said gland and adapted to surround the propeller-shaft.

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