

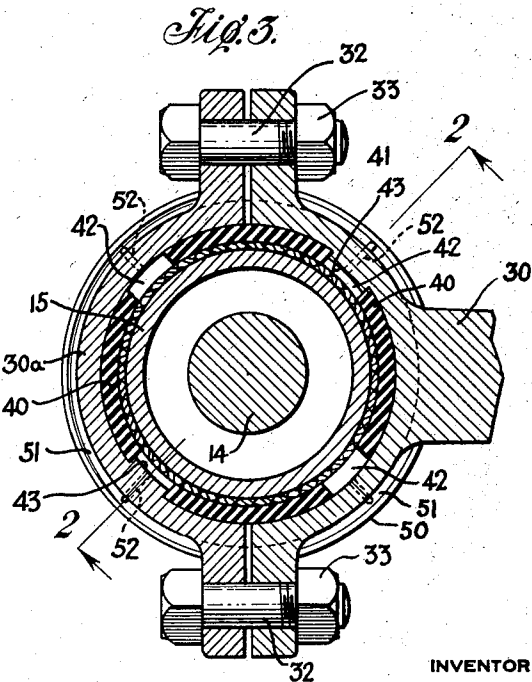
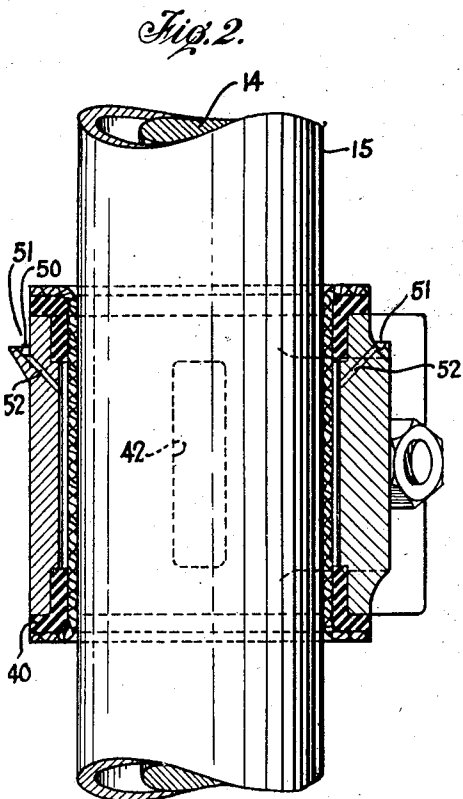
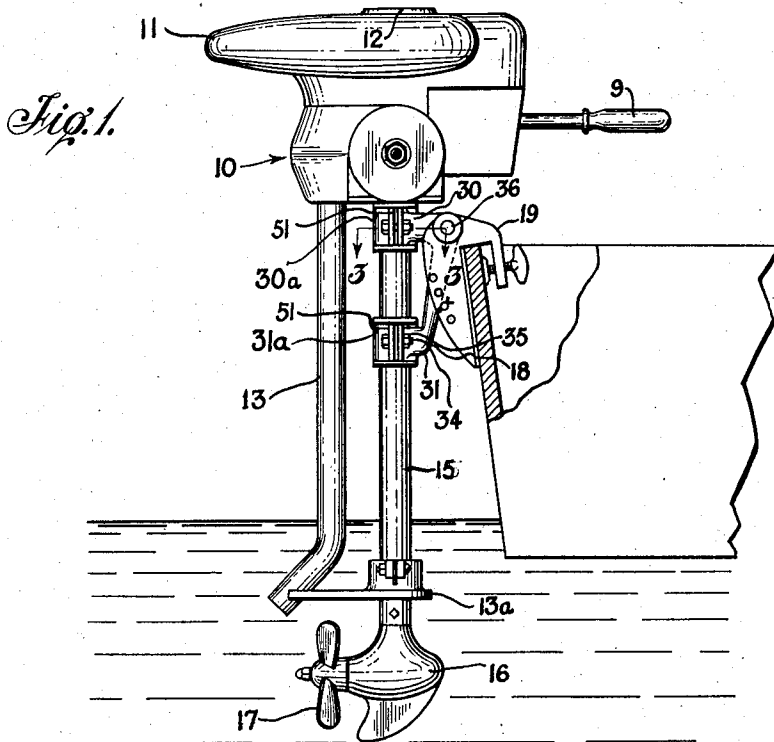
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RESILIENT BUSHING FOR OUTBOARD MOTOR MOUNTING

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RESILIENT BUSHING FOR OUTBOARD
MOTOR MOUNTINGSWilliam J. Grubbs, Akron, Ohio, assignor to The
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3 Claims. (Cl. 248-4)

This invention relates to bushings, and more particularly it relates to a bushing in which a driveshaft housing of an outboard motor revolves.

An object of the invention is to provide a bushing for an outboard motor driveshaft housing that will permit easy manual turning of the housing while providing enough friction between the bushing and the housing so that the steering handle or tiller of an outboard motor may be set at a selected position and it will remain in that position until purposely moved by the operator of the boat.

Another object of the invention is to provide a bushing that is adapted to intercept oil running down the outside driveshaft housing and to receive such oil in openings formed in the walls of the bushing from which openings the oil gradually emerges and distributes itself over the bushing contact surface.

A further object of the invention is to provide a bushing having attached to its inner surface a fabric so treated that it will have a high static and a low dynamic friction.

A still further object of the invention is to provide a bushing that will function as a vibration dampener between an outboard motor supporting means and a boat upon which the said motor is mounted.

Yet another object of the invention is to provide a bushing for the mounting bracket of an outboard motor that will not injure the driveshaft housing which is mounted therein.

The driveshaft housings of outboard motors are generally made of a non-ferrous metal such as aluminum or bronze; otherwise the housing would rust as it is exposed to water. The attaching brackets are ordinarily made of cast iron, such brackets having two arms which terminate in split yokes. These yokes have machined bearing surfaces which when the yokes are assembled provide bearings in which the driveshaft housing is revolvably held. The vibrations of outboard motors are severe and in service the soft metal of the housing is frequently broken or worn through by the harder metal of the attaching bracket. Not only do the motor vibrations cause the harder metal to cut through the softer but the turning of the housing in its bearing, which occurs in steering a boat, also causes wear between the bracket and the housing. These are serious faults of prior art.

In operating a boat driven by an outboard motor it is often desirable to be able to set the tiller to steer the boat in a circular course and to have the tiller remain in that position without the op-

erator holding his hand on the tiller. This is true, as for example, in the case of a man trolling when his course lay off a curved shore line or around submerged rocks. In such case a man's hands are ordinarily occupied with his fishing tackle. However, heretofore tillers would not hold such set positions unless the bearings were so tight on the driveshaft housing that the tiller was too hard to turn to be satisfactory and also would cause the housing to be injured by its tight fit in its metal bearing.

The above and other objects and advantages of this invention will be more fully understood by referring to the following description and accompanying drawing in which:

Fig. 1 is a perspective view of an outboard motor mounting embodying this invention and showing such motor in operative position attached to a boat;

Fig. 2 is a sectional view taken on line 2-2 of Fig. 3; and

Fig. 3 is a cross-sectional view taken on line 3-3 of Fig. 1.

As illustrated in Fig. 1 of the drawing the mounting comprises an outboard motor 10, a tiller 9, a fuel tank 11, a starter wheel 12, exhaust pipe 13, exhaust bracket 13a, driveshaft 14, driveshaft housing 15, gear transmission 16, propeller 17, mounting bracket 18, and boat bracket 19. The motor mounting bracket 18 has an upper and a lower arm terminating in one portion of respective split yokes 30 and 31. The portion 30a necessary to complete the yoke 30 is attached thereto by bolts 32 and nuts 33. In similar fashion the yoke 31 is completed by portion 31a attached thereto by bolts 34 and nuts 35. Since the bushings in the yokes are identical, the invention will be explained in connection with the bushing mounted in the upper yoke 30. As will be understood by those familiar with the art, outboard motors are usually mounted on boat brackets provided to be attached to the rear of a boat. The boat bracket and the motor mounting bracket are also adapted for pivotal attachment as shown at 36 in Fig. 1. As indicated above the motor mounting bracket is usually cast of iron and it has the ends of its arms machined to form a bearing in which the drive shaft housing is mounted. The top of the bracket 18 assembly contacts the bottom of the motor in order to support the weight of the motor and its assembly, thus avoiding the necessity of clamping the housing tightly in its bearings. The lower end of the motor mounting bracket is similarly fastened and engages the housing 15 in order to stabilize it.

As will be seen by reference to Figs. 2 and 3 a bushing 40 is mounted in the split yoke 30. Said bushing is molded in the usual manner of manufacturing mechanical rubber goods; however in molding, a plurality of circumferentially spaced rectangular recesses 42 are formed in the walls of the bushing. It is to be noted that these recesses do not extend entirely through the bushing but terminate at an inside layer of fabric 41. It is also to be noted that the fabric 41 is turned outwardly over the edges of the bushing and accordingly much of the weight of the motor rests on the fabric. It is to be understood, however, that the inner layer of fabric may end flush with the end of the bushing. It will be seen, of course, that when the bushing 40 is in its mounted position the recess 42 is converted into a compartment between the fabric 41 and the metal in said split yoke. It will also be seen that the inside face of the split yoke 30 has an inwardly extending projected portion 43 adapted to enter for a short distance diametrically opposite recesses 42. These portions 43 act to prevent the bushing from turning with said housing. As this bushing is exposed to oil, as will be explained hereinafter, it is formed of an oil-resistant rubber-like material, such as for example, but without limitation, a copolymer of butadiene and acrylonitrile sold under the name of "Buna N," or a polymer of 2-chlorobutadiene sold under the name of neoprene. However, if a material such as neoprene provided the direct frictional contact surface against the driveshaft housing the bushing would be worn away, also it would not provide a satisfactory contact surface. Accordingly this invention provides a contact surface by molding on the inside surface of the bushing said layer of fabric as stated above.

A laterally and upwardly extending circumferential rib 50 is projected from the outside surface of the members of the split yoke. This rib forms a groove 51 between it and the members of said yoke. The grooves 51 have closed ends (not shown) and openings from the groove 51 in the form of drilled holes 52 extend through the walls of the said yoke opening on the inside into said rectangular recesses 42 in the walls of the bushing.

Outboard motors are fueled with gasoline to which oil has been added and very frequently due to the tilting of a boat when gasoline is poured into the gasoline tank much of it is spilled outside the tank. The gasoline readily evaporates but the oil will run down the exhaust pipe and the driveshaft housing. Oil running down the yoke will be intercepted in said grooves 51 and flow through the holes 52 into the recesses 42 where it is retained until it gradually seeps through the treated fabric 41. When an outboard motor is in actual service the amount of oil which has heretofore been lost in this way is considerable and it will be seen from the foregoing that this invention defines means for intercepting and saving the oil that otherwise would run down said housing and be wasted. Also means are described for retaining the excess of said oil within the openings of said bushings where it is stored but exposed to the fabric whereby oil gradually seeps through the fabric and keeps the frictional contact surface between the housing and the bushings lubricated. Of course, if there was not enough oil supplied to the bushing due to the spilling of the gasoline then the required amount of oil for lubrication could be fed directly to the bushing from an oil can.

After said bushing 40 has been molded and vulcanized it is dipped into a solution of paraffin and oil and allowed to remain in the solution long enough for the fabric 41 to become impregnated with the paraffin. Of course, the entire bushing becomes coated and it has been found that paraffin provides a very good protection for the bushing during storage and thereafter. The impregnation of the fabric with the paraffin is an important feature of the invention. Applicant has found that by this means he is able to provide a high static friction between the driveshaft housing and the fabric. Therefore, when the split yoke is tightened only lightly against the housing considerable resistance against rotary movement of the housing in its bearing is set up. It is to be understood that driveshaft housing 15 is rotated by the tiller 9 in the manner common in the art. Consequently if the operator of a boat sets the tiller in a position to cause the boat to be driven in a chosen arc, it will not be necessary for him to keep his hand on the tiller as it will remain in that position until manually moved. However, if the tiller is manually moved thereby breaking the grip or seal of the fabric 41 to said housing then the dynamic friction between the housing and the fabric is very low and the tiller can be easily shifted from one position to another.

Outboard motors are often mounted upon rowboats which are not built sturdy enough to withstand the vibrations transmitted to the boat from the motor. Consequently it is very desirable that the boat be protected as much as possible from the effects of such vibrations. Applicant's bushing provides very effective means in reducing the severity of such vibrations. His rubber-like bushing has sufficient thickness and is resilient, however, this alone is not sufficient to accomplish applicant's purpose as neoprene or rubber or the like when confined in a yoke such as is necessary to retain an outboard motor in operative position is quite hard as it has no openings into which it may distort. In the present invention cushioning effect is made possible by providing the said rectangular openings into which the bushing can expand when subjected to the increased force caused by the vibrations. Thus it will be seen that applicant's bushing is not only a lubricating means but also an effective vibration dampener.

Not only does the bushing here disclosed have high static friction, improved lubricating qualities, and vibration dampening characteristics; but the bushing, having a fabric housing contact face backed up by a wall of soft rubber-like material, will not crush or wear through the housing wall. The elastic quality of the bushing makes it possible to tighten it to cause only slight compression of its walls against the said driveshaft housing in which condition it will maintain contact with said housing over a long period of service during which time the bushing exerts a continuous and gentle pressure on the housing, holding it in a predetermined operative position without rattle or chatter between the housing and the bushing bearing.

While only one embodiment of the invention has been described it will be understood that the details as shown may be changed without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. The combination with an outboard motor mounting of a hollow cylindrical bushing, said

bushing being composed of an outer layer of oil-resisting rubber-like material, said material being of substantial thickness, and having relatively large openings formed through it at circumferentially spaced intervals, said bushing having an inner layer of fabric, said fabric being exposed to said openings in said outer layer, said fabric being saturated with a solution of oil and paraffin, and a metal split yoke in which the bushing is mounted to form a bearing for a drive-shaft housing of said motor, said yoke having a laterally and upwardly extending circumferential rib which defines a groove between said yoke and said rib, said yoke having inlet holes extending through the wall of the yoke from said groove to said openings in the bushing, whereby spilled oil running downwardly over said yoke is caught in the groove and delivered through the inlet holes to the openings in the bushing, thereby providing a reserve supply of oil in contact with said inner layer of fabric through which it is gradually absorbed and delivered to the surface of said bearing.

2. The combination with an outboard motor mounting of a hollow cylindrical bushing, said bushing being composed of an outer layer of oil-resisting rubber-like material, said outer layer having relatively large radially inwardly extend-

ing openings formed therethrough at circumferentially spaced intervals, said bushing having an inner layer of fabric, said fabric covering the inner ends of said openings, means for supplying a lubricant to said openings while said bushing is in operative position, thereby providing a reservoir communicating with said fabric through which lubricant collected in said reservoir seeps.

3. The combination with an outboard motor mounting of a hollow cylindrical bushing, said bushing having relatively large openings formed through it at circumferentially spaced intervals, said bushing having an inner layer of fabric, said fabric being exposed to said openings in said outer layer, and a metal split yoke in which the bushing is mounted to form a bearing for a drive-shaft housing of said motor, said yoke having a laterally and upwardly extending circumferential rib which defines a groove between said yoke and said rib, said yoke having inlet holes extending through the wall of the yoke from said groove to said openings in said bushing, whereby spilled oil running downwardly over said yoke is caught in the groove and delivered through the inlet holes to the openings in the bushing, thereby providing a reserve supply of oil to the surface of said bearing.

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