

Feb. 12, 1952

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2,585,774

MOUNTING AND ENGINE COVER MOUNTING FOR OUTBOARD MOTORS

Filed May 8, 1950

3 Sheets-Sheet 1

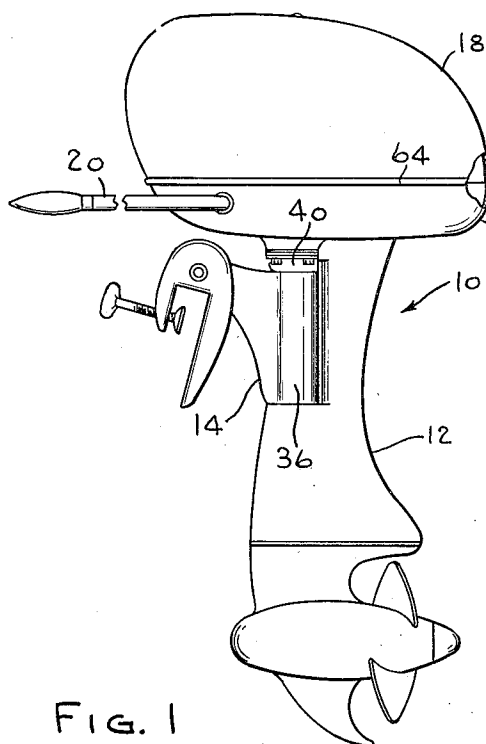


FIG. 1

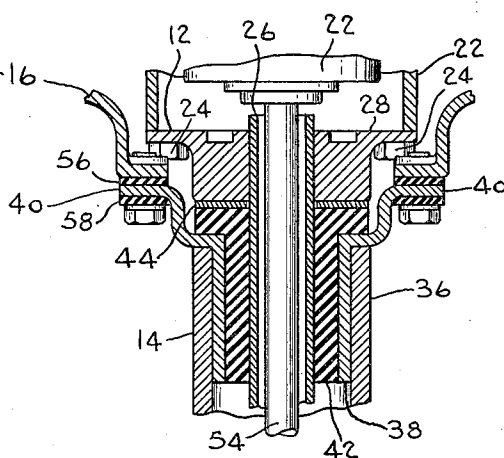


FIG. 3

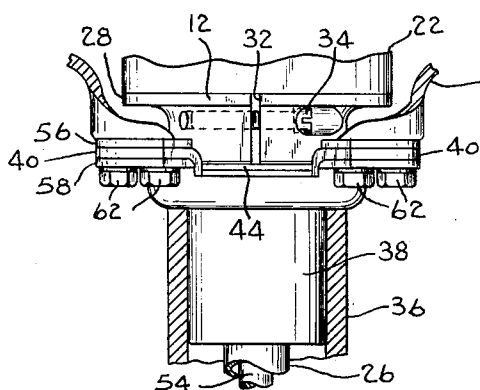


FIG. 4

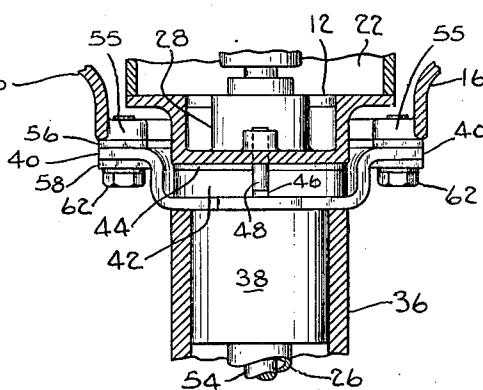


FIG. 5

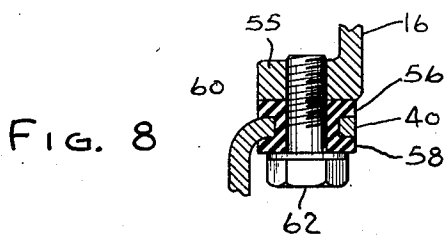


FIG. 8

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3 Sheets-Sheet 2

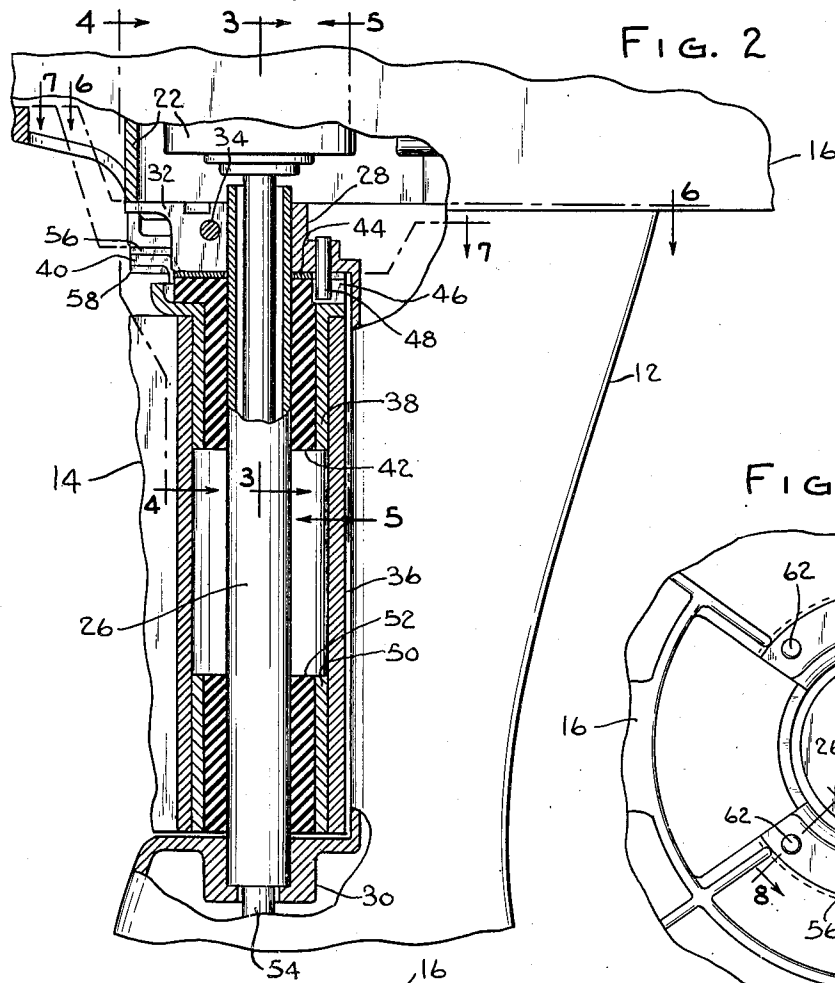


FIG. 2

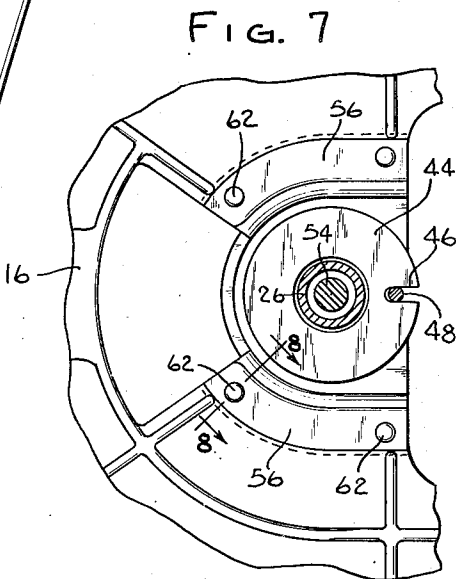


FIG. 7

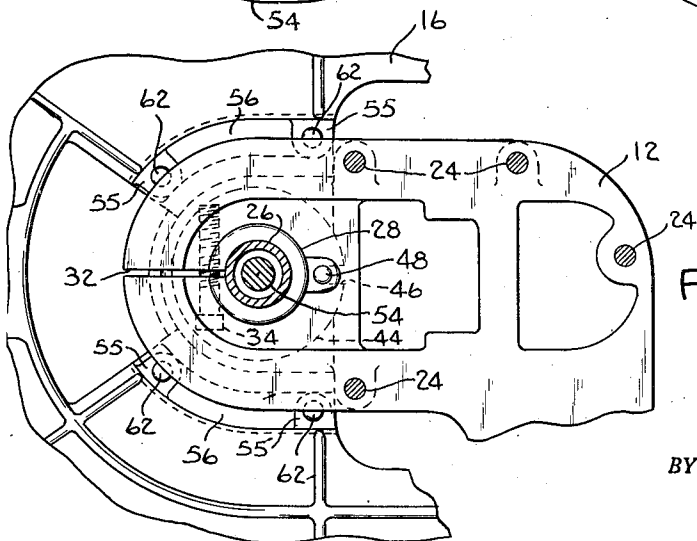


FIG. 6

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3 Sheets-Sheet 3

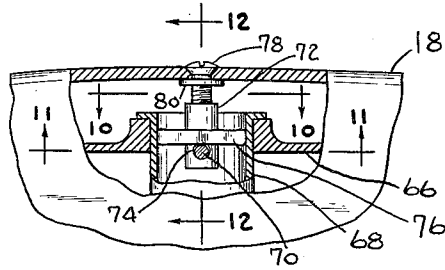


FIG. 9

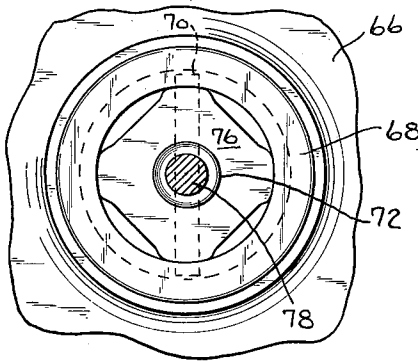


FIG. 10

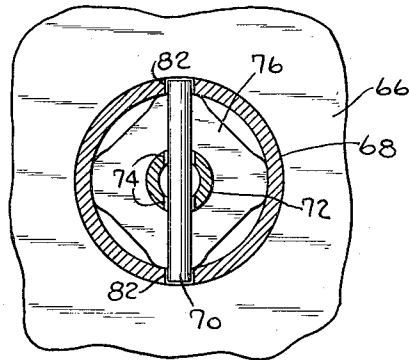


FIG. 11

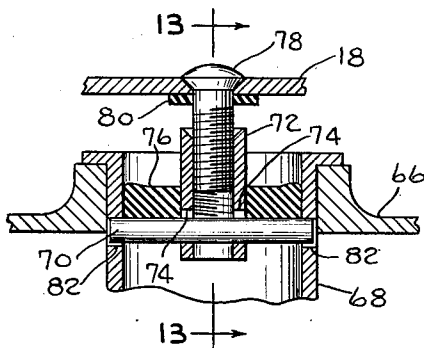


FIG. 12

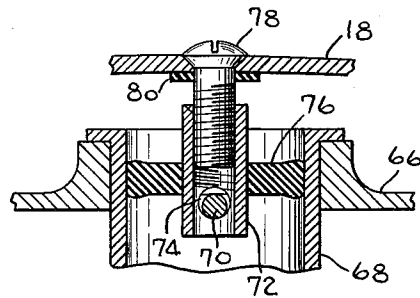


FIG. 13

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MOUNTING AND ENGINE COVER MOUNTING
FOR OUTBOARD MOTORS

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Application May 8, 1950, Serial No. 160,602

10 Claims. (Cl. 115—18)

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This invention relates to improvements in outboard motors and particularly to mountings therefor which lessen the transmission of vibration shock from the engine to the tiller, engine cover, and boat.

Shock mountings have been developed for cushioning the torque vibration of the engine from the transom bracket and from the tiller. Such mountings do not however prevent other types of vibration from being transmitted to the tiller and to the transom bracket. The covers for the engines of outboard motors in accordance with present design are rather large and relatively heavy. It is important therefore that they be insulated from torque and other types of vibration.

It is an object of this invention therefore to provide a mounting for an outboard motor which prevents the transmission of torque vibration from the engine to the tiller, engine cover, and transom bracket and also minimizes the transmission of other types of vibration from the engine to such parts.

Another object of the invention is to provide means for securing the engine cover to the engine support plate in a facile and simple manner, easily operated and feasibly unobtrusive.

The first of these objects is attained by providing an engine cover and tiller support which is carried by the transom bracket and floatably mounting the engine with respect to the support and the transom bracket by a resilient member carried by the bracket. It is preferable to also provide a vibration absorbing member between the support and the transom bracket which will prevent the transmission from the engine of other than torque vibration to the tiller and engine housing. With this construction the oscillation of the engine and its shaft housing due to torque vibration is absorbed by permitting such oscillation to take place within the limits of a resilient bushing through which the engine is mounted to a sleeve-like member rotatably carried in the transom bracket. By reason of resilient shock-absorbing members positioned between such sleeve-like member and the engine cover and tiller support, any vibration transmitted from the engine to the sleeve-like member is further dampened and the amount thereof transmitted to the tiller and cover so reduced as to be negligible.

The second of these objects is attained by loosely mounting a threaded tubular member to the starter spider so that it is substantially coaxial with the axis of rotation of the crank shaft

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of the engine and by securing the cover thereto with a screw through the top of the cover. The loose mounting and coaxial placement of the threaded tube prevents any torque or other vibration from being transmitted to the engine cover through the screw. The top of the engine cover is slightly deflected as the screw is tightened and thus supplies sufficient force to hold the cover securely against its support.

The novel features, which are considered characteristic of the invention, are set forth with particularity in the appended claims. The invention itself, however, both as to its organization and its method of operation, together with additional objects and advantages thereof, will best be understood from the following description of a specific embodiment when read in connection with the accompanying drawings, in which:

Fig. 1 is a view in side elevation of an outboard motor embodying the present invention, part being shown in section for sake of illustration;

Fig. 2 is an enlarged fragmentary view partly in side elevation and partly in section showing the details of the shock mounting;

Fig. 3 is a fragmentary sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a fragmentary sectional view taken on line 4—4 of Fig. 2;

Fig. 5 is a fragmentary sectional view taken on line 5—5 of Fig. 2;

Fig. 6 is a fragmentary sectional view taken on line 6—6 of Fig. 2;

Fig. 7 is a fragmentary sectional view taken on line 7—7 of Fig. 2;

Fig. 8 is a fragmentary enlarged sectional view taken on line 8—8 of Fig. 7;

Fig. 9 is a fragmentary view partly in side elevation and partly in section showing the detail of the mechanism for holding the engine cover to its support;

Fig. 10 is an enlarged fragmentary view taken on line 10—10 of Fig. 9;

Fig. 11 is an enlarged fragmentary sectional view taken on line 11—11 of Fig. 9;

Fig. 12 is an enlarged fragmentary sectional view taken on line 12—12 of Fig. 9; and

Fig. 13 is a fragmentary sectional view taken on line 13—13 of Fig. 12.

Referring to the drawings by reference numerals, the outboard motor, indicated generally at 10, in its usual construction is well known. The power head or engine is mounted at the top of the vertical leg or power unit support 12 and its power is transmitted through drive shafts and gearing to the propeller carried at the lower

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end of such leg. The motor is carried on the transom of a boat. It is mounted thereto by a transom bracket of conventional design, one part of the transom bracket, designed as swivel bracket 14, being pivoted so that the motor may be swung with the swivel bracket in a vertical plane.

In this particular embodiment of the invention there is provided a support plate 16 upon which is carried an engine cover 18 and to which the tiller 20 is secured. The support plate 16 is not secured to the power head but instead is carried by swivel bracket 14 in the manner hereinafter described. The power head, however, is directly mounted to the vertical leg or power unit support 12 by having a lower portion of the engine block 22 secured to the upper end of such leg by machine bolts 24. Thus the torque vibration and other types of vibration created by the operation of the power head are directly transmitted to the vertical leg or power unit support 12.

The vertical leg or power unit support 12 and its power head are connected with the swivel bracket 14 so as to have relative rotation with respect thereto for the purpose of steering. To this end the leg or power unit support 12 mounts a tubular king pin 26 in upper and lower bearings 28 and 30 formed at the top and bottom of a recess in the forward wall of such leg. The upper bearing 28 is split at 32 and a machine screw 34 adjusts the diameter of such bearing to clamp the tubular king pin 26 in its proper assembled position. The swivel bracket 14 has a cylindrical steering column bearing portion 36 which substantially completely surrounds the tubular king pin 28. However, the inner diameter of the steering bearing 36 is considerably larger than the outer diameter of the king pin 26 so that there may be incorporated therebetween torque-absorbing bushing units. The upper of these bushing units consists of an outer metal sleeve-like member 38, the outer diameter of the cylindrical portion of which has a snug turning fit within the steering column bearing 36. At its upper end the member 38 has an outwardly flaring flange 40, a portion of which constitutes a seat for receiving vertical thrust from the weight of the motor and another portion of which provides a support to which is mounted the support plate 16. An oil-resistant synthetic rubber bushing 42 is vulcanized to the interior diameter of the member 38 and is provided with a central bore which slidably receives the tubular king pin 26. At its upper end the bushing is flared outwardly and has vulcanized to its upper surface a metal washer 44 provided with a radial slot 46. This slot accommodates a pin 48 fixed in the upper portion of the vertical leg or power unit support 12. The upper portion of the rubber bushing is compressed and carries the weight of the power head and vertical leg or power unit support 12. However, whenever the power head is rotatably moved relative to the vertical leg or power unit support 12 a torque is transmitted through the pin 48 to the washer 44 to which the rubber bushing 42 is vulcanized. Thus bushing 42 will be stressed in shear, by reason of the turning of its upper surface with respect to the outer surface thereof vulcanized to the sleeve-like member 38, and the motor is allowed to rotatively oscillate with respect to the sleeve-like member 38 and swivel bracket 14 within the elastic limits of such bushing. In so doing all but negligible amounts of torque vibration are absorbed within the bushing and not transmitted to the swivel bracket or the transom of the boat.

In operation of the outboard motor certain

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amounts of lateral thrust are transmitted from the tubular king pin 26 to the swivel bracket 14 and support plate 16. These are absorbed by compressing the walls of the bushing 42 and the bushing 52, the latter of which is vulcanized to the inner wall of the metal sleeve 50 fitted within the lower part of the steering column bearing 36 thus providing broader distribution of lateral vibration forces. To assemble the transom bracket to the vertical leg the upper and lower bushing units are inserted in their respective places in the steering column bearing 36 and then the swivel bracket 14 is fitted within the recess of the vertical leg or power unit support 12 and the tubular king pin 26 slid longitudinally down through the upper bearing 28 through the bores in each of the bushings and into the lower bearing 30. The clamping screw 34 is then tightened to hold the pin in place. The drive shaft 54 of the motor passes through the tubular king pin when the engine is assembled in place. Before the engine is secured to the vertical leg 12 of the support plate 16 is fastened to the mounting flange 40. The support plate 16 has four inwardly projecting lugs 55 which rest upon the upper surface of the flange 40 and are threaded to receive machine screws 62 by which the plate 16 is made fast to the sleeve-like member 38.

The support plate 16 has a peripheral shoulder 64 at its upper edge on which is seated the lower edge of the engine cover 18. The tiller 20 is secured in the wall of the support plate 16 so that this plate thus acts as a carrying member for both the engine cover and tiller. It is preferable to insulate the plate 16 from the mounting flanges 40. To effectuate this a lower layer 56 and an upper layer 58 of oil-resistant synthetic rubber is vulcanized to both bottom and top sides of the flanges 40 and such layers are joined by liners 60 which pass through openings in the flanges. Thus the machine screws 62 as well as the lugs 55 are spaced from the flanges 40 by a considerable thickness of rubber. This insures that vibration other than torque vibration which is transmitted to the sleeve-like member 38 through the bushing 42 is absorbed and no appreciable or disturbing amount thereof will be transmitted through support plate 16 to the cover 18 or tiller 20.

In order to retain the cover 18 in place on the support plate 16 it is necessary that some fastening device be employed. It is desirable that the device used be inexpensive and at the same time easily operated so that the cover may be quickly removed and replaced. To accomplish this, holes 82 are drilled in diametric positions in the walls of the hollow mounting 68 which forms the axial support for the starter pulley and associated mechanism (not shown). This mounting is press-fitted within and supported by the spider mounting 66 which is structurally secured to the power unit support 12 to provide the structural support for the entire starter mechanism. The mounting 68, because it forms the axial support for the starter pulley, is concentrically aligned with the drive shaft of the power unit and axis of rotation of said power unit support and hence angular oscillations of such power unit do not effect appreciable torque vibration of the mounting. A transverse pin 70 has a loose fit within the diametric holes in the hollow mounting 68. In order to keep the pin 70 from longitudinal displacement the holes in the hollow mounting are spaced closely enough to the upper end of such mounting so that they will be within the confines

of the opening in the spider 66 in which such mounting is positioned. A longitudinally, interiorly threaded tube 72 is loosely mounted through diametric, enlarged holes 74 in its walls on pin 70 so that the tube 72 may wobble from side to side and be self-aligning. It is desirable, however, to normally hold the tube 72 in a substantially vertical position in order that the screw 78 may readily fit therein. This is accomplished by placing a square block made of sponge rubber or other resilient material which is mounted on the tube 72 and engages the interior walls of the mounting 68 to center the tube 72 substantially coaxially with the axis of the drive shaft of the engine. The top of the cover is provided with an opening in which is positioned a headed machine screw 78 rotatably held in place by a rubber washer 80 tightly engaging the shank of such screw adjacent its head and bearing against the inner surface of the engine cover 18. To operate this fastening device it is only necessary to put the cover in place. This automatically aligns the screw 78 with the threaded tube 72. By turning the screw 78 clockwise it is drawn into the tube and the top of the cover slightly deflected and placed under tension holding the cover 18 tightly on the shoulder 64. When it is desired to remove the cover it is only necessary to unthread the screw 78 from the tube 72 and the cover may then be immediately removed. The washer 80 keeps the screw 78 from being lost and hence the device becomes a very effective fastener. As the head of the screw 78 may be recessed in a counter-sunk portion of the top of the cover 18 it will be hardly visible and will not alter or mar the smooth, stream-line appearance of the engine cover and its support.

Although only one embodiment of the invention is shown and described herein it will be understood that this application is intended to cover such changes or modifications as come within the spirit of the invention or scope of the following claims.

We claim:

1. In an outboard motor, a transom mounting including a swivel bracket having a steering column bearing, a power unit support turnable with respect to said bearing, a resilient connection between said support and said bearing to dampen vibration transmission therebetween, an engine cover supporting plate associated with said bearing and rotatable with respect to said power unit support, a tiller secured to said plate, and an engine cover mounted on said plate.

2. In an outboard motor as claimed in claim 1, a member rotatably mounted in said bearing, and a resilient connection between said member and said supporting plate.

3. In an outboard motor as claimed in claim 1, a fastening element extending between said engine cover and said power unit support for detachably holding said cover to said supporting plate, said fastening element being coaxially positioned relative to the axis of rotation of said power unit support to prevent torque vibrations from being transmitted from said power unit support to said cover.

4. In an outboard motor, a transom mounting including a swivel bracket having a steering column bearing, a power unit having a support turnable about an axis coaxial with said bearing, a sleeve-like member rotatably fitted in said bear-

ing and having a flange extending outwardly of said bearing, a resilient connection between said support and said member for permitting said support to oscillate with respect to said member, a supporting plate secured to said flange and having an outer portion extending beyond said power unit to hold an engine cover, a tiller operatively secured to said plate, and an engine cover mounted on said outer portion and encasing said power unit.

5. In an outboard motor as claimed in claim 4, a resilient member between said supporting plate and said flange.

6. In an outboard motor as claimed in claim 4, an internally threaded tube loosely connected to said power unit support and coaxially arranged with respect to the axis of said bearing, and an externally threaded member carried by said cover and engageable with said tube when said cover is positioned on said support to hold said cover thereon.

7. In an outboard motor, a transom mounting including a swivel bracket having a steering column bearing, a power unit support turnable with respect to said bearing, a resilient connection between said support and said bearing to dampen vibration transmission therebetween, an engine cover supporting plate associated with said bearing and rotatable with respect to said power unit support, and an engine cover mounted on said plate.

8. In an outboard motor having a power unit and a vertical drive shaft, a support for said power unit providing a housing for said shaft, a mounting member having a steering column bearing, a tubular king pin secured to said support and encircling said drive shaft, said king pin being positioned within said bearing, a bushing unit interposed between said bearing and said king pin, said unit comprising a metallic sleeve-like outer portion rotatably carried in said bearing, an inner flexible portion secured to said sleeve-like portion and in engagement with said king pin, and a washer on the upper end of said inner flexible portion and secured thereto, said power unit being connected with said washer whereby torque vibration is transmitted therebetween, and an enclosure for said said power unit supported by said outer portion.

9. In an outboard motor as claimed in claim 8 in which said washer is slotted and said power unit has a pin extending into said slot to transmit torque vibration between said unit and said washer.

10. In an outboard motor as claimed in claim 8 in which there is an engine cover support resiliently connected to said sleeve-like outer portion and in which a tiller is mounted on said support.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,932,785	Irgens	Oct. 31, 1933
2,256,831	Karey	Sept. 23, 1941
2,462,272	Martin	Feb. 22, 1949