

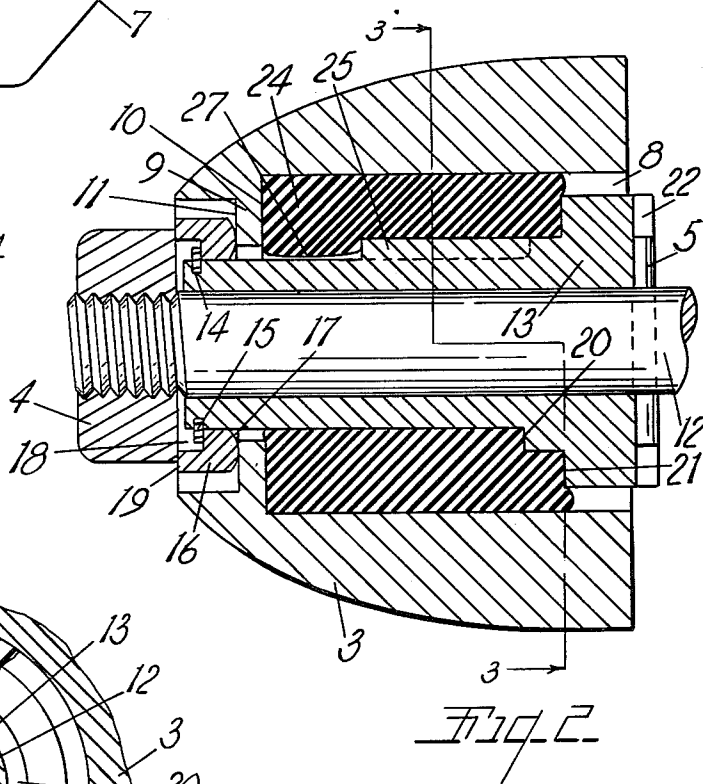
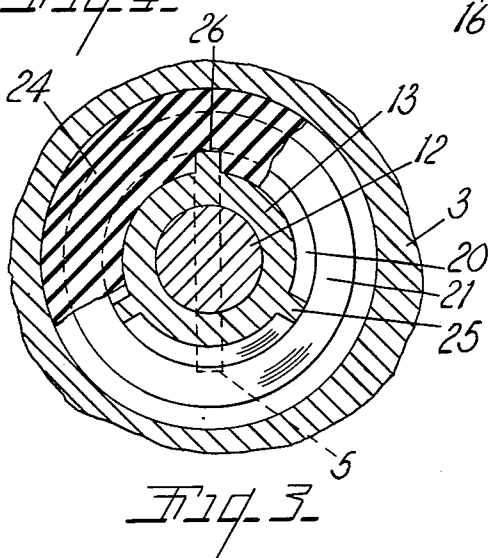
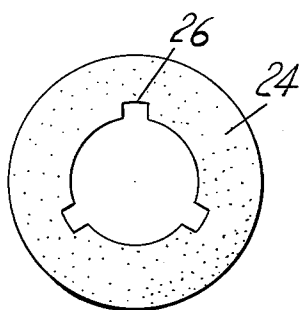
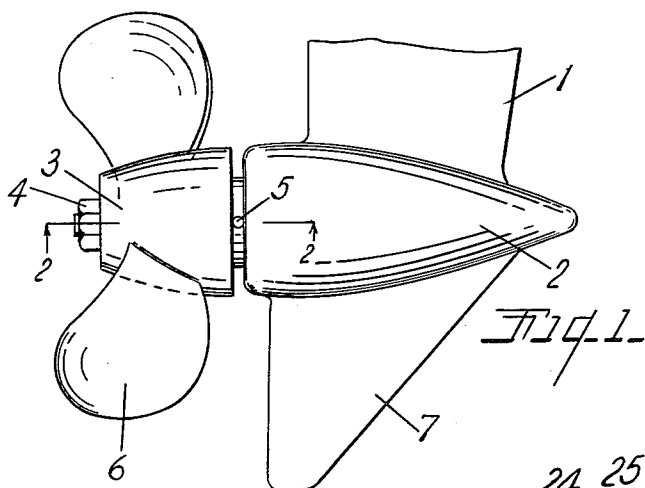
July 31, 1962

J. H. RIELAG

3,047,074

CUSHIONED MARINE PROPELLER MOUNTING

Filed Oct. 24, 1960



INVENTOR.
John H. Rielag
BY *Arthur A. Clark*
ATTORNEY

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3,047,074

CUSHIONED MARINE PROPELLER MOUNTING
John H. Rielag, Grand Rapids, Mich., assignor to Marine
Propeller Company, Grand Rapids, Mich.
Filed Oct. 24, 1960, Ser. No. 64,408
4 Claims. (Cl. 170—160.54)

This invention relates to cushioned marine propeller mounting. The principal objects of this invention are: First, to provide a mounting for marine propellers which will absorb or cushion torsional impacts between the driving shaft and the propeller.

Second, to provide a torsional cushion for marine propellers which is entirely contained within the propeller so that the propeller can be removably mounted on a propeller shaft and connected thereto by the usual type of shear pin and propeller shaft nut.

Third, to provide a torsional impact cushion for a marine propeller with a deformable cushioning element that is compressed axially by a retaining ring element that coacts with the usual mounting nut on the propeller shaft so that tightening the mounting nut on the propeller shaft supplements the initial axial compression in the cushioning element and imposes a locking force on the threaded engagement of the mounting nut on the propeller shaft.

Fourth, to provide a novel form of retaining washer between the hub of a marine propeller and a cushioned metallic bushing within the hub, the washer having a convex selfcentering engagement with the hub and exposed abutment surface adapted to be engaged by a mounting nut on a propeller shaft.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings, of which there is one sheet, illustrate a highly practical form of the propeller hub and mounting.

FIG. 1 is a fragmentary side elevational view of a marine propeller mounted on the driving head of an outboard type motor.

FIG. 2 is a fragmentary cross sectional view through the propeller and mounting taken along the plane of the line 2—2 in FIG. 1.

FIG. 3 is a fragmentary transverse cross sectional view taken along the plane of the line 3—3 in FIG. 2.

FIG. 4 is an end elevational view of the deformable cushioning element incorporated in the mounting shown in FIGS. 2 and 3.

It has been a common practice to mount propellers on the shafts of outboard motors by means of a retaining nut on the propeller shaft and a shear pin transversely engaging the propeller shaft and the hub of the propeller to drive the propeller from the shaft while permitting the pin to shear in the event that the propeller strikes an obstruction. This practice is followed to prevent damage to the motor parts.

With the recent advent of higher powered outboard motors and larger and heavier propellers which can be driven thereby, it has been found that the inertia of the heavier propellers and the greater resistance to rotation thereof in the water is sufficient to shear or break the old type of shear pin connections to the propeller shaft when the new powerful motors are suddenly accelerated and this objectionable shearing has occurred without the propeller striking an obstruction and in the normal practice of accelerating the newer motors.

The present invention provides a practical torsional cushion between the propeller shaft and the propeller which will absorb the initial shock of the rapidly accelerated propeller shaft and permit the propeller to lag slightly behind the propeller shaft during the impact period of acceleration so that the shear pin which is

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still provided between the propeller shaft and the propeller will not be broken.

In the drawings a propeller mounting on the propeller head of an outboard motor is conventionally illustrated in FIG. 1 in which a shaft column depending from the motor is indicated at 1 supporting a gear head casing 2 from which the propeller shaft projects rearwardly into a propeller hub 3 retained in place by the propeller shaft nut 4. The shear pin for drivingly connecting the hub to the propeller shaft appears at 5 and the propeller blades are conventionally illustrated at 6. A guard fin 7 projects below the gear head 2 to beyond the diameter of the propeller blades.

The particular cushion mounting of the propeller hub 3 appears more clearly in FIGS. 2 and 3 in which the hub is disclosed as having a central chamber 8 with an interior annular flange 9 located toward the rear of the hub to provide a forwardly facing shoulder 10 and a rearwardly facing shoulder 11. The propeller shaft 12 from the gear head 2 extends through the chamber in the propeller hub and is threaded to receive the hub retaining nut 4 on its rear end.

Positioned around the shaft 12 and within the chamber 8 is a cylindrical metal mounting bushing 13 having a snap ring groove 14 formed in its outer end and receiving a washer retaining ring 15. The ring 15 axially retains a metal washer 16 on the end of the bushing and the washer has a forwardly convex radial cross section as at 17 which bears against the rearwardly facing shoulder 11 to prevent rearward displacement of the hub 3 with respect to the bushing. The washer is recessed in its rear face as at 18 to receive the retaining ring 15 and to provide an abutment face 19 against which the propeller nut 4 bears to retain the propeller hub axially on the shaft.

The forward end of the metal bushing 13 is shouldered in a first radially projecting shoulder 20 and a second further projecting shoulder 21 both of which are received in the forward end of the chamber 8 in the hub. The forward face of the bushing is transversely notched as at 22 to receive the shear pin 5 passed through the propeller shaft 12. It will be appreciated that the notch 22 and bushing 13 have no coaction with the shear pin until the assembled propeller hub and bushing are mounted on the propeller shaft and clamped in place by the nut 4. Positioned in the annular space in the chamber 8 between the hub 3 and the bushing 13 is an annular sleeve 24 of deformable elastic material such as rubber. This sleeve is compressed during installation between the forwardly facing shoulder 10 and the double shoulder 20—21 on the bushing by pressing the bushing rearwardly through the flange 9 until the washer 16 and the retaining snap ring 15 can be installed behind the shoulder 11. This deforms the sleeve 24 into tight frictional gripping engagement with the interior of the hub 3 and the exterior of the bushing 13.

In order to prevent slipping of the bushing 13 within the deformable sleeve 24 the bushing is provided with three axially extending ribs 25 on its exterior which project part way along the length of the sleeve 24. The sleeve in turn is provided with coacting interior grooves 26 (see FIG. 4) which receive the ribs 25. The compressing action on the sleeve 24 causes the rubber material of the sleeve to tightly engage the ribs 25 and also to collapse into the groove 26 beyond the ends of the ribs as at 27 in FIG. 2. The broader area of contact between the exterior of the cushioned sleeve 24 and the interior of the chambered hub 3 makes it unnecessary to provide corresponding interlocking ribs between the hub and the exterior of the cushion. In operation of the propeller the blades 6 and hub 3 are permitted to lag slightly behind the shaft 12 and bushing 13 by torsional flexing of the

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elastic sleeve 24 when the shaft 12 is rapidly accelerated. This prevents the full load of the blades 6 from being applied instantaneously to the shear pin 23 and prevents the shear pin from being unintentionally and undesirably broken or sheared off in normal operation of the propeller. It is pointed out that the normal axial clamping force of the propeller nut 4 on the shaft 12 will be applied through the washer 16 and concave face 17 to the hub 3 to supplement the initial compression of the deformable sleeve 24 against the shouldered forward end of the bushing 13. This increases the frictional grip of the sleeve on the hub 3 to a certain extent and more importantly provides an automatic locking load on the threaded engagement between the nut 4 and the shaft 12. The propeller including the hub 3 and cushioned bushing 13 can be installed and removed in the usual manner simply by removing the retaining nut 4.

What is claimed as new is:

1. A marine propeller comprising a chambered hub on which the blades of the propeller are formed, an interior annular flange formed around the chamber of said hub toward the rear of the chamber to form rearwardly and forwardly facing shoulders, a metal shaft receiving bushing positioned in said chamber and extending through said flange, an annular metal washer positioned around the rear end of said bushing and having radial cross section with a convex forward face bearing against said rearwardly facing shoulder, a retaining snap ring received in a groove provided therefor in said bushing and engaging the rear of said washer, said washer being recessed in the rear to receive said ring and having a rearwardly facing surface adapted to be engaged by a retaining nut on a propeller shaft extending through said bushing, said bushing having a double stepped radially projecting shoulder on its forward end, a cushion sleeve of deformable elastic material compressed between said shoulder on said bushing and said forwardly facing shoulder on said hub into frictional gripping contact with the chamber wall of said hub and the outside of said bushing, and axially extending ribs on the exterior of said bushing of lesser height than the shoulder on the bushing received in slots provided therefor in the interior of said sleeve, said ribs being shorter than said sleeve, said bushing having means located forwardly of said hub to receive a shear pin passed through a shaft received in said bushing.

2. A marine propeller comprising a chambered hub on which the blades of the propeller are formed, an interior annular flange formed around the chamber of said hub toward the rear of the chamber to form rearwardly and forwardly facing shoulders, a metal shaft receiving bushing positioned in said chamber and extending through said flange, an annular metal washer positioned around the rear end of said bushing and having radial cross section with a convex forward face bearing against said rearwardly facing shoulder, a retaining ring received in a groove provided therefor in said bushing and engaging the rear of said washer, said washer having a rearwardly facing surface adapted to be engaged by a retaining nut on a propeller shaft extending through said bushing, said bushing having a double stepped radially projecting shoulder on its forward end, a cushion sleeve of deformable elastic material compressed between said shoulder on said

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bushing and said forwardly facing shoulder on said hub into frictional gripping contact with the chamber wall of said hub and the outside of said bushing, and axially extending ribs on the exterior of said bushing of lesser height than the shoulder on the bushing received in slots provided therefor in the interior of said sleeve, said ribs being shorter than said sleeve, said bushing having means located forwardly of said hub to receive a shear pin passed through a shaft received in said bushing.

3. A marine propeller comprising a chambered hub on which the blades of the propeller are carried, an interior annular flange formed around the chamber of said hub to form rearwardly and forwardly facing shoulders, a rigid shaft receiving bushing positioned in said chamber and extending through said flange, an annular rigid washer positioned around the rear end of said bushing and having a forward face bearing against said rearwardly facing shoulder, means axially retaining said washer on said bushing, said washer having a rearwardly facing surface adapted to be engaged by a retaining nut on a propeller shaft extending through said bushing, said bushing having a radially projecting shoulder on its forward end, a cushion sleeve of deformable elastic material compressed between said shoulder on said bushing and said forwardly facing shoulder on said hub into frictional gripping contact with the chamber wall of said hub and the outside of said bushing, and axially extending ribs on the exterior of said bushing of lesser height than the shoulder on the bushing received in slots provided therefor in the interior of said sleeve, said ribs being shorter than said sleeve, said bushing having means located forwardly of said hub to receive a shear pin passed through a shaft received in said bushing.

4. A marine propeller comprising a chambered hub on which the blades of the propeller are carried, an interior annular flange formed around the chamber of said hub to form rearwardly and forwardly facing shoulders, a rigid shaft receiving bushing positioned in said chamber and extending through said flange, an annular rigid washer positioned around the rear end of said bushing and having a forward face bearing against said rearwardly facing shoulder, means axially retaining said washer on said bushing, said bushing having a radially projecting shoulder on its forward end, a cushion sleeve of deformable elastic material compressed between said shoulder on said bushing and said forwardly facing shoulder on said hub into frictional gripping contact with the chamber wall of said hub and the outside of said bushing, and axially extending ribs on the exterior of said bushing of lesser height than the shoulder on the bushing received in slots provided therefor in the interior of said sleeve, said bushing having means located forwardly of said hub to receive a shear pin passed through a shaft received in said bushing.

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