April 16, 1963 P. M. HAMLYN ETAL 3,085,544

MARINE PROPULSION UNITS

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Fig. 1.

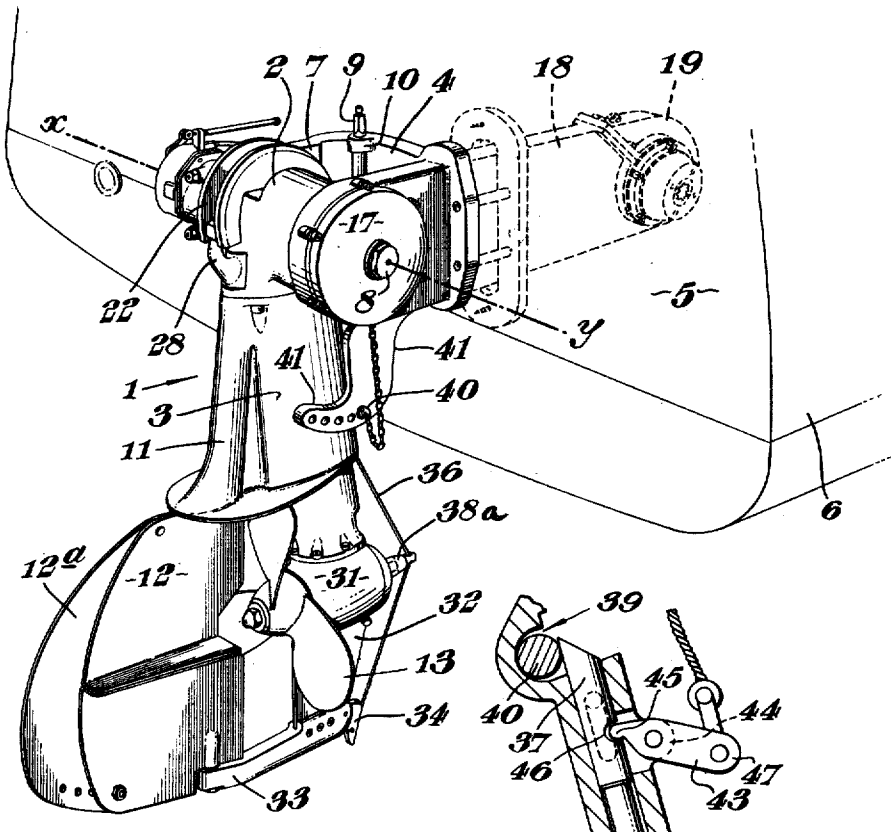


Fig. 3.

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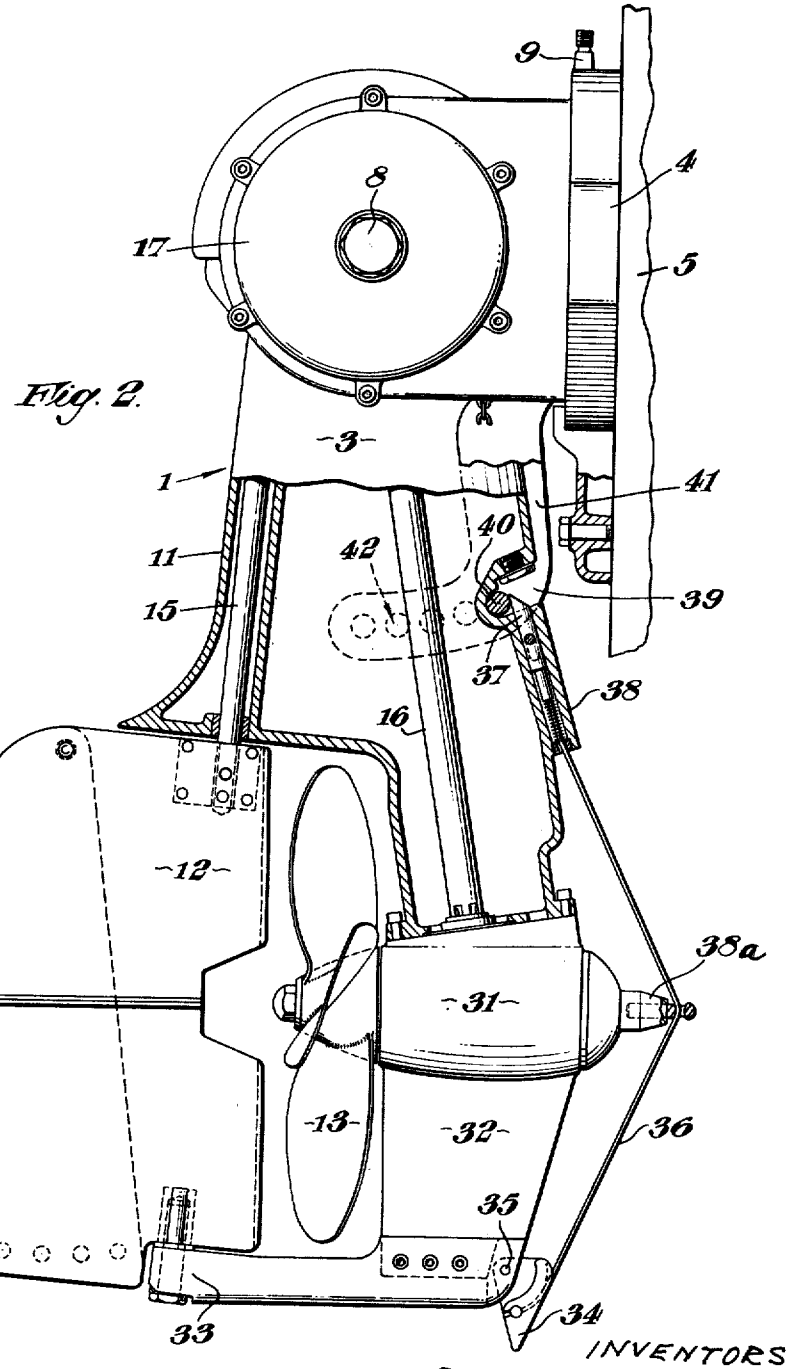


Fig. 2.

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MARINE PROPULSION UNITS

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3 Claims. (Cl. 115—41)

This invention has reference to marine propulsion units of the type adapted to be attached to the transom of a boat and including a main casing containing a main shaft suitably powered and driving a propeller mounted at the foot of the casing on a underwater gear housing for the propeller shaft and its gear, the main casing being supported by a transom bracket in such a manner that the unit is capable of tilting upwardly in a vertical plane about a pivotal axis should underwater obstacles be encountered when moving ahead. Units of this description are referred to herein as marine propulsion units "of the type described." Such units of comparatively small power, termed outboard motors, generally include a self-contained prime mover mounted fixedly on or in combination with the tiltable unit. The invention is applicable to such outboard motors, and also to marine propulsion units of the type described which are of larger power, the propeller being driven by an inboard prime mover driving the main shaft of the unit through the vessel's transom.

The said invention is concerned particularly with the construction of the locking device controlling the tilting action, and has for its object to provide an efficient lock to prevent the unit tilting upwards (necessary when the propeller is driving the boat astern) said lock being automatically released should an underwater obstacle be encountered when the boat is moving ahead.

According to the said invention a marine propulsion unit of the type described is provided with a locking device to prevent the unit tilting, comprising a rocking plate or feeler pivoted on the base of the underwater gear housing or to a skeg or keel fast therewith, a flexible cable or equivalent connected by one end to said feeler and extending upwardly outside the forward face of the main casing with its upper end attached to a spring-loaded latch-ended locking bolt axially slidable in a bolt housing on the main casing, and a transverse pin carried by a bracket attachable to the boat's transom and engageable by said bolt, whereby rocking of the feeler on encountering an underwater obstruction unlatches the locking bolt from the pin allowing the unit to rise about its pivotal axis.

The flexible cable is preferably of stainless steel, and is advantageously held away from the face of the underwater gear housing and main casing by a projecting strut having a guide hole for the cable. By this spacing arrangement the locking bolt is unlatched should the cable encounter an obstruction.

In order that the said invention may be readily understood an embodiment thereof will be described by way of example with the aid of the accompanying drawings wherein:

FIGURE 1 is a perspective view of the unit attached to the transom of a waterborne vessel;

FIGURE 2 is a side view thereof partly in section, looking from the right of FIGURE 1, and drawn to a larger scale; and

FIGURE 3 is a sectional view of the locking bolt and its housing showing a modification, and drawn to a still larger scale than FIGURE 1.

Like numerals of reference indicate the same or corresponding parts in the several views.

The general view depicted in FIGURE 1 shows a marine propulsion unit of the type described and embodying the invention and from this illustration there will be noted a main casing of a general T-shape designated as a whole by the numeral 1 having a top casing part 2 (the top bar of the T) and a depending part 3 (the leg of the T). This casing is mounted on a transom bracket 4 adapted to be secured to the transom 5 of a waterborne vessel 6. The transom bracket 4 has a pair of spaced apart parallel plate parts 7 constituting trunnion bearings between which the top part 2 of the main casing is mounted, being pivoted on a horizontal axis x—y which coincides with the axis of the nut 8. One of said plate parts 7 is seen in FIGURE 1 the other being hidden behind a casing 17 also carried by the transom bracket 4. There is a vertical rudder post 9 rotatable in lugs 10 on the base plate part of the transom bracket 4, externally of the casing, and within the tubular stern part 11 of the leg 3 of the T-shape main casing 1 there is rotatably mounted a rudder mounting shaft 15 (see FIGURE 2) operating the rudder 12. In the larger body part of the depending leg 3 of the main casing there is a sub-shaft 16 (see FIGURE 2) for the propeller 13. The main casing 1 can tilt about the axis x—y in the aft direction when the unit encounters an obstacle. Across the interior of the top 2 of the casing, and mounted at each end in suitable bearings is a horizontal power-driven shaft, i.e. the main shaft, which is driven by a chain sprocket via a disc clutch in the casing 17 forming no part of the present invention. The casing 17 is continued through the transom 5 as indicated at 18 and at the inboard end 19 there is mounted a second chain sprocket within the casing driven by an internal combustion engine. The sprocket at 19 drives the sprocket in casing 17. The said main shaft is adapted to drive the aforesaid sub-shaft 16 disposed at right-angles to the main shaft and extending downwardly within the leg part 3 of the T-shaped casing. It terminates near the foot of the casing 1 in an underwater gear housing 31 attached to the main casing, and is fitted with a bevel-wheel drive in said housing to a propeller shaft which extends out of the housing to carry the propeller 13 of the unit.

Below the underwater gear housing 31 running in the fore and after direction there is fixed a keel or skeg 32 the bottom edge of which extends astern to provide an upwardly projecting pivotal point 33 for the bottom of a rudder 12. As a part of the leg 3 of the main casing 1, astern of the aforesaid sub-shaft 16, there is formed the aforesaid tubular housing 11 along the leg of the T-shape for the rudder mounting shaft 15 journalled therein at top and bottom and extending out of the bottom to carry the rudder. The shaft 15 is adapted to be turned by the vertical rudder post 9 by a device which allows tilting of the units as set forth in co-pending application No. 160,040 (Patent No. 3,051,119) and forms no part of the present invention.

At the forward bottom corner of the skeg 32 there is pivoted a rocking plate 34 of approximately triangular form, the pivot pin 35 passing through one corner thereof, and another corner projecting downwardly. This constitutes a feeler for encountering underwater obstacles and is adapted to be rocked by said obstacles when the boat is moving forward, the feeler then swinging in a backward direction towards the rudder. A stainless steel flexible cable 36 is attached by one end to the said rocking plate 34 and is brought up over the outside forward face of the underwater gear housing 31 and main casing 1 to a locking bolt 37. Intermediately the cable is passed through an eye at the end of a strut 38a projecting from the underwater housing 31 so that it is sharply flexed at this point, the two parts on each side standing clear of the housing and main casing.

The said locking bolt 37 is spring-loaded in a tubular housing 38 on the outside of the main casing 1 so as to

project normally upwards into a transverse recess **39** formed in the casing. In this recess there is disposed a transverse locking pin **40** carried between two cheeks **41** projecting from the fixed transom bracket **4**, and the slidable bolt **37** is formed with a chamfered nose so as to give the bolt a latch end to engage the locking pin **40** forward thereof. This normally holds the unit against upward tilting. When the feeler **34** is rocked rearwardly, or the cable **36** deflected by encountering an obstacle, the locking bolt **37** is retracted against spring action and the unit can then swing upward about the axis *x—y*. On its return movement under gravity the bolt is pressed back by the transverse pin **40** engaging the latch end and the unit automatically is locked once more against tilting.

The transverse pin **40** may be selectively engaged through any one of a series of holes **42** in the cheeks **41** in order to adjust the normal locked position of the unit.

In FIGURE 3 there is seen a modification of the bolt **37** whereby it can be operated manually from the vessel as well as automatically by the rocking plate or feeler **34**. For this purpose a short two-armed lifting lever **43** is pivoted between lugs **44** on the tubular housing **38**, and one end **45** is nosed to engage a recess **46** in the latch bolt **37**. The other end **47** of the lifting lever **43** is coupled to a cable **48** led up to the vessel and suitably anchored thereto so as to be available should the crew desire to unlock the unit for tilting.

We claim:

1. A marine propulsion unit adapted to be attached to the transom of a boat, including a main casing containing a powered main shaft for driving a propeller at the foot

of the casing on a underwater gear housing, the main casing being supported by a transom bracket in such a manner that the unit is capable of tilting upwardly should underwater obstacles be encountered, a locking device to prevent the unit from tilting, said locking device comprising a feeler pivoted on a keel fast with the underwater housing, a cable connected by one end to said feeler and extending upwardly outside the forward face of the main casing with its upper end attached to a spring-loaded latch-ended locking bolt axially slidable in a bolt housing on the main casing, and a transverse pin carried by a bracket attachable to the boat's transom and engageable by said bolt, whereby rocking of the feeler on encountering an underwater obstruction unlatches the locking bolt from the pin allowing the unit to rise about its pivotal axis.

2. A marine propulsion unit according to claim 1 characterised in that the locking bolt is provided with means whereby it can be operated manually from the vessel as well as automatically by the pivoted feeler.

3. A marine propulsion unit according to claim 2 wherein the said means for operating the locking bolt manually comprises a two-armed lifting lever pivoted to the bolt housing, one end of said lever operatively engaging the bolt, and the other end being coupled to an operating cable.

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