

Sept. 30, 1969

M. J. PURETIC

3,469,558

MARINE PROPULSION UNIT

Filed Oct. 25, 1967

2 Sheets-Sheet 1

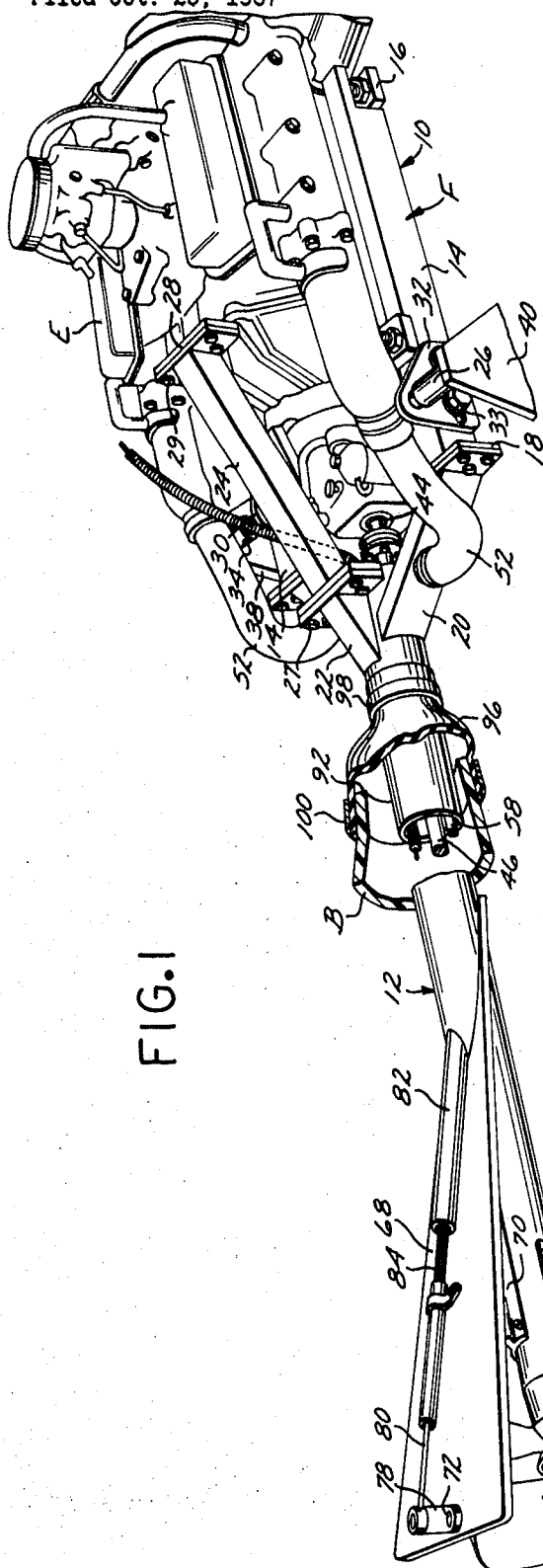


FIG. 1

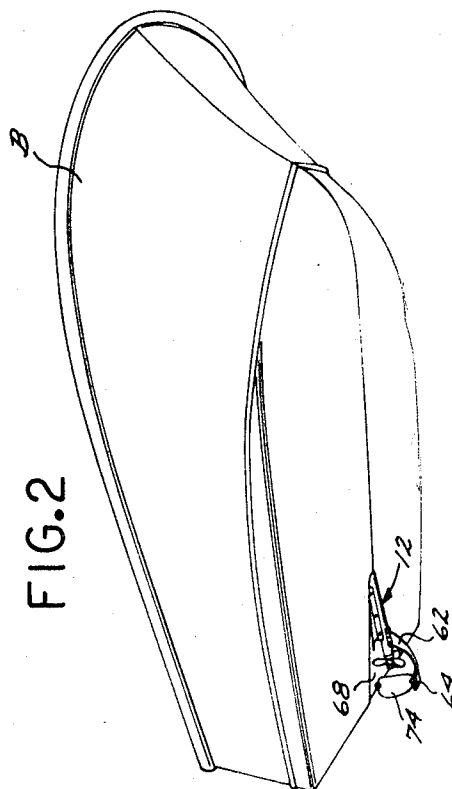


FIG. 2

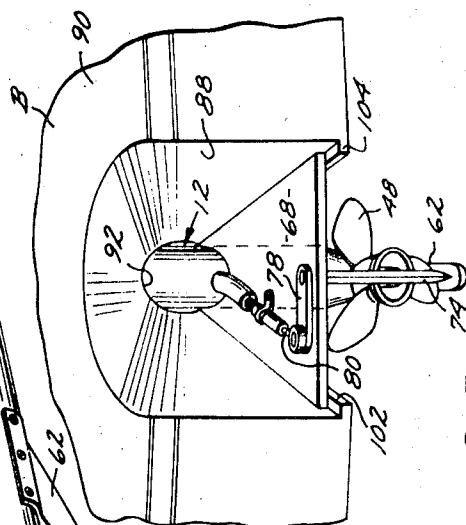


FIG. 3

INVENTOR
MARIO J. PURETIC
BY *Fulwider, Patton, Rieber,
Lee and Uticht*
ATTORNEYS

Sept. 30, 1969

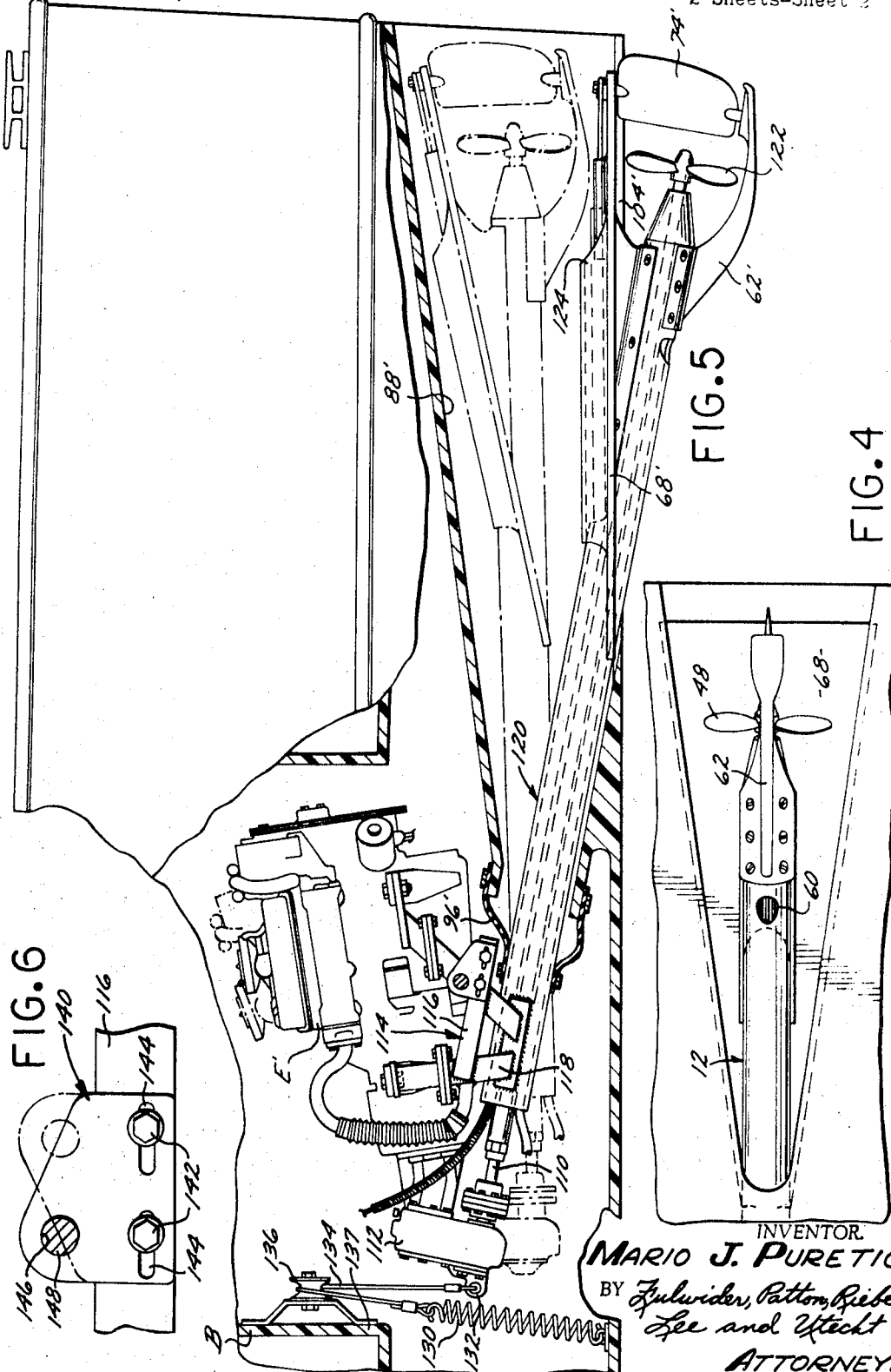
M. J. PURETIC

3,469,558

MARINE PROPULSION UNIT

Filed Oct. 25, 1967

2 Sheets-Sheet 2



INVENTOR
MARIO J. PURETIC
BY *Fulwider, Patton, Gieber,
Lee and Utecht*
ATTORNEYS

1

2

3,469,558

MARINE PROPULSION UNIT

Mario J. Puretic, 259 6th Ave. N., Monte Cristo Isle,
Tierra Verde, Fla. 33715

Filed Oct. 25, 1967, Ser. No. 677,893

Int. Cl. B63h 5/12, 5/16

U.S. Cl. 115—41

4 Claims

ABSTRACT OF THE DISCLOSURE

A propulsion unit for a boat utilizing a conventional inboard engine. The inboard engine is carried by the front end of a longitudinally extending rigid frame, the rear end of such frame taking the form of a hollow tube. The propeller shaft extends through the tube from the drive shaft of the engine. The intermediate portion of the frame is pivotally attached to the boat hull for vertical movement relative thereto. The rear end of the tube carries a skid. The tube is urged upwardly into a longitudinal tunnel formed in the boat hull when the skid engages the ground. The bottom of the tunnel is closed during normal operations by a cavitation plate carried by the tube to provide minimum drag. A rudder is supported between the rear end of the cavitation plate and the skid and the steering mechanism may be carried by the unit.

BACKGROUND OF THE INVENTION

Field of the invention.—The present invention relates generally to boats and more particularly to a novel propulsion unit which permits a boat to be operated in shallow draft conditions without damaging the propeller or rudder.

Prior art.—It is known to provide boats with propeller and/or rudder supporting means which automatically pivot upwardly under shallow draft conditions. The applicant is aware of the following pertinent U.S. patents:

J. W. Martin, 830,908, Sept. 11, 1906

J. W. Daniels, 2,569,802, Oct. 2, 1951

J. W. Daniels, Re. 24,451, Apr. 8, 1958

J. A. Baker, 2,856,883, Oct. 21, 1958

W. R. Wood, 2,961,988, Nov. 29, 1960

SUMMARY OF THE INVENTION

It is a major object of the present invention to provide a self-contained propulsion unit for a boat utilizing a conventional inboard engine, such unit including the engine, propeller shaft and rudder, with such propulsion unit pivoting upwardly under shallow draft conditions to thereby prevent damage to the propeller and rudder.

It is another object of the present invention to provide a marine propulsion unit of the aforedescribed nature wherein the tube pivots upwardly into a longitudinally extending tunnel formed in the boat hull under shallow draft conditions. The lower end of the tunnel is closed during normal operation of the unit by means of a cavitation plate thereby affording a smooth hull underbody for maximum boat speed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a preferred form of marine propulsion unit embodying the present invention;

FIG. 2 is a perspective view in reduced scale showing a boat hull provided with a marine propulsion unit embodying the present invention;

FIG. 3 is a broken perspective view showing said marine propulsion unit installed in a boat hull;

FIG. 4 is a broken bottom view taken from a point below FIG. 3;

FIG. 5 is a broken vertical sectional view, partly in elevation, showing a second form of marine propulsion unit embodying the present invention; and

FIG. 6 is a broken side elevational view in enlarged scale showing an adjustment element utilized in the marine propulsion unit of FIG. 5.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIGS. 1 through 4, there is shown a first form of marine propulsion unit embodying the present invention. This marine propulsion unit includes a rigid frame F which is arranged longitudinally relative to the hull of a boat B. The frame F includes an engine mount, generally designated 10, and a drive tube, generally designated 12, that extends rearwardly from the engine mount. The engine mount 10 includes a pair of side frames 14 connected by front and rear transverse frames 16 and 18. A conventional inboard engine E is supported upon the side frames 14. The front end of the drive tube 12 is rigidly affixed to the rear transverse frame element 18 as by means of a pair of outwardly and forwardly extending channels 20 and a rear upwardly and forwardly extending channel 22, the latter joining a front upwardly and forwardly extending channel 24. Preferably, the front of channels 20 are bolted to the rear engine frame 18 by means of bolts 26. The frame elements are of standard construction to support a variety of conventional engines. The two channels 22 and 24 are bolted together by bolts 27, while the front end of the front channel 24 is bolted to a suitable bracket 28 on the engine E by bolts 29.

The rear portion of the side frames 14 are secured to a pair of transversely aligned pivot brackets 30 and 32 by bolts 33. The upper portion of these pivot brackets receives the inner end of a pair of pivot pins 34 and 36. The outer ends of these pivot pins are supported by a pair of upright mounting plates 38 and 40 affixed to the boat hull B. Brackets 30 and 32 are secured to mounting plates 38 and 40 by bolts 41 that extend through elongated slots 42 in the brackets to engage side frames 14. With this arrangement the engine mount 10, and hence the drive tube 12 is free to pivot vertically relative to the boat hull B.

The drive shaft 44 of the engine E is coupled to a propeller shaft 46 that extends rearwardly through the drive tube 12. The rear end of the propeller shaft 46 is keyed to a conventional propeller 48. The exhaust from the engine E is discharged directly into the front end of the tube 12 by suitable flexible manifolding conduits 52. Preferably, the exhaust gases are discharged rearwardly through the tube 12 and out the hollow propeller hub 54. Cooling water from the engine E may be introduced therein by means of a conduit 58 extending forwardly through the tube T from a suitable scoop 60 disposed at the underside of the rear portion of the tube (FIG. 4). The cooling water will be discharged into the drive tube 12 with the exhaust gases.

The rear portion of the drive tube 12 is provided at its underside with a downwardly and rearwardly extending ground-engaging skid 62. The rear end of this skid 62 is formed with a mounting boss 64 for a lower rudder pin 66.

A rearwardly extending cavitation plate 68 has its front end cut out to receive the intermediate portion of the drive tube 12. This cavitation plate 66 is generally triangular in configuration being wider at its rear end than at its front end. The underside of the cavitation plate 68 is provided with a depending bracket 70 that is rigidly but removably affixed to the upper portion of the drive tube 12. The rear central portion of the cavitation plate 68 carries an upper pin 72 for a rudder 74, the lower por-

tion of the rudder being supported by the aforementioned lower rudder pin 66 mounted upon skid 62.

A generally transversely extending tiller arm 78 is keyed to the upper rudder pin 72. The outer end of this tiller arm 78 is pivotally affixed to the rear of a steering tiller 80. The steering cable extends forwardly from the crank arm 78 through a sleeve 80 into the confines of the tube 12. The steering cable 80 is housed within a suitable flexible shield 84. As indicated particularly in FIG. 1, the shield 84 and its cable 80 extend through the front end of the drive tube 12 upwardly and forwardly for connection with the steering wheel (not shown) of the boat B.

Referring particularly to FIGS. 2, 3 and 4, the boat hull B is formed with a longitudinal tunnel 88 that extends from the intermediate portion of the hull rearwardly through the hull's transom 90. The front end of the tunnel 88 is formed with an aperture 92 for receiving the forward portion of the tube 12. A resilient generally cup-shaped diaphragm or boot 96 has its front end sealingly secured to the front portion of the tube 12 by means of a ring 98. The rear end of the sealing cup 96 is similarly sealingly engaged with the boat hull B adjacent the aperture 92 by a seal ring 100.

As shown particularly in FIGS. 3 and 4, the boat hull is provided with inwardly extending flanges 102 and 104 along the underside of the tunnel 88. The upwardly-facing surfaces of these flanges receive the outer side edges of the cavitation plate 68 during normal operating conditions of the propulsion unit. At this time the cavitation plate 68 will serve to close the gap across the bottom of the tunnel 88 and thereby provide a smooth underbody surface for the boat hull B in the manner of a conventional hull design.

The aforescribed construction provides a simple yet rugged, self-contained marine propulsion unit wherein the engine and propeller shafts are maintained in constant alignment. Initial installation of the propulsion unit may be accomplished rapidly, and similarly, such propulsion unit may be readily replaced when necessary. In this regard, the assembled engine mount 10 and drive tube 12 and their component parts are arranged in place relative to the boat hull B and the pivot pins 34 and 36 secured between the brackets 30 and 32 and mounting plates 38 and 40. Thereafter, the flexible diaphragm 96 is secured in place. Finally, the engine and steering controls are connected and the installation is complete.

Referring now to FIGS. 5 and 6, there is shown a second form of propulsion unit embodying the present invention. This second embodiment incorporates a so-called "V-drive" engine mounting wherein the engine E' faces forwardly and drives the propeller shaft 110 through a conventional gear box 112. The engine E' is supported upon an engine mount, generally designated 114. The engine mount 114 utilizes a pair of side frames 116 which are rigidly supported upon transverse cross-braces 118 that extend downwardly and inwardly to the front portion of a drive tube, generally designated 120. A propeller 122 is keyed to the rear end of the propeller shaft 116.

The drive tube 120 is provided with associated parts similar to those described in conjunction with FIGS. 1 through 4 hereinabove, and like parts bear primed reference numerals in FIGS. 5 and 6. In the embodiment of FIGS. 5 and 6, however, the exhaust gases discharged from the engine E' are discharged above the cavitation plate 68' through a suitable conduit 124. If it proves desirable to effect a more positive biasing of the drive tube 120 into its lower operative position, a tension spring 130 may be connected to an ear 132 formed on the front of gear box 112 by means of a cable 134 that passes over a pulley 136 secured to a vertical wall 137 of the boat hull B. The lower end of spring 130 is affixed to the bottom of the boat hull B.

Referring now to FIG. 6, the side frames 116 of the engine mount 114 are attached to a pair of pivot brackets 140 by means of a pair of bolts 142. The bolts 142

extend through complementary longitudinal slots 144. The upper front portion of the pivot brackets 140 are formed with a bore 146 to receive a pivot pin 148, such pin being attached to the hull B as by means of mounting plates 38 and 40 shown in FIG. 1. This arrangement affords maximum longitudinal adjustment of the weight of the engine E' relative to the engine mount 114. In this regard, it should be particularly noted that each of the pivot brackets 140 may be reversed from its solid outline in FIG. 6 to its phantom outline therein so as to supplement the adjustability afforded by the elongated slots 144.

In operating a boat B provided with either form of the aforescribed propulsion units, the drive tube and its attached parts will normally assume the lower position of FIGS. 2, 3 and 5. In this regard, positioning the pivot pins 34, 36 and 148 above the center line of the drive tubes insures that the reactive force produced by the propeller will always tend to maintain the drive tube in such lower position. Additional downward reaction of the rear end of the tube 12 is afforded by moving the engine rearwardly relative to the drive tube. In both forms of the invention engagement of the side edges of the cavitation plate 68 with the flanges 102 and 104 will serve as stop means limiting downward movement of the drive tube and its associated parts from their normal operating position. Engagement of the sides of the cavitation plate with the tunnel's interior walls will take up any side strains applied to the drive tube.

It should be observed that with the drive tube 12, 120 in its lower, normal operating position, the cavitation plate 68, 68' will serve to completely close the bottom of the tunnel 88, 88' to thereby provide a smooth underbody surface for the boat hull B in the manner of a conventional hull design. This will permit maximum forward speed of the boat, contrary to the speed which would be obtainable if the tunnel gap were left uncovered. As the boat B increased its speed, the tunnel 88, 88' will be emptied of water.

Referring now to FIG. 5, assuming that the boat B encounters shallow water, the underside of the skid 62, 62' will engage the ground. Upon such engagement the drive tube 12, 120 and its associated parts will pivot upwardly so as to protect the propeller and rudder from damage. As the skid pivots upwardly it will effect concurrent upward vertical movement of the drive tube and its associated parts into the confines of the tunnel 88, as indicated in phantom outline in this figure. When the boat has again moved into deeper water, the drive tube will undergo downward pivotal movement to its original position. It should be observed that should the boat run aground or encounter extremely shallow water so as to preclude further forward motion of the boat, the direction of rotation of the propeller may be reversed and the propeller will then supply a sufficient volume of water flowing forwardly through the tunnel to assist in backing the boat off the bottom.

Various other modifications and changes may be made with respect to the foregoing detailed description, without departing from the spirit of the invention.

I claim:

1. A propulsion unit for use with a boat hull formed with a longitudinal tunnel from its intermediate portion rearwardly through its transom, the front end of said tunnel being formed with an aperture, said unit, comprising:

an engine mount;

a drive extending through said aperture rearwardly from said engine mount in longitudinal alignment with said tunnel, said drive tube assuming a normal position wherein its rear end is below said boat hull; horizontal pivot means on said engine mount securable to said boat hull, said pivot means being disposed above the center-line of said drive tube;

5

flexible seal means between said drive tube and said aperture;

a propeller shaft extending through said tube;

a skid on the rear portion of said tube that engages the ground to thereby pivot said tube upwardly from its normal position into the confines of said tunnel;

and a cavitation plate carried by said tube, said plate closing the bottom of said tunnel when said tube is in its normal position, with said plate moving upwardly into said tunnel as said tube pivots upwardly and with the reactive force of said propeller tending to maintain said drive tube in its normal position.

2. A propulsion unit as set forth in claim 1 wherein spring means are interposed between said unit and said hull for biasing said drive tube towards its normal position.

3. A propulsion unit as set forth in claim 1 wherein said hull is formed with a pair of inwardly extending flanges along the lower portion of said tunnel that en-

6

gage the side edges of said cavitation plate to thereby limit downward movement of said drive tube beyond its normal position.

4. A propulsion unit as set forth in claim 1 wherein said pivot means include a pair of pivot brackets longitudinally adjustably supported on said engine mount and reversible relative to said engine mount, the front portion of said pivot brackets having aligned bores, and said pivot means also includes a pivot pin extending through said aligned bores and attached to said hull.

References Cited

UNITED STATES PATENTS

15	444,475	1/1891	Weed et al.	115—41
	2,265,079	12/1941	Mettair	115—41
	2,569,802	10/1951	Daniels	115—41
	2,948,252	8/1960	Alexander	115—34 X

20 TRYGVE M. BLIX, Primary Examiner