April 17, 1962 E. G. LARSON 3,030,055

POWER LIFT FOR BOAT-MOUNTED OUTBOARD MOTORS

Filed Feb. 10, 1960 2 Sheets-Sheet 1

FIG. 1.

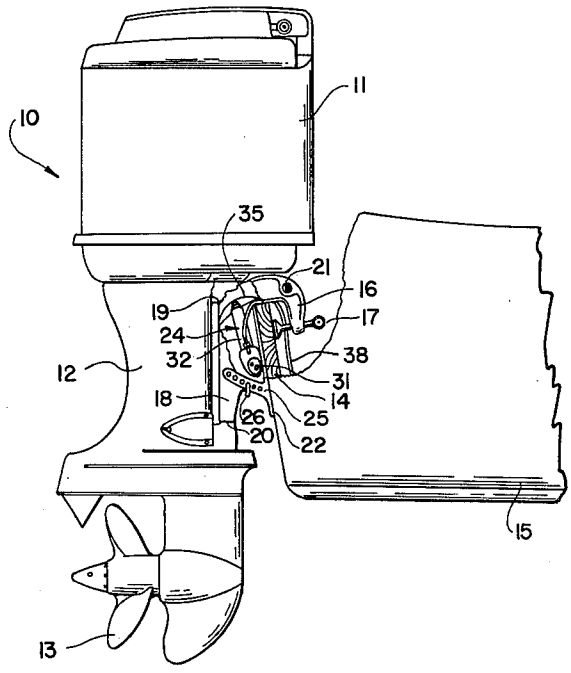
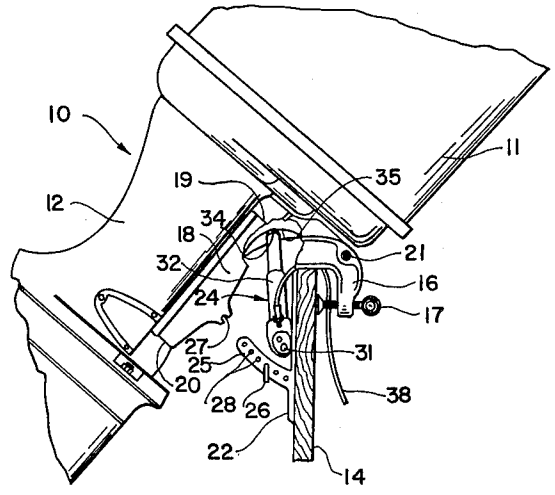


FIG. 2.



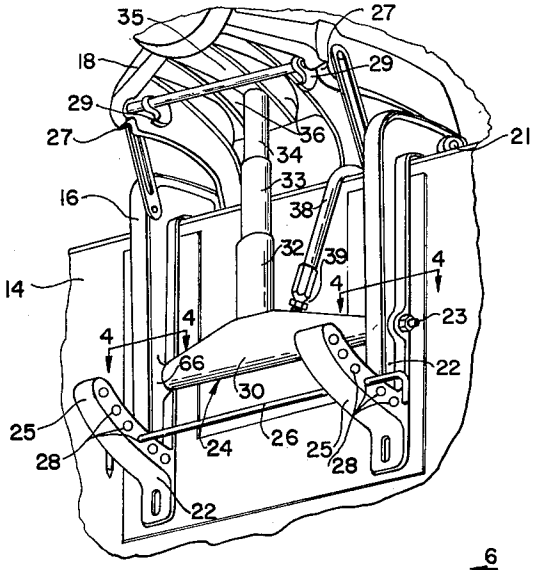
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Filed Feb. 10, 1960 2 Sheets-Sheet 2

FIG. 3.



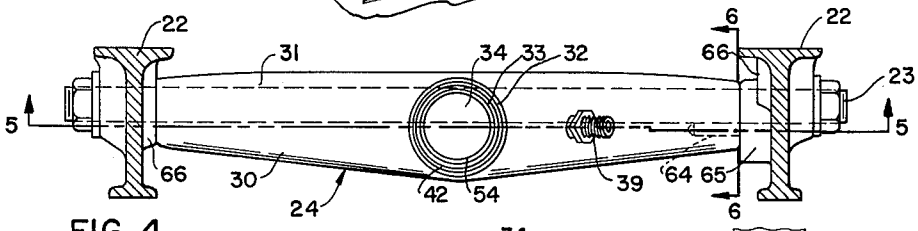


FIG. 4.

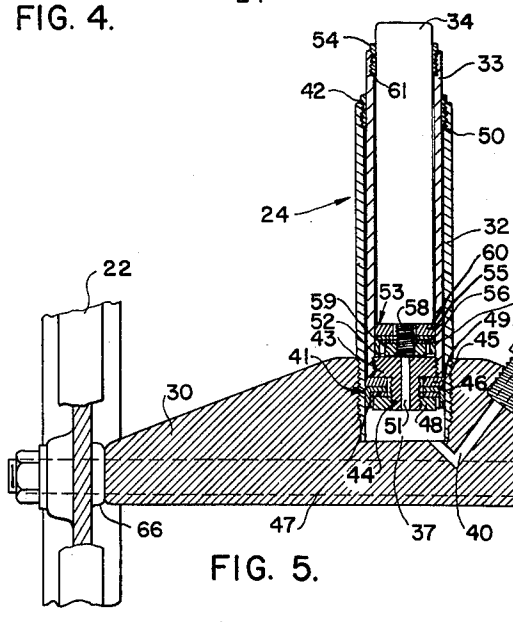


FIG. 5.

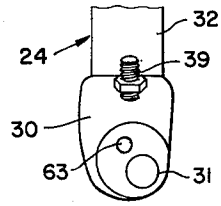


FIG. 6.

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POWER LIFT FOR BOAT-MOUNTED OUTBOARD MOTORS

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This invention relates to power lift apparatus and is concerned with elevating an outboard motor relative to a boat transom to which it is secured.

Outboard motors are customarily swivel mounted for steering purposes on a swivel bracket which in turn is hinged to a mounting bracket so that the motor may be raised and lowered about a horizontal axis. The mounting bracket is adapted for clamping to the transom of a boat. This enables the motor to be swung upwardly to approximately horizontal position under a variety of circumstances.

As so mounted, the motor ordinarily has to be raised and lowered by hand. With the more powerful and heavier motors, this is quite difficult and often requires the operator to climb into the water in order to raise the propeller over shallows.

It is a major object of this invention to provide a compact and positive acting outboard motor lift adapted to act between a motor mounting bracket and a swivel bracket for raising the swivel bracket and the outboard motor swiveled thereon about a motor hinge mounting on the motor mounting bracket.

Another object is to provide a hydraulic cylinder adapted to occupy relatively sheltered space between the boat transom and the motor swivel bracket and to be mounted on a motor mounting bracket.

A further object is to provide an outboard motor lift cylinder adapted to lift the motor, to permit the motor to be lifted away from the cylinder output and to maintain the cylinder in engaging position relative to the motor while the motor is lifted away from the cylinder output.

Features in the accomplishment of these objects are the provision of a telescoping cylinder structure having a base pivotally mounted on a motor mounting bracket and having an output member for engaging a motor swivel bracket. The telescoping cylinder is particularly compact when contracted and is well protected and sheltered from damage in its mounting on a pivot pin between depending legs of the motor mounting bracket. In this mounting the cylinder occupies space between the boat transom and the motor swivel bracket when the motor is in a lowered running position.

Another important feature is that the base cylinder in the telescoping cylinder is the largest and most powerful of the several cylinders thereof and completes its power stroke through the range of motor raising requiring the greatest lifting force. Thereafter a smaller faster acting cylinder takes over and moves through its stroke to complete the motor raising.

A specific embodiment representing what is presently regarded as the best mode of carrying out the invention is illustrated in the accompanying drawings.

In the drawings:

FIG. 1 represents a side elevation of an outboard motor mounted on a boat transom, major portions of the boat and portions of the motor mounting and swivel brackets being broken away to reveal cylinder and bracket details;

FIG. 2, a fragmentary side elevation partially broken away to illustrate the cylinder, brackets and motor in partially raised relation;

FIG. 3, a fragmentary perspective view showing the

cylinder fully extended and the motor swivel bracket fully raised;

FIG. 4, a top plan view of the cylinder and the bracket legs in horizontal section taken on lines 4—4 of FIG. 3;

FIG. 5, a transverse vertical section taken on line 5—5 of FIG. 4; and

FIG. 6, a partial side elevation of the cylinder taken on line 6—6 of FIG. 4.

Referring to the drawings:

Outboard motor 10 having an upper powerhead 11, a drive shaft housing 12 and a propeller 13 at the bottom, is mounted on the transom 14 of boat 15 by two brackets in a conventional manner (see FIGS. 1, 2 and 3). One of these is a motor mount bracket 16 clamped directly on boat transom 14 by clamp screw 17 and the other is a swivel bracket 18 upon which the motor is swivel mounted for boat steering purposes.

This mountng, as used by most outboard motor manufacturers, employs an upper swivel joint connection 19 and a lower joint connection 20 between motor 10 and swivel bracket 18 and a hinge mounting 21 on motor mount bracket 16 about which the motor and swivel bracket may be raised. Mount bracket 16 has depending legs 22 with a bolt 23 extending therethrough upon which my telescoping power cylinder 24 is mounted for raising swivel bracket 18 and motor 10.

Bolt 23 is enough above the tilt lock bracket arms 25 and tilt lock adjustment pin 26 that the compact construction of cylinder 24 avoids interference problems. Pin 26, upon which notches 27 of swivel bracket 18 seat, is inserted through different adjustment holes 28 of bracket arms 25 for different motor tilt and ideal boat planing. Latch hooks 29 are arranged for hooking onto pin 26 and holding the motor in place when reverse is used.

Base 30 of telescoping cylinder 24 is pivotally mounted on bolt 23 which extends through opening 31 thereof. Cylinder base 30 also acts as a spacer for bracket legs 22. In addition, cylinder 24 is well protected from damage by being mounted between bracket legs 22 and sheltered between the boat transom 14 and the swivel bracket 18 particularly when bracket 18 is in the lowered motor-running position.

Telescoping hydraulic power cylinder 24 has a base cylinder 32 which is threaded into base 30, a small cylinder 33 which telescopes in and out of cylinder 32 and an output piston 34 which telescopes in and out of cylinder 33. Telescoping cylinder 24 is arranged for output piston 34 to exert force on the inside top of pocket 35 between reinforcing ribs 36 of bracket 18 for raising the swivel bracket 18 and outboard motor 10 as fluid under pressure is fed into cylinder chamber 37 from a pressure source (not shown) in boat 15. Fluid is passed under pressure to chamber 37 or drained therefrom through flexible hydraulic line 38, line fixture 39 mounted on cylinder base 30 and passageway 40 in the cylinder base 30.

Small cylinder 33 is supported and given guidance for its telescoping movement in and out of base cylinder 32 by a piston and seal assembly 41 and by a guide and stop band 42 which is threaded into the top of cylinder 32. Piston and seal assembly 41 includes a mounting member 43 which is threaded into the bottom of cylinder 33 and which has a threaded stud extension 44. Piston disc 45, a flexible seal 46 and a seal spreading washer 47 are mounted on stud extension 44 by nut 48. The upper surface portion 49 of piston disc 45 that extends radially outward beyond the outer surface of cylinder 33 establishes the outer limit of cylinder 33 travel by coming into stopping engagement with the bottom 50 of guide and stop band 42. It should be realized that mounting member 43 also forms the bottom of cylinder 33 and is provided with a passage 51 therethrough in or-

der to provide free fluid communication between cylinder chamber 37 of base cylinder 32 and cylinder chamber 52 of small cylinder 33.

Output piston 34 is supported and given guidance for its telescoping movement in and out of small cylinder 33 in the same manner as for cylinder 33 in base cylinder 32 by a piston and seal assembly 53 and by a guide and stop band 54 which is threaded into the top of cylinder 33. Piston and seal assembly 53 in this instance includes piston disc 55, a flexible seal 56 and a seal spreading washer 57 mounted on a stud extension 58 of piston 34 by nut 59. The upper surface portion 60 of piston disc 55 that extends radially outward beyond the outer surface of piston 34 establishes the outer limit of piston 34 travel by coming into stopping engagement with the bottom 61 of guide and stop band 54.

Referring again to FIGS. 1, 2, and 3 it will be seen that hinge mounting 21 is well forward on clamp bracket 16, in advance of transom 14 and forward with respect to motor 10. In view thereof greater force is required for raising swivel bracket 18 and motor 10 through the first range of raising movement and until the motor comes closer to a balanced state above the hinge mounting 21. The telescoping cylinder 24 is particularly well suited for meeting such power output requirements. When fluid under pressure is being fed thereto for piston 34 to raise the swivel bracket 18 and motor 10, the larger base cylinder 32 is moved through its more powerful stroke before the small cylinder 33 takes over and moves through its stroke. In addition, with fluid being fed at a constant rate the small cylinder 33 moves piston 34 through its stroke at a faster rate when less force is required.

Output piston 34 which acts on swivel bracket 18 by exerting thrust force thereon when motor raising is desired is not fastened to swivel bracket 18. This permits outboard motor 10 to freely pivot up about hinge mounting 21 for the lower portion of motor 10 and propeller 13 movement up and over an underwater obstruction. Whenever the motor 10 and swivel bracket 18 are lifted away from piston 34 by such action, cylinder 24 must be maintained in position for engaging the inside top of pocket 35 when the swivel bracket 18 is returned to engagement therewith instead of just flopping down its pivotal mounting on bolt 23. This is accomplished by action of a spring 62 loaded ball 63 contained within hole 64 of cylinder base 30 against an adapter plate 65 which is fitted over boss 66 of one bracket leg 22. Cylinder base 30 is thereby bodily biased into increased frictional contact with the boss 66 of the other bracket leg 22. On the other hand this mounting arrangement allows the cylinder 24 to pivot about is mounting for proper contact with the top of pocket 35 throughout the

range of swivel bracket 18 movement about hinge mounting 21.

Whereas there is here illustrated and described a preferred construction which I presently regard as the best mode of carrying out my invention, it should be understood that various changes may be made without departing from the disclosed inventive subject matter particularly pointed out and distinctly claimed hereinbelow.

I claim:

1. A power device for raising an outboard motor about its hinge mounting on a boat, said motor being swiveled on a bracket for steering purposes and such swivel bracket being hinged about a horizontal axis to a mounting bracket adapted for attachment to the transom of a boat, said swivel bracket having a transverse undersurface against which force may be exerted for raising the bracket and the motor about said horizontal axis; said device comprising a telescoping power cylinder having an extendable and retractible work end unattached to other structure and positioned and arranged to freely engage said undersurface of the swivel bracket; a transverse base for said cylinder pivotally secured to said mounting bracket intermediate the width thereof below and under cover of said undersurface of the bracket; means for hydraulically extending and retracting said work end; and means for maintaining said cylinder in raised position independently of engagement with said undersurface of the swivel bracket, so that it will remain in said raised position when out of engagement with the undersurface of said swivel bracket.

2. The device of claim 1, wherein said telescoping power cylinder comprises a first cylinder mounted on said base, a second cylinder fitted for sliding movement within said first cylinder and adapted to be the piston of said first cylinder, and said work end comprises a piston fitted for sliding movement within said second cylinder and adapted for being the output thrust member of said telescoping power cylinder.

3. The device of claim 1, wherein the means for maintaining said cylinder in raised position independently of engagement with said under surface of the swivel bracket includes resilient biasing means adapted for friction loading of said cylinder base in its pivotal mounting on the mounting bracket.

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