

Jan. 16, 1962

G. R. ANDERSON ETAL
OUTBOARD MOTOR TILT MECHANISM

3,016,869

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2 Sheets-Sheet 1

FIG. 1

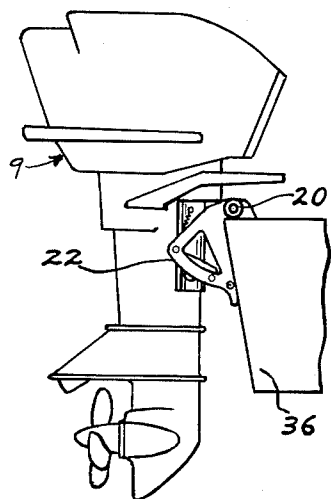


FIG. 2

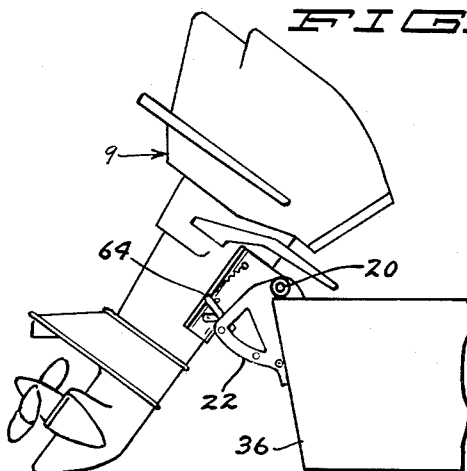


FIG. 3

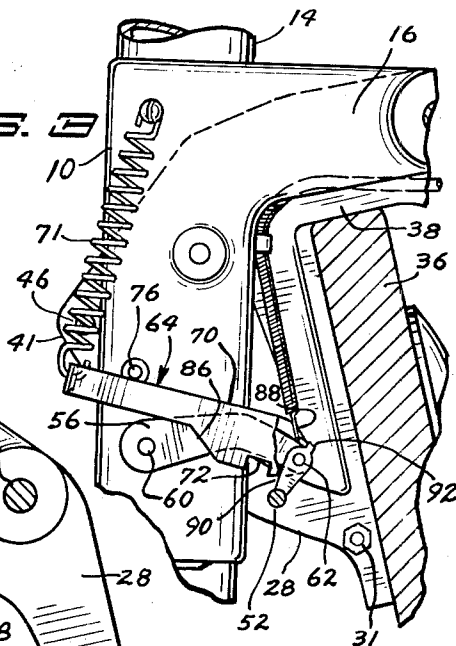
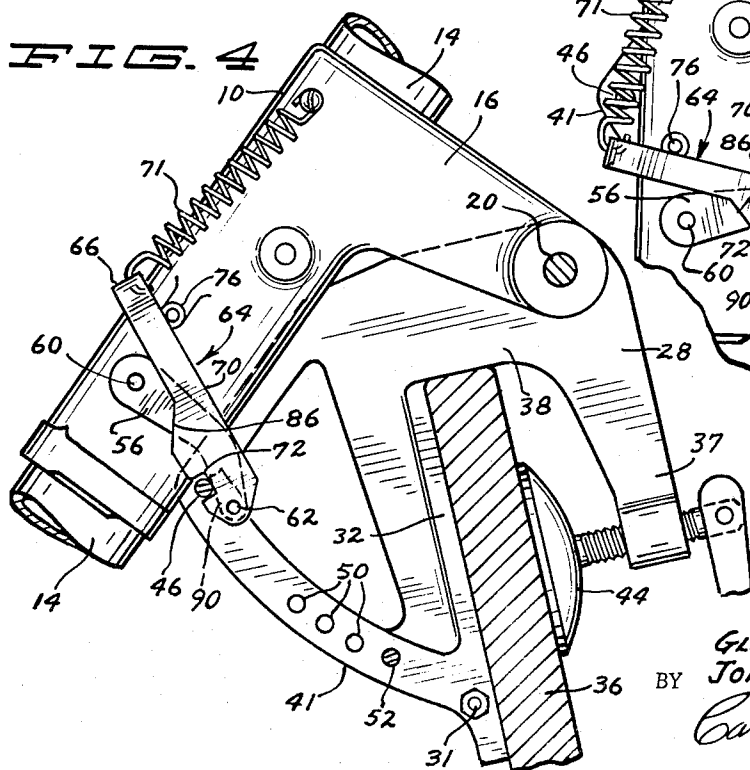


FIG. 4



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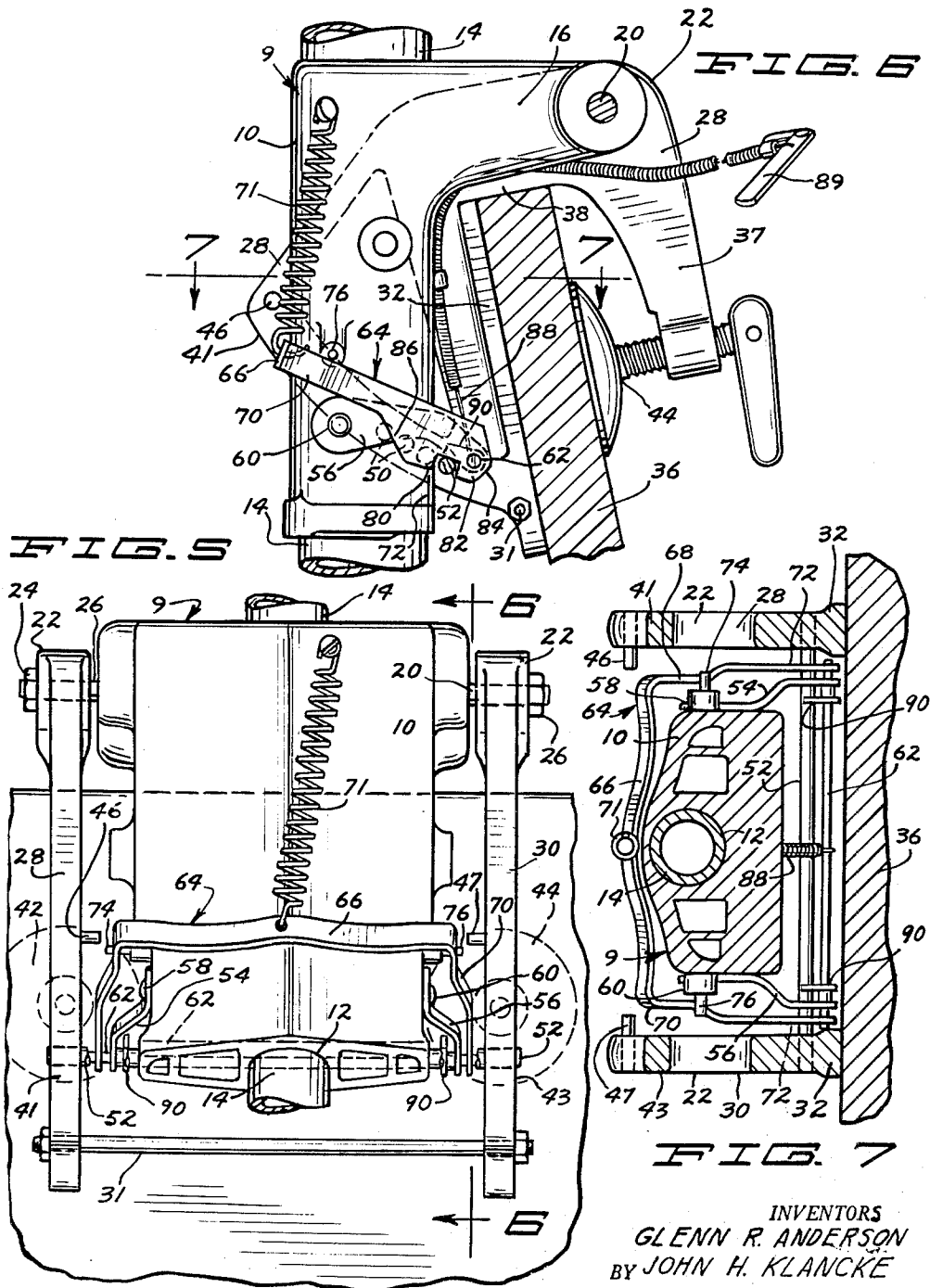
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OUTBOARD MOTOR TILT MECHANISM

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OUTBOARD MOTOR TILT MECHANISM

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7 Claims. (Cl. 115-17)

This invention relates to outboard motors and more particularly to means for allowing the propulsion unit of the motor to be tilted from its normal upright operative position to a preselected forwardly tilted secondary operative position and for automatically releasably locking the propulsion unit in such secondary position.

In outboard motor operation the propulsion unit is normally held in a substantially upright position with the propeller relatively deeply submerged for maximum thrust. However, under certain conditions such as where the motor is used to propel the boat in shallow water or through weed beds, it is desirable to tilt the propulsion unit forwardly to a position where the propeller operates nearer to the water surface. Such tilting of the unit is particularly advantageous where the operator desires to beach the boat or to bring the boat in close to shore at a shallow beach to pick up a water skier.

While a small tiller carrying motor can be manually moved to and held in a forwardly tilted position, such is not the case with some of the heavier motors now in use. This is due both to the motor weight and the fact that such motors are generally operated by remote controls.

It is thus one object of the present invention to provide an outboard motor having a propulsion unit movable between fixed normal and tilted operating positions and wherein the unit propeller and gravity are utilized to move the unit between such positions.

It is a further object of this invention to provide improved means for releasably locking an outboard motor propulsion unit in a preselected forwardly tilted operative position.

It is a still further object of this invention to provide an outboard motor having improved means for releasably locking the propulsion unit in a forwardly tilted position wherein a control means used for releasing the propulsion unit from the forwardly tilted position is also used for releasing the propulsion unit from an upright operative position.

It is yet another object of this invention to provide improved means for supporting and releasably locking an outboard motor in a preselected tilted position which means is rugged in construction, reliable in operation and can be economically manufactured.

Still another and more specific object of the invention is to provide a new and improved mechanism on an outboard motor and controllable at a point remote from the motor to tilt the motor forwardly to a tilted operative position, lock it in its tilted position, and return it to its normal upright operative position as desired and said mechanism adapted to release the motor for movement to an inoperative position when an underwater obstacle is engaged regardless of which operative position the motor is in at the time of such engagement.

These and other objects of the present invention will be apparent in view of the following description and appended drawings.

Briefly stated, the present invention provides an outboard motor including a transom bracket for securing the motor to a boat and a propulsion unit pivotally connected to the transom bracket for movement about a generally horizontal tilt axis. Locking means are provided for releasably locking the propulsion unit in an operating position and in a forwardly tilted secondary operative position including a tilt support means connected to said transom

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bracket and a latch yieldably connected to said propulsion unit and adapted to engage the tilt support means when the propulsion unit is tilted to the secondary position. Specifically, the latch means is connected to the propulsion unit at a point below the tilt axis and is itself adapted for pivotal movement about a horizontal axis relative to said propulsion unit. The tilt support means includes a first extension projecting rearwardly from the transom bracket and spaced laterally on one side of a portion of the propulsion unit and a second extension projecting rearwardly from the transom bracket and spaced laterally on the other side of a portion of the propulsion unit. First and second tilt support members or pins are provided on the first and second extensions respectively. The latch is adapted to engage the first and second support members when the propulsion unit is tilted forwardly to the secondary position.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

FIG. 1 is a side elevation of an outboard motor mounted on a boat transom with the propulsion unit in upright normal operating position.

FIG. 2 is similar to FIG. 1 but shows the propulsion unit in a forwardly tilted secondary operative position with the propeller near the water line.

FIG. 3 is similar to FIG. 6 with the propulsion unit in upright position but with the latch means disengaged to allow movement of the unit to a forwardly tilted position.

FIG. 4 is similar to FIG. 3 but shows the propulsion unit in its forwardly tilted operative position.

FIG. 5 is a rear elevation of the central portion of an outboard motor incorporating the tilt mechanism of the present invention and with the propulsion unit locked in its normal upright position.

FIG. 6 is a vertical section taken along line 6-6 of FIG. 5 and looking in the direction indicated.

FIG. 7 is a horizontal section looking downwardly along line 7-7 of FIG. 6.

While this invention has broad utility and can be used with outboard motors of various designs, we prefer to employ the invention in conjunction with an outboard motor tilt mechanism described in the Hulsebus Patent No. Re. 25,048, dated October 3, 1961, which provides a releasable catch for securing the motor in an upright operative position and includes impositive detent means for permitting the motor to tilt forwardly in the event that the propeller or skeg should receive a sharp blow from an underwater obstacle while the boat is traveling at high speed.

Referring now to the drawings, there is shown a suspension and tilting mechanism for an outboard motor including the usual propulsion unit 9 and swivel bearing housing 10. In the center of the housing 10 is a vertically extending swivel bearing 12 in which kingpin 14 is rotatably mounted. In steering the boat to which the motor is attached, the kingpin 14 and the parts of the propulsion unit 9 affixed to the kingpin 14 are pivoted about the axis of swivel bearing 12 in the usual manner. Integral with the upper end of the housing 10 is a horizontally disposed pintle arm 16 which is provided with a transverse opening in which a pintle 20 is mounted. The ends of pintle 20 are connected to a transom bracket 22 by a suitable fastening means such as nuts 24 and 26. The pintle 20 serves as a generally horizontal tilt axis for pivotal movement of the propulsion unit 9 with respect to the transom bracket 22.

The transom bracket 22 comprises two bracket members, a first member designated 28 affixed to the pintle 20 on one side of pintle arm 16 and a second member designated 30 affixed to pintle 20 on the other side of

pintle arm 16. These two bracket members are rigidly connected together at their upper ends by pintle 20 and at their lower ends by means of connecting bar 31.

Each of bracket members 28 and 30 includes an upright transom engaging portion 32 adapted to seat against the outside surface of a boat transom 36, a generally horizontally extending portion 38 which projects forwardly over the top of the transom 36 and a downwardly extending clamp screw support 37 with clamps 42 and 44 being respectively mounted on the two supports. Integral with each of the bracket members 28 and 30 and projecting rearwardly therefrom are two extensions designated at 41 and 43 respectively. The extensions 41 and 43 are spaced laterally on opposite sides of a portion of the propulsion unit 9. Each of the extensions 41 and 43 comprises a generally C-shaped member integral with the transom bracket members 28 and 30 respectively. Mounted respectively on the rear end portion of extensions 41 and 43 are tilt support pins 46 and 47. The tilt support pins 46 and 47 are mounted coaxially and each projects a short distance inwardly from the extension to which it is attached. The tilt support pins are provided for the purpose of securing the propulsion unit 9 in a forwardly tilted position as explained more fully hereinbelow.

In the lower portion of each of extensions 41 and 43 there are provided a plurality of spaced apart horizontally disposed circular openings 50. Each opening is coaxial with a corresponding opening in the other extension. In one coaxial pair of openings 50 is placed a retainer means such as locking bar 52. This bar 52 is partially broken away in FIG. 5 for a clearer understanding of the other parts. The locking bar 52 is preferably easily removable and may be placed in any desired pair of coaxial openings 50. The locking bar 52 is used to secure the motor in an upright operative position as more fully explained hereinbelow.

Pivotaly connected to the sides of the swivel bearing housing 10 are latch guide levers designated at 54 and 56. The levers 54 and 56 are secured at the point of attachment to the housing 10 by retainer screws 58 and 60 respectively. The other end of each of the levers 54 and 56 are connected to a horizontally extending latch bar 62. Also attached to the latch bar 62 is a latch 64. The latch 64 has an end portion 66 spaced outwardly from the rear side of housing 10 and two generally parallel forwardly extending legs 68 and 70. A tension spring 71 attached at one end to the member 66 of latch 64 and at the other end to the housing 10 is adapted to cause the ends of latch 64 connected to latch bar 62 to be maintained normally in a bar 52 engaging position by pivotal movement of the latch 64 about fulcrums formed by projections 74 and 76 on housing 10. The spring urges the forward end of latch 64 in a clockwise direction as viewed in FIGS. 3, 4 and 6. It is thus apparent that the latch 64 is yieldably mounted on the propulsion unit 9. When the latch 64 is moved counterclockwise as viewed in FIG. 6 against spring retention of the spring 71, it moves to a catch releasing position. On the lower side of each of legs 68 and 70 is provided a notch 72 adapted to engage the bar 52 to secure the propulsion unit 9 in an upright position during operation of the motor. The locking bar 52 thus serves as a first catch to secure the propulsion unit in the operative position.

Each notch 72 is provided with parallel side walls 80 and 82 (FIG. 6). At the free end of each of legs 68 and 70 is provided an inclined surface 84 which slants rearwardly toward the mouth of notch 72. On the other side of each notch 72 is provided a second inclined surface 86 also slanted toward the mouth of notch 72.

Fastened securely to the approximate center of the latch bar 62 is a suitable control means such as control cable 88 which allows pivotal movement of latch 64 about pivot extensions 74 and 76 from a remote vantage

point by means of a suitable manual control such as lever 89.

A pair of pawls 90 are journaled on the bar 62, one adjacent each member 54 and 56, and extend rearwardly to normally rest upon the bar 52. Projections 92 (FIG. 3) on the pawls 90 engage stop portions provided on members 54 and 56 to limit downward swinging of the pawls to the position shown in FIG. 3.

When the propulsion unit 9 is to be placed in the upright operating position, a force can be exerted on the motor manually tending to cause counterclockwise rotation of the propulsion unit 9 as viewed in FIG. 2 about the pintle 20 until the inclined surfaces 84 of the latch 64 rest against the rearwardly facing side of locking bar 52. Upon the exertion of additional pressure, the notched ends of the latch 64 will be lifted due to the contact between the inclined surfaces 84 and the bar 52. The notches 72 of the latch 64 will then become engaged with bar 52 thereby locking the propulsion unit 9 securely in the preselected upright operating position. It will be understood that bar 52 can be placed in any pair of openings 50 and that such openings in each bracket extension are arranged on an arc having pivot axis 20 as a center.

When it is desired to place the motor in a forwardly tilted position, tension is applied to cable 88 thereby lifting latch bar 62 and the attached ends of latch 64 so as to disengage the latch 64 from locking bar 52. Tension on cable 88 can then be released and the latch will be held out of engagement by the pawls 90 which come to rest against bar 52 (FIG. 3). The propulsion unit 9 can then be pivoted clockwise about pintle 20 as viewed in FIG. 2. Pivotal movement of the propulsion unit is continued until the inclined surfaces 86 engage the support pins 46 and 47. Contact between these surfaces and the pins will cause pivotal movement of the latch 64 about extensions 74 and 76 against tension of the spring 71. The notches 72 of the latch 64 will then drop into engagement with the pins 46 and 47 which serve as a second catch to retain the propulsion unit securely in a preselected forwardly tilted position. Pins 46 and 47 are positioned on the same arc as openings 50.

In the event that the propulsion unit is provided with a reversible propeller, movement of the unit to the tilted position can be accomplished with practically no manual effort in the following manner. The latch 64 is first disengaged from the retaining bar 52 by exerting tension on cable 88. The propeller is then reversed with the propulsion unit in operation. The propeller will then be carried rearwardly causing pivotal movement of the propulsion unit 9 about the pintle 20. Contact between the inclined surfaces 86 and the tilt support pins 46 and 47 will cause the notched end of the latch 64 to be elevated. The notches 72 of the latch 64 will then become engaged with the pins 46 and 47 so as to hold the propulsion unit securely in the forwardly tilted position.

When it is desired to move the propulsion unit again to its upright operating position, the latch is again raised by the manual control means and the propulsion unit will gravitationally move back to its upright operating position with the notches 72 reengaging the retainer bar 52.

Since the propulsion unit 9 is given firm support on the left by tilt support pin 46 and on the right by tilt support pin 47, the stability of the propulsion unit while it is held in the forwardly tilted position is assured. Furthermore, the pins 46 and 47 provide support for the propulsion unit 9 at a substantial distance from the pintle 20 so that the forces exerted by the propulsion unit against the pins remain within acceptable limits thereby reducing the chance for breakage of the pins.

The pins 46 and 47 are so positioned as to lock the propulsion unit at an angle such as shown in FIG. 2 wherein the propeller and lower unit of the motor are sufficiently submerged to draw water for adequate cooling and allow sufficient reverse thrust to pull a boat rear-

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wardly away from a beach. On the other hand, they are sufficiently elevated to allow use of the boat in shallow water. It is found that on conventional motors this angle of tilt should preferably be approximately thirty degrees from the vertical.

In actual use of the invention it is found that the propulsion unit can be positioned and retained in a preselected forwardly tilted operative position with ease and convenience. It is found that the invention is especially valuable when used in relatively heavy motors having reversible propellers. The invention also proves to be rugged in construction, reliable in operation and can be economically manufactured.

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described our invention, what we claim to be new and desire to protect by Letters Patent is:

1. In an outboard motor, a transom bracket adapted for fixed attachment to the transom of a boat disposed above the surface of the water in which the boat is afloat, a normally upright propulsion unit having a driven propeller at its lower end, means on said propulsion unit for reversing said propeller, said propulsion unit being pivoted to said transom bracket on a horizontal axis for tilting movement between a preselected upright operating position with the propeller relatively deeply submerged in the water and a preselected forwardly tilted operative position with the propeller less deeply submerged in said water, locking means acting between said propulsion unit and transom bracket for releasably locking said propulsion unit in said upright operating position, control means for releasing said locking means whereby reverse rotation of said propeller will swing said propulsion unit about said horizontal axis toward said tilted position, a second locking means acting between said propulsion unit and said transom bracket for locking the power unit in said preselected tilted position, and said two locking means having separate catch pins mounted on the transom bracket in spaced positions on a common arc of said horizontal axis.

2. In an outboard motor having a reversible propulsion unit, a transom bracket for clamping said motor in a fixed position on a boat transom, said propulsion unit being pivoted to the transom bracket for movement about a horizontal tilt axis between a substantially upright primary operating position and a forwardly tilted secondary operating position, a first fixed catch on said transom bracket, a latch means pivotally mounted on the power unit below said tilt axis for movement between a position adapted to engage said first catch to lock the power unit in its upright position and a catch releasing position allowing said propulsion unit to tilt forwardly, spring means yieldably retaining said latch means in its catch engaging position, a remote lever connected to said latch means for moving said latch means against said spring retention to a catch releasing position, and a second fixed catch on the transom bracket to the rear of the first catch and engageable by the latch means to lock said propulsion unit in said secondary position.

3. In an outboard motor having a reversible propeller, a transom bracket for securing said motor to the transom of a boat afloat on water, a propulsion unit pivotally connected to said transom bracket for pivotal movement about a generally horizontal tilt axis between an upright operating position with the propeller relatively deeply submerged in the water and a forwardly tilted operating position with the propeller near the water surface, a retainer means provided on said transom bracket for holding said propulsion unit in an upright operating position, a latch yieldably connected to said propulsion unit below said tilt axis for pivotal movement with respect to said propulsion unit about a horizontal axis, spring means connected between said latch and said

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propulsion unit for normally retaining said latch in a first position adapted to engage said retainer means, said latch being movable against said spring retention to a second position adapted to release said retainer means and free the propulsion unit for movement to said forwardly tilted position by reverse operation of the propeller, a first extension projecting rearwardly from said transom bracket on one side of a portion of said propulsion unit, a second extension projecting rearwardly from said transom bracket on the other side of a portion of said propulsion unit, first and second tilt support members provided on said first and second extensions respectively to the rear of said retainer means, said retainer means and said first and second tilt support means being located on the same arc of movement of said latch means about said tilt axis, said latch means being adapted to engage said first and second tilt support members when said propulsion unit is moved to said tilted position, said engagement between said latch means and said tilt support members being adapted to secure said propulsion unit in said forwardly tilted position, and control means operatively connected to said latch means for moving said latch from said first position to said second position from a remote vantage point.

4. In an outboard motor, a transom bracket adapted for fixed attachment to the transom of a boat disposed above the surface of the water in which the boat is afloat, a normally upright propulsion unit having a driven propeller at its lower end, means on said propulsion unit for reversing said propeller, said propulsion unit being pivoted to said transom bracket on a horizontal axis for tilting movement between a preselected upright operating position with the propeller relatively deeply submerged in the water and a preselected forwardly tilted operative position with the propeller less deeply submerged in said water, locking means acting between said propulsion unit and transom bracket for releasably locking said propulsion unit in said upright operating position, control means for releasing said locking means whereby reverse rotation of said propeller will swing said propulsion unit about said horizontal axis toward said tilted position, locking means acting between said propulsion unit and said transom bracket for locking the power unit in said preselected tilted position, and said two locking means having a common latch device mounted on said propulsion unit.

5. In an outboard motor, a transom bracket adapted for fixed attachment to the transom of a boat disposed above the surface of the water in which the boat is afloat, a normally upright propulsion unit having a driven propeller at its lower end, means on said propulsion unit for reversing said propeller, said propulsion unit being pivoted to said transom bracket on a horizontal axis for tilting movement between a preselected upright operating position with the propeller relatively deeply submerged in the water and a preselected forwardly tilted operative position with the propeller less deeply submerged in said water, locking means acting between said propulsion unit and transom bracket for releasably locking said propulsion unit in said upright operating position, control means for releasing said locking means whereby reverse rotation of said propeller will swing said propulsion unit about said horizontal axis toward said tilted position, locking means acting between said propulsion unit and said transom bracket for locking the power unit in said preselected tilted position, and said control means being provided with means responsive to releasing of the locking means to hold the locking means in releasing condition until the propeller is given reverse rotation.

6. In an outboard motor having a reversible propulsion unit, a transom bracket for clamping said motor in a fixed position on a boat transom, said propulsion unit being pivoted to the transom bracket for movement about a horizontal tilt axis between a substantially upright primary operating position and a forwardly tilted secondary operating position, a first catch on said transom bracket,

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a latch means pivotally mounted on the power unit below said tilt axis for movement between a position adapted to engage said first catch to lock the power unit in its upright position and a catch releasing position allowing said propulsion unit to tilt forwardly, spring means yieldably retaining said latch means in its catch engaging position, a remote lever connected to said latch means for moving said latch means against said spring retention to a catch releasing position, a second catch on the transom bracket to the rear of the first catch and engageable by the latch means to lock said propulsion unit in said secondary position, and the said first and second catches being located on the same arc of movement of said propulsion unit about said tilt axis.

7. In an outboard motor having a reversible propulsion unit, a transom bracket for clamping said motor in a fixed position on a boat transom, said propulsion unit being pivoted to the transom bracket for movement about a horizontal tilt axis between a substantially upright primary operating position and a forwardly tilted secondary operating position, a first catch on said transom bracket, a latch means pivotally mounted on the power unit below

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said tilt axis for movement between a position adapted to engage said first catch to lock the power unit in its upright position and a catch releasing position allowing said propulsion unit to tilt forwardly, spring means yieldably retaining said latch means in its catch engaging position, a remote lever connected to said latch means for moving said latch means against said spring retention to a catch releasing position, a second catch on the transom bracket to the rear of the first catch and engageable by the latch means to lock said propulsion unit in said secondary position, and a pawl being pivotally carried by the latch means to gravitationally drop into engagement with the first catch to hold the latch means in catch releasing position against said spring retention when the lever is operated to move the latch means.

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