Jan. 29, 1952 L. D. WATKINS 2,583,910

OUTBOARD MOTOR THRUST AND TILT LOCK ADJUSTMENT

Filed March 4, 1948

Fig. 1

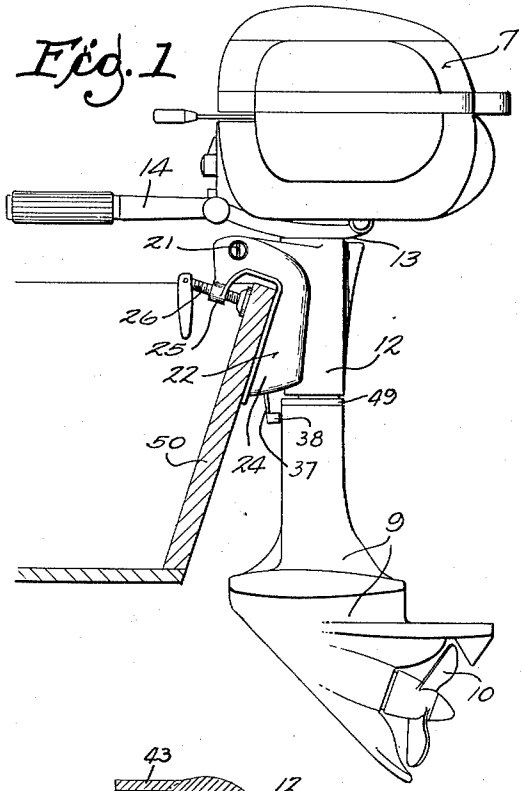


Fig. 2

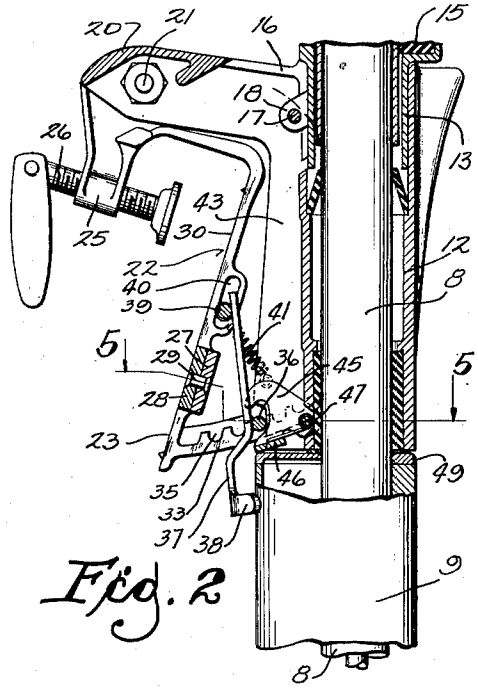


Fig. 6

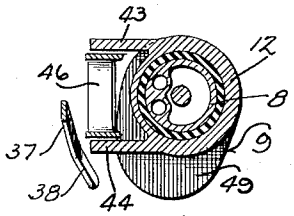


Fig. 5

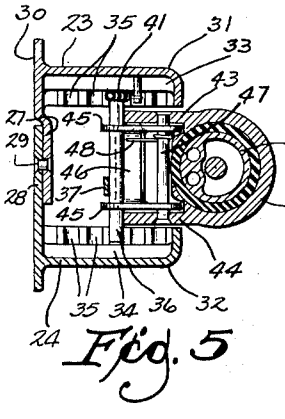


Fig. 3

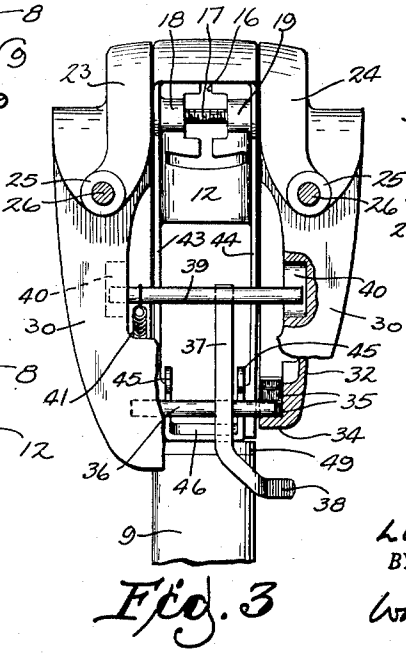
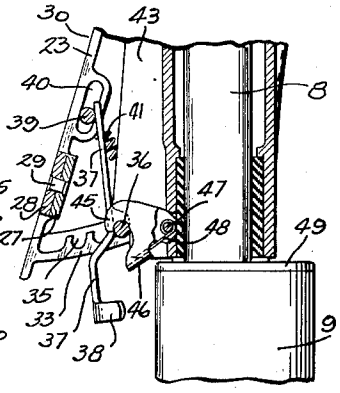


Fig. 4



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OUTBOARD MOTOR THRUST AND TILT LOCK ADJUSTMENT

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9 Claims. (Cl. 248—4)

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This invention relates to outboard motor thrust and tilt lock adjustments.

It is a primary object of the invention to provide simplified means for the adjustment of the thrust member which transmits to an outboard motor bracket the thrust developed by the motor, and to which member the motor proper is automatically locked when rotated to reversing position so that it cannot tilt away from such member when the direction of thrust is reversed.

In addition to specific improvements in the outboard motor bracket and its supporting bearing, the invention contemplates a novel and improved arrangement whereby the thrust member is manually adjustable to a variety of positions respecting the bracket without requiring either the use of tools or manipulation of any nut or bolt, the member being subject to manipulation by the operator's fingertip with the greatest ease and yet being adapted fixedly to maintain its adjustment under all conditions of motor operation.

The above and other objects of the invention will appear more fully from the following disclosure thereof.

In the drawings:

Fig. 1 is a view in side elevation of a complete outboard motor embodying the invention.

Fig. 2 is an enlarged fragmentary detail view in axial section through the mounting member and the adjustable thrust element showing the means for supporting and adjusting such element.

Fig. 3 is a view of the parts shown in Fig. 2 as they appear in front elevation, portions thereof being broken away.

Fig. 4 is a fragmentary detail view similar to a portion of Fig. 2 but showing the parts in the position which they assume when the outboard motor is being operated in reverse.

Fig. 5 is a view taken in transverse section substantially on the line 5—5 of Fig. 2.

Fig. 6 is a fragmentary detail view taken in transverse section at a lower level than Fig. 5 and showing the outboard motor in process of rotation for reversal.

In accordance with conventional practice, the outboard motor embodying this invention comprises a power head generically designated by reference character 7 connected by a tubular shaft housing 8 with a "lower unit" 9 which contains the usual gearing (not shown) for driving the propeller 10.

The power head 7, shaft housing 8 and lower unit 9 are all in rigid assembly, rotatable unitarily for steering and reversing, and mounted for that purpose in the bearing member 12. The bearing member, as best shown in Fig. 2, comprises a generally tubular portion extending downwardly from the tiller bushing 13 to the upper end of the lower unit 9. The tiller 14

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projects from the bushing 13 immediately beneath the power head. A rubber cushion 15, a fragment of which appears in Fig. 2, is interposed between the tiller sleeve 13 and the power head to absorb power head vibration. In order to yieldably hold the tiller in any position to which it may be adjusted, the tiller sleeve 13 is clamped in the bearing member 12 which, for this purpose, is slotted at 16 (Fig. 2 and Fig. 3), the slot being spanned by a clamp bolt 17 which passes through bosses 18, 19, at opposite sides of the slot as a means of tightening the bearing member 12 upon sleeve 13.

The slot 16 extends into the supporting arm 20 which is fulcrumed on the pintle bolt 21 of the bracket 22.

The bracket, generically designated at 22, may conveniently be made in practice of two separately fabricated parts 23, 24 spaced to receive the arm 20 and connected at their upper ends by the pintle bolt 21. Each of the component parts of the bracket is provided with a threaded boss at 25 for one of the clamp screws 26 by means of which the outboard motor is mounted on the transom of the boat. The respective bracket parts 23 and 24 are provided near their lower ends with complementary transversely extending straps 27, 28 which, as best shown in Fig. 5, are formed to lap each other in order that they may be secured by a rivet at 29, or otherwise.

The respective bracket parts 23 and 24 comprise transom engaging flanges 30 and outwardly extending wing portions 31, 32, respectively. The respective wing portions 31, 32 have segmental flanges 33, 34 (cf. Figs. 2, 3 and 5), the respective flanges being formed to provide integral pockets 35 in parallel arcuate series concentric with the pintle bolt 21 upon which the outboard motor assembly is tiltable in a vertical plane upon striking a submerged object.

A thrust bar 36 has its ends seated in corresponding pockets 35 at opposite sides of the bracket. To it is welded or otherwise connected a control lever 37 which preferably has a finger piece 38 projecting laterally for convenient manipulation. The lever extends above the thrust element 36 and is similarly connected by welding or otherwise to a guide bar 39, the ends of which are engaged in the channels 40 in the wing portions 31, 32 of the respective bracket parts 23, 24. The guide bar 39 normally rests near the bottoms of the opposing channel 40 as shown in Figs. 2 to 4, being urged downwardly by a tension spring 41. Under the bias of the spring 41, the thrust element 36 is securely fixed with its ends in opposing pockets 35. However, a relatively light touch on the handle 38 of lever 37 will lift the lever 37, the thrust element 36 and the guide element 39 sufficiently so that the thrust element can readily be manipulated from

one pocket to another to fix a thrust position in which the bearing member 12 and the outboard motor assembly mounted therein will be substantially upright. Thus it requires but a moment to effect an adjustment of the outboard motor assembly to upright position to fit the angle of inclination of the transom of any boat, and such adjustment is made by simply raising the handle 38 to free the element 36 from the notches in which its ends are then engaged, and thereupon manipulating it to the desired new position and releasing it for reengagement with another set of notches.

The bearing member 12, which is generally circular as shown in Fig. 2, is provided with forwardly directed reenforcing flanges 43, 44 which are continuous vertically throughout its height and extend outwardly as a part of the integral arm 20 above described. These flanges bear at their lower forward margins against the thrust element 36, as is best shown in Fig. 5. Pivoted between these flanges is a reverse lock made in one piece to comprise a pair of spaced hooks 45 integrally joined by a web at 46, the reverse lock being pivoted on a pintle 47 and urged downwardly by the bias of spring 48.

The upper end of the lower unit 9 comprises a wide and somewhat elliptical plate 49 which, in the normal forward propulsion position of the outboard motor engages the web 46 of the reverse latch to support the latch in the position shown in Fig. 2 where its hooks 45 are raised out of contact with the thrust bar 36. However, if the outboard motor is rotated somewhat beyond normal steering range, as is the case where it is to be turned 180 degrees for reversal, as soon as the outboard motor reaches the angular position shown in Fig. 6, the upper terminal 49 of its lower unit will pass from beneath the web 46 of the reverse latch, thereby allowing reverse latch to move downwardly (counterclockwise as viewed in Fig. 4) until its hooks 45 engage the thrust bar 36, thereby securely latching the bearing element 12 to the bracket to preclude any tilting such as would otherwise occur when the motor is turned beyond the position of Fig. 6 to reverse the direction of propeller thrust.

It will be evident that when the motor is restored to its position of forward propulsion by movement such as occurs in a clockwise direction from the position of Fig. 6, the upper terminal portion 49 of the lower unit will, in moving beneath the web 46 of the reverse latch, exert a camming action on the reverse latch tending to lift the latch and thereby to disengage its hooks from the thrust element 36.

The operation may be summarized as follows:

The assembly comprising the power head 7, the shaft housing 8 and the lower unit 9 is rotatable for steering and for reversing in a bearing member 12. The said assembly is also tiltable as a unit with the bearing member 12 about a fulcrum provided by pintle bolt 21 of bracket 22 for two purposes; first, for adjustment to upright position to compensate for the inclination of the boat transom 50, and secondly, for free tilting movement if the lower unit 9 encounters a submerged obstruction during use.

Adjustment of the tiltable parts to a position in which such parts have, or appear to have, an upright position, is achieved by an adjustment of the thrust element 36 of the bracket, which is effected so easily as to be susceptible of fingertip operation. With the outboard motor idle, so that there is no thrust exerted by the propeller on

the element 36, the handle 38 is pushed upwardly to disengage element 36 from the notches or recesses 35 provided by the bracket at the opposite ends of bar 36. Once disengaged from such notches, the bar may readily be manipulated by handle 38 of lever 37 to a different notch, in any of which it will function as a part of the bracket to receive the propeller thrust and to transmit such thrust through the bracket to the boat. The thrust element or bar 36 and lever 37 are guided for adjusting movement by means of the guide member or bar 39, the ends of which are confined in channels 40 which accommodate the bodily upward displacement of thrust element 36 and its pivotal movement to a new position.

If the free tilting movement of the tiltable parts to and from thrust engagement with thrust element 36 were the only factor requiring consideration, it would not be necessary that the bar 36 be maintained at substantially fixed radius respecting the fulcrum pintle 21. However, it is also desired, as above noted, to interlock the tiltable parts with the bracket against separation during reversal. Such interlock is effected automatically by the latch hooks 45 whenever the portions unitarily rotatable for steering and reversing are rotated beyond normal steering range as indicated in Fig. 6 and Fig. 4. Within the normal steering range, the hooks 45 are engaged by the top of the lower unit and oscillated to the releasing position shown in Fig. 2, allowing free tilting of the tiltable parts. Outside of the steering range of rotative adjustment of the lower unit, the hooks are permitted to descend into a position for interlocking engagement with the thrust element 36 of the bracket so that notwithstanding that the propeller thrust is now directed astern, the otherwise tiltable parts are restrained from tilting. Because the segmental flanges 33, 34 are disposed on an arc about the center of the pintle bolt 21, it will be apparent that in all positions of the thrust element 36, the same relationship between such thrust element and the hooks 45 will be maintained, to permit of the automatic engagement and release of the hooks with such element as the rotatable parts are rotated.

I claim:

1. In an outboard motor, the combination with transom bracket means including articulating means, of a propelling assembly mounted on said articulating means and tiltable thereon to and from operative propelling position, and a thrust element defining said position and adapted to receive the thrust of said assembly, the said bracket means providing surfaces defining a plurality of positions for said element, the said surfaces comprising notches at laterally spaced points on the bracket means and the element having spaced portions engaged in corresponding notches and being adjustable by disengaging it from one pair of notches and engaging it in another pair thereof, and a guide element separate from said assembly and connected with the thrust element for maintaining the connection of the thrust element with the bracket while accommodating the adjustment aforesaid, the said bracket means having ways in which the guide element is confined for limited movement in the course of adjustment of the thrust element.

2. The combination set forth in claim 1 in further combination with biasing means acting upon one of said elements in a direction to urge

the said portions of the thrust element into the respective notches with which it is engaged.

3. The combination set forth in claim 1 in which the guide element is oscillatable as well as reciprocable in the ways provided by the bracket means.

4. In an outboard motor, the combination with transom bracket means provided with a pintle, of a bearing member pivoted on said pintle for tilting movement in a vertical plane, a unitary assembly comprising a power head, shaft housing and lower unit swiveled in said member and adapted to partake of the tilting movement thereof, a thrust element adjustably mounted on the bracket means and engaged in the tilting of said member and assembly under forward propulsive of thrust, said bracket means being provided with a series of upwardly opening notches laterally spaced in pairs and with which spaced portions of said element are selectively engageable to define different positions of said element, and a guide element separate from said assembly and connected for limited movement with the bracket means and with said thrust element and adapted to accommodate upward and fore and aft movement of the thrust element in the course of the adjustment of the latter between selected pairs of notches.

5. The combination set forth in claim 4 in further combination with a spring connected with the guide element and acting downwardly thereon for biasing said thrust element into a selected pair of notches.

6. In an outboard motor, the combination with bracket means provided with a transverse pintle and a pair of spaced latch arms provided with notches in laterally spaced pairs, of an outboard motor assembly pivoted on said pintle and normally disposed between said arms, a thrust element with which said assembly is normally engaged and from which it is movable rearwardly about the pintle, said thrust element having spaced portions selectively engageable with the spaced notches of a given pair, means biasing said element into the selected pair of notches, and means separate from said assembly for guiding said element for adjustment from a selected pair of notches against said bias into engagement with the notches of a different pair, said guiding means comprising a control lever connected to said element, a guide bar connected with the lever above said element, said bracket means being provided with guide slots in which said bar is movable upwardly and is also oscillatable in the course of the disengaging and adjusting movements of said thrust element.

7. In an outboard motor, the combination with transom bracket means provided with a transverse pintle, of a bearing member provided with a forwardly extending arm fulcrumed on said pintle, a unitary assembly of power head shaft housing and lower unit swiveled on said bearing member for rotation therein and to partake of pivotal movement of said bearing member about said pintle, said bracket means comprising laterally spaced rearwardly extending wing portions between which a part of said bearing member is normally disposed, said wing portions having segmental flanges provided with opposing pairs of notches in series about said pintle, a thrust element comprising a bar having in its ends engaged in corresponding notches and positioned to receive the thrust of said assembly, said element being adjustable from engagement in the notches

of one pair to engagement with the notches of another pair, a guide bar, a lever extending from the guide bar to the thrust element, said bracket means having ways in which the guide bar is reciprocable and oscillatable in the course of adjustment of the thrust element, and a spring biasing the thrust element into the notches in which it is selectively engaged.

8. In an outboard motor, the combination with transom bracket means provided with a transverse pintle, of a bearing member provided with a forwardly extending arm fulcrumed on said pintle, a unitary assembly of power head shaft housing and lower unit swiveled on said bearing member for rotation therein and to partake of pivotal movement of said bearing member about said pintle, said bracket means comprising laterally spaced rearwardly extending wing portions between which a part of said bearing member is normally disposed, said wing portions having segmental flanges provided with opposing pairs of notches in arcuate series about said pintle, a thrust element comprising a bar having its ends engaged in corresponding notches and positioned to receive the thrust of said assembly, said element being adjustable from engagement in the notches of one pair to engagement with the notches of another pair, a guide bar, a lever extending from the guide bar to the thrust element, said bracket means having ways in which the guide bar is reciprocable and oscillatable in the course of adjustment of the thrust element, and a spring biasing the thrust element downwardly into the notches in which it is selectively engaged, said bearing member being provided with a hook in pivotal connection therewith for movement to and from interlocking engagement with the thrust element, said lower unit being provided with a cam normally engaged during forward propulsion with said hooks for elevating the hooks to a releasing position, said hooks being biased for engagement with the thrust element in the course of lower unit rotation to a position where said cam is no longer effective thereon.

9. In an outboard motor adapted for swingable suspension on a transom bracket and having a bearing member and a lower unit swiveled on said bearing member, said transom bracket comprising spaced rearwardly extending segmental flanges with opposing pairs of notches, the combination of a thrust element comprising a bar having ends engageable in corresponding notches and positioned to receive the thrust of a motor, and a hook in pivoted connection with said bearing member for movement to and from interlocking engagement with the thrust element, said lower unit being provided with a cam normally engaged during forward propulsion with said hooks for elevating the hooks to a releasing position, said hooks being biased for engagement with the thrust element in the course of the lower units rotation to a position where said cam is no longer effective thereon.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,127,744	Linthwaite	Aug. 23, 1938
2,441,000	Armstrong	May 4, 1948