

Oct. 31, 1933.

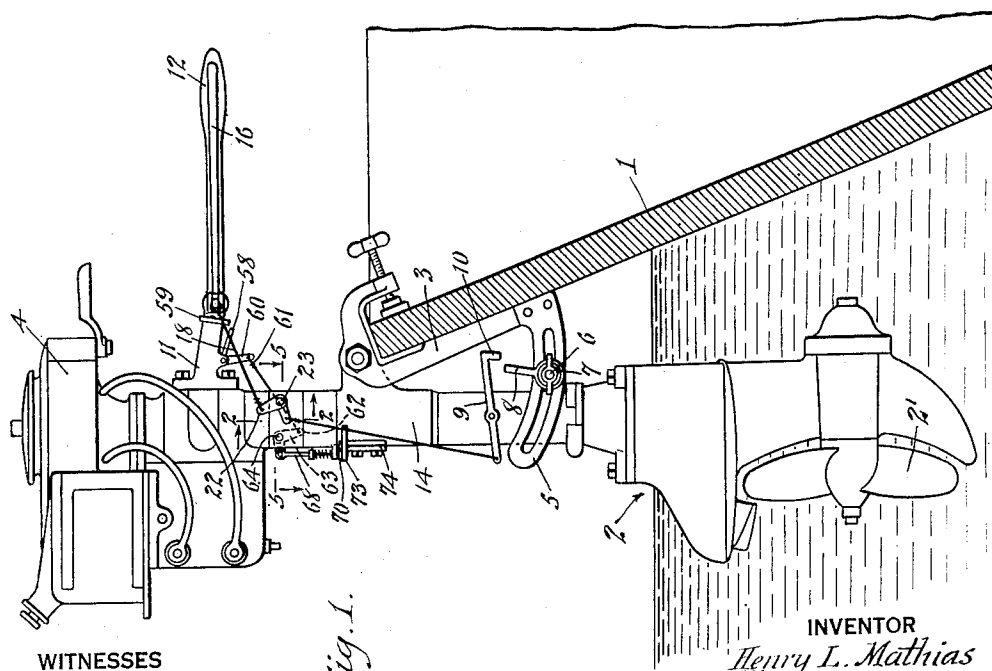
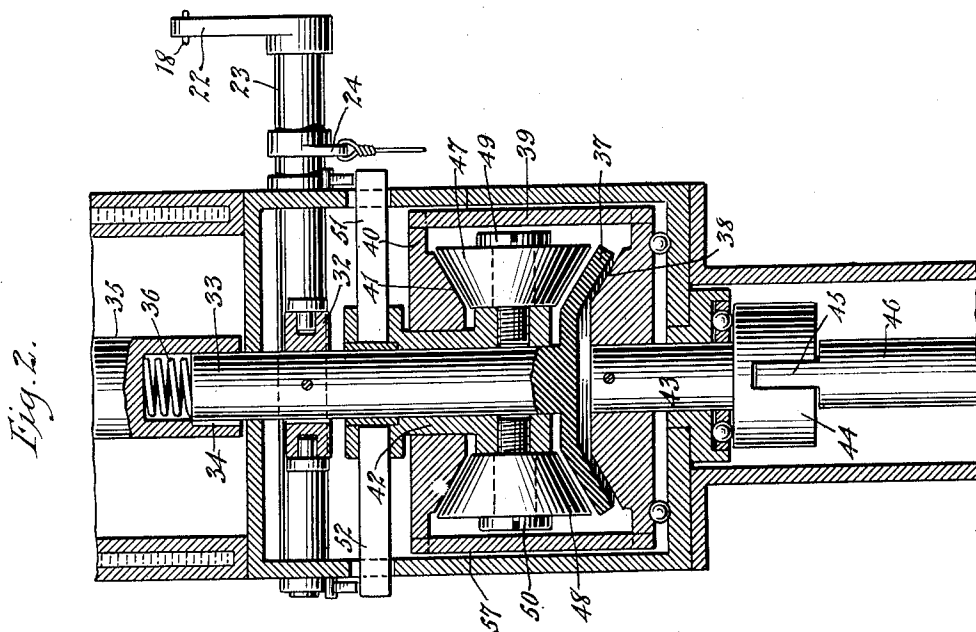
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1,933,481

OUTBOARD MOTOR TRANSMISSION

Filed Jan. 10, 1933

3 Sheets-Sheet 1



WITNESSES

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3 Sheets-Sheet 2

Fig. 4.

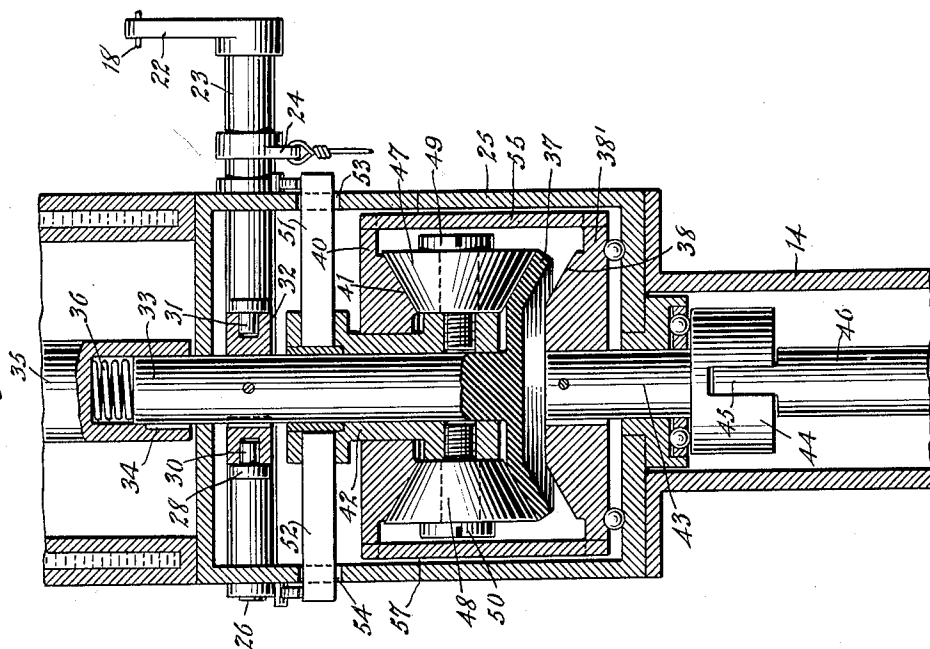
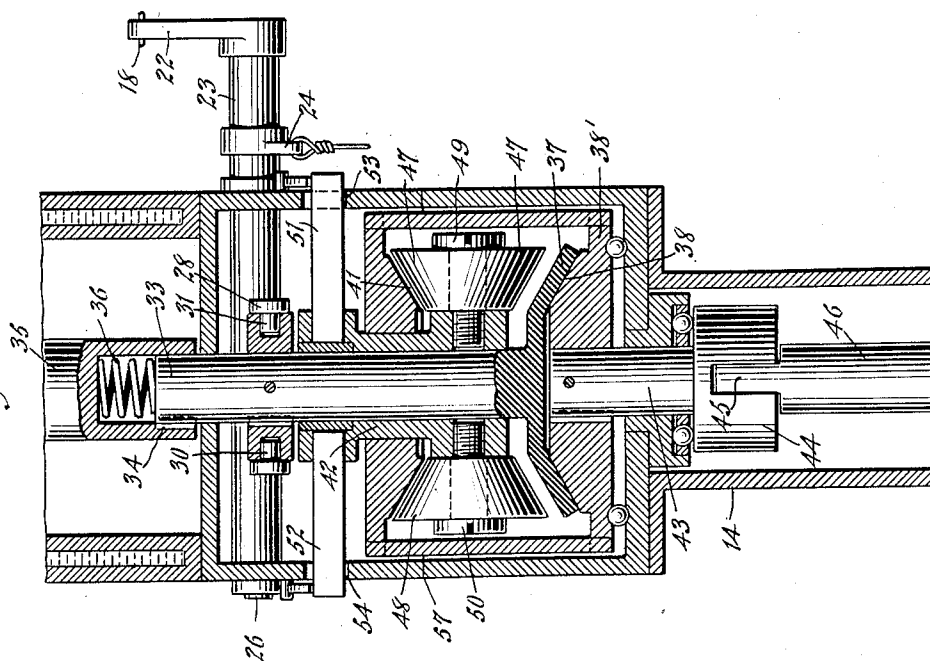


Fig. 3.



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3 Sheets-Sheet 3

Fig. 5.

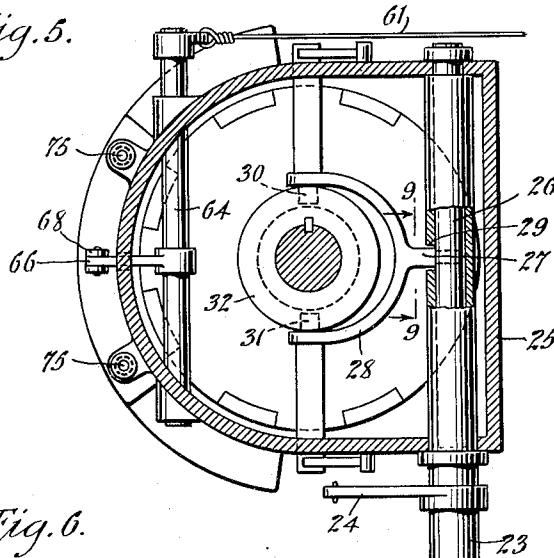


Fig. 6.

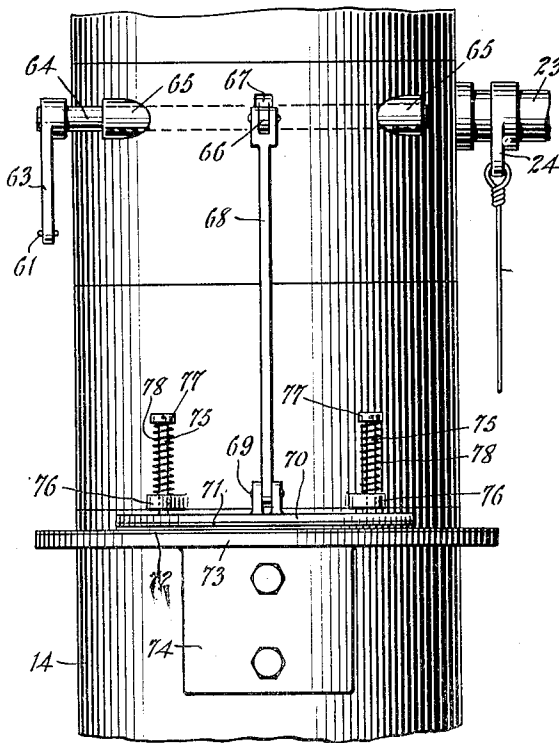


Fig. 7.

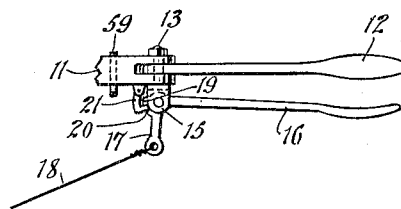


Fig. 8.

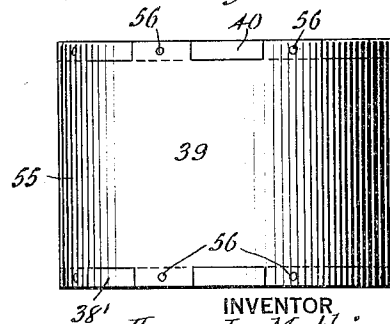
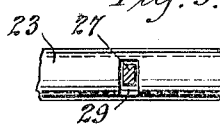


Fig. 9.



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1,933,481

OUTBOARD MOTOR TRANSMISSION

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Application January 10, 1933. Serial No. 651,048

5 Claims. (Cl. 115—18)

This invention relates to propelling devices for boats and particularly to an improved outboard motor wherein the parts are so formed that the propeller may be caused to rotate in either direction quickly.

The principal object of the present invention is to provide a simple construction whereby an outboard motor may be caused to operate in either direction, with the mechanism so formed that it may be shifted quickly and easily to cause the motor to function in a forward direction and in a rearward direction.

Another object of the invention is to provide an outboard motor whereby the steering mechanism may be locked whenever desired so that the parts will be held in a given position without the attention of the operator.

An additional object, more specifically, is to provide a reverse mechanism forming part of the transmission of an outboard motor, wherein the forward drive is maintained in functioning position by a spring and is moved from that position to a reverse drive through the action of the operator.

In the accompanying drawings—

Figure 1 is a side view of an outboard motor with an embodiment of the invention applied thereto, the motor being shown in connection with part of a boat;

Figure 2 is an enlarged fragmentary sectional view through Figure 1 on the line 2—2; the parts being shown in neutral or idling position;

Figure 3 is a view similar to Figure 2 but showing the parts when the motor is functioning to drive the boat forwardly;

Figure 4 is a view similar to Figure 2 but showing the parts in a position where the motor is driving the boat rearwardly;

Figure 5 is an enlarged sectional view through Figure 1 approximately on the line 5—5;

Figure 6 is an enlarged fragmentary side view of part of the mechanism shown in Figure 1, the view illustrating how the steering mechanism may be locked;

Figure 7 is a fragmentary top plan view of the control lever shown in Figure 1, the same illustrating the locking mechanism for holding the clutch and associated parts in neutral position as shown in Figure 2;

Figure 8 is a side view of the casing shown in Figure 2, the same illustrating how the end members are mortised into the casing;

Figure 9 is an enlarged fragmentary sectional view on the line 9—9 in Figure 5, the same illus-

trating a certain loose motion between the power sleeve and the lifting yoke.

Referring to the accompanying drawings by numerals, 1 indicates a boat of any desired kind to which the propeller mechanism 2 is connected by a suitable clamping structure 3 which is old and well known. Mounted on the propeller structure 2 is a motor 4 of the usual construction. The clamping structure 3 is provided with an arc shaped slotted arm 5 in which a bolt 6 is fitted. A washer 7 surrounds bolt 6 and is provided with an arm 8 whereby when the bolt 6 is tightened the arm 8 will be locked in a given position. It is to be understood that the propeller mechanism 2 rests against the bolt 6 when the boat 1 is being propelled forwardly, but in case it is desired to move the boat rearwardly the propeller naturally is reversed, and in order to prevent the mechanism 2 from swinging rearwardly a pivotally mounted lever 9 is provided having a hook 10 which moves down into engagement with the arm 8 so that the propeller mechanism cannot move rearwardly unless the boat 1 is moving forward under momentum and the propeller mechanism 2 strikes a stone or other immovable object, whereupon arm 8 and washer 7 will be swung around the bolt 6 as the friction is not such as to resist this strain. However, ordinarily the arm 8 is sufficiently rigidly held to prevent a rearward swinging movement of the propeller mechanism 2, so that when the propeller mechanism is functioning in a rearward direction, it will cause the boat to move rearwardly in the usual manner.

Pivotally connected to the bracket 11 is a steering arm 12, the pivotal connection 13 being such that arm 12 may be swung upwardly and downwardly freely without effecting the steering action, but when swung horizontally will swing all parts of the motor and propeller mechanism except the bracket 14 which is bolted to the clamping structure 3. As shown in Figure 7, an ear 15 extends from the bracket 11 and on this ear is pivotally mounted a reverse lever 16, said reverse lever having a right angled projection 17 to which a cable or rod 18 is connected. A segment 19 having preferably a single notch 20 is rigidly connected to arm 16 and positioned so that the pivotally mounted pawl 21 may be moved into the notch 20 at any time for locking the arm 16 and associated parts against movement. When the pawl 21 is extending into the notch 20, the lever 16 and the parts connected therewith are held in neutral position as shown in Figure 2. The cable or rod 18 is connected to the arm

22 rigidly secured to the sleeve 23 (Figure 5), whereby this sleeve will be rocked when the cable or rod 18 is pulled.

An auxiliary arm 24 is rigidly secured to sleeve 23 and is swung when the sleeve 23 is rocked. Sleeve 23 extends into the housing 25, shown in Figure 5, and arranged interiorly of this sleeve is a rod 26 into which the end 27 of yoke 28 extends. The end 27 is preferably rigidly secured to rod 26 but loosely fits into the opening or slot 29, as shown in Figure 9, whereby there will be a certain amount of loose motion. The swinging upward and downward movement of yoke 28 is very small and to cause a certain appreciable movement of the lever 16 this loose motion is provided. The yoke 28 is provided with pins 30 and 31 which extend into an annular groove 32 which is rigidly secured to the driving shaft 33. This driving shaft is splined at 34 to the engine shaft 35. A spring 36 acts on part of shaft 35 and on the end of shaft 33 to give the same a continuous tendency to move downwardly as shown in Figure 2.

When the pawl 21 (Figure 7) is engaging notch 20, yoke 28, ring 32 and the other parts are held in the position shown in Figure 2, which is the idling or neutral position. As soon as the pawl 21 is moved out of this notch and the lever 16 is in free swinging movement, spring 36 will quickly move shaft 33 downwardly under clutch plate 37 and will be thrust tightly against the cone clutch 38, so that if the engine is rotating power will be immediately transmitted to clutch 38. This clutch is a rigid part of the housing 39, which has a top plate 40 having a cone 41 rotatably mounted on a sleeve 42. An auxiliary driving shaft 43 is pinned or otherwise rigidly secured to the cone clutch 38, said auxiliary driving shaft having a clutch head 44 for receiving the clutch extension 45 of the driven shaft 46.

It will thus be seen that when the parts have been lowered until they are in the position shown in Figure 3, and the engine 4 is operating, the driven shaft 46 will be driven in such a direction that the propeller 2' will function to drive the boat 1 in a forward direction. Considerable space is shown between the clutch plate 37 and the cone 38, as illustrated in the drawings, and also considerable space is shown between the clutch plate 37 and the beveled wheels 47 and 48, but this space is exaggerated for the purpose of illustration, as usually in a full sized machine the space is somewhere between $\frac{1}{8}$ inch and $\frac{1}{16}$ inch.

When the parts are in the position shown in Figure 3 the boat is moving forwardly if the engine is functioning. If it should be desired to disengage the motor from the propeller but not stop the operation of the motor, the lever 16 is moved over towards the steering lever 12 until the parts are in the position shown in Figure 2. The pawl 21 if desired may then be lowered into notch 20, whereupon the engine may idle as long as desired. The pawl 21 may at any time be disengaged and the parts lowered to resume the position shown in Figure 3 under the action of the spring 36. However, if it is desired to reverse the propeller 2', lever 16 is moved over towards lever 12 as far as possible, and when this is done the clutch plate 37 is moved upwardly against the beveled wheels 47 and 48. If the engine is still functioning power will be transmitted to these wheels and in turn the wheels will transmit power to the cone 41 as they are forced against this cone. The wheels 47 and 48 are rotatably mounted on suitable pins 49 and 50 carried by the

extension on sleeve 42 so that this sleeve moves upwardly with the wheels until the wheels tightly engage the cone 41.

Bars 51 and 52 are rigidly secured to the sleeve 42 which is slidably mounted on shaft 33, said bars extending loosely through slots 53 and 54 in the casing 25. These slots are sufficiently long to provide the up and down movement necessary to cause the wheels 47 and 48 to engage and disengage the cone 41. It will be noted that cone 41 forms part of the top plate 40, while the cone clutch 38 forms part of the bottom plate 38', said plates being mortised into the tubular body 55, as shown in Figures 5 and 8. This will allow the parts to be rigidly assembled or disassembled. Preferably suitable pins or screws 56 are used to connect the end plates to the body 55. In regard to the casing 25, the same is preferably made in two parts, and after the structure has been assembled the parts are welded along the line 57, although it could be secured together in some other manner.

When the device is functioning in a normal manner and the boat is moving forwardly, the steering arm or lever 12 is shifted back and forth as desired, to secure the desired guiding action to the boat. Sometimes it is desired to lock the steering arm against movement so that both hands of the operator may be used for other purposes and yet the boat allowed to proceed in a straight line forwardly, or, if desired, in a curve in a forward direction. When this is desired a small lever 58 (Figure 1) is swung upwardly toward bracket 11 and the sliding ring 59 is lowered thereover so as to lock the lever in its raised position. When this occurs the lever 60 which is integral with lever 58 is also swung upwardly and pulls on the rod or cable 61, which rod or cable is secured at 62 to the lever 63, which lever is in turn rigidly secured to shaft 64.

Shaft 64, as shown in Figure 6, is journaled in suitable journal boxes 65 and is provided with an arm 66 extending through slot 67. The end of arm 66 is pivotally connected with link 68, which link is pivotally connected at 69 to plate 70. Plate 70 at its lower surface is provided with a cushion 71 formed of rubber, felt or other material, and coacting with a rubber, felt or other pad 72 mounted on the arc-shaped flange 73, which flange has a bracket 74 bolted or otherwise rigidly secured to the stationary bracket 14. Plate 70 carries the rods 75 which rods extend through suitable ears 76. Each rod has an enlarged end 77 so that the spring 78 may act on the end 77 and on the ears 76 to give a continuous tendency to the plate 70 to move upwardly. However, when lever 58 is swung upwardly as shown in Figure 1, link 68 is forced downwardly until the cushion members 71 and 72 are tightly engaging, whereupon bracket 11, arm 12, engine 4 and associated parts are locked against swinging or rotary movement in a horizontal plane. As these parts are locked against horizontal rotation, the propeller mechanism 20 is also locked in a similar manner, so that the propeller 2' will continue to act to force the boat 1 in a forward direction, or in a circle, as the parts have been originally set.

Whenever it is desired to again control the movement of the boat 1, the ring 59 is slipped off lever 58, and then lever 12 may function freely as spring 78 will function quickly to lift the plate 70. Usually the lever 58 and associated parts are used only at short intervals, though if desired where there is a large lake, or where the

boat is on the ocean and it is desired to cruise slowly in a circle, the parts may be set at the desired angle and then lever 58 and associated parts are caused to function. When the parts are set as just described, the boat will move in a straight line, or in a circle, as long as the engine functions.

I claim:

1. In an outboard motor, a transmission comprising means for operating in a forward direction and in a rearward direction, said means including a housing having a pair of oppositely positioned cone cams, a pair of rollers adjacent said cams but normally out of contact therewith, a driven shaft connected to one of said cones, a driving shaft extending to a point near the cone connected to the driven shaft, a clutch plate positioned between said wheels and the last mentioned cone, means for normally holding said clutch plate in connection with the last mentioned cone, and manually actuated means for moving the clutch plate away from the last mentioned cone and against said wheels with sufficient pressure to cause the wheels to move against the other cone, whereby as the driving shaft and clutch plate rotate they will rotate said wheels and said other cone for causing said housing and said driven shaft to rotate in a reverse direction.

2. In an outboard motor, a transmission and a control therefor comprising a reciprocating driving shaft, a driven shaft, means for slidably connecting the driving shaft to the power shaft, a spring acting on the power shaft and the driving shaft to cause the driving shaft to move to a given position, a clutch plate rigidly connected to the driving shaft, a housing surrounding the clutch plate and part of the driving shaft, said housing including a pair of oppositely positioned driving cones, the parts of said housing being rigidly connected together so as to move as a unit, a driven shaft rigidly secured to one of said driving cones, a sleeve extending through the other driving cone, a pair of rollers mounted on said sleeve and positioned to engage said other cone when moved to a predetermined position, said clutch plate being positioned between the cone secured to the driven shaft and said rollers, a ring rigidly secured to said driving shaft, said ring having an annular groove, a yoke having a pin fitting into said groove, and means including a manually actuated lever for raising said yoke, driving shaft and associated parts against said spring whereby said clutch plate is moved away from the cone secured to the driven shaft and into engagement with said rollers for forcing said rollers against said other driving cone, whereby said housing and parts connected therewith are

driven in a reverse direction, and means connected with said sleeve for preventing independent rotation thereof while allowing a sliding movement.

3. In an outboard motor, a transmission including a forward drive and a reverse drive, said transmission being provided with a housing rigid throughout and formed with oppositely positioned friction driving surfaces, a sliding sleeve extending through one of said surfaces, a pair of rollers carried by said sleeve and adapted to be moved into engagement with the friction surfaces carrying the sleeve, a driven shaft connected to the other friction surface, a driving shaft slidably mounted on said sleeve and carrying a clutch plate, spring means for normally moving said driving shaft and clutch plate against said other clutch surface, and manually actuated means for moving said driving shaft and clutch plate until the clutch plate engages said rollers and presses the same against the friction surface carrying said sleeve, whereby said housing will be reversed and said driven shaft will be reversed.

4. In an outboard motor, a steering arm and means coacting therewith for locking the said steering arm in any adjusted position, said means including a stationary arc-shaped flange, a reciprocating plate connected to the parts of the outboard motor which swing horizontally, means including a locking ring for forcing and holding said plate against said flange, and spring means for moving the plate away from the flange when said locking means has been disengaged.

5. In an outboard motor structure for propelling boats and the like, a stationary bracket adapted to be connected with the boat, and swinging parts mounted on the stationary bracket, said swinging parts including the propeller and associated mechanism, and a motor and associated mechanism, a steering arm connected with the swinging parts for causing the propeller to act as a rudder for steering the boat as well as propelling the same, an arc-shaped flanged member secured to said stationary bracket and provided with a friction surface, a plate coacting with said flanged member and carried by the swinging parts of the device, said plate being positioned near said flanged member, a plurality of means including a pivotally mounted arm for moving said plate against said friction surface so as to lock the swinging parts rigidly to said stationary part, and means for locking said swinging arm in a functioning position whereby said steering arm is locked against movement.

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