E. BURROUGHS.

MOTOR OAR.

APPLICATION FILED JAN. 15, 1914.

1,138,078.

Patented May 4, 1915.

5 SHEETS—SHEET 1.

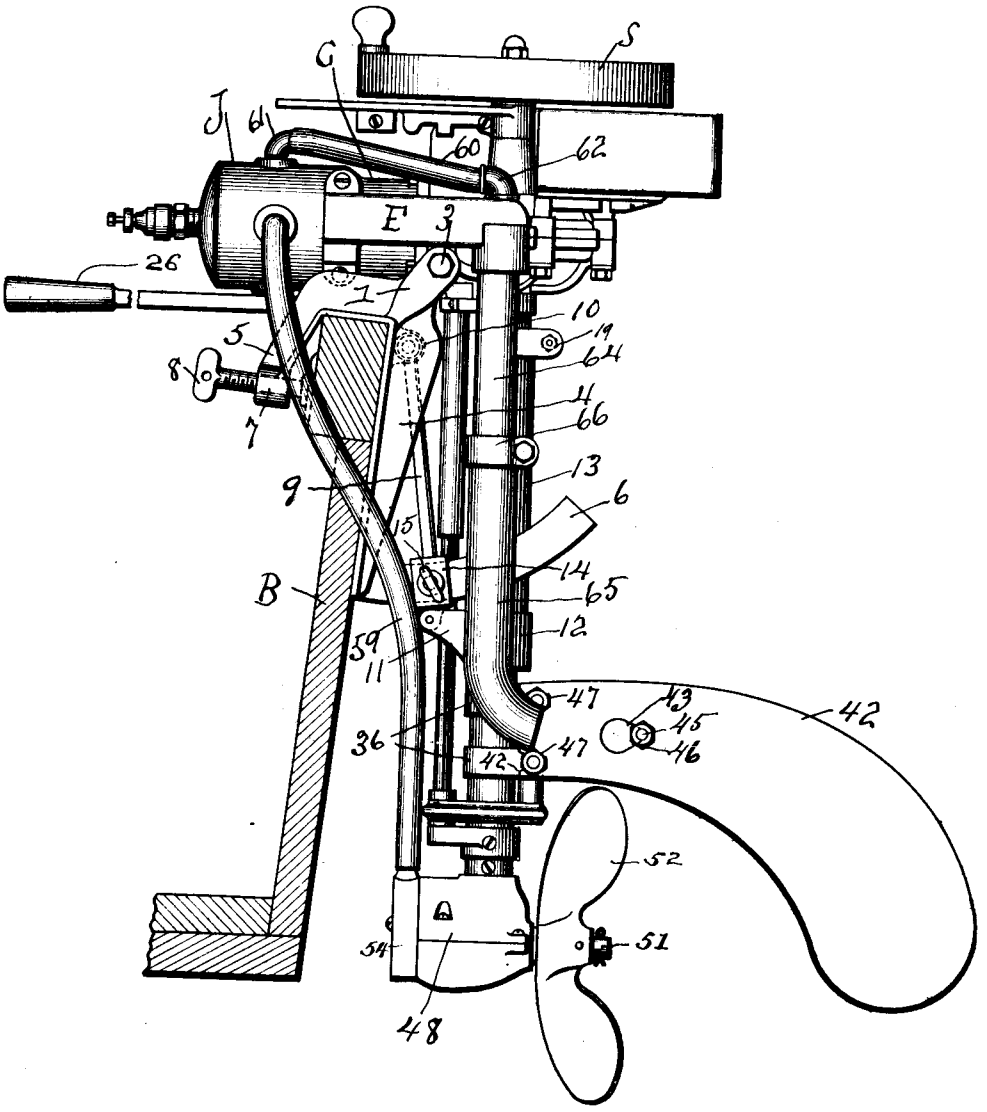

Fig. 1.

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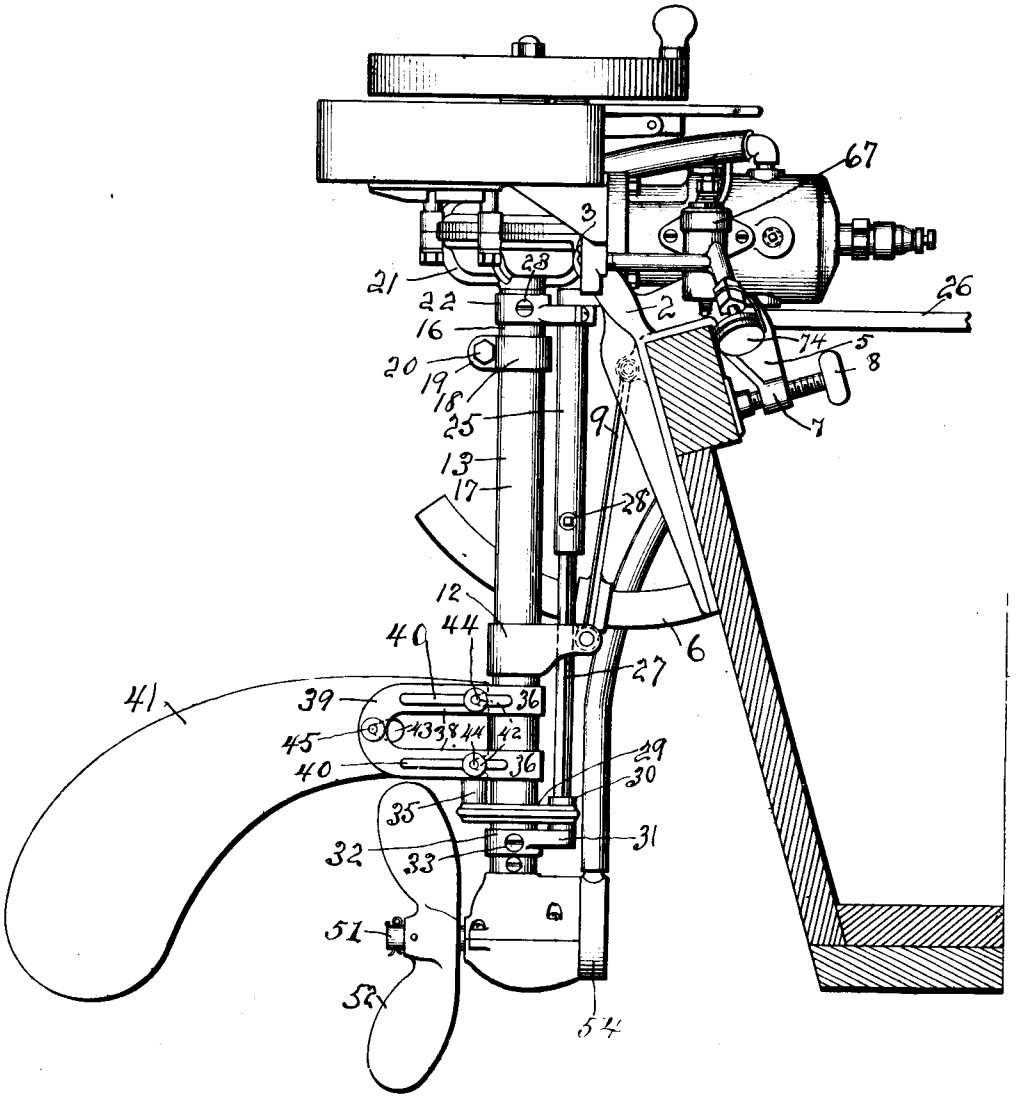

Fig. 2

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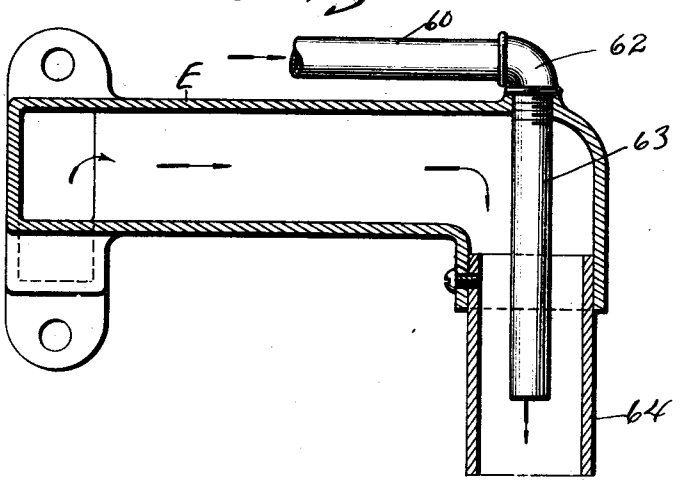
5 SHEETS—SHEET 3.

Fig. 3



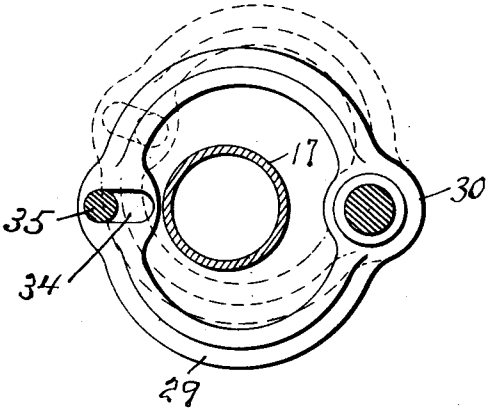


Fig. 4

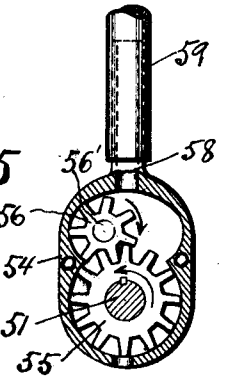


Fig. 5

Witnesses

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5 SHEETS—SHEET 4.

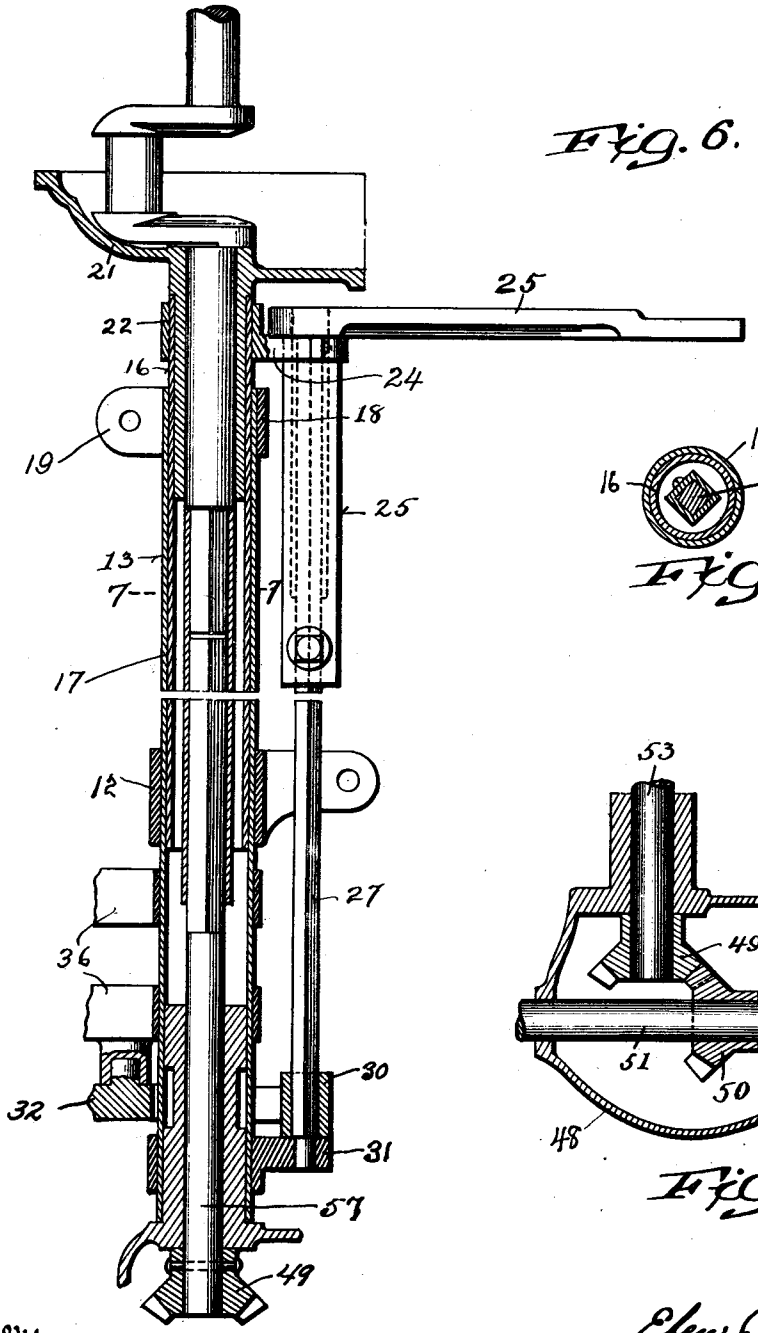

Fig. 6.

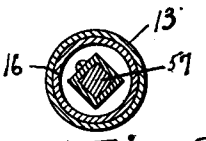

Fig. 7.

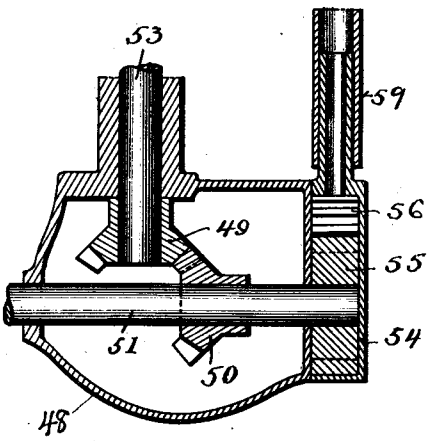

Fig. 8.

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5 SHEETS—SHEET 5.

Fig. 9.

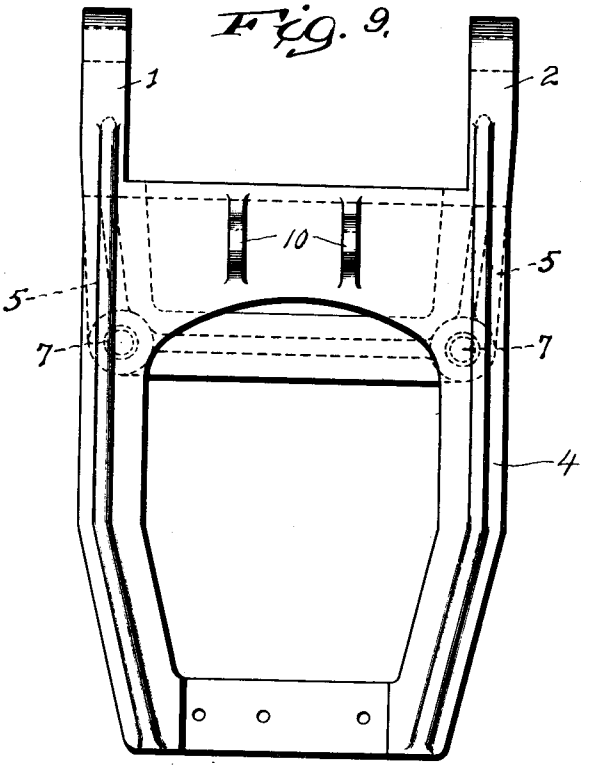


Fig. 10

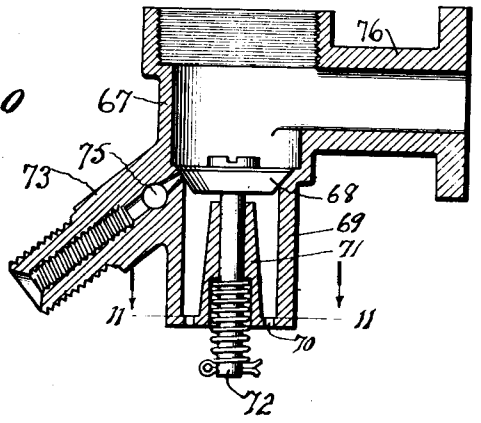
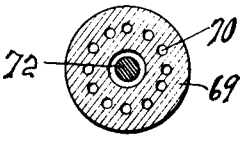


Fig. 11.



Witnesses

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UNITED STATES PATENT OFFICE.

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MOTOR-OAR.

1,138,078. Specification of Letters Patent. Patented May 4, 1915.

Application filed January 15, 1914. Serial No. 812,290.

To all whom it may concern:

Be it known that I, EBEN BURROUGHS, citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Motor-Oars, of which the following is a specification.

This invention relates to out-board motors.

The primary object of the present invention is, in a ready, novel and practical manner, to utilize the motion of the propeller shaft when driven in either direction, to actuate a force pump for supplying water continuously, while the propeller is revolving, to the water jacket of the engine whence it is discharged into an out-take communicating with the exhaust, the action of the water in conjunction with the spent gas from the cylinder operating to set up a partial vacuum in the exhaust, which will operate effectively to scavenge the cylinder and thus maintain the engine in the best condition for doing effective work.

A further object is to improve the manner of combining the rudder with the rudder post whereby the latter may readily be removed or replaced, as the requirement may arise without disturbing any of the parts of the steering mechanism.

A further object is to improve the manner of combining the motor with a boat whereby to permit any adjustment of the rudder post, the rudder and propeller, in a manner that may be accomplished merely by the adjustment of a single part of the attachment.

A further object is to improve the construction of the mixing valve in such manner as to insure positive and thorough mixing of the air and hydro-carbon passing to the cylinder, whereby to conserve the gasolene and to insure a more effective explosion.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists, under the first object stated, in combining with the propeller shaft a force pump, and connecting the pump casing with the water jacket, the pump being of the force type whereby under the rotation of the propeller, a constant stream of water will be supplied to the jackets, and is conducted thence to a pipe connecting with the exhaust, the water conducting pipe terminating short of the lower end of the out-take pipe, whereby as the spent gases escape from the exhausts to the out-take pipe, they are met by the water escaping from the jacket and the two agents in their passage through the out-take establish a partial vacuum, which serves to operate upon the cylinder in such manner as to scavenge the same of all burnt gases and thus maintain the same in the best possible shape for doing effective work.

The object stated under the second head consists in mounting upon the rudder post a casting having two arms each provided with a longitudinal slot, and a rudder blade having a longitudinal slot, bolts being employed that project through the slots and through the rudder blade, the nuts of which, upon being loosened, will permit of the head of the bolt or of the nut that clamps the casting to the blade to pass through the longitudinal slot in the latter, and thus permit the blade readily to be detached from the casting.

The object stated under the third head consists in providing the clamp that secures the engine and its attachment to the boat, with a segmental arm, and further employing a brace bar, the upper end of which is pivotally connected with a boss carried by the upper portion of the clamp, and the lower end of which is pivotally-connected with a sleeve mounted upon the rudder post, the brace bar adjacent to its lower end being provided with a clamp arranged to slide upon the segmental arm, and be held in any desired adjustment thereof by means of a set screw carried by the clamp and co-acting with the arm.

The object stated under the fourth head consists in providing the mixing valve with a series of orifices, forming thereby a screen-like bottom upon which the gasolene dropping from the valve seat is spread, thus permitting an intimate mixture of the air and gasolene before the mixture passes to the cylinder.

The invention consists in various other novel details of construction, hereinafter fully described and claimed.

In the accompanying drawings forming a part of this specification, and in which like characters of reference indicate corresponding parts:—Figure 1 is a view in side elevation partly in section, showing the left hand side of the engine or motor and its attachments, looking toward the bow of the boat. Fig. 2 is a similar view looking from the right hand side of the motor engine.

Fig. 3 is an enlarged detail sectional view showing the manner in which the water from the water jacket is conveyed to the outlet that communicates with the exhaust, whereby to set up a partial vacuum in the latter. Fig. 4 is a plan view showing the novel form of steering ring employed, and the manner in which the latter operates to actuate the rudder. Fig. 5 is a view in front elevation of the force pump used in supplying water to the water jacket of the motor. Fig. 6 is a vertical longitudinal sectional view through the drive shaft head. Fig. 7 is a horizontal sectional view taken on the line 7—7, Fig. 6. Fig. 8 is a sectional detail view showing the arrangement of the gearing for driving the propeller and also the means for operating the pump for supplying water to cool the jacket of the cylinder. Fig. 9 is an enlarged detail view in front elevation of the boat clamp. Fig. 10 is a vertical sectional view through the carbureter, and, Fig. 11 is a horizontal sectional view taken on the line 11—11, Fig. 10.

Referring to the drawings, C designates the cylinder of the gasolene motor provided with the usual water jacket J, S, the steering wheel, and E, the exhaust, and as these parts may be of the usual or any preferred construction, further description thereof is deemed unnecessary.

The engine as a whole is suspended from the stern of a boat B by a clamp that is provided at its upper end with two arms 1 and 2 that straddle the casting of the engine and are held pivotally assembled therewith by a bolt 3. The clamp has integrally formed with it a relatively long arm 4 and a relatively short arm 5, the former being designed to bear against the outer surface of the stern of the boat and being provided at its lower end with an upwardly curved segmental arm 6, the arm 5 terminating in an internally threaded head 7 carrying a clamping bolt 8 that is designed to secure the clamp as a whole to the upper edge of the stern. With the engine and its accessories moving upon the bolt 3 as a pivot, it is necessary that some means must be employed whereby the engine shall be maintained in any desired angular adjustment, thus to insure the most effective working of the propeller and operation of the rudder. To secure this result, there is a brace bar 9 employed, the upper end of which is pivotally connected with a pair of lugs 10 projecting outwardly from the upper portion of the arm 4 of the clamp, the lower end of the bar being pivotally connected with an extension 11 carried by a collar 12 slidably mounted upon the rudder post 13. Adjacent to the lower end of the brace bar is arranged a collar 14 that is designed to slide upon the arm 6, and to be held at any desired adjustment relatively thereto by a set screw or bolt 15, clearly shown in Fig. 1. From this arrangement, it will be seen that should it be desired to alter the angular adjustment of the engine with relation to the stern of the boat, it will only be necessary to loosen the set bolt 15, swing the structure bodily to the desired angle, and then re-tighten the bolt 15.

The rudder post 13 to which reference has been made comprises two tubular members 16 and 17 having telescoped relation, the upper end of the section 17 having combined with it a split collar 18 provided with ears 19 through which passes a clamping bolt 20, the object of this arrangement being to permit of any adjustment of the parts, and their rigid securing together when the adjustment has been completed. The section 16 of the steering post is rigidly connected with a spiral 21 secured to the under side of the engine casing, and carries a collar 22 that is held assembled with the section by a screw 23, the collar having an arm 24 projecting from it in which is mounted in any suitable manner, the steering post 25.

The casting designated by numeral 25 is right angular in shape, as shown in Fig. 6. Its vertical portion is provided with a square hole for telescoping with member 27. Tiller handle 26 is a detachable handle adapted to be fastened to the horizontal portion of member 25 in a suitable manner. Telescoped within the member 25 is the steering rod 27, the two parts being held at the desired longitudinal adjustment by a set bolt 28. Loosely disposed adjacent to the lower end of the rudder post is a steering ring 29 shown in detail in Fig. 4, this ring being free from contact with the rudder post. On one side of the ring is a boss 30 in which is rigidly secured the lower portion of the member 27 of the steering post, its lower terminal being stepped or seated in an extension 31 of a collar 32 secured adjacent to the lower end of the section 17 of the rudder post by a screw 33. In diametrical alinement with the center of the boss 30 is a slot 34 in which works a stud or pin 35 depending from the lower side of the rudder supporting casting. This casting, as shown in Fig. 2, consists of two collars 36 encircling the section 17 of the rudder post and forming a continuation of two arms 38, connected by a bend 39, each of the arms being provided with a suitable longitudinal slot 40.

As above stated, it is one of the objects of the invention to assemble the rudder with the rudder post in such manner as to permit of the former being readily detached and attached thereto as may be required. This result is secured by providing the rudder 41 at its upper end with two notches 42, and adjacent to its upper end with a key-hole shaped slot 43, as shown. The notches are engaged by bolts 44 that pass through the

bosses 40, and the slot 43 is engaged by a bolt 45 carrying at one end a nut 46, the bolts 44 being provided also with nuts 47. When the rudder is in operative position, its upper end will abut against the lower end of the section 17 of the rudder post, in which position it is held by the combined action of the bolts 44 and 45 and nuts 46 and 47, and when in this position, the bolt 45 occupies the small end of the key-hole slot 43. Now, should it be desired to move the rudder, it will simply be necessary to loosen the bolts 46 and 47 and move the rudder away from the rudder post to permit the head of the bolt 45 to come opposite the large end of the key-hole slot, when, in a manner that will be obvious, the rudder may be detached.

Secured to the lower end of the rudder post is a casing 48 in which are disposed the beveled gears 49 and 50 for imparting motion to the propeller shaft 51, the latter carrying at one end a propeller 52, of any preferred construction, the gear 49 being carried by the lower end of the drive shaft 53 which extends upward through the rudder post and is connected in any suitable manner with the engine, while the gear 50 is carried by the propeller shaft 51. Secured to the casing at the end opposite that occupied by the propeller is a casing 54 in which is arranged a force pump comprising two intermeshing gears 55 and 56, the former of which is carried by the propeller shaft 51 and the latter of which is loose in the casing and runs on the top of the gear 55, and is provided with a hole 56′ to lighten the structure. The chamber in the casing is of substantially 8-shape, and the propeller or gear 55 occupies the lower segment of the casing and practically fills it while the upper propeller or gear 56 occupies only about one-half of the upper chamber, as clearly shown in Fig. 5, and travels back and forth in the casing, in accordance with the direction of the rotation of the gear 55. The casing is provided with a tubular extension 58 to which is connected the lower end of a pipe 59, the upper end of which enters the side of the water jacket, as shown in Fig. 1. Now, it will be seen that as the propeller is driven by the engine, in the usual manner, that the water entering the pump chamber will be forced upward therefrom through the pipe 59 into the water jacket, whence after circulating in the usual manner, it escapes from the top of the jacket through a pipe 60, one end of which connects with a coupling 61 having threaded engagement with the water jacket, and the other end of which connects with one end of a union 62, the other end of which is connected in any suitable manner with the exhaust E.

As clearly shown in Fig. 3, the union 62, within the exhaust E has connected with it a short section of pipe 63 that extends downward into an out-take pipe consisting of two members 64 and 65, having a telescopic connection with each other, and being held in any desired adjustment by the pinch collar 66. Under the operation of the engine, and as the water is being discharged into the outlet, the burnt gases from the cylinder will enter the exhaust in the direction of the arrows shown in Fig. 3, and will pass downward into the outlet where they mix with the water discharging from the pipe 63 and in their passage toward escape, the gas and water cause a partial vacuum to be created in the exhaust which will operate to withdraw burnt gases from the cylinder, and thus scavenge the latter, thus causing the engine always to be maintained in the best condition for use.

As usual, the cylinder is provided with a carbureter 67, shown in detail in Fig. 10, in which is arranged a spring seated mixing valve 68. The casing of the carbureter is provided with a chamber 69, the bottom of which is formed with a series of openings 70, and projecting upward from the bottom is a sleeve 71 in which works the stem 72 of the valve 68. Projecting from the casing is an extension 73 having a threaded bore therein for the reception of the needle valve 74, the extensions being provided with a duct 75 leading from the feed tank. One side of the casing is provided with an extension 76 that connects with the cylinder of the engine.

From the foregoing description, it will be seen that every provision is made whereby vertical adjustments of the various parts of the steering mechanism may be effected, and further provision is made whereby the engine or structure as a whole may be adjusted relative to the steering of the boat to bring the rudder to the most effective position for operation.

What I claim as new is:—

1. An improved out-board motor comprising a water jacket engine, means for forcing water to the water jacket including an 8-shaped pump chamber, a propeller operated gear and a meshing reversibly operable loosely mounted gear in the 8-shaped chamber, a tubular connection from the chamber to the water jacket of the engine, an exhaust, an adjustable out-take with which the exhaust communicates, and a conduit between the water jacket and the out-take scavenging the cylinder by the operation of the water in conjunction with the spent gases establishing a partial vacuum within the exhaust, substantially as set forth.

2. In an out-board motor, the combination of a water jacket engine, a reversibly operable gear pump actuated by the propeller, a connection between the pump and the water jacket of the engine, an exhaust, an

out-take with which the exhaust communicates and having its open end terminating under water, a conduit communicating with the water jacket and extending downward into the out-take and operating to cause the water in conjunction with the spent gases to establish a partial vacuum within the exhaust whereby to cause the cylinder to be scavenged, substantially as set forth.

3. In an out-board motor, an engine, a longitudinally adjustable rudder post supported therefrom, a longitudinally extensible steering post supported from the rudder post, a steering ring operatively connected with the lower end of the steering post, a rudder supported by the rudder post, and an operative connection between the rudder and the steering ring.

4. In an out-board motor, a rudder post, a casting carried thereby and provided with longitudinal slots, a rudder provided with an elongated slot, and bolts securing the casting and rudder together, and serving as a means to permit disconnection of the rudder from the casting.

5. In an out-board motor, the combination with an engine, of a clamp secured thereto and provided with a segmental arm, a rudder post, a clamp on the rudder post, and a pivoted brace bar connecting the two clamps.

6. In an out-board motor, the combination with an engine, of a clamp secured thereto and provided with a segmental arm, a longitudinally-adjustable rudder post, a clamp on the rudder post, and a pivoted brace bar connecting the two clamps.

7. In an out-board motor, an engine, a longitudinally-adjustable rudder post supported therefrom, a longitudinally adjustable steering post carried by the rudder post, a rudder supported by the lower end of the rudder post, a steering ring rigidly secured to the lower end of the steering post and operatively connected with the rudder, a propeller casing supported by the rudder post, and means driven from the engine to actuate the propeller.

8. In an out-board motor, an engine, a rudder post supported therefrom, a steering post carried by the rudder post, a rudder supported by the lower end of the rudder post, a steering ring rigidly secured to the lower end of the steering post, and operatively connected with the rudder, a propeller arranged at the lower end of the rudder post and driven from the engine, a pump actuated by the propeller, and a connection between the pump and the engine.

9. In an out-board motor, a rudder post, a casting carried thereby and provided with longitudinal slots, a rudder provided with an elongated slot and with terminal notches, and bolts passing through the slots of the casting and engaging respectively with the slot in the rudder and with the notches thereof.

10. In an out-board motor, a rudder post, a casting carried thereby and provided with longitudinal slots, a rudder provided with a key-hole shaped slot and with terminal notches, and bolts passing through the slots of the casting and engaging respectively with the slot in the rudder and with the notches thereof.

11. In an out-board motor, an engine having a crank shaft having a squared tubular portion, a longitudinally adjustable transmission shaft having a squared end portion telescoping with and adjustably secured to the aforesaid squared tubular portion, a longitudinally adjustable rudder post supported from the engine and incasing the transmission shaft, a longitudinally adjustable steering post carried by the rudder post, a rudder supported by the lower end of the rudder post, and a propeller actuated by the transmission shaft, combined substantially as and for the purposes set forth.

12. In an out-board motor, a gear pump comprising a substantially 8-shaped casing, a gear mounted in the lower portion of said casing adapted to be driven by the propeller, a relatively smaller gear of smaller size than the chamber in which it is mounted, loosely mounted and adapted to be operated in alternate directions, and tubular means opening out of the upper portion of said upper gear chamber, through which water is forced upward by the aforesaid loosely mounted gear, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

EBEN BURROUGHS.

Witnesses:
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FULTON R. GORDON.