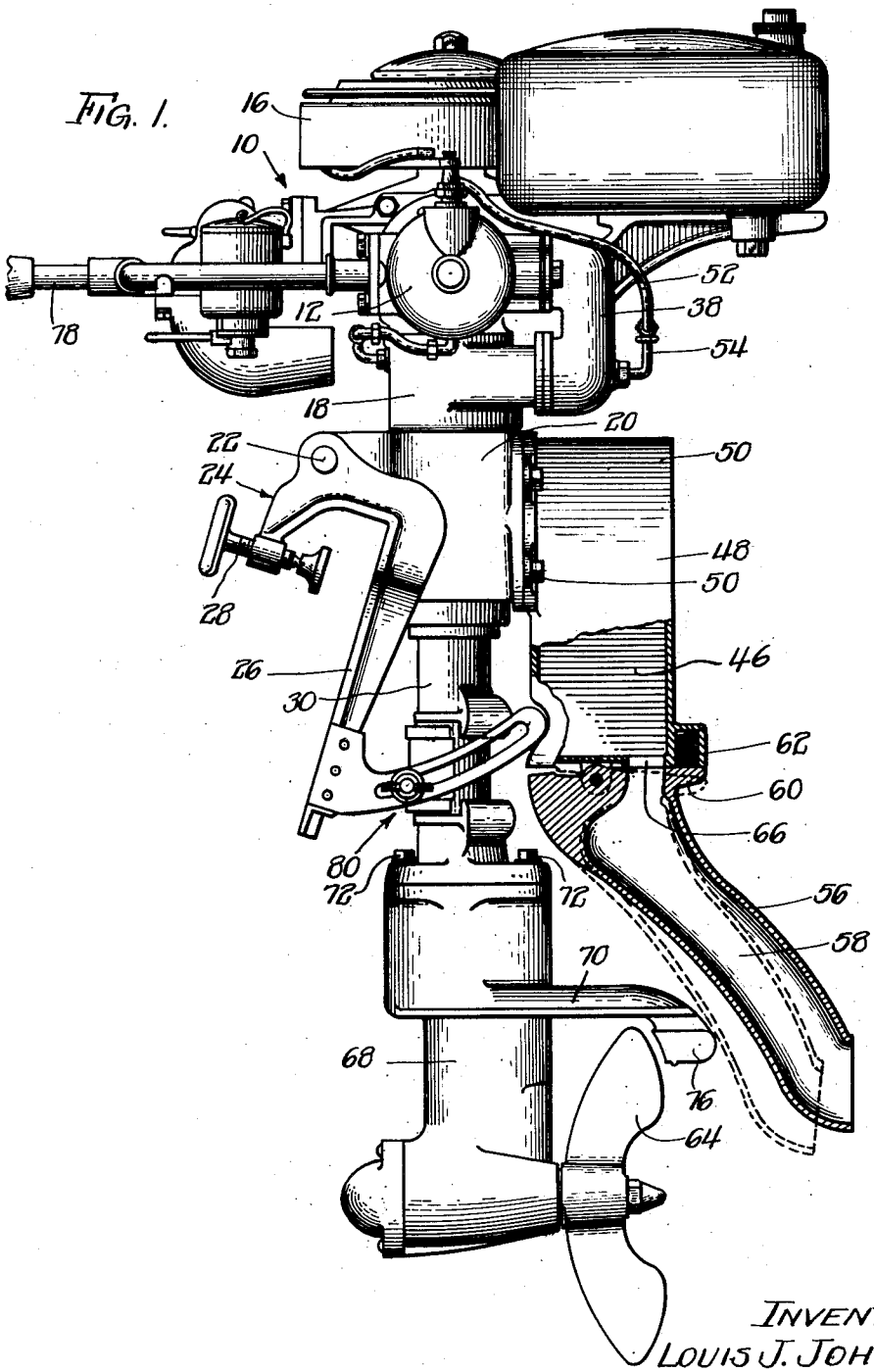
Sept. 22, 1931. L. J. JOHNSON ET AL 1,824,736

OUTBOARD MOTOR

Filed Nov. 7, 1928 2 Sheets-Sheet 1

FIG. 1.



INVENTORS:
LOUIS J. JOHNSON
HARRY L. JOHNSON
BY Cheever & Cox ATTYS.

Sept. 22, 1931. L. J. JOHNSON ET AL 1,824,736

OUTBOARD MOTOR

Filed Nov. 7, 1928 2 Sheets-Sheet 2

FIG. 2.

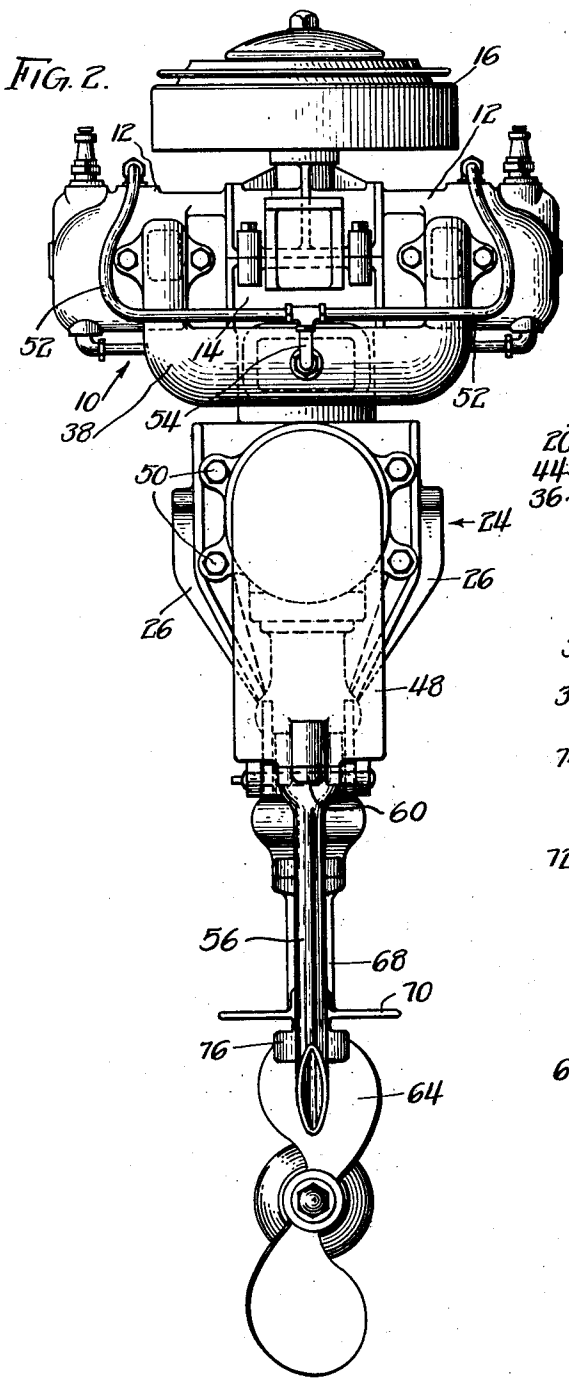
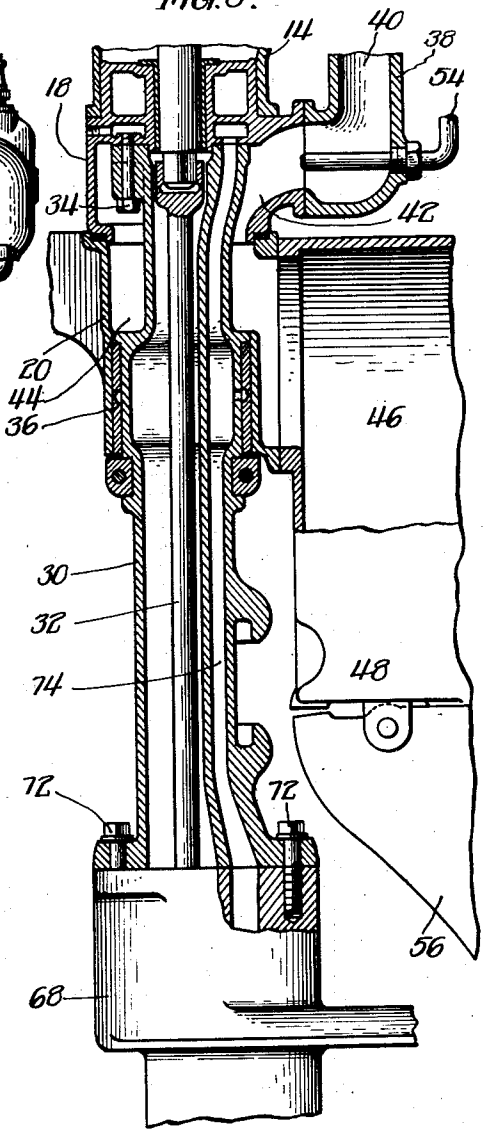


FIG. 3.



INVENTORS:-
LOUIS J. JOHNSON
HARRY L. JOHNSON
BY Cleaver & Cox ATTYS.

Patented Sept. 22, 1931 1,824,736

UNITED STATES PATENT OFFICE

LOUIS J. JOHNSON, OF SOUTH BEND, INDIANA, AND HARRY L. JOHNSON, OF WAUKEGAN, ILLINOIS, ASSIGNORS TO JOHNSON BROTHERS ENGINEERING CORPORATION, OF SOUTH BEND, INDIANA, A CORPORATION OF INDIANA

OUTBOARD MOTOR

Application filed November 7, 1928. Serial No. 317,749.

Our invention relates to marine motors and more particularly to motors of the outboard type provided with an underwater exhaust.

In general, one of the primary objects of our invention is to provide a quiet running outbard motor and to this end we contemplate the provision of efficiently operable means for effecting the discharge of the exhaust gases under the surface of the water.

Another object of our present invention is to provide an exhaust device of the instant nature which will not only discharge the exhaust gases under the water, but which will also discharge water from the cooling system of the motor together with the exhaust gases.

Another object of our invention is to provide, in combination with an outboard motor of the type in which the engine is rotatable about a substantially vertical axis, an exhaust outlet which is secured in a fixed position with respect to the support upon which the motor is rotatable.

A still further object of our present invention is to provide, in combination with the underwater exhaust device above set forth, a relief mechanism of simple and durable construction which will positively prevent the building up of back pressures and hence greatly expedite the starting and uninterrupted functioning of the motor.

A still further object of our invention is to provide, in combination with an underwater exhaust device, an expansion chamber into which the exhaust gases from the motor may be discharged prior to the discharge thereof into the water, whereby the possibility of developing back pressures may be reduced to a minimum.

Still another object of the invention is to provide a relief mechanism in association with the underwater exhaust device of an outboard motor which is automatically operable to positively effect the discharge of exhaust gases into the atmosphere until the boat carrying the motor attains a predetermined speed, at which time said relief mechanism operates to effect the discharge of the exhaust gases into the water, thereby insuring quiet running of the motor and the removal of obnoxious exhaust vapors from the vicinity of the motor.

Another object of our invention resides in the provision of an outboard motor assembly in which the motor proper is rotatable upon a relatively fixed support adapted for application to a boat, a muffler being provided for receiving exhaust gases from the motor, said muffler being also secured in a relatively fixed position with respect to the rotation of the motor upon the support, thereby providing a stationary exhaust outlet for an outboard motor which is adapted to revolve on a substantially vertical axis.

A further and more specific object of our invention resides in the provision of an outboard motor assembly of the double opposed cylinder type which is rotatable for steering purposes, a housing of stream-line or wedge-shaped construction encasing the lower portion of the vertical drive-shaft and providing a mounting for a propeller, said motor assembly being further provided with a fixed support adapted for convenient association with the stern of a boat, said support serving also as a relatively fixed mounting for an exhaust device such as a muffler or silencer.

In addition to the above mentioned advantageous characteristics, our invention contemplates the provision, in combination with an outboard motor of the type which is rotatable about a substantially vertical axis, an outlet chamber which is arranged concentric with the steering post or drive shaft so as to permit free and, in fact, full turning of the motor about said vertical axis.

These and other objects will be more apparent from the following detailed description when considered in connection with the accompanying drawings, wherein—

Figure 1 is a side elevational view of an outboard motor assembly embodying features of our invention, a portion of the exhausting device being shown in section in order to more clearly disclose the functional characteristics thereof;

Figure 2 is a rear elevational view of the outboard motor assembly shown in Figure 1, the fuel tank being removed in order that the

invention may be more readily understood; and

Figure 3 is a fragmentary vertical sectional view taken centrally of the vertical drive-shaft to disclose the structural characteristics of the fixed mounting or support which permits rotation of the motor for steering purposes, and also to disclose the path taken by the exhaust gases and water from the cooling system.

Referring now to the drawings more in detail wherein like numerals have been employed to designate similar parts throughout the various figures, it will be observed that for the purpose of illustrating a practical embodiment of our invention, a motor of the double opposed cylinder construction is disclosed in Figures 1 and 2 and this motor has been designated generally by the numeral 10. This motor 10 simulates the motor disclosed in our copending application Serial No. 247,004 filed January 16, 1928 and includes a pair of oppositely disposed cylinder blocks 12 which are positioned on opposite sides of a central block 14. The upper portion of this block 14 provides a mounting for a fly-wheel 16 and the lower part thereof is mounted upon a hollow supporting head 18. This supporting head 18 is rotatably mounted upon a non-rotatable bearing 20. This bearing 20 is pivotally mounted at 22, Figure 1, upon a bracket 24, which bracket is formed with a pair of depending bracket arms 26 which are adapted to be secured to the stern of a boat (not shown) through the agency of suitable clamping screws 28. From the foregoing it will be apparent that the motor 10 is rotatable about a substantially vertical axis upon the bearing 20 and also tiltable about the transverse pivotal axis 22.

The head 18 and the bearing 20 surround a vertical housing 30 which encases a vertical drive-shaft 32. This housing 30 is of unitary construction and is secured at its upper extremity to the head 18 in any suitable manner as by means of a bolt 34 shown in Figure 3. Thus, when the motor 10 is rotated, the drive-shaft housing 30 is likewise rotated. In addition to supporting the head 18, the bearing 20 serves as a lateral support for the housing or casing 30. Interposed between the inner surface of the bearing 20 and the peripheral surface of the housing 30 is a collar 36 which is formed preferably of rubber or other suitable material for cushioning impacts and preventing transmission of vibration and sound which will render the housing 30 readily rotatable within the bearing 20 and which is easily lubricated.

Superimposing each exhaust port of the cylinder blocks 12 is a branch duct of a manifold 38. The central portion of this manifold 38 is suitably connected to the side of the head 18 as clearly shown in Figures 1 and 3 so as to establish communication between the passage 40 of the manifold and a chamber 42 within the head 18. This chamber 42 communicates with another chamber 44 presented within the bearing 20 and this chamber 44 opens rearwardly into an expansion chamber 46 of a muffler or silencer 48. Thus, exhaust gases from the cylinders 12 will pass through the passage 40 of the muffler 38 and thence through the chambers 42 and 44 into the expansion chamber 46. The muffler 48 has a suitable flanged connection with the bearing 20 and is secured in position by means of bolts 50, Figures 1 and 2. It will also be observed that suitable conduits or branch pipe connections 52 extend from the cylinder blocks 12 to a central or main pipe 54, the lower extremity of which projects into the passage 40 of the manifold 38, Figure 3. These pipes 52 communicate at their upper extremities with the water jackets of the cylinders 12 and it will thus be apparent that water from these cylinders will pass through the pipes 52 and 54 into the chambers 42 and 44 and thence into the expansion chamber 46. In other words, cooling water from the cylinders 12 will be discharged, together with the exhaust gases, into the muffler chamber.

The lower extremity of the muffler 48 pivotally supports a discharge pipe 56 of stream-line cross section which is provided with a passage-way 58. Extending laterally of the upper extremity of the pipe 56 is a projection 60 which engages with a coil spring 62. This coil spring 62 is suitably housed within the lower portion of the muffler 50 and serves to constantly bear downwardly against the projection 60. The portion of the pipe 56 oppositely disposed from the projection 60 is adapted to engage the bottom of the muffler 50 when said pipe is swung downwardly through the agency of the coil spring 62 to the position shown by the dotted lines in Figure 1. When the speed of travel of the motor assembly attains a predetermined rate, the pipe 56 will be swung upwardly to the normal operating position shown in Figure 1 and it will be apparent that when the discharge pipe occupies this position, gases and cooling water entering the muffler chamber 46 will be directed through the passage-way 58 and into the water at a point immediately adjacent and to the rear of a propeller 64. Before the above mentioned predetermined speed of travel of the motor assembly through the water is attained, the spring 62 will serve to maintain the pipe 56 in its downward position shown by the dotted lines, Figure 1, so as to permit the exhaust gases to be discharged into the atmosphere above the surface of the water through the opening 66 at the lower end of the muffler 48. By discharging the gases into the atmosphere in this manner the possibility of developing back pressures within the motor is positively

precluded. As soon as the motor assembly reaches a predetermined speed of travel through the water, the exhaust gases are discharged through the passage-way 58 without the probability of establishing back pressures because the movement of the gases within the passage-way will be accelerated as a result of the suction occasioned at the lower extremity thereof. In this connection it is to be understood that by providing an expansion chamber into which the exhaust gases may be discharged prior to the entrance of said gases under the water, such gases are expanded before reaching the water. This is decidedly advantageous in that it materially assists to reduce the tendency for developing back pressures. In other words, if the gases were discharged directly into the water without first permitting them to expand into a chamber such as the chamber 46, there would be a much greater tendency for back pressures to develop. Expansion chambers of the type just mentioned are particularly adaptable for use in connection with two-cycle engines. This will be readily apparent when it is understood that the charging and scavenging stroke is combined in the two-cycle engine whereas in the four-cycle engine there is an independent scavenging stroke which more readily forces the exhaust gases from the motor. Thus, in addition to the relief mechanism just described, the expansion chamber serves as a means for insuring the uninterrupted functioning of an engine while the exhaust gases are being discharged under the water.

The propeller 64 is suitably mounted upon a housing 68 of stream-line construction which is provided with an anti-cavitation plate 70. This housing 68 encases the lower portion of the drive-shaft 32 and is supported at its upper extremity by bolts 72 which extend through the flanged portion of the housing 30. A passage-way 74 within the housing 30 communicates at its upper extremity with the water jacket of the cylinder blocks 12 and at its lower extremity with the chamber or passage-way presented within the housing 68. Through the action of the propeller 64 water is forced into an adjacent water-gathering mouth portion 76 of the anti-cavitation plate 70, the medial portion of said plate, and thence through the housing and upwardly into the passage-way 74. For a more detailed understanding of the action of the propeller in forcing water through the anti-cavitation plate 70 and upwardly through the housing 68, reference is again made to our above mentioned co-pending application Serial No. 247,004. Thus, water entering the anti-cavitation plate through the action of the propeller 64, is forced upwardly through the passageway 74 within the housing 30 and thence through the water jackets of the cylinder blocks 12. From the upper portions of the cylinder blocks 12 cooling water is conducted through the pipes 52 and the passage 38 into the series of connected chambers just described, and finally through the muffler 48 and the pipe 56.

The motor assembly is freely tiltable about pivot 22 when the housing 68 is positioned as shown in Figure 1. This tilting movement may be readily effected by pressing downwardly on a suitable tiller 78. The drive-shaft housing 30 is equipped with a locking device indicated generally by the numeral 80 which is adapted to prevent the rearward tilting of the motor assembly when the propeller 64 is in reverse position. This locking device 80 forms the subject matter of a separate invention, but is shown to more clearly illustrate the practical application of the present invention.

From the foregoing it will be understood that our invention provides an outboard motor assembly which is equipped with an underwater exhaust device of simple and practical construction. By using this underwater exhaust mechanism, the quiet running of the motor is assured and the presence of exhaust gases in the vicinity of the motor is positively prevented. The relief mechanism prevents back pressures from being developed within the motor. There is a greater tendency for these back pressures within the motor to be established at the time the motor is started and our improved relief mechanism operates to permit the exhaust gases to be freely discharged into the atmosphere at the time the motor is started. When the motor is driving a boat through the water at a normal speed, the relief mechanism automatically operates to effect the discharge of the exhaust gases and water below the water surface at a point within the wake or race created by the propeller. By providing the bearing 20, the motor 10 is readily rotatable and the chamber 44 presented within the bearing provides a convenient means of communication between the manifold and the muffler. In other words, by having the chamber 44 concentrically arranged with respect to the shaft casing 30 as well as the shaft 32 itself, a structure is presented which will permit full turning of the engine without effecting communication between the exhaust manifold and the point of discharge of the gases after leaving the chamber 44. Obviously, other passage-ways and chambers might be employed to direct exhaust gases and water into the muffler without departing from the spirit and scope of our invention. We have found that by providing the head 18 and the bearing 20 with chambers, a convenient and very practical arrangement is presented for effectively maintaining communication between the rotatable motor and the relatively fixed muffler. Other types of mufflers as well as re-

lief mechanisms might also be employed without deviating from the scope of our invention. The parts of the motor assembly normally positioned within the water, including the housing 68 and the discharge pipe 56, are preferably of stream-line construction and thus a minimum amount of resistance is occasioned during the movement of these parts through the water. Attention is also directed to the fact that by employing our type of mounting or support, namely the head 18 and the bearing 20, the hot exhaust gases are conducted away from the cylinder blocks without making direct contact with the drive-shaft or any other rotatable parts. In other words, the chamber contained within the bearing 20 serves as a means for conducting the exhaust gases and water from a rotatable motor into a fixed discharge member without causing said gases and water to be brought into direct contact with the vertical drive-shaft. Water which is discharged with the exhaust gases serves to cool the material or parts adjacent the chamber 42 as well as the chamber 44 and also provides an effective cooling medium for the muffler 48. It will also be apparent that our invention provides an outlet for the exhaust gases as well as the cooling water for a motor which is rotatable about a substantially vertical axis, said exhaust being fixed with respect to the support upon which said motor is rotatable. As hereinbefore stated, the provision of an expansion chamber particularly in connection with outboard motors of the type described, serves as an effective means to greatly minimize the possibility of developing back pressures. In other words, the expansion chamber not only serves as a muffler or silencer but also as a means to permit free expansion of the gases prior to the discharge thereof beneath the water. It has already been pointed out that the resilient collar 36 provides an effective bearing surface for the casing 30 for the reason that resilient material such as rubber is very readily lubricated. In addition, this collar 36 provides a very effective means for maintaining the casing 30 as well as the casing 68 in a fixed position with respect to the support or bearing 20 as the casing 68 passes through the water. This is due to the resiliency of the collar, said resiliency serving to cause said collar to bear against the surfaces positioned adjacent thereto with sufficient force to enable the casing 30 to withstand the tendency to rotate in response to vibrations occasioned by the operation of the motor. In other words, the resilient collar 36 serves as a piloting means, that is to say, it serves as a means for securing the motor and casing parts against rotation which would otherwise be imparted thereto as a result of the engine vibration.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:—

1. In an outboard motor assembly, the combination of a support, a motor mounted thereon, means connected with the motor for effecting the discharge of exhaust gases underwater, and means operable by the movement of the assembly through the water for relieving against the development of back pressure by the exhaust gases within the motor.

2. In an outboard motor assembly, the combination of a support, a motor mounted thereon, means connected with the motor for effecting the discharge of the exhaust gases underwater, and means in said discharge means operable when the motor is running slowly to relieve against the development of back pressures by the exhaust gases within the motor, said means being rendered inoperative by movement of the assembly in the water.

3. In an outboard motor assembly, the combination of a support, a motor mounted thereon so as to be positioned above the surface of the water when in use, a propeller mechanism, a drive-shaft interposed between the propeller mechanism and the motor, and means connected with the motor for effecting the discharge of exhaust gases under water comprising a muffler carried by the support and a pipe hinged thereto and extending under water at the rear of the propeller.

4. In an outboard motor assembly, the combination of a support, a water cooled motor mounted thereon, a propeller mechanism, a drive-shaft interposed between the propeller mechanism and the motor, and means for effecting the discharge of cooling water and exhaust gases underwater, said means comprising a muffler carried by the support and a pipe hinged thereto above normal water level extending into the water and having a port at the hinge controlled by the pipe dependent upon the movements thereof through the water.

5. In an outboard motor assembly, the combination of a support, a substantially vertical drive-shaft, a motor mounted at the upper end thereof, a propeller mechanism connected at the lower end thereof and including a rearwardly projecting plate, a housing connecting the mechanism and the motor turnably mounted upon the support, and means for effecting the discharge of exhaust gases from the motor underwater comprising a muffler carried by the support and a movable discharge pipe to extend from the muffler into the water clear of engagement with said plate in any rotated position thereof.

6. In an outboard motor assembly, the combination of a support, a motor rotatably mounted thereon for steering, a muffler carried by the support, a manifold connecting the exhaust ports of the motor with the muffler at the support, and means con-

nected with the muffler for conducting exhaust gases to a point below the surface of the water and having an automatic back-pressure relief for the muffler dependent for operation upon the speed of movement of said means in the water.

7. In an outboard motor assembly, a support, a motor rotatably mounted on the support, a propeller mechanism, a drive-shaft connecting the motor with the propeller mechanism, a housing for the drive-shaft extending through the support, said support being provided with a chamber positioned externally of the shaft housing, means connecting said chamber through the housing with the exhaust ports of the motor, and means connected with said chamber for effecting the discharge of exhaust gases underwater.

8. In an outboard motor assembly, a support, a motor rotatably mounted thereon, a propeller mechanism, a drive-shaft connecting the propeller mechanism with the motor, a housing for said shaft extending through the support having an exhaust passage, said support being provided with a chamber positioned externally of the drive-shaft housing communicating with the passage, means connecting the chamber with the exhaust ports of the motor through said passage, and means connected to said chamber for effecting the discharge of exhaust gases underwater.

9. In an outboard motor assembly, a support, a water cooled motor rotatably mounted upon the support, a propeller mechanism, a drive-shaft interposed between the motor and the propeller mechanism, a housing for said drive-shaft extending through the support, said support being provided with a chamber positioned externally of the drive-shaft casing, means comprising a passage in the housing connecting said chamber with the exhaust port of the motor, means for conducting cooling water from the motor to said chamber, and means connected with the chamber for effecting the discharge of the cooling water and exhaust gases underwater.

10. In an outboard assembly, a support adapted for attachment to a boat, a motor rotatably mounted on said support, a substantially vertical drive-shaft connected at the upper extremity to the motor, a propeller mechanism connected to the lower extremity of said drive-shaft, a housing for said drive-shaft formed at its lower extremity so as to present a member of stream-line cross section and adapted to rotate in response to the rotation of the motor, said support being provided with a chamber surrounding the drive-shaft casing, means including a passage in the housing for connecting said casing with an exhaust port of the motor, a muffler connected to the support for communicating with the chamber therein, and means connected with the muffler for effecting the discharge of exhaust gases therefrom underwater.

11. In an outboard motor assembly, the combination of a support, a motor rotatably mounted thereon for steering, and means connected with the motor and extending beneath the surface of the water for effecting the discharge of gases underwater, the portion of said means within the water being of stream-line contour and independent of the movement of the motor for steering.

12. In an outboard motor assembly, a support, a motor rotatably mounted upon the support for steering so as to be positioned above the surface of the water when in use, a propeller mechanism, a drive-shaft interposed between the propeller mechanism and the motor, a casing for said drive-shaft, and a conduit of stream-line contour attached to the support and connected with an exhaust port of the motor and adapted for effecting the discharge of exhaust gases underwater, the conduit remaining stationary when the motor and drive-shaft casing are rotated for steering.

13. In an outboard motor assembly, a support adapted to be mounted upon a boat, a motor rotatable upon the support, a muffler secured in a relatively fixed position upon the support, and means for establishing communication between an exhaust port of the motor and the muffler.

14. In an outboard motor assembly, a support adapted for attachment to a boat, a motor rotatably mounted thereon, a chamber within the support adapted to discharge exhaust gases fed thereto, and means interposed between said chamber and an exhaust port of the motor to effect the discharge of exhaust gases into said chamber.

15. In a marine motor assembly, the combination of a support adapted for attachment to a boat, a motor rotatably mounted upon said support, a muffler secured in a relatively fixed position with respect to the rotation of the motor in the support for steering, and means for conveying exhaust gases from the motor into the muffler.

16. In a marine motor assembly, a support, a motor rotatable upon the support, means connected with the motor through the support for effecting the discharge of exhaust gases therefrom, said means being secured in a fixed position with respect to said support.

17. In an outboard motor assembly, a support, a motor rotatable upon the support, an expansion chamber for receiving exhaust gases from the motor, and means communicating with the expansion chamber for effecting the discharge of said exhaust gases therefrom, said means being secured in a fixed position with respect to said support, and the motor being rotatable relatively thereto for steering.

18. In an outboard motor assembly, a sup-

port, a motor rotatable upon said support, means having an expansion chamber for receiving exhaust gases from the motor, and means communicating with said expansion chamber for effecting the discharge of said exhaust gases, said first and second mentioned means being secured in fixed positions with respect to the support, and the motor being rotatable relatively thereto for steering.

19. In an outboard motor assembly, a support, a motor rotatable upon the support, and means connected with the motor for effecting the discharge of exhaust gases underwater, said means being secured in a fixed position with respect to the support, and the motor being rotatable relatively thereto for steering.

20. In a marine motor assembly, a support, a water cooled motor rotatable thereon, means connected with the motor for effecting the discharge of exhaust gases and cooling water under the water through which the assembly passes, said means being secured in a relatively fixed position with respect to the support, and pressure relief means for exhaust gases in said discharge means.

21. In an outboard motor assembly, the combination with a support; of an engine, propeller, and a connecting housing rotatable in the support for steering; means in connection with the engine for discharging exhaust gases under water; and movement operated means for automatically relieving back pressure due to said exhaust under water.

22. In a marine motor, a support, an engine mounted thereon, means connected with the engine for discharging engine exhaust gases under water, and movement operated means for automatically relieving back pressure in said discharging means.

23. In a marine motor assembly, a support, a motor mounted thereon, means connected with the motor for discharging exhaust gases under water, and means dependent upon the movement of the assembly through the water for automatically varying back pressure in the discharging means.

24. In an outboard motor assembly, a support for rigid attachment to a boat, a muffler attached to the support, and an under water discharge pipe leading therefrom; and a combined engine, propeller, and a connecting drive shaft casing rotatable in the support for steering and having an exhaust passage from the engine communicating with the muffler from the inside of the support.

25. In an outboard motor assembly, a boat support, a muffler attached thereto and an underwater exhaust pipe extending therefrom; a motor, propeller, and a connecting drive shaft housing rotatable in the support for steering; means for conducting an induced flow of engine cooling water from the rear of the propeller and discharging it into the exhaust muffler; and means dependent upon the contact of the exhaust pipe with the water through which it passes for relieving exhaust back pressure in the muffler to insure a circulation of cooling water at low engine speed.

26. In an outboard motor assembly, a support and a bearing support pivoted therein to swing in a vertical plane; a muffler attached to the bearing support and having an underwater exhaust pipe extending therefrom; and a combined engine, propeller, and a connecting drive shaft and housing, all rotatable in the bearing support for steering independent of the muffler and pipe, and swinging with the muffler, the pipe, and the bearing support in a vertical plane about the other support.

27. In an outboard motor assembly, a support, an engine rotatable upon the support in a substantially horizontal plane above the surface of the water when in use, and closable exhaust means operated by the movement of the motor assembly through the water for opening and closing said means to effect the discharge of the engine exhaust gases under water.

28. In an outboard motor assembly, a support, a water cooled engine rotatable therein for steering, and closable atmospheric discharge means operated by the movement of the assembly through the water for opening and closing said means to effect the discharge of exhaust gases above water and the discharge of exhaust gases and cooling water under the water through which the assembly passes when the latter is in motion through the water.

29. In a marine motor assembly, a combustion engine and an under water exhaust connected to the engine and comprising water engaging means having a atmospheric opening above water level which is closed by the movement of the assembly through the water.

30. In a marine motor assembly, a combustion engine and an underwater exhaust therefor connected to the engine having atmospheric outlet means for opening and closing said means to effect the discharge of exhaust gases above water in starting the engine and closable to discharge the gases under the water dependent upon the movement of the assembly through the water.

31. In a marine motor assembly, a combustion engine and an engine exhaust means therefor dependent upon the movement of the assembly through the water with closable atmospheric outlet means for opening and closing said means to discharge exhaust gases to the atmosphere above water in starting the engine and under water when the assembly is in movement through the water.

32. In a marine motor assembly, a combustion engine, an engine exhaust system

therefor comprising a main exhaust opening and an auxiliary opening, and movable means dependent upon movement through the water for controlling the exhaust discharge through the openings.

33. A vehicle propelling combustion engine having an exhaust comprising a plurality of discharge openings, and movement operated means dependent upon the resistance of the medium through which the engine and vehicle passes for varying the exhaust discharge.

34. A marine combustion motor having an exhaust discharge system comprising means extending into the water and movable in accordance with the resistance of the water for varying the exhaust discharge.

35. A marine combustion motor having an exhaust with a variable exhaust discharge opening, and movable means extending into the water and dependent for movement upon the resistance of the water which it engages for changing the opening for the exhaust discharge.

In witness whereof, we have hereunder subscribed our names.

LOUIS J. JOHNSON.
HARRY L. JOHNSON.