

March 7, 1933.

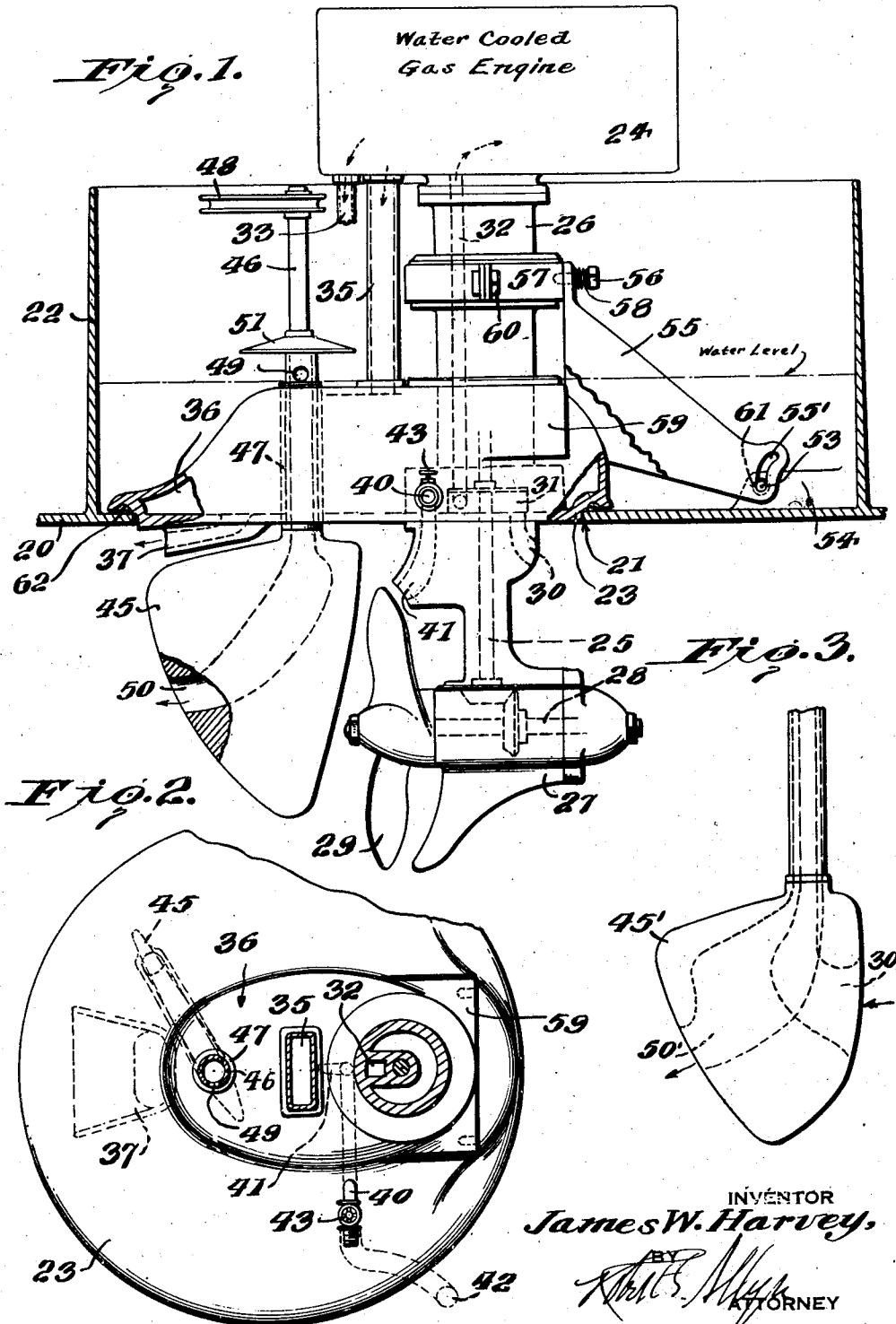
J. W. HARVEY

1,900,180

MOTOR BOAT INSTALLATION

Filed Dec. 24, 1931

4 Sheets-Sheet 1



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MOTOR BOAT INSTALLATION

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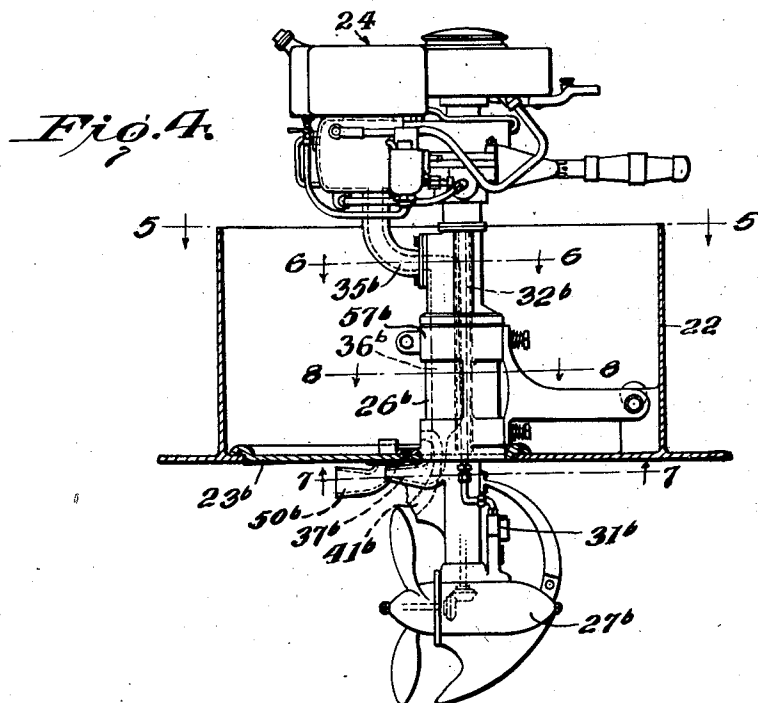
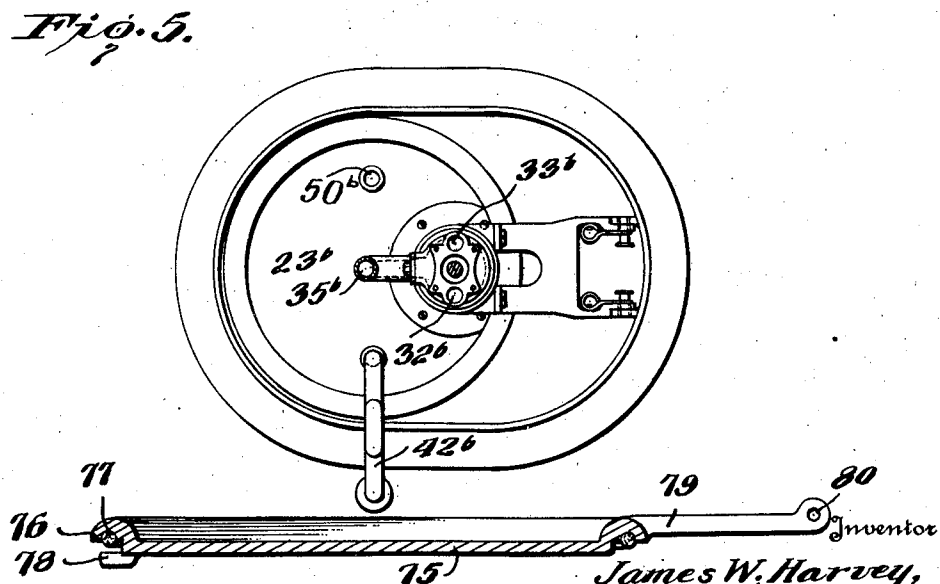


Fig. 3^a

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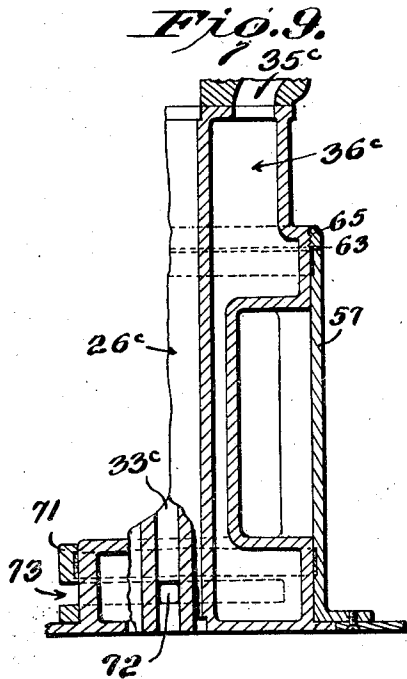
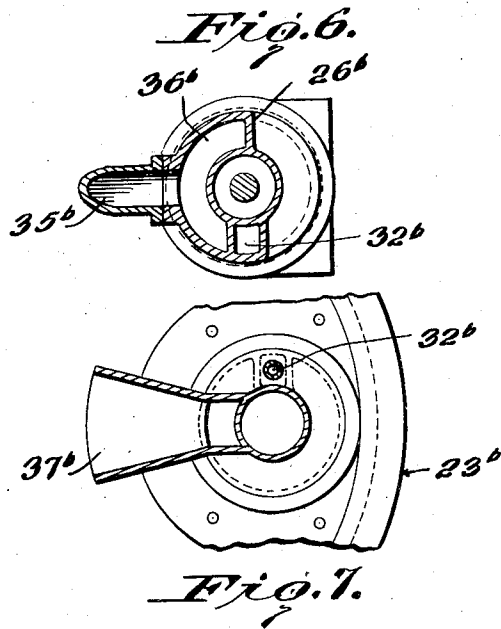
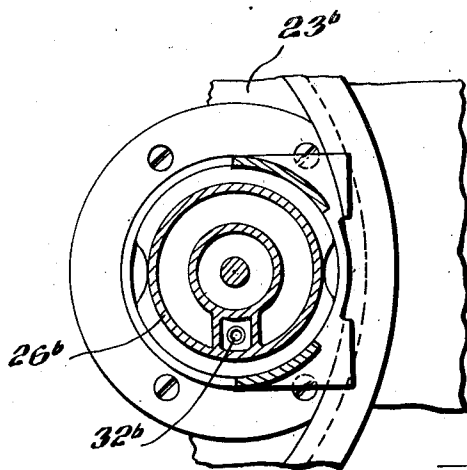
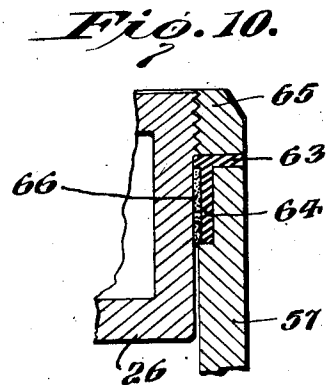


Fig. 8.

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Fig. 12.

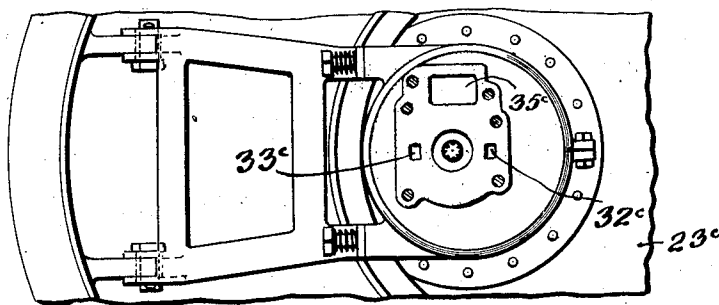


Fig. 11.

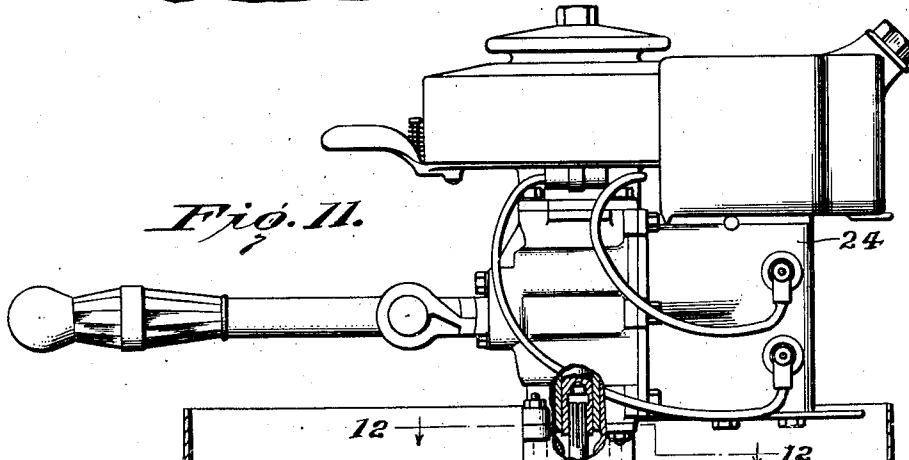
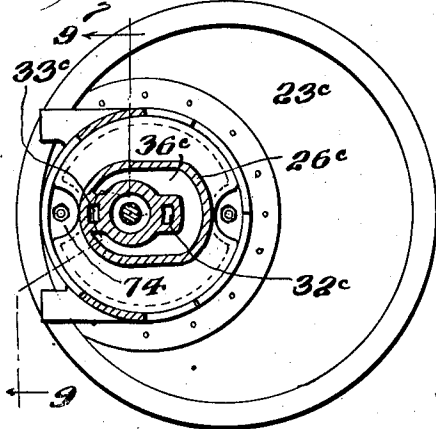
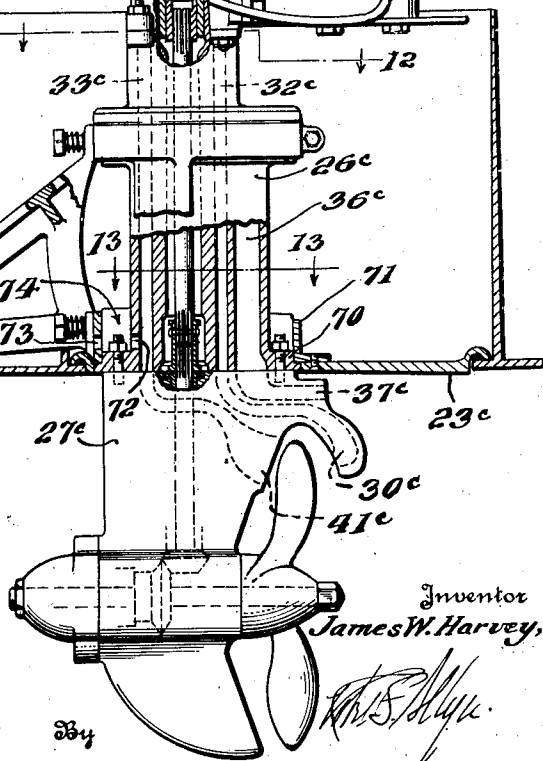


Fig. 13.



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MOTOR BOAT INSTALLATION

Application filed December 24, 1931. Serial No. 582,980.

My invention relates generally to constructions of the character set forth in my Patents 1,786,997 and 1,824,887 having tilting motors mounted inboard.

One object is to effectively cool the cylinders and muffle the exhaust of motors of this type.

Another object is to provide means for adequately draining or bailing the boat and/or the casing.

Another object is to provide an automatic drain which is effective even when the boat is turning.

Another object is to reduce the vibration of the parts or the effects of such vibration to a minimum.

Another object is to reduce to a minimum the danger of breakage when striking an obstruction with the propeller housing.

Another object is to provide for steering without shifting the propeller.

Another object is to provide a simple form of tilting rudder.

Another object is to so design the structure that it can be made at minimum cost.

Another object is to provide a device for closing the opening in the bottom of the casing when the propeller is retracted.

Some features of the disclosure are claimed in my application 550,303, filed July 13, 1931.

Fig. 1 is a side view and partial section showing one embodiment of the improvements of my invention. This shows the power unit with a separate rudder and an exhaust muffler mounted in a tilting housing and provided with an underwater exhaust, an automatic drain discharging through the rudder and a drain or bailer actuated by the propeller. This also shows a resilient support for the power unit, the parts being shown in the running position.

Fig. 2 is a plan view and partial section showing the base of the housing and attached parts.

Fig. 3 is a detail side view of a modified form of rudder and indicating a water inlet passage and an exhaust passage.

Fig. 3—A is a detail sectional view of a closure device.

Fig. 4 is a side view and partial longitudinal

section showing a modified form of construction.

Fig. 5 is a plan view and section on the plane of the line 5—5 of Fig. 4.

Fig. 6 is a detail section and plan on the plane of the line 6—6 of Fig. 4.

Fig. 7 is a detail section on the plane of the line 7—7 of Fig. 4 looking upwardly.

Fig. 8 is a fragmentary section and plan on the plane of the line 8—8 of Fig. 4.

Fig. 9 is a vertical sectional view showing exhaust and drain passages in the housing, the section being on the general plane of the line 9—9 of Fig. 13.

Fig. 10 is an enlarged fragmentary section showing one of the soft rubber bushings for supporting the upper part of the housing.

Fig. 11 is a side view and partial section showing another modified form of my invention.

Fig. 12 is a fragmentary plan showing the housing, the power head being removed above the plane of the line 12—12.

Fig. 13 is a horizontal section and plan on the plane of the line 13—13 of Fig. 11.

The bottom plate 20 of the boat or casing is provided with an opening 21 which for convenience in manufacture may be circular. Surrounding this opening is a side wall 22 which may be integral with the bottom plate 20 to form a casing adapted to be secured to the bottom of the boat as set forth in my Patent #1,786,997. The construction of the casing, however, is immaterial to my present invention although the side wall 22 should be high enough to extend above the load water line of the boat.

The motor unit includes a bottom plate 23 adapted to close the opening 21. This plate 23 is formed as a part of the housing or framework which supports the motor and the propeller.

The power head 24 may be of any type and the invention is particularly applicable to the use of water cooled gas engines. The crank shaft extension 25 is supported in a vertical housing member consisting of the parts 26 and 27. The part 26 may be termed the intermediate housing which is supported on the plate 23 and the part 27 may be termed

the lower housing which supports the shaft 28 and the propeller 29 beneath the bottom plate.

Cooling water may be introduced in a number of different ways. For instance, in constructions as shown in Fig. 1, water is taken in through the inlet 30 and forced by a conventional type of impeller or rotary pump 31 through the passage 32 to the engine. The cooling water may be discharged from the engine through the outlet 33 into the casing or otherwise disposed of.

The exhaust from the engine is discharged from the usual engine manifold (not shown) through the pipe 35, to the muffler extension chamber 36 which has a discharge orifice 37 at the rear beneath the bottom plate. When the motor is in use the bottom of the muffler chamber is of course being continually cooled by the water beneath the boat and it may be additionally cooled by the water which comes from the cooling jacket of the engine. For instance, in the form shown, the water is discharged from the pipe 33 on top of the muffler chamber 36 from which it may be drained as set forth in my former patents or as set forth herein.

A drain pipe 40 having its inner end above the bottom plate 23, discharges through a suction outlet 41 beneath the bottom plate. The forward movement of the boat tends to draw the water from the outlet 41. This action may be supplemented by the propeller 29 by the simple expedient of locating the outlet 41 close to the forward edge of the tip of the propeller. In fact, by this arrangement the propeller may be utilized to drain the casing when the boat is tied to the dock.

Preferably, this outlet 41 is located near the outer circumference of the path of movement of the propeller so as to minimize the effect of air which may be drawn out and which might tend to cut down the efficiency of the propeller. A flexible pipe 42 may be connected on to the drain 40 for the purpose of bailing portions of the boat outside of the casing 22, if desired. A valve 43 may be provided for shutting off or controlling the passage through this drain or an automatic check valve (not shown) might be provided in this drain to prevent water running back into the casing.

The rudder 45 has a post 46 supported in a sleeve 47 which passes through the muffler chamber of the housing. The upper end of this rudder post is provided with a suitable arm or quadrant 48 for convenience in operation. The lower part of this rudder post is hollow and provided with an inlet 49. The lower end of the rudder post is connected to the rudder, and the rudder is provided with a passage or channel 50 with its exit in the aft edge of the rudder so that when the boat is in motion or when the propeller is in motion, water will be drawn through the pas-

sage 50 so as to drain the casing down to the level of the inlet 49. By suitably constructing the muffler chamber 36, the height of this inlet 49 above the bottom 23 may be arranged at any level desired. It will be obvious from the foregoing that a very large proportion of the surface of the muffler chamber is continuously water cooled.

By providing the drain opening in the aft edge of the rudder, I insure a maximum amount of suction at all times, in view of the fact that the boat is always travelling away from the trailing edge of the rudder. A plate 51 may be provided above the inlet 49 to prevent water spurting out into the casing from the drain outlet passage.

In order to facilitate retraction of the propeller and rudder, I prefer to mount the motor on a hinge pin 53 supported by one or more lugs 54 inside the casing near the front edge thereof. The motor housing is provided with a bracket or arm 55 hinged on this pin and suitably connected to the housing or framework of the motor so that the entire motor and propeller unit may be tilted about the hinge pin as a horizontal axis. This tilting action may be effected by simply pulling forward on the motor or by the engagement of the propeller housing with an obstruction while the boat is moving forwardly. By locating the hinge pin 53 close to the bottom of the boat, I provide a maximum ease of tilting since a great part of the weight of the motor unit is in the power cylinders, fly-wheel, and so forth, which are located at the upper end of the housing 26. It will be understood of course that the parts of the housing 26, 27 and 36, will usually be made of some light metal such as aluminum or aluminum alloy.

To minimize shock due to impact with the propeller housing, I may connect the motor housing to the bracket 55 by means of a number of bolts 56 which pass through the upper ends of the arm 55 and are screwed into the housing 26 or into a collar or sleeve 57 which may embrace the intermediate part of the housing. A spring 58 is interposed between the head of each bolt 56 and the bracket arm 55. A similar type of connection may be effected between the lower edge of the arm 55 and the bosses 59 above the bottom plate 23 so that when the propeller housing strikes an obstruction the tendency is to compress the springs and thus reduce the shock of impact. The sleeve 57 may be split at one or more points and clamped to the part 26 of the housing by bolts 60.

Additional resiliency of support may be afforded by means of a rubber bushing 61 for each hinge pin 53, a rubber bearing ring 62 around the flange of the bottom plate 23, and a soft rubber bushing 63, as shown in Fig. 10. This bushing 63 has a vertical flange 64 located in a groove in the sleeve 57 and a

horizontal flange supported on the top of the sleeve 57 where it is clamped in place by means of a ring 65, which may be screw threaded on the upper edge of the housing member 26. This tubular bushing prevents vibrations of the motor from being transmitted to the sleeve 57 and the supporting bracket 55. The supporting soft rubber ring 62 also prevents vibrations of the motor from being transmitted direct to the bottom plate of the casing. In this way, not only is the noise of vibration eliminated, but the destructive mechanical effect of vibration is avoided. This also eliminates the effect of vibrations which may not be heard but might be felt by the rider. An interior non-metallic bearing ring 66, for instance, of bakelite may be provided if desired.

In some cases it may be desirable to provide the arm 55 with a special slot 55' for each hinge pin so that when the motor is tilted forwardly and the propeller retracted into the casing the arm may be given an additional movement and thus permit the power end of the unit to be lowered forwardly where it will take up less overhead room. Obviously the slot might be located in the supporting lug and permit the hinge pin to be relocated when retracting the motor and propeller. The shape of the slot will depend upon the additional movement desired.

In the construction shown in Fig. 3 rudder 45' is provided with a water inlet 30' which may be connected to the cooling system of the motor. This rudder is also provided with an outlet passage 50' for the drain water.

In the construction shown in Figs. 4 to 8 the bottom plate 23^b supports the intermediate housing 26^b and the lower housing 27^b which carries the usual propeller. In this case the cooling water is picked up by the pump 31^b and delivered through the pipe or conduit 32^b to the motor. The cooling water from the motor is discharged through the outlet pipe or passage 33^b. The casing is drained by the action of the propeller exercised aft the suction outlet 41^b. One or more additional automatic drains 50^b may be provided if desired. The suction pipe 42^b may be connected to one of these drain outlets for the purpose of bailing the boat outside of the wall of the casing.

In this form of construction the housing member 26^b is provided with a chamber 36^b which has one end connected by pipe 35^b to the engine manifold and connected at the lower end to the exhaust outlet 37^b beneath the bottom plate of the supporting frame. This particular construction is especially designed for the smaller types of motors and the housing may be rotatably mounted in the sleeve 57^b so that by turning the housing and the propeller about a vertical axis the boat may be steered or its direction reversed.

It will be understood, of course, that I pre-

fer to support this type of motor in a manner similar to that previously described so that the motor may be tilted to retract the propeller into the casing 22 and thus clear the bottom of the boat.

In the construction shown in Figs. 11, 12 and 13 cooling water is picked up in a well known manner, for instance, through inlet 30^c and carried to the motor through passage 32^c and carried away through passage 33^c and discharged through the outlet 41^c where its escape is aided by the action of the propeller. In this case again, as in the form shown in Figs. 4 to 8, the exhaust manifold of the motor discharges through the passage 35^c into the muffler chamber 36^c in the housing 26^c and the exhaust is discharged through the outlet 37^c beneath the bottom plate 23^c of the casing.

For the purpose of draining the casing in this instance I provide passages leading into the suction outlet passages 33^c and 41^c as shown in Figs. 9 and 11. The lower part of the intermediate housing has a flange 70 bolted to the lower housing part 27^c. A collar 71 secured to the bottom plate serves as a lateral support for the lower end of the housing part 26^c. Passage 72 is cut through the side wall of the housing 26^c and a slot 73 is cut through the lower end of the collar 71 so as to permit water to flow through the slot and into the space 74 which receives one of the bolts and thence through the passage 72 into the passage 33^c so that as the propeller rotates it will draw out and discharge water and oil or grease which may collect in the casing.

It should be understood that in this type of construction the boat may be steered by rotating the lower or propeller housing or that a separate rudder might be provided if desired. In the latter case the lateral area of the lower housing part should be made as small as possible, as shown in Fig. 1, so as to afford a minimum lateral resistance to turning movement of the boat.

In Fig. 3—A I have shown an auxiliary closure device for the opening 21 in the bottom of the casing to be employed when the motor is not in use. This device consists of a plate 75 adapted to fit the opening 21 and provided with a flange 76 and a rubber bearing ring or gasket 77. Near the rear edge of this plate I provide one or more prongs or fingers 78 adapted to fit beneath the edge of the bottom plate of the casing. The front edge of the plate 75 is provided with an arm 79 having an opening 80 adapted to line up with the hinge pin 53. The motor unit may be readily detached by simply removing the hinge pin 53. The auxiliary plate 75 can then be substituted, it merely being necessary to drop the rear edge of the flange 76 into place, hook the finger or fingers 78 beneath the edge of the bottom plate 20 and press down the arm 78 until the opening 80 is in position to permit the hinge pin 53 to be

inserted and hold the device in place. The rubber ring 77 yields sufficiently to form a tight joint and at the same time press upwardly so as to hold the device in place without rattling.

These constructions are adapted to be installed either as single units as shown in my former patents or in multiple units disposed wherever desired along the bottom of the boat. It is thus possible to employ a number of standard power units when the boat needs more power than could be provided by a single unit.

The tilting retractable unit also has especial value in boats having streamlined sterns in which it is practically impossible to mount a motor and difficult to properly support a rudder. A unit such as one of those shown in the drawings can be readily installed in the flat part of the bottom just forward of the tapered stern so as to provide the power at the most effective point and also adequately and effectively steer the boat without danger of injury to the propeller or rudder.

I claim:

1. A boat attachment comprising a casing to be secured in the bottom of the boat and having an opening in its bottom, a plate fitting this opening in the casing, a propeller carried by said plate, a rudder carried by said plate, means for turning said rudder for steering independently of the movement of the propeller and pivoted means for supporting said plate in the casing to permit the propeller and the rudder to be simultaneously tilted and retracted into said casing.

2. A boat installation comprising a casing having an opening in its bottom, a plate fitting the opening in the casing, a propeller carried by said plate, a rudder pivoted to said plate, means for turning said rudder for steering independently of the movement of the propeller, means for supporting said plate in the casing to permit the propeller and the rudder to be retracted into said casing, and means actuated by the propeller for draining the casing.

3. A boat attachment comprising a casing to be secured in the bottom of the boat and having an opening in its bottom, a plate fitting the opening in the casing, a propeller carried by said plate, a rudder carried by said plate behind the propeller and having a suction outlet having an inlet in the casing and means for supporting said plate in the casing to permit the propeller and the rudder to be retracted into said casing.

4. In a boat installation, a casing secured in the bottom of the boat and having an opening in its bottom, a plate fitting the opening in the casing, a propeller and housing carried by said plate, a rudder carried by said plate, means for turning said rudder for steering independently of the movement of the propeller, means for supporting said

plate in the casing to permit the propeller and the rudder to be retracted into said casing, and draining means having a suction outlet in the aft edge of the rudder.

5. A boat installation comprising a casing having an outlet opening, a gas engine unit having a bottom plate filling said outlet opening, said unit including a housing serving as an exhaust muffler expansion chamber within said casing having an outlet beneath the bottom plate, means for admitting cooling water to the engine through said bottom plate and discharging the water in contact with a wall of the expansion chamber.

6. A boat installation comprising a casing having an outlet opening, a gas engine unit having a bottom plate filling said outlet opening, said unit including a housing serving as an exhaust muffler expansion chamber within said casing having an outlet beneath the bottom plate, at least a part of the bottom plate forming a part of the housing, means for admitting cooling water to the engine through said bottom plate, and means for draining water from the casing at a level above the bottom plate.

7. A boat installation comprising a casing having an outlet opening, a gas engine unit having a bottom plate filling said outlet opening, said unit including a housing serving as an exhaust muffler expansion chamber on the bottom plate within said casing and having an outlet beneath the bottom plate, means for admitting cooling water to the engine through said bottom plate and discharging the water into said casing, and means for draining water from the casing at a level above the bottom plate.

8. A boat installation comprising a casing having an outlet opening, a gas engine unit having a metallic bottom plate filling said outlet opening, said unit including a housing serving as an exhaust muffler expansion chamber within said casing having an outlet beneath the bottom plate, means for admitting cooling water to the engine through said bottom plate and means for draining water from said casing at a level above the bottom plate so as to maintain cooling water on said plate at the base of said chamber.

9. A motor boat installation comprising a casing having an opening in the bottom, a motor unit having a plate normally closing said opening, and including a propeller beneath the plate, means for admitting cooling water from in front of the propeller and means actuated by the propeller for draining the casing.

10. A boat attachment comprising a casing to be mounted in a boat and having an opening, a power unit including a propeller, a plate secured to said unit above said propeller and normally closing said opening, a bracket hinged in said casing, and resilient means of connection between said bracket and

said power unit to permit the power unit to yield aft when its lower end meets an obstruction.

11. A boat attachment comprising a casing to be mounted in a boat, and having an opening, a power unit including a propeller, a plate secured to said unit above said propeller and normally closing said opening, a soft rubber support for said plate, a bracket supported at one end in said casing, and resilient means of connection between said bracket and said power unit to permit the power unit to yield aft when its lower end meets an obstruction.

12. A boat attachment comprising a casing to be mounted in a boat and having an opening, a power unit including a propeller, a plate secured to said unit above said propeller normally closing said opening, a bracket hinged in said casing, means of connection between said bracket and said power unit to permit the power unit to yield aft when its lower end meets an obstruction, and a soft rubber bushing forming a pivotal support for said bracket.

13. A boat attachment comprising a casing to be mounted in a boat and having an opening, a power unit including a propeller, a plate secured to said unit above said propeller and normally closing said opening, a bracket supported in said casing, means of connection between said bracket and said power unit to permit the power unit to yield aft when its lower end meets an obstruction, and a soft rubber bushing forming a pivotal support for said bracket near the front of the casing.

14. A boat installation comprising a casing having an opening in the bottom, a plate for closing said opening, an arm provided with a resilient hinge connection in the casing, a resilient connection between said arm and said plate, and directing means carried by said plate and projecting from the bottom thereof and adapted to be retracted into said casing.

15. A motor mounting comprising a casing having an opening in the bottom, a power unit having a vertical housing, a motor mounted on the upper end of the housing, a propeller on the lower end of the housing, a bottom plate above the propeller fitted to the opening in the bottom of the casing, a supporting sleeve for the housing, a soft rubber bushing interposed between the sleeve and the housing for resiliently supporting the power unit in the sleeve and an arm connected to said sleeve and hinged to the casing to permit the power unit to tilt and retract the propeller through the opening into the casing.

16. A motor boat installation comprising a casing for support in the bottom of a boat and having an opening in its bottom, a motor unit having a vertical shaft housing with a

power cylinder supported on the upper end and a propeller on the lower end, a bottom plate secured to the housing and movably supported in said opening, a cooling water system including a pump for drawing water from below said plate and forcing it through the cylinder spaces, said housing having an expansion and muffler chamber connected to the exhaust of the motor and having a discharge outlet beneath said plate.

17. A motor boat installation comprising a casing for support in the bottom of a boat and having an opening in the bottom of the casing, a propeller and its housing having a plate detachably supported in said casing, means for discharging exhaust gases from the motor beneath the bottom plate including an expansion chamber located in the casing, means for drawing in cooling water through the bottom plate and circulating it through the motor cooling spaces, means for discharging cooling water from the motor cooling spaces into the casing and means for automatically drawing the water from the casing when the boat is under way.

18. A motor boat installation comprising a casing for support in the bottom of a boat and having an opening in its bottom, a sleeve having a bottom plate closing said opening, a power unit rotatably mounted in said sleeve, a supporting ring threaded on the power unit and supported on the upper end of said sleeve and a resilient packing between the edges of the bottom plate and the edges of the opening in the bottom of the casing.

19. A motor boat installation comprising a casing having an opening in the bottom, a power unit having a vertical housing with a motor on the upper end and a propeller on the lower end, a sleeve embracing said housing and having a bottom plate normally closing said opening, a resilient supporting bushing interposed between the upper end of said sleeve and said housing and additional means for supporting said sleeve from a point other than said bottom plate.

20. A motor boat installation comprising a casing for support in the bottom of a boat and having an opening in the bottom of the casing, a sleeve having a plate detachably supported in the opening in the bottom casing, a power unit mounted in said sleeve, and a soft rubber ring bushing interposed under pressure between the power unit and said sleeve for supporting the power unit.

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