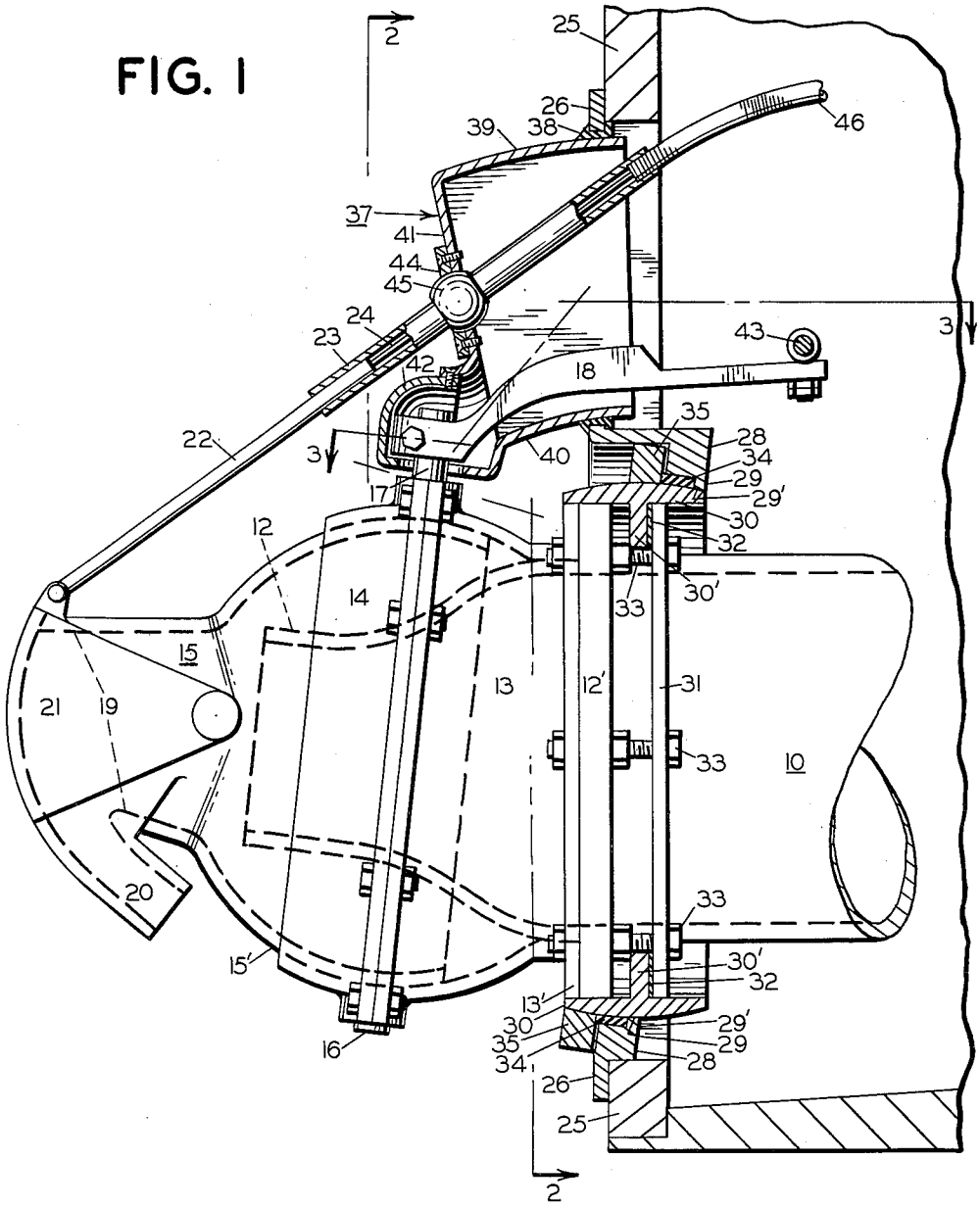
May 14, 1963 B. M. CHRONIC 3,089,454

ADJUSTABLE MOUNTING FOR HYDRO-JET PROPULSION MEANS ON BOATS

Filed Oct. 2, 1961 3 Sheets-Sheet 1

FIG. 1



INVENTOR.
BILL M. CHRONIC

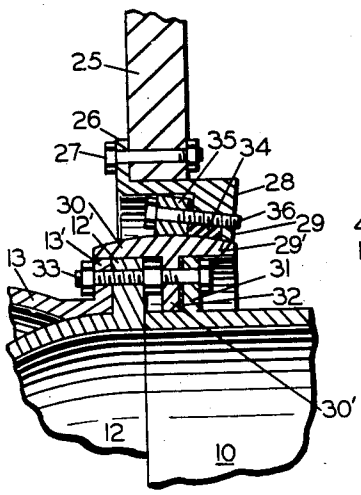
BY F. R. Geisler.
ATTORNEY

May 14, 1963 B. M. CHRONIC 3,089,454

ADJUSTABLE MOUNTING FOR HYDRO-JET PROPULSION MEANS ON BOATS

Filed Oct. 2, 1961 3 Sheets-Sheet 2

FIG. 4



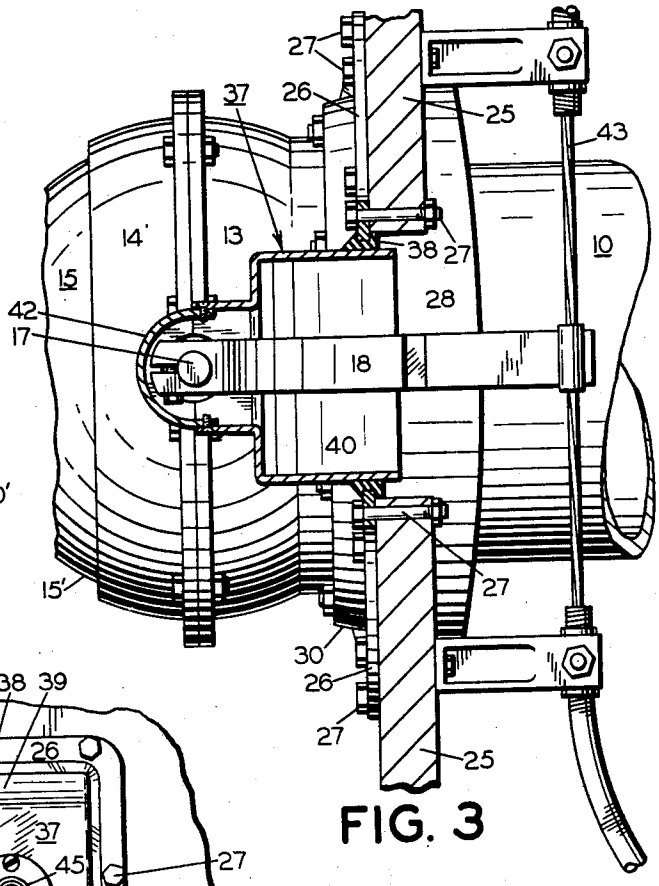


FIG. 3

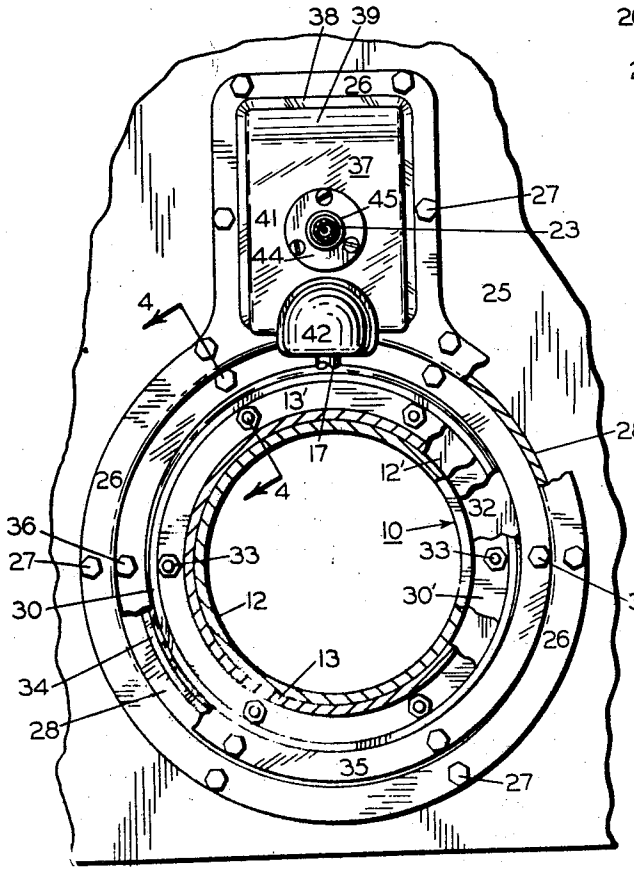


FIG. 2

INVENTOR.
BILL M. CHRONIC

BY F. R. Geisler.

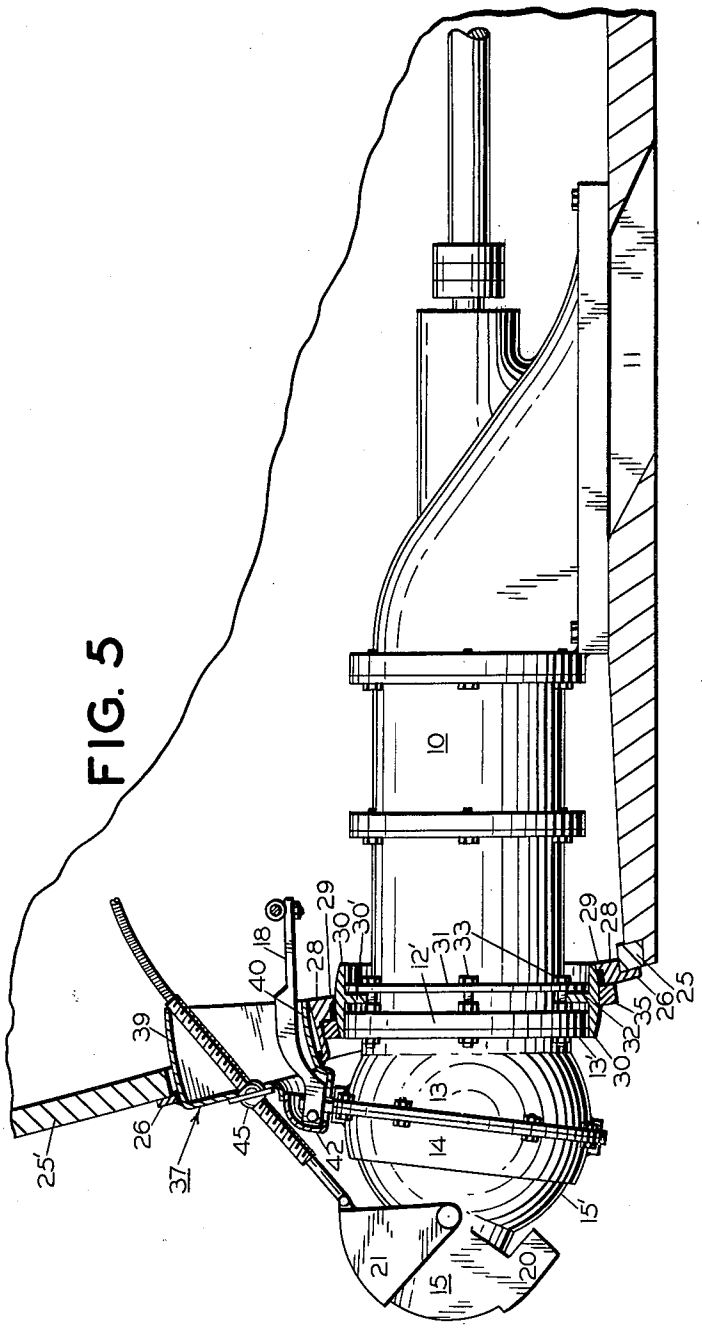
ATTORNEY

May 14, 1963 B. M. CHRONIC 3,089,454

ADJUSTABLE MOUNTING FOR HYDRO-JET PROPULSION MEANS ON BOATS

Filed Oct. 2, 1961 3 Sheets-Sheet 3

FIG. 5



INVENTOR.
BILL M. CHRONIC

BY F. R. Geiler.
ATTORNEY

United States Patent Office

3,089,454

Patented May 14, 1963

3,089,454

ADJUSTABLE MOUNTING FOR HYDRO-JET PROPULSION MEANS ON BOATS

Bill M. Chronic, Boise, Idaho, assignor to Star-Fire Marine Jet Co., Spokane, Wash., a corporation of Washington

Filed Oct. 2, 1961, Ser. No. 142,295
8 Claims. (Cl. 115—12)

The present invention is concerned with the driving of amphibious crafts in the water by the forceful discharge of a jet of water from the rear of the craft.

More specifically, this invention relates to the manner in which and to the means by which such jet propulsion apparatus is mounted in the rear of a boat, and particularly the mounting of that portion of such propulsion apparatus which extends through the rear wall of the boat.

The invention has been developed especially to provide an adjustable mounting for a hydro-jet propulsion apparatus of the type described in the pending application for patent, Serial No. 26,158, entitled "Driving and Maneuvering Means for Motor Boats and Amphibious Crafts," filed May 2, 1960, by Harry J. Eaton and subsequently assigned, and the adjustable mounting of the present invention accordingly will be described and illustrated in use with the same jet propulsion apparatus as described in the said pending application.

One of the problems which has been encountered in the installing of such hydro-jet propulsion apparatus in conventional speed boats and similar crafts has arisen from the fact that the rear wall or transom of the boat in which the propulsion apparatus is to be installed may be vertical or may be sloped at various degrees of angularity with the vertical. As a result, it has not been possible heretofore to fabricate complete jet propulsion assemblies, including mounting means for the same, ready for being installed in a boat regardless of the slope of the rear wall of the boat. A main object of the present invention is to provide an improved and adjustable mounting, as part of such hydro-jet propulsion assembly, which is adaptable for use with rear walls or transoms having a considerable range of slopes, and thus to enable the assembly to be entirely pre-fabricated and ready for easy installation in any boat having a rear wall positioned within such range, and also to enable such assembly to be removed from one boat and installed, without any changing of parts, in another similar craft in which the rear wall has a differently inclined slope, or a vertical slope instead of an inclined slope.

Another problem which has heretofore been encountered in connection with such hydro-jet propulsion apparatus installed in boats is that access to the interior of the propulsion apparatus thus, for example, access to the impellers in the pumping section where the hydro-jet is produced, when one of the impellers may be in need of repair or replacement, has necessitated almost complete dismantling and removal of the entire apparatus.

A further important object of this invention accordingly is to provide an improved mounting for such hydro-jet apparatus which will facilitate access to the interior of the apparatus from outside of the boat after the apparatus has been installed and will enable an interior part of the apparatus, such as a pumping impeller, to be removed without the necessity of removing or dismantling the entire apparatus and with considerably less expenditure of time and effort, and consequently at much less expense.

These particular objects and other incidental advantages are attained with the special improved adjustable mounting herein described, with such mounting functioning as briefly explained.

In the following description and explanation reference is made to the accompanying drawings wherein:

FIG. 1 is a fragmentary sectional elevation showing the rear of the boat in which the hydro-jet propulsion apparatus has been installed and showing the adjustable mounting secured in postion as part of the hydro-jet propulsion assembly, the major portion of the jet propulsion apparatus being shown in elevation and illustrating the operation of the apparatus in the driving of the boat in reverse, and the mounting means for the apparatus in the rear wall of the boat being broken away and shown in sectional elevation for clarity together with the control and steering elements;

FIG. 2 is a sectional elevation taken on line 2—2 of FIG. 1, but drawn to a smaller scale;

FIG. 3 is a fragmentary section taken on the line indicated at 3—3 in FIG. 1;

FIG. 4 is a fragmentary section on line 4—4 of FIG. 2, but drawn to the same scale as FIG. 1; and

FIG. 5 is a sectional elevation similar in part of FIG. 1 but drawn to a smaller scale, showing the same jet propulsion assembly including the same adjustable mounting, but showing the mounting and jet propulsion apparatus secured in place in a boat having a sloping rear wall instead of a vertical rear wall as in the case of FIG. 1, the propulsion apparatus being illustrated in the normal position for driving the boat forwardly.

The hydro-jet producing means or apparatus, with which the present invention is designed to be used and with which it combines to form the complete jet propulsion assembly, includes a pumping portion mounted in a housing conduit indicated in general by the reference character 10 (FIGS. 1 and 5). This conduit or housing for the pumping portion preferably is formed of sections bolted together (as shown in FIG. 5) and the housing or conduit leads from an intake opening 11 in the bottom of the boat to an opening in the rear wall or transom of the boat. A suitable grating and screen (not shown) are mounted at the intake opening 11 to prevent any objects which might damage the pump assembly from being drawn into the conduit through the intake 11.

The water delivered by the pump is discharged through a jet-producing nozzle (indicated by the broken lines 12 in FIG. 1) which is located on the outside of the rear wall of the boat and mounted in place in the apparatus by means of an annular external flange 12' provided at the forward end of the nozzle. A housing consisting of two companion members 13 and 14, which are bolted together, extends about the nozzle 12, spaced from the nozzle. The inner or forward member 13 of this housing has an annular flange 13' by which the housing is secured in the apparatus and which extends around over the flange 12' of the nozzle. The companion housing members 13 and 14 form an open housing constituting a substantial portion of a hollow sphere.

A jet-directing member 15 has an inner or forward portion 15' (FIG. 1) which also forms part of a hollow sphere concentric with the housing formed by the members 13 and 14. This inner or forward portion 15' of the jet-directing member has a pair of diametrically opposite, external, radially extending pivot shafts 16 and 17, and the adjacent flanges by which the housing members 13 and 14 are secured together have mating off-set portions which provide channels in which these two pivot shafts are rotatably mounted. The arrangement is such that the jet-directing member 15 is rotatable to a limited extent on an axis perpendicular to the axis of the discharging end of the nozzle 12, the axis of the discharging end of the nozzle being inclined slightly upwardly with respect to the axis of the conduit 10. A steering arm 18, secured

to the upper pivot shaft 17, controls the positioning of the jet-directing member 15.

The rear portion of the jet-directing member 15 has a channel (indicated by the broken lines 19 in FIG. 1) through which the jet from the nozzle 12 passes. The outer end of the bottom wall of this channel has an opening which connects with an integral nozzle 20 leading downwardly and forwardly. Each of the edges at the rear of the sides of the jet-directing member 15 is curved in order to enable a rear end shutter 21, formed with a curved outer wall, to swing down closely but freely over the outer end of the member 15 and channel 19. A rod 22, slidably mounted in a movable supporting sleeve 23, is connected with the rear end shutter 21 and also with a control cable 24. The shutter 21 is normally in the raised position (shown in FIG. 5), and thus entirely out of the path of the jet, when the boat is being driven forwardly. However, the lowering of the shutter 21 (to the position shown in FIG. 1) blocks the normal path of the jet and forces the water from the jet to be discharged downwardly and forwardly through the integral reversing nozzle 20, causing the boat to be driven in reverse direction, the curved outer wall of the lowered shutter 21 combining with the downwardly-forwardly curved reversing nozzle 20 to form a continuous curved guideway for reversing the jet.

The hydro-jet propulsion apparatus which has been described thus far is substantially identical to that described in the previously mentioned pending application Serial No. 26,158. The adjustable mounting for such jet propulsion apparatus, which constitutes the present invention, and which combines with the propulsion apparatus to form the complete hydro-jet propulsion assembly, will now be briefly described.

In FIGS. 1, 2, 3, and 4 a portion of the rear wall or transom of the boat is indicated at 25, the rear wall in this case being shown as vertical, for example, or, in other words, being shown as substantially perpendicular to the axis of the conduit or pump housing 10. However, in FIG. 5, as later mentioned, the rear wall 25' of the boat is shown inclined rearwardly to illustrate the easy adjustability of the assembly mounting.

A portion of the rear wall of the boat is cut out to accommodate the hydro-jet propulsion apparatus and the cut out portion is made to provide a double opening corresponding in over-all shape to the shape of a special transom mounting frame 26 (the shape of which is shown best in FIG. 2), which transom mounting frame is an important part of the mounting means. Thus the opening cut in the rear wall of the boat will have a lower circular area, larger in diameter than the conduit 10, and an upper rectangular area slightly larger than the size of the steering control box later described. The transom mounting frame 26 is secured on the outside of the rear wall of the boat around this opening by suitable bolts 27 (FIGS. 2 and 4). The lower circular portion of this mounting frame 26 is formed with an inwardly or forwardly extending fragmentary cylindrical portion which terminates in a ring 28 which is off-set from the frame 26 and which lies in a plane which intersects the plane of the outer face of the mounting frame, and, in the example, illustrated, the plane of the off-set ring 28 intersects the plane of the outer face of the mounting frame 26 at the bottom of the mounting frame. At its inner end this off-set ring 28 has an annular inside flange 29. The inner periphery 29' on this inside flange 29 constitutes a portion or zone of a spherical surface, the reason for which will be presently apparent.

A spherical segment ring 30 (FIGS. 1 and 4), having an outside periphery constituting a zone of a spherical surface, has an annular inside flange 30', the inner diameter of which flange is slightly greater than the outside diameter of the conduit 10. This arrangement enables the segment ring 30 to be slid onto the end of the conduit 10. The center of the spherical surface, of which the outside periphery of the segment ring 30 constitutes a zone, is on the axis of the conduit 10 when the segment ring 30 is in place on the conduit, and the inside flange 30' is located in a plane passing through the center of such spherical surface. The conduit 10' has a rear external annular flange 31, and, when the spherical segment ring 30 is set in place on the end of the conduit 10, a gasket seal ring 32 is placed on the outside of the flange 31 and thus becomes compressed between the ring flange 30' and the flange 31 on the conduit 10. When so arranged, when the jet-propulsion apparatus is in proper position in the boat, the outside periphery of the segment ring 30 will engage the inner periphery 29' of the inside flange 29 of the off-set ring 28 of the transom mounting frame. As previously mentioned, the inner periphery 29' of the flange 29 constitutes a zone of a spherical surface, which surface has substantially the same radius as the spherical surface of which the outer periphery of the segment ring 30 constitutes a zone, but, unlike the outer periphery of the segment ring 30, no portion of the periphery 29' includes a great circle of such spherical surface. The outer or rear edge of the periphery 29' is a circle of greater radius than the other or inner edge of the surface 29'. Consequently the segment ring 30 can be brought into engagement with the inner periphery 29' of the flange 29 but cannot be moved inwardly past the flange 29.

Clamping bolts 33 extend through the mounting flange 13' of the housing member 13, through the mounting flange 12' of the nozzle 12, through the flange 30' of the spherical segment ring 30, and through the flange 31 on the conduit 10, securing these members firmly in place on the end of the conduit 10 and clamping the gasket seal ring 32 between the flange 30' and the flange 31.

To complete this portion of the mounting means a gasket ring 34 (FIG. 1) is placed against the flange 29 and in a recess provided in the flange 29 to form a watertight seal between the segment ring 30 and the flange 29. Finally a retainer ring 35 is placed on the segment ring 30 on the outside of the flange 29 and gasket ring 34 and is secured snugly in position in contact with the periphery of the spherical segment ring 30 and pressing against the sealing gasket ring 34 by bolts 36 (FIGS. 2 and 3).

The inner periphery of this retainer ring 35, like the inner periphery 29' of the flange 29, also constitutes a zone of a spherical surface having substantially the same radius as the spherical zone of the outer periphery of the segment ring 30 but not containing a great circle of the spherical surface, and the surface of the inner periphery of the retainer ring 35 is arranged oppositely from the surface 29', that is to say, the inner rear edge of the inner periphery of ring 35 constitutes a larger circle than the outer rear edge. Consequently the retainer ring 35 cannot be moved entirely over the spherical segment ring 30 and the spherical segment ring 30 cannot move outwardly through the retainer ring 35. Thus, when the retainer ring 35 is firmly clamped in place by the bolts 36, the spherical segment ring 30, and with it the end of the conduit 10, together with the nozzle 12 and outer housing 13–14, will be firmly mounted in the transom frame 26.

This completes the mounting of the jet propulsion apparatus in the rear wall or transom of the boat except for the remaining upper portion of the opening in the transom and the corresponding upper portion of the transom mounting frame designed to accommodate the steering and shutter controls. These controls are housed in a special control cover box 37 which is firmly but adjustably held in the upper rectangular opening of the transom mounting frame 26 by a resilient control box seal or gasket 38. This gasket 38 is U-shaped in cross section and snugly engages the surrounding edge of the wall of the transom mounting frame 26 about the control opening and resiliently presses against the outside of the control cover box 37 on all four sides so as to hold the con-

trol cover box in place in the transom mounting frame and provide a water-tight connection between the transom mounting frame and the control cover box, while allowing the position of the control box to be adjusted.

The control cover box 37 is substantially rectangular, but, as shown in FIG. 1, the top wall 39 and the shorter bottom wall 40 are curved surfaces with the center of curvature being substantially at the center of the lower circular opening in the transom mounting frame (and thus also on the axis of the conduit 10 when the control cover box is set in place). The side walls of the box are straight, the forward or inside face is open, and the rear or outer wall 41 of the box has a bottom extension on which a curved cap 42 is mounted. The cap 42 together with the extension on this outer or rear wall 41 form an enclosure around an opening through which the top of the pivot shaft 17 for the jet-directing member 15 extends.

As apparent from FIGS. 1 and 3, the control cover box 37 and the rear wall extension and the cap 42 are so arranged as to afford ample freedom of movement for the steering arm 18. The steering arm 18 extends into the interior of the boat and is secured to the steering cable 43.

The rear or outer wall 41 of the control cover box 37 also has a separate opening at which a socket 44 for a spherical bearing member 45 is secured. The bearing member 45 holds the sleeve 23 for the operating rod 22 which is attached to the shutter 21. The control cable 24, which is attached to the sliding rod 22, passes through a suitable flexible conduit leading inside the boat to the reverse control mechanism.

As previously mentioned, FIG. 1 shows the adjustable mounting of the present invention employed on a boat in which the rear wall or transom is substantially vertical, while FIG. 5 shows the same mounting in a boat having an inclined rear wall or transom. Due to the fact that the outer periphery of the spherical segment ring 30 constitutes a zone of a spherical surface having its center on the axis of the conduit 10, and that the inner peripheries of the flange 29 and of the retainer ring 35 also constitute zones of substantially the same spherical surface and are oppositely arranged with respect to each other so as to combine to secure the segment ring 30 firmly but adjustably in place in the transom frame, and further due to the fact that the flange 29 extends in a plane arranged at acute angularity with the plane of the outside face of the transom mounting frame, these various parts of the mounting assembly enable the end of the conduit 10 and the external members of the jet propulsion apparatus to be easily and properly mounted in a boat regardless of whether the rear wall or transom of the boat is vertical, as illustrated in FIG. 1, or is inclined, as illustrated in FIG. 5. This is an important feature of the invention.

In the event repairs or replacements are required in the pumping section of the jet propulsion apparatus it is a relatively simple matter to remove the retainer ring 35 from the outside of the boat. Then, by unbolting the conduit 10 from the intake housing in the boat, the entire pump and steering assemblies, exclusive of the intake housing, can readily be removed from the interior of the boat through the opening in the transom frame and without even disturbing the transom mounting frame. Heretofore as previously indicated, it has been impossible to have such access to the interior of the conduit 10 from outside the boat, and repairs or replacements in the pumping section previously have necessitated the complete removal of the entire apparatus from the boat.

I claim:

1. In combination with a hydro-jet boat propulsion apparatus of the type described, including a conduit housing mountable in the boat and terminating in an opening in the boat transom, with steering and control elements connected with said conduit so as to be positioned externally of the boat transom, adjustable mounting means on the boat transom for the propulsion apparatus, said mounting means including a mounting frame adapted to be removably secured on the outside of the boat transom, said frame having an open ring portion with an inside periphery having a diameter greater than the overall diameter of the conduit housing in said propulsion apparatus, a spherical segment ring placeable on the rear end of said conduit housing, said segment ring having an outside periphery capable of engagement with the inside periphery of said open ring portion and constituting a zone of a spherical surface, means for securing said segment ring on said conduit housing, the maximum diameter of said outside periphery of said segment ring being greater than the diameter of said inner periphery of said ring portion of said mounting frame, retaining means on the outside of said ring portion of said frame for engaging said outside periphery of said segment ring, and sealing gaskets between said segment ring and said conduit housing and between said segment ring and said ring portion of said frame.

2. In combination with a hydro-jet boat propulsion apparatus of the type described, including a conduit housing mountable in the boat and terminating in an opening in the boat transom, with steering and control elements connected with said conduit so as to be positioned externally of the boat transom, adjustable mounting means on the boat transom for the propulsion apparatus, said mounting means including a mounting frame adapted to be removably secured on the outside of the boat transom, said frame having an offset open ring portion with the inside periphery having a diameter greater than the overall diameter of the conduit housing in said propulsion apparatus, a spherical segment ring placeable on the rear end of said conduit housing, said segment ring having an outside periphery capable of engagement with said inside periphery of said ring portion and constituting a zone of a spherical surface with its center at the approximate center of said segment ring, means for securing said segment ring on said conduit housing, the maximum diameter of the outside periphery of said segment ring being greater than the diameter of said inner periphery of said ring portion of said mounting frame, a retainer ring mountable on the outside of said offset ring portion of said frame and on said outside periphery of said segment ring, the inside periphery of said retainer ring having a diameter less than the maximum diameter of said outside periphery of said segment ring, and means for securing said retainer ring on said mounting frame in engagement with said outside periphery of said segment ring.

3. In combination with a hydro-jet boat propulsion apparatus of the type described, including a conduit housing mountable in the boat and terminating in an opening the boat transom, with steering and control elements connected with said conduit so as to be positioned externally of the boat transom, adjustable mounting means on the boat transom for the propulsion apparatus, said mounting means comprising a mounting frame adapted to be removably secured on the outside of the boat transom, said frame having an open ring portion, the inside periphery of said open ring portion constituting a zone of a spherical surface, the minimum diameter of said zone being greater than the overall diameter of the conduit housing in said propulsion apparatus, a spherical segment ring placeable on the rear end of said conduit housing, said segment ring having an outside periphery capable of engagement with said inside periphery of said open ring portion and constituting a zone of a spherical surface with its center at the approximate center of said segment ring, said segment ring having an inner annular flange slidable on the end of said conduit housing, means for securing said annular flange and therewith said segment ring on said conduit housing, the maximum diameter of said outside periphery

of said segment ring being greater than the minimum diameter of said inner periphery of said ring portion of said mounting frame but the minimum diameter of said outside periphery of said segment ring being less than the minimum diameter of said inner periphery of said ring portion, a retainer ring mountable on the outside of said ring portion of said frame and on said outside periphery of said segment ring, the inside periphery of said retainer ring constituting a zone of a spherical surface with a minimum diameter less than the maximum diameter of said outside periphery of said segment ring, sealing gaskets between said segment ring and said conduit housing and between said segment ring and said ring portion of said frame, and means for securing said retainer ring on said mounting frame in engagement with said outside periphery of said segment ring.

4. The combination set forth in claim 3 with said outside periphery of saild segment ring and the inside peripheries of said ring portion of said frame and also of said retaining ring constituting zones of spheres of substantially the same radius.

5. The combination set forth in claim 1 with said mounting frame also having an upper opening above said open ring portion adapted for substantial registration with the upper part of an opening in the boat transom, and a control cover box slidably but firmly mounted in said upper opening of said mounting frame, the outer rear wall of said box having means for accommodating the exterior controls for the propulsion apparatus.

6. In combination with a hydro-jet boat propulsion apparatus of the type described, including a conduit housing mountable in the boat and terminating in an opening in the boat transom, with steering and control elements connected with said conduit so as to be positioned externally of the boat transom, adjustable mounting means on the boat transom for the propulsion apparatus, said mounting means including a mounting frame adapted to be removably secured on the outside of the boat transom, said frame having an offset open ring portion with an inside periphery having a diameter greater than the overall diameter of the conduit housing in said propulsion apparatus, a spherical segment ring placeable on the rear end of said conduit housing, said segment ring having an outside periphery capable of engagement with said inside periphery of said offset open ring portion and constituting a zone of a spherical surface with its center at the approximate center of said segment ring, means for securing said segment ring on said conduit housing, the maximum diameter of said outside periphery of said segment ring being greater than the diameter of said inner periphery of said ring portion of said mounting frame, a retainer ring mountable on the outside of said offset ring portion of said frame and on said outside periphery of said segment ring, the inside periphery of said retainer ring having a diameter less than the maximum diameter of said outside periphery of said segment ring, means for securing said retainer ring on said mounting frame in engagement with said outside periphery of said segment ring, said mounting frame also having a rectangular upper opening above said open ring portion adapted for substantial registration with the upper part of an opening in the boat transom, a gasket around said upper opening in said frame, a control cover box slidably but firmly mounted in said latter mentioned gasket and frame opening, said control cover box being substantially rectangular in vertical cross section but the top and bottom walls of said box constituting curved surfaces, means on the outer rear wall of said box for accommodating the outer end of a steering control arm, a universal mounting on said rear wall of said box, and a guideway for the reversing control for the propulsion apparatus carried in said universal mounting.

7. The combination set forth in claim 3 with said mounting frame also having a rectangular upper opening above said open ring portion adapted for substantial registration with the upper part of an opening in the boat transom, a gasket around said upper opening in said frame, a control cover box slidably but firmly mounted in said latter mentioned gasket and frame opening, said control cover box being substantially rectangular in vertical cross section but the top and bottom walls of said box constituting concentric curved surfaces having a common center of curvature substantially at the center of said lower open ring portion of said mounting frame when said control cover box is mounted in said frame, and means on the outer rear wall of said box for accommodating the exterior controls for the propulsion apparatus.

8. In combination with a hydro-jet boat propulsion apparatus of the type described, including a conduit housing mountable in the boat and terminating in an opening in the boat transom, with steering and control elements connected with said conduit so as to be positioned externally of the boat transom, adjustable mounting means on the boat transom for the propulsion apparatus, said mounting means consisting of a mounting frame adapted to be removably secured on the outside of the boat transom, said frame having an offset open ring portion, the inside periphery of said open ring portion constituting the zone of a spherical surface, the minimum diameter of said zone being greater than the overall diameter of the conduit housing in said propulsion apparatus, a spherical segment ring placeable on the rear end of said conduit housing, said segment ring having an outside periphery capable of engagement with said inside periphery of said offset open ring portion and constituting a zone of a spherical surface with its center at the approximate center of said segment ring, said segment ring having an inner annular flange slidable on the end of said conduit housing, means for securing said annular flange and therewith said segment ring on said conduit housing, the maximum diameter of said outside periphery of said segment ring being greater than the minimum diameter of said inner periphery of said offset ring portion of said mounting frame but the minimum diameter of said outside periphery of said segment ring being less than the minimum diameter of said inner periphery of said offset ring portion, a retainer ring mountable on the outside of said offset ring portion of said frame and on said outside periphery of said segment ring, the inside periphery of said retainer ring constituting a zone of a spherical surface with a minimum diameter less than the maximum diameter of said outside periphery of said segment ring, sealing gaskets between said segment ring and said conduit housing and between said segment ring and said offset ring portion of said frame, means for securing said retainer ring on said mounting frame in engagement with said outside periphery of said segment ring, said outside periphery of said segment ring and the inside peripheries of said offset ring portion of said frame and of said retaining ring constituting zones of spheres of substantially the same radius, said mounting frame also having an upper opening above said open ring portion adapted for substantial registration with the upper part of an opening in the boat transom, a gasket around said upper opening in said frame, a control cover box slidably but firmly mounted in said latter mentioned gasket and frame opening, the top and bottom walls of said box constituting concentric curved surfaces having a common center of curvature substantially at the center of said lower open ring portion of said mounting frame when said box is in place in said frame, means on the outer wall of said box for accommodating the outer end of a steering control arm, a universal mounting on said rear wall of said box, and a guideway for the reversing control for the propulsion apparatus carried in said universal mounting.

No references cited.