Sept. 13, 1966 F. W. ROSENTRATER 3,272,439

STEERING AND REVERSING ASSEMBLY FOR WATER JET BOATS

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Fig. 1

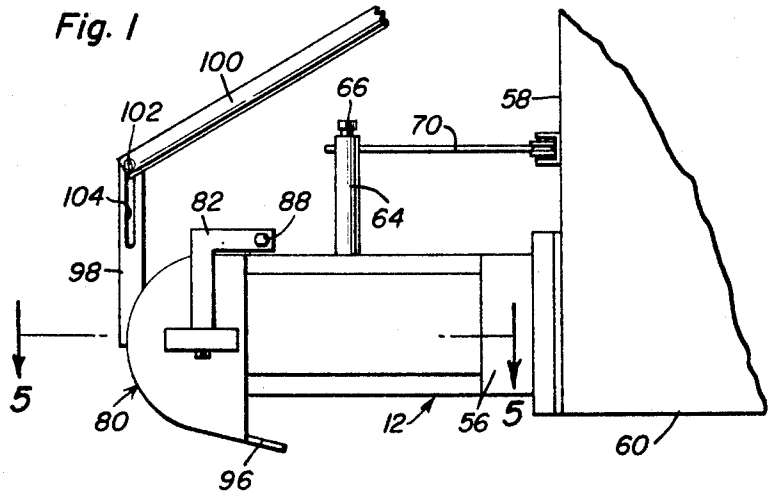
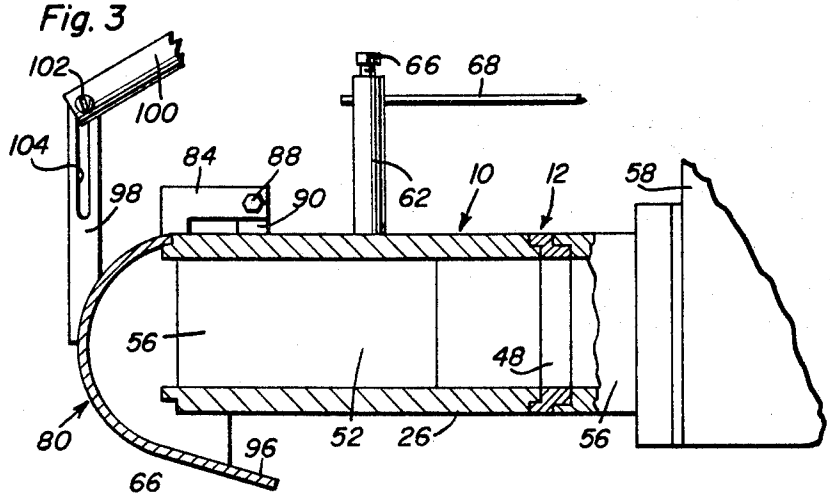


Fig. 3



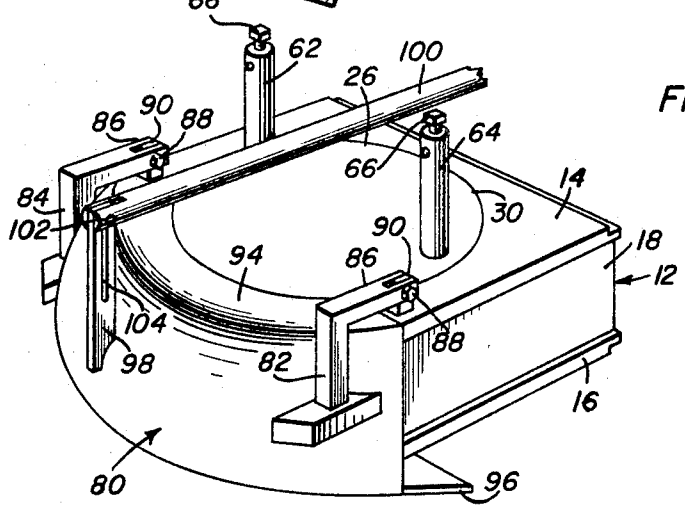


Fig. 6

Fred W. Rosentrater
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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STEERING AND REVERSING ASSEMBLY FOR WATER JET BOATS

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Fig. 2

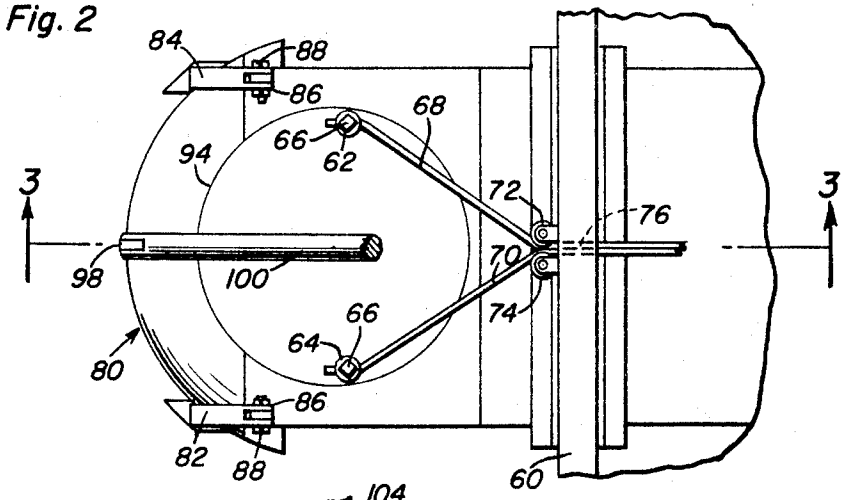
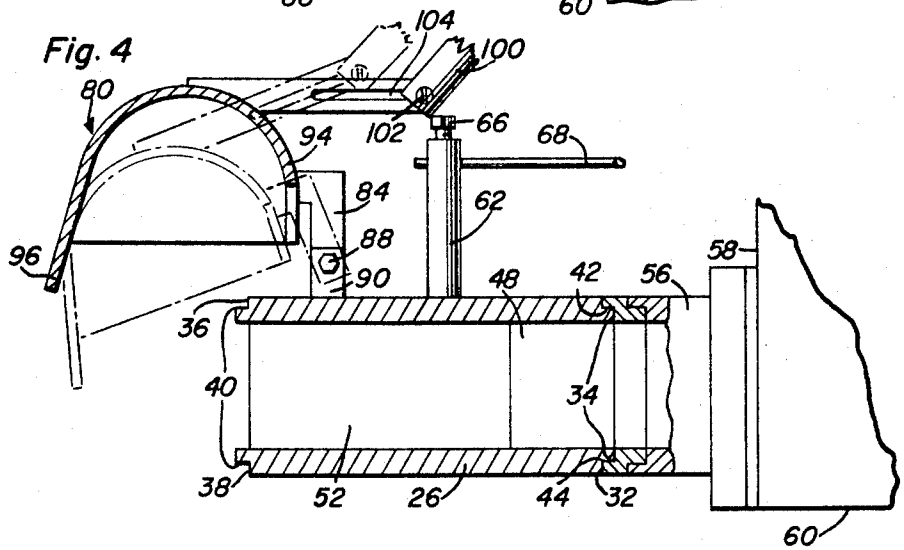


Fig. 4



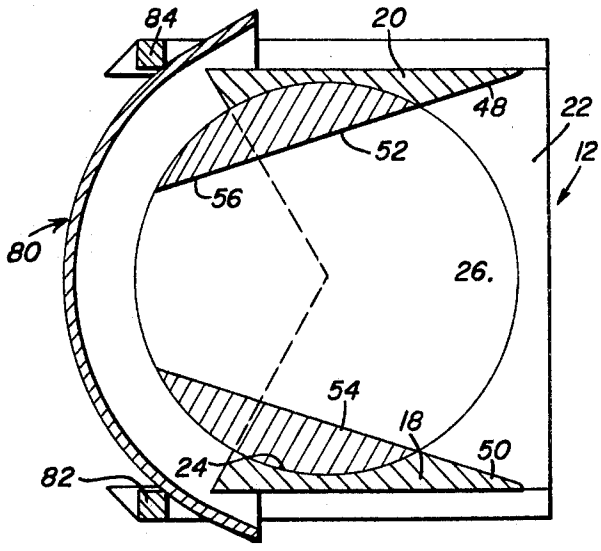


Fig. 5

Fred W. Rosentrater
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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3,272,439

STEERING AND REVERSING ASSEMBLY FOR WATER JET BOATS

Fred W. Rosentrater, 3816 W. 115th Place, Chicago, Ill.

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6 Claims. (Cl. 239—265.25)

This invention relates to a novel and useful steering and reversing assembly for water jet boats. The steering and reversing assembly of the instant invention is adapted to be incorporated in the manufacture of new water jet boats as well as being adapted to be readily installed on existing water jet boats.

The main object of this invention is to provide an assembly for receiving the discharge of water from the outlet nozzle of a water jet pump and for selectively modifying the direction of discharge of the jet of water whereby the water jet boat may be steered by changing the direction in which the propelling jet of water is finally discharged.

Another object of this invention is to provide a steering and reversing assembly for water jet boats which will eliminate the necessity for conventional rudder mechanisms.

Still another object of this invention, in accordance with the immediately preceding object, is to provide a steering and reversing assembly for water jet boats which will eliminate the necessity for reverse gearing assemblies between the power source and the water turbine of a water jet boat.

Yet another object of this invention is to provide a steering and reversing assembly for water jet boats including a reversing mechanism that may be readily moved from an inoperative position to an operative position even while the water turbine or pump of the associated water jet boat is operating at full speed.

Still another object of this invention is to provide a steering mechanism which will coact with the associated reversing mechanism in a manner enabling the associated water jet boat to be steered while the reversing mechanism is in operation.

Another object of this invention is to provide a reversing mechanism including means by which it may be rendered only partially operative thereby making it possible for the steering and reversing assembly to be utilized to effect equal forward and rearward thrust so that a "neutral" position may be obtained without disengagement of the associated power source from the associated water turbine or pump.

A final object of this invention to be specifically enumerated herein is to provide a steering and reversing assembly for water jet boats which will conform to conventional forms of manufacture, be of simple construction and easy to use so as to provide a device that will be economically feasible, long lasting and relatively trouble free in operation.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary side elevational view of the rear portion of a water jet propelled boat shown with the steering and reversing assembly of the instant invention operatively associated therewith;

FIGURE 2 is a top plan view of the embodiment illustrated in FIGURE 1;

FIGURE 3 is an enlarged longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 3—3 of FIGURE 2;

FIGURE 4 is a longitudinal vertical sectional view similar to FIGURE 3 but showing the reversing mechanism of the instant invention in an inoperative position in solid lines and a partially operative position in phantom lines;

FIGURE 5 is an enlarged horizontal sectional view taken substantially upon the plane indicated by the section line 5—5 of FIGURE 1; and

FIGURE 6 is a perspective view of the steering and reversing assembly.

Referring now more specifically to the drawings, the numeral 10 generally designates the steering and reversing assembly of the instant invention which includes an elongated housing generally referred to by the reference numeral 12 and which is generally rectangular in transverse vertical cross section including top and bottom walls 14 and 16 and opposite side walls 18 and 20. The housing 12 defines a longitudinally extending passage 22 and the passage 22, at its rear end portion, defines a generally partial circular cavity 24 in which a steering body 26 which is substantially circular in horizontal cross section is snugly and rotatably received.

The top and bottom walls 14 and 16 of the housing 12 have vertically alined openings 30 and 32 formed therein and each of the openings 30 and 32 includes a diametrically enlarged inner portion 34. The steering body 26 includes a pair of projections 36 and 38 which are rotatably received in the openings 30 and 32 and it will be noted that the projections 36 and 38 define a pair of annular shoulders 40 which abut against the annular shoulders 42 and 44 defined between the openings 30 and 32 and the diametrically enlarged inner portions 34 thereof. In this manner, the steering body 26 is journaled for rotation between the top and bottom walls 14 and 16 and is prevented from shifting axially relative to the housing 12.

It will be noted that the opposite side walls 48 and 50 of the forward end of the passage 22 are forwardly divergent and also that the opposite side walls 52 and 54 of the longitudinal passage 56 formed through the steering body 26 are forwardly divergent. In addition, from FIGURE 5 of the drawings it may be seen that when the longitudinal centerline of the passage 56 generally parallels the longitudinal centerline of the passage 22 the opposite side walls 48 and 50 comprise coplanar continuations of the opposite side walls 52 and 54.

The forward end of the housing 12 has an adapter 56 secured thereto in any convenient manner and it will be noted that the adapter 56 is secured to the rear face of the transom 58 of the boat 60 in any convenient manner and in communication with the outlet of the water jet propulsion assembly (not shown) which powers the boat 60.

In addition, it may be seen that a pair of standards 62 and 64 project upwardly from the top wall of the steering body 26 and that the standards 62 and 64 include setscrews 66 for securing one end of a pair of pull members 68 and 70 to the standards 62 and 64. The free ends of the pull members 68 and 70 are guided by pulleys 72 and 74 supported from the transom of the boat 60 and passed through an opening 76 in the transom to a forward point in the boat 60 for operation by means of a suitable steering mechanism.

With attention now invited more specifically to FIGURES 4 and 6 of the drawings there may be seen an arcuate reversing body generally referred to by the reference numeral 80 which is generally semi-circular in radial cross section and which has a pair of L-shaped arms 82 and 84 secured thereto. The arms 82 and 84 are bifurcated on their free ends as at 86 and are pivotally secured, as by means of pivot fasteners 88, to mounting lugs 90 secured to and projecting upwardly from the

top wall **14** of the housing **12**. It may be seen that the axis of rotation of the reversing body **80** is disposed above and forward of the rear end of the housing **12** and that the reversing body **80** may be swung from the fully inoperative position illustrated in solid lines in FIGURE 4 of the drawings to the operative position illustrated in FIGURE 3 of the drawings.

It may be seen from FIGURES 2 and 6 of the drawings that the reversing body **80** includes an upper lip **94** and a lower lip **96** and that the upper lip, when the reversing body **80** is in the operative position, seats against the shoulder **40** at the rear end of the steering body **26**. Further, the lower lip **96** is disposed below and projects forwardly of the rear lower portion of the steering body **26** so as to direct the discharge of water through the steering body forwardly and downwardly.

When the steering body is disposed in the position illustrated in FIGURE 5 of the drawings and the reversing body is positioned as illustrated in phantom lines in FIGURE 4 of the drawings, the steering and reversing assembly **10** is approximately in a neutral position wherein a portion of the discharge from the steering body **26** will be directed rearwardly while the remainder of the discharge of water will be directed downwardly. With the reversing body thus positioned, the boat **60** will be propelled neither forwardly nor rearwardly.

It will further be noted that when the reversing body **80** is in the position illustrated in FIGURES 1–3, 5 and 6 of the drawings the steering body **26** may be rotated relative to the housing for the purpose of steering the boat **60** while the latter is moving in reverse. Of course, inasmuch as the reversing body **80** has a tendency to fully reverse the discharge of water, the steering controls including the pull members **68** and **70** are not reversed and therefore the operator of the boat **60** need not bear in mind a reverse control of the steering controls.

The reversing body **80** has a slotted upstanding arm **98** fixedly secured thereto and the free end of an actuating arm **100** is pivotally connected to the slotted end of the arm **98** by means of a pivot fastener **102** slidably received in the slot **104**. Manipulation of the arm **100** is utilized to move the reversing body **80** between the positions illustrated in FIGURES 4 and 6 of the drawings.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalvents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A steering and reversing assembly for water jet boats of the type including a water jet outlet, said assembly comprising an elongated housing having a longitudinal first passage formed therethrough and including means adapted to sealingly communicate the front end of said housing with said outlet, the rear end of said passage defining an upstanding generally cylindrical cavity in said passage, a steering body snugly and rotatably disposed in said cavity blocking the rear end of said passage and having a generally diametric second passage formed therethrough forming an oscillatable continuation of said first passage and including a forward end communicated with the forward end of said first passage, said steering body projecting outwardly of the rear end of said housing, said housing including opposite side walls whose upper marginal portions are interconnected by means of a top wall, said top wall having a partial circular opening formed therein communicating with the rear edge portion of said

top wall, said steering body including a top wall having a generally circular portion journaled in said opening, an arcuate water jet deflection and reversing body, means pivotally securing said reversing body to said housing for rotation about an axis extending transversely of and disposed slightly above the rear end of said first passage and along a line disposed in a plane substantially normal to the longitudinal centerline of said first passage, said reversing body being generally semi-circular in radial cross-section and being swingable from a raised inoperative position disposed rearwardly of and above the rear marginal portions of said steering body and a lowered position with said reversing body positioned behind and in horizontal alignment with said steering body, said reversing body, when in said lower position, including an extended lower lip disposed slightly below the lower portion of the rear end of said steering body and also a centrally disposed arcuate upper lip rotatably receiving and disposed in sealing engagement with the rear marginal portion of the circular portion of said top wall of said steering body projecting outwardly of the rear of said housing.

2. The combination of claim **1** wherein the rear end of said second passage is of a width considerably less than the width of the rearmost end of said first passage.

3. The combination of claim **1** wherein the partial circular opening formed in said top wall comprises a diametrically reduced upper portion of a diametrically larger partial circular opening formed through said top wall, said top wall including an upper generally cylindrical projection journaled in said small diameter upper portion and the remainder of said circular top wall being journaled in said larger partial circular opening.

4. The combination of claim **1** wherein said steering body includes means projecting upwardly therefrom through said small diameter upper portion of said partial circular opening formed in said top wall and adapted to have means secured thereto for effecting oscillation of said steering body.

5. The combination of claim **1** wherein the forward ends of the opposite sides of said first passage comprise clear planar extensions on the opposite side walls of said second passage when the longitudinal centerline of said second passage generally parallels the longitudinal centerline of said first passage.

6. The combination of claim **1** wherein said housing includes a bottom wall extending between the lower marginal portions of said side walls thereof and said bottom wall has a partial circular opening formed therethrough aligned with the opening formed through said top wall, said steering body also including at least a cylindrical portion of its bottom wall which is rotatably received in the partial cylindrical opening formed in the bottom wall of said housing.

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MARK NEWMAN, *Primary Examiner.*

A. L. SMITH, *Assistant Examiner.*