

[54] STEERING UNIT FOR MARINE CRAFT

[76] Inventor: William M. Jackson, 1701 Lobdell No. 92, Baton Rouge, La. 70806

[22] Filed: Jan. 2, 1974

[21] Appl. No.: 429,853

Related U.S. Application Data

[63] Continuation of Ser. No. 247,718, April 26, 1972, abandoned.

[52] U.S. Cl. 115/12 R, 9/1 A, 114/151, 114/235 R

[51] Int. Cl. B63b 21/00

[58] Field of Search 114/150, 151, 235 R, 56, 114/63; 9/1 A; 115/16, 20, 39, 53, 12 R

[56] References Cited

UNITED STATES PATENTS

2,268,155	12/1941	Lynch	115/39
2,543,253	2/1951	Napoli	115/16
2,984,202	5/1961	Lunde	114/235 R
3,335,436	8/1967	Sharp	9/1 A

3,391,669 7/1968 Buster..... 9/1 A

FOREIGN PATENTS OR APPLICATIONS

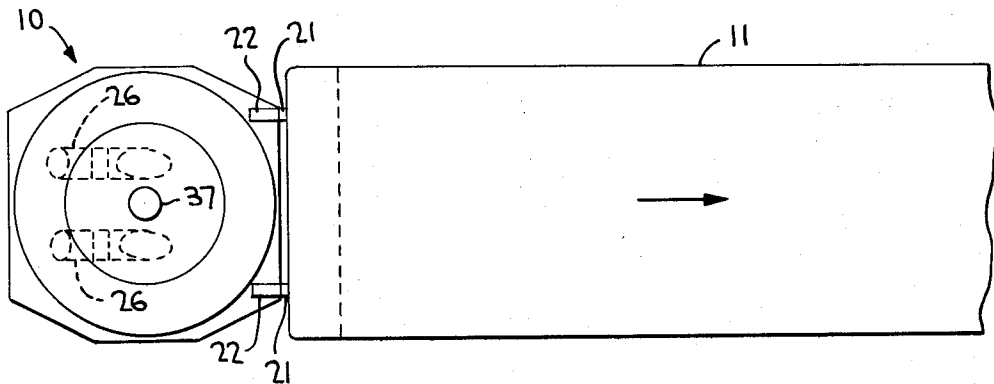
1,215,548 4/1966 Germany..... 114/235 R

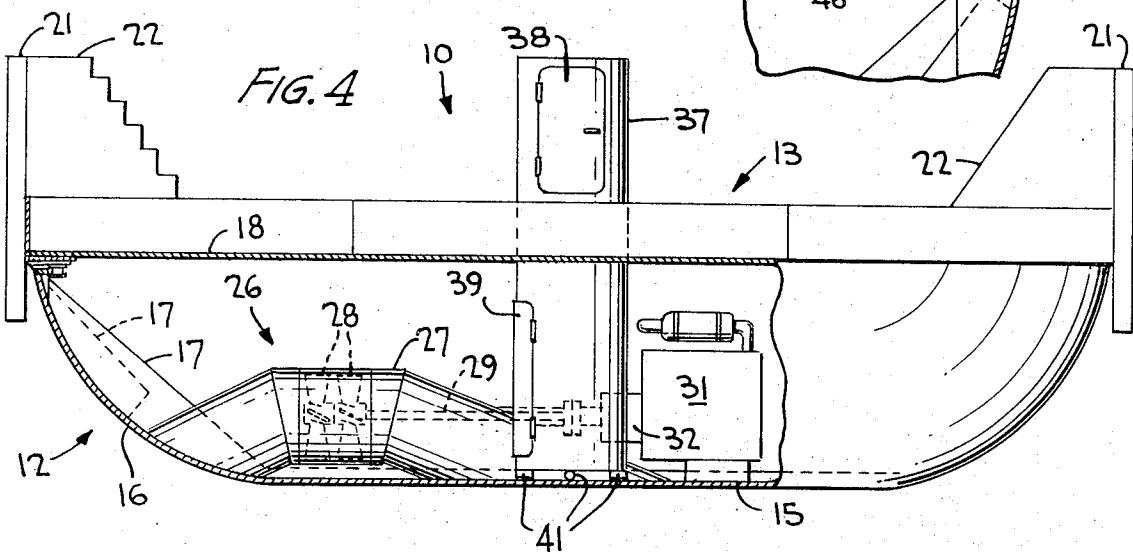
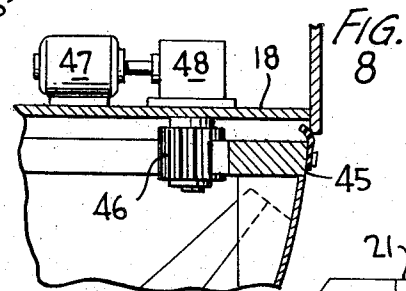
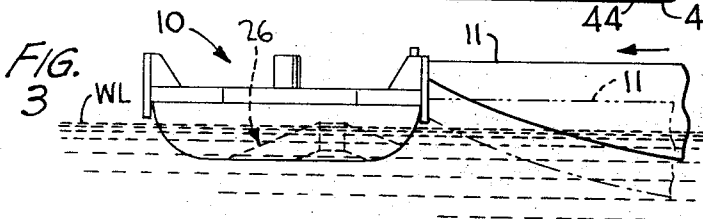
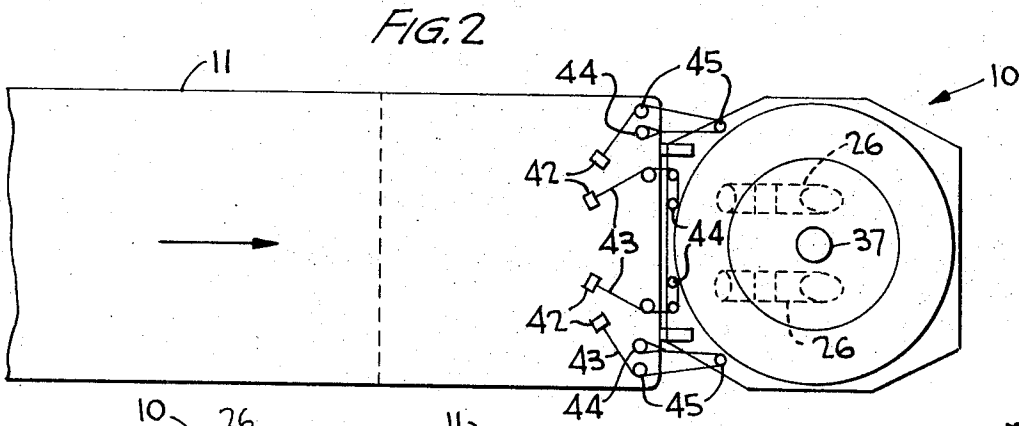
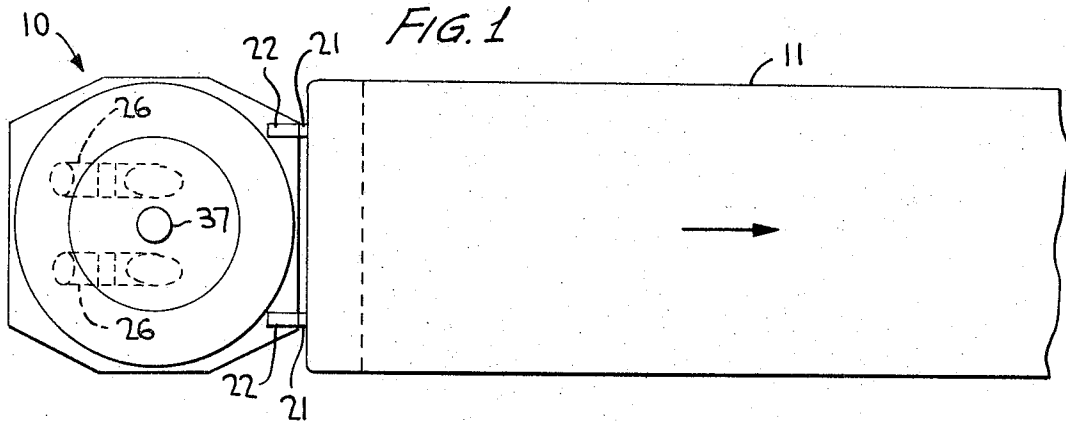
Primary Examiner—Trygve M. Blix
Assistant Examiner—Jesus D. Sotelo
Attorney, Agent, or Firm—Watson, Cole, Grindle & Watson

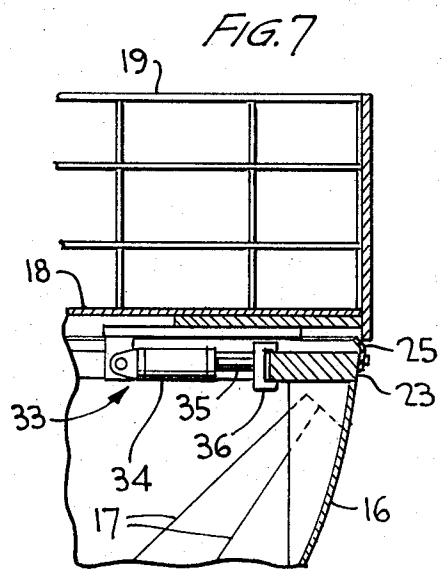
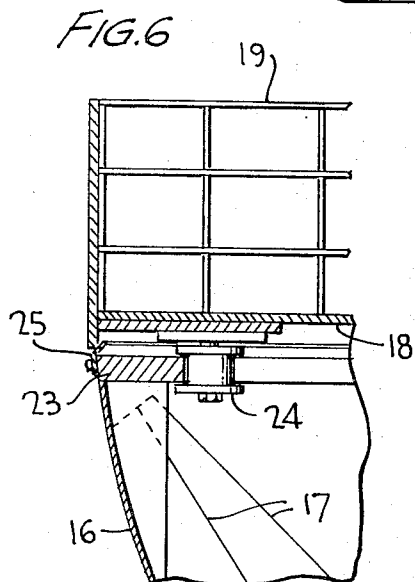
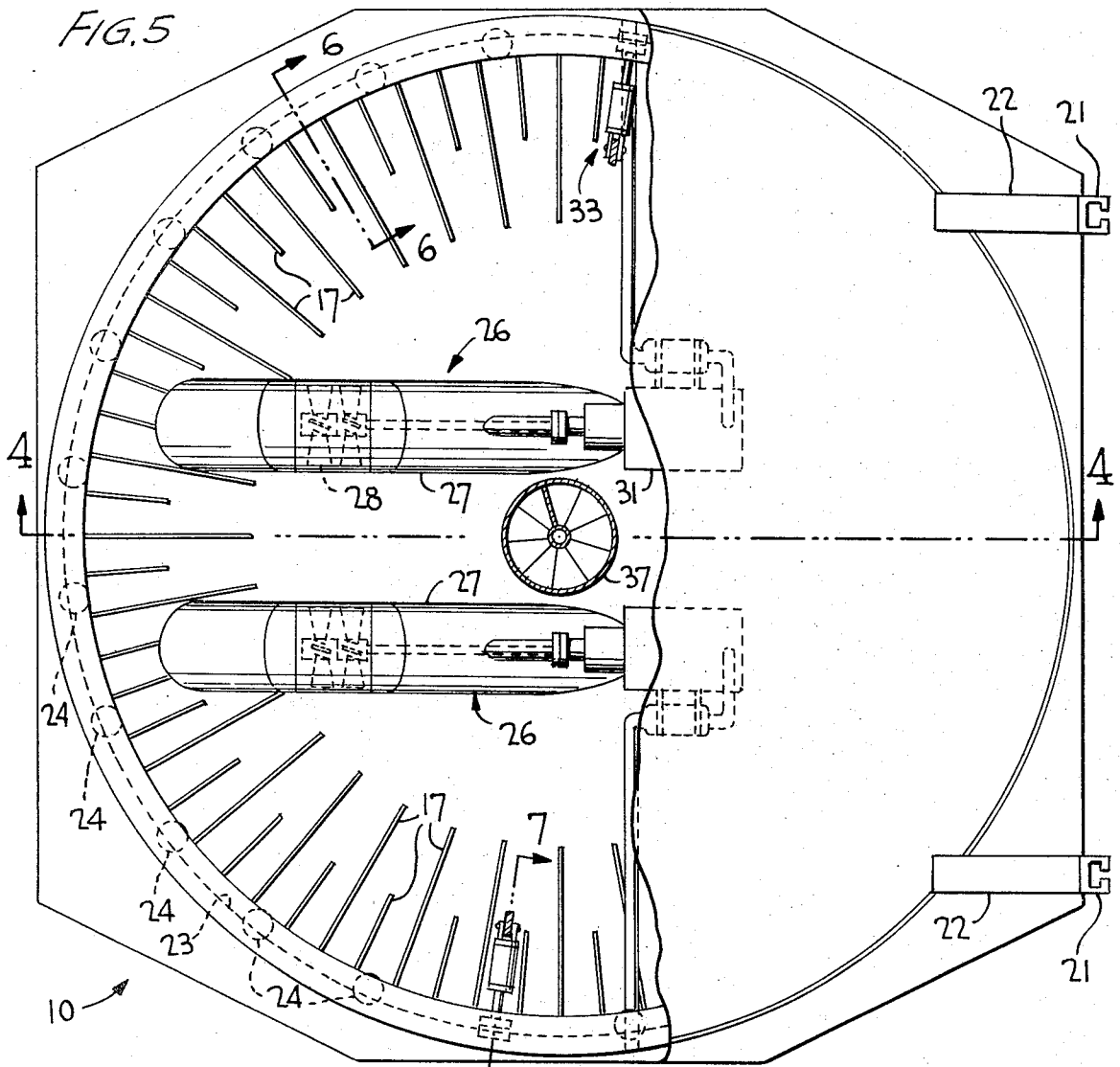
[57] ABSTRACT

A marine unit mounted either forward or aft of a barge for steering or for steering and propelling same, including a spherical hull section being rotatable about the central vertical axis of a stationary deck section. After being rotated a predetermined amount, the marine unit is capable of shifting the barge in a lateral direction for purposes of steering it along a desired path. Shifting of the barge is effected by a pair of propulsion devices spaced on opposite sides of the central vertical axis.

8 Claims, 8 Drawing Figures







STEERING UNIT FOR MARINE CRAFT

This is a continuation, application Ser. No. 247,718 filed Apr. 26, 1972, now abandoned.

This invention relates generally to a steering unit for barges and the like, and more particularly, to such a unit capable of steering the barge by causing its forward and aft end to be moved laterally to any desired extent so that it may be easily maneuvered along its path of travel.

BACKGROUND OF THE INVENTION

In order for barges of any appreciable length to be properly moved along waterways toward their destination, a highly trained and skilled operator must exercise great care in maneuvering the barge, especially within confined and narrow waterways, so as not to run aground or so as to avoid collision with other marine craft. High winds, which are oftentimes constantly shifting, and inclement weather conditions increase the peril for the operator as the barge is so moved either under its own power or with the use of a tow boat or the like. Steering devices have therefore been devised in the past for more effectively controlling the barge as it continues along its circuitous route. However, such conventional steering devices are most often incapable of causing the barge to be shifted abruptly within short distances in a transverse direction of its path of movement when it becomes necessary to quickly avoid the danger of collision or running aground.

SUMMARY OF THE INVENTION

A steering unit for barges has therefore been devised which is capable of quickly and efficiently shifting the path of movement of a barge with the use of a marine unit mounted either forward or aft of the barge thereby avoiding the need for complex and expensive equipment. Such a unit basically comprises a hull section connected to a stationary deck and rotatable about a central vertical axis with respect to such deck. The hull section is in the shape of a spherical section and is provided with propulsion devices located on opposite sides of the vertical axis so that, when actuated together, the barge is propelled forwardly and, when actuated one-at-a-time, the fore or aft section of the barge is abruptly shifted in a transverse direction to the path of movement thereof.

It is therefore a principal object of the present invention to provide a marine unit for the steering of barges, as outlined above, in a quick, economical and highly effective manner.

Another object of this invention is to provide such a unit wherein the propulsion devices may comprise tubular fluid pumps and wherein the unit is mounted either fore or aft of the barge by means of vertically disposed elongated connectors to thereby accommodate various draft elevations of the barge.

A further object of the present invention is to provide such a marine unit wherein the hull and deck sections thereof are interconnected by means of a peripheral flange on the hull section and a plurality of rotatable spool members mounted on the deck section for cooperation therewith.

A still further object of this invention is to provide such a unit wherein brake means are provided on the deck section for cooperation with such flange so that

the entire section may be adequately braked after a predetermined degree of rotation thereof.

A still further object of this invention is to provide such a unit wherein a peripheral gear may be provided on the hull section with powered rotatable gears mounted on the deck section in cooperation with the gear ring for rotational movement of the hull section in lieu of or in addition to movement thereof by actuation of one or the propulsion devices.

A still further object of the present invention is to provide such a unit wherein a stairwell is mounted on the deck section and extends toward the hull section to rest on the bottom wall thereof for gaining access to the interior of the hull section.

Other objects, advantages and novel features of the present invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

FIG. 1 is a top plan view showing the steering unit of the present invention mounted at the aft end of a barge only partly shown;

FIG. 2 is a plan view of the steering unit of FIG. 1 mounted at the forward end of a barge unit partly shown;

FIG. 3 is a side elevational view of the FIG. 2 embodiment;

FIG. 4 is a sectional view taken along the line 4—4 of FIG. 5 showing various details of the steering unit shown slightly enlarged as compared to FIGS. 1—3; FIG. 5 is a top plan view, partly broken away, of the steering unit of FIG. 4;

FIG. 6 is a detailed view, slightly enlarged, taken along the line 6—6 of FIG. 5 showing the interconnection between the hull section and the deck section;

FIG. 7 is a sectional view, slightly enlarged, taken along the line 7—7 of FIG. 5 showing the means for braking the rotatable hull section; and

FIG. 8 is a sectional view showing an alternative means of rotating the hull section with the use of a power actuated gear wheel in cooperation with a gear ring.

Turning now to the drawings wherein like reference characters refer to like and corresponding parts throughout the several views, the steering unit generally designated 10 is shown for a barge 11 and is mounted aft of the barge as shown in FIG. 1, or forward of the barge, as shown in FIG. 2. The steering unit comprises a hull section 12 interconnected with a stationary deck section 13 in such a manner as to be rotatable about a central vertical axis thereof. The hull section 12 comprises a spherical hull plate 16 having a flat bottom plate 15. If desired, hull plate 16 may alternatively be in the shape of a conical section. Hull section 12 is reinforced interiorly by means of a plurality of framing plates 17 each extending radially and spaced along the inner periphery of hull plate 16, as shown in FIGS. 4 and 5 of the drawings.

Stationary deck section 13 comprises substantially a base plate 18 having railings 19 (see FIG. 6) along its periphery and vertically disposed channel connectors 21 mounted forward and aft of the hull section by means of bracing members 22, as shown in FIGS. 4 and 5.

The hull section 12 is interconnected with the deck section by means of a ring member 23 secured to the upper edge of hull plate 16 along the periphery thereof.

A plurality of spool members 24 are rotatably mounted to the under side of base plate 18 for cooperation with the ring 23 disposed within the grooves of members 24 are shown in FIG. 6. A resilient seal member 25 may be secured along the outer periphery of ring 23 for sealing the space between the hull and deck sections as shown in FIGS. 6 and 7.

As can be seen most clearly in FIGS. 4 and 5, a propulsion device 26 is operatively mounted within the hull section 12 and comprises substantially a cylindrical tube 27 open at opposite ends of the exterior of the hull section. Each propulsion device 26 is substantially the same as the steering unit for barges disclosed in my prior U.S. Pat. No. 3,590,776, issued July 6, 1971. Briefly, a tube 27 thereof contains a pair of propeller blades 28 mounted on a rotatable shaft 29 which is rotated by means of a power unit 31 through a suitable gearing 32. Upon actuation of each propulsion device, rotation of the blades 28 causes water to flow through the tube 27 in an opposite direction from the desired direction of bow movement. In this case, water is pumped through the tube 27 in the aft direction of the steering unit, i.e., from right to left when viewing it in FIGS. 4 and 5.

A braking device 33 comprising a cylinder 34, a piston rod 35 and a brake shoe 36 mounted thereon, is mounted at any number of predetermined locations to the under side of base plate 18 of the deck section (see FIGS. 5 and 7). When the braking devices are actuated, the brake shoes thereof are made to operatively engage with the inner peripheral end of ring 23 for the purpose of effectively braking rotational movement of the hull section to be hereinafter described.

In FIG. 4 it can be seen that a stairwell unit 37 is provided along the central vertical axis (not depicted) of the deck section, is mounted to the base plate 18 thereof and extends toward bottom plate 15 of the hull section to rest thereon. A spiral staircase not shown may be provided within the stairwell so as to gain access to the interior of the hull section through doors 38 and 39. Also, bearings 41 are provided between the lower plate 15 and the bottom of the stairwell to facilitate a smooth movement there between during rotation of the hull section with respect to the deck section.

As can be seen in FIG. 2 of the drawings, the steering unit 10 is additionally interconnected with the forward end of barge 11 by means of a winch 42 and a cable 43 extending about guides 45 on both the barge and steering unit with the free end of the cable being secured about a capstan 44. Winches 42 may be of any conventional design of such a type as to automatically pay out and wind up cables 43 thereon, depending on the draft elevation of the barge 11. For example, when the barge is heavily loaded, as shown in phantom in FIG. 3, its forward end will of course move downwardly with respect to steering unit 10 along the vertical channel connectors 21 thereof. Winches 42 will therefore be made to pay out an additional amount of cable 43 therefrom so as to accommodate the lower draft elevation of the barge.

In operation, actuation of both the propulsion devices 26 simultaneously will serve to propel the barge 11 forwardly in both embodiments in the direction of the arrows shown in FIGS. 1 and 2. Units 10 may therefore be utilized as an auxiliary means for propelling the barge in such a manner, especially in the FIG. 1 embodiment. However, where it becomes necessary to

shift either end of the barge abruptly in a transverse or angular direction of movement from the forward direction of the barge, one or the other of the propulsion devices 26 is actuated to thereby rotate the hull section 12 of the steering unit either clockwise or counter clockwise depending on which of the propulsion devices 26 is so actuated. Of course, hull section 12 will be rotated in a clockwise direction (looking downwardly) upon actuation of the propulsion device lying to the left of stairwell 37 when facing the direction of movement of the barge in FIG. 1, and the hull section 12 will be moved in a counter clockwise direction upon actuation of the other propulsion device shown in the Figure.

The extent of rotation of the hull section 12 in either of such directions is controlled by means of the braking devices 33 which, when actuated, simply apply a braking action against the inner peripheral edge of ring 23 to stop the rotational movement of the hull section when desired. Thereafter, continued actuation of one or both of the propulsion devices 26 will quickly, and within a short turning distance, steer the barge 11 by shifting its ends angularly with respect to its direction of travel. For example, after the hull unit has been rotated in a counter-clockwise direction and braked in such position, continued actuation of the propulsion devices thereof will shift the aft end of the barge in FIG. 1 transversely leftward if the hull section had been rotated 90° or will shift the aft end of the barge angularly to the left after the hull section has been rotated between 0° and 90° in a counter clockwise direction. Therefore, the forward end of the barge may be steered for movement to the right or left depending on the rotation of hull section 16.

When unit 10 is mounted forward of barge 11, as in FIG. 2, actuation of one or the other of the propulsion devices 26 will cause rotation in the same manner as described with reference to the FIG. 1 embodiment. Therefore, when hull section 16 is rotated for example in a clockwise direction (looking downwardly in FIG. 2), actuation of both propulsion devices 26 will cause the forward end of the barge to be steered to the right depending on the degree of rotation of the hull section. However, actuation of one or the other of the propulsion devices 26 will vary the degree of steering movement.

Instead of utilizing the propulsion devices for initially rotating hull section as above-described it may become desirable to provide an internally toothed gear ring 45, of the type shown in FIG. 8, along the periphery of the hull plate 16 upper edge. A toothed gear wheel or wheels 46 are therefore mounted to the under side of base plate 18 of the deck section with each being rotatably driven by means of a power unit 47 through a standard gearing 48. Intermeshing between the teeth of wheels 46 and ring 45 therefore effects rotation of the hull section 12 to any desired extent depending on the rotation of wheels 46. After the hull section is so rotated, either clockwise or counterclockwise, the power unit 47 is de-energized to maintain the hull section in such a rotated position. Thereafter, either or both the propulsion devices 26 are actuated to steer the barge 11 either front or aft in a manner similar to that described above.

From the foregoing, it can be seen that a practical and simple but highly effective marine unit has been devised for steering a barge along a waterway in a com-

pletely and easily controllable manner without the need for extensive training and skill heretofore required. The hull section of the steering unit is partly spherical in its hull design so that, regardless of its degree of rotation, it meets with little resistance as it moves through the water. The barge may be, therefore, more effectively and accurately controlled by actuation of the propulsion devices as above described.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A marine unit capable of being mounted either forward or aft of a barge for steering purposes, comprising a hull having a horizontal bottom wall section and a side wall section of circular horizontal cross-section varying in diameter between the smallest diameter at said bottom wall section to the largest at the top of said side wall section, a flat deck extending over the entirety of said hull, means mounting said hull to the underside of said deck for rotation of said hull about its central vertical axis relative to said deck, means on said deck for connecting it to the barge thereby rendering it stationary relative to said hull, propulsion devices for movement of fluid therethrough between the forward and aft ends thereof and being mounted within said hull for rotation therewith on opposite sides of said vertical axis, and means for actuating each of said propulsion devices independently of one another, whereby actuation of both said propulsion devices together serves to propel the unit and barge forwardly while actuation of one of said propulsion devices serves to rotate said hull

with respect to said deck for steering of the barge by said propulsion devices in a prescribed direction.

2. The unit according to claim 1 wherein said side wall section is defined by a part spherical section.

3. The unit according to claim 1 being mountable to the barge by means of spaced vertically disposed elongated connectors provided on said deck fore and aft thereof for accommodating various draft elevations of the barge.

4. The unit according to claim 1 wherein each said propulsion device comprises a tubular fluid pump.

5. The unit according to claim 1 wherein said interconnecting means includes a ring member secured along the upper portion of said side wall section, and a plurality of rotatable spool members mounted on said deck for cooperation with said ring member.

6. The unit according to claim 5 wherein braking means are provided on said deck for cooperation with said ring member whereby said hull may be braked after a predetermined degree of rotation during actuation of said one propulsion device.

7. The unit according to claim 1 wherein a gear ring is secured along the upper portion of said side wall section and rotatable gear wheels are provided on said deck in operable engagement with said gear ring for rotational movement of said hull about said central axis.

8. The unit according to claim 1 further comprising a stairwell unit mounted on said deck along said vertical axis and extending toward said hull to rest on said bottom wall section thereof for gaining access to the interior of said hull from said deck.

* * * * *

35

40

45

50

55

60

65