April 12, 1949. F. A. FORLANO 2,467,022

MARINE PROPULSION AND STEERING DEVICE

Filed July 17, 1946 3 Sheets-Sheet 1

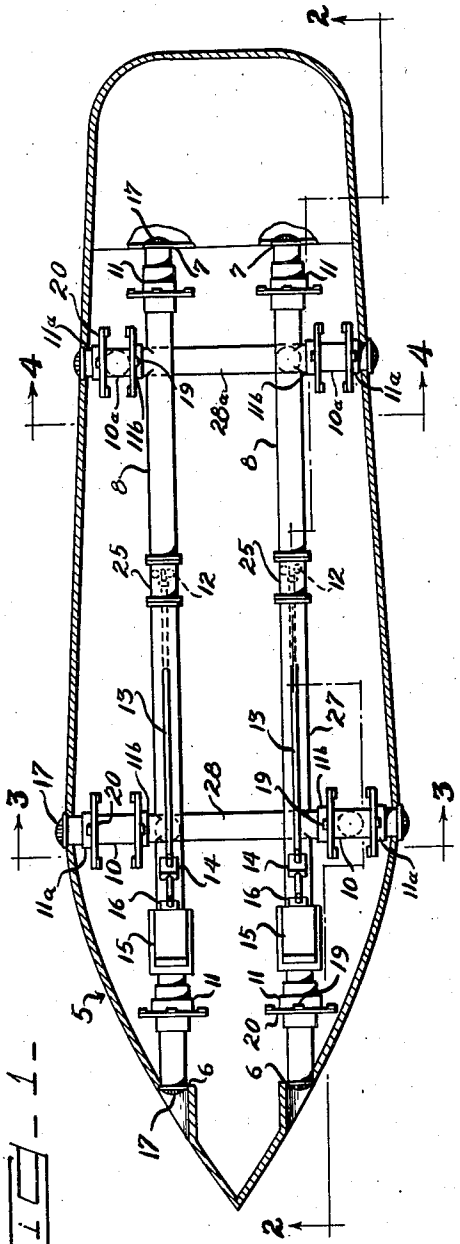


FIG. 1.

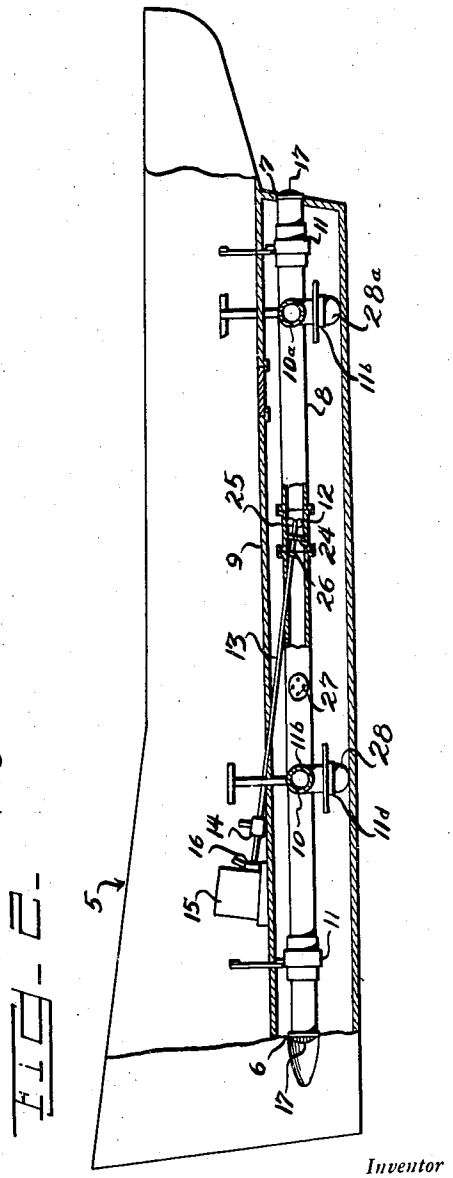


FIG. 2.

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FIG. 3.

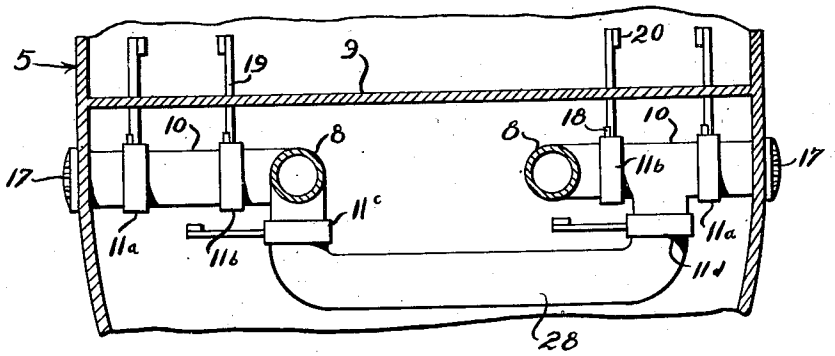
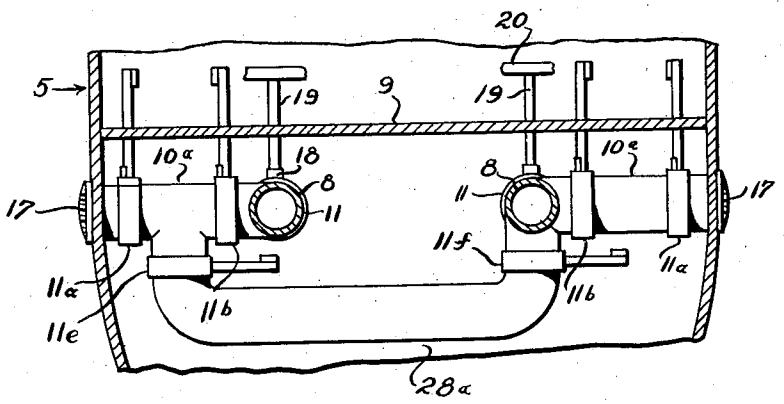


FIG. 4.



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FIG. 7.

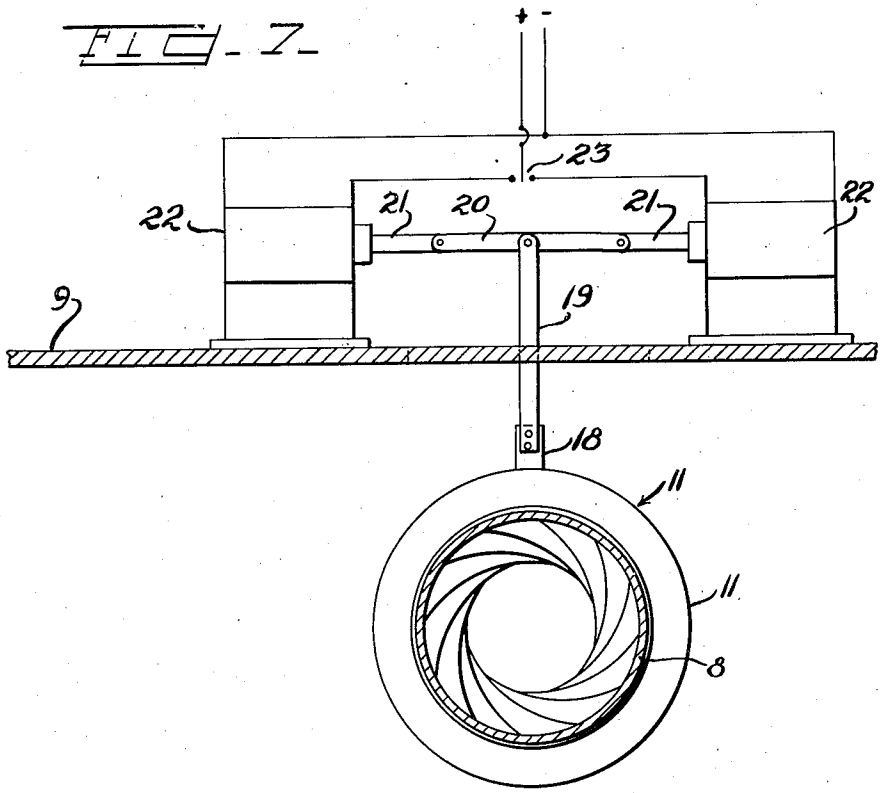


FIG. 5.

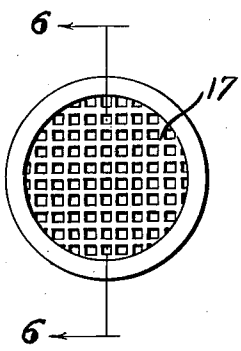
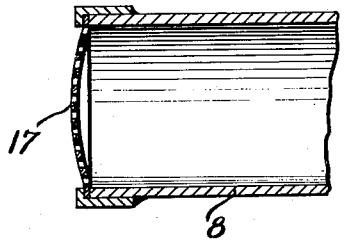


FIG. 6.



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UNITED STATES PATENT OFFICE

2,467,022

MARINE PROPULSION AND STEERING DEVICE

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Application July 17, 1946, Serial No. 684,297

1 Claim. (Cl. 115—16)

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This invention relates to improvements in boats, and more especially to novel means for propelling and steering boats.

An object of the invention is to provide simple and efficient means for propelling and steering a boat by the controlled passage of water through tubes which open through the front and sides of the boat, such passage of the water through the tubes being forced by means of screw propellers.

The exact nature of the present invention, as well as more specific objects and features thereof, will become apparent from the following description when considered in connection with the accompanying drawings in which:

Figure 1 is a view partly in top plan and partly in horizontal section, of a boat equipped with propelling and steering means embodying the present invention.

Figure 2 is a view partly in side elevation and partly in vertical longitudinal section, taken substantially on line 2—2 of Figure 1.

Figure 3 is an enlarged fragmentary transverse section taken on line 3—3 of Figure 1.

Figure 4 is a view similar to Figure 3, taken on line 4—4 of Figure 1.

Figure 5 is an enlarged end view of one of the tubes.

Figure 6 is a fragmentary section taken on line 6—6 of Figure 5.

Figure 7 is an enlarged view partly in section and partly in elevation, showing a form of electrical means for actuating each of the valves which control the entrance and exit of water to and from each tube and each branch thereof.

Referring in detail to the drawings, 5 indicates the hull of a boat provided with an opening at 6 at each side of the bow thereof below the water line of the boat. Another opening is provided at 7 in the stern of the boat below the water line and at each side of the longitudinal center of the boat. The openings at 6 and 7, at each side of the keel or longitudinal center of the boat are connected together by a tube 8 which extends longitudinally of the boat adjacent the bottom and below the floor 9 thereof. Each tube is adapted to conduct water from the bow to the stern through the boat, and each is provided with lateral branches 10 and 10*a*, respectively adjacent the bow and stern of the boat and opening through the adjacent side of the latter below the water line. Independently operable valves 11 are provided for controlling the entrance and exit of water to and from each end of each tube, and these valves are preferably of the iris type shown in Patent 2,321,336 granted June 8, 1943, to Albert

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W. Tondreau, so that the column of water passing through the tubes will always be symmetrical. A propeller 12 is arranged in each tube between the branches thereof, and means is provided for driving the propellers, selectively in opposite directions. As shown, each propeller has a shaft 13 extending from a reversing gearing 14 interposed between the propeller and a driving motor or engine 15. A clutch 16 is used to disconnect the engine from the drive shaft of gearing 14.

As shown in Figures 5 and 6, the ends of each tube and the outer end of each branch thereof is preferably covered by a grill or screen 17 so as to prevent entrance of trash and other foreign matter into each tube and the branches thereof, such as might interfere with the efficiency of the device or foul the propellers 12.

Any suitable operating means may be provided for valves 11. However, electrical power means is preferably provided for opening and closing each valve 11, so that all of the valves may be controlled from a single switch board at a particular location within the boat. For instance, as shown in Figure 7 the handle 18 of each valve may be provided with an extension 19 connected by a link 20 to the cores 21 of solenoids 22 located at opposite sides of said extension 19, a double throw switch 23 being provided to selectively energize the solenoids 22. Thus, energization of one solenoid 22 will cause closing of the valve and energization of the other solenoid 22 will cause opening thereof, the degree of opening being suitably regulated by any means common in the electrical art. Any suitable means may also be provided to automatically render the solenoids 22 inoperative when they move the handle 18 to an extent wherein the valve is either completely open or completely closed.

Each propeller 12 may be mounted at 24 in a removable section 25 of the associated tube 8, and the shaft 13 of each propeller may embody sections separably joined at 26 to provide a unit which is removable to facilitate repairing of the propeller or its mount 24. Each tube 8 has a covered manhole at 27 so that a workman may enter the tube for making repairs or uncoupling the sections of shaft 13 at 26.

Each branch 10 and 10*a* is controlled by a pair of spaced valves 11*a* and 11*b* which may be separately operated in the same way as the valves 11. Near the bow, one tube 8 is connected to the branch 10 of the other tube 8 at a point between the valves 11*a* and 11*b* of said branch by a cross tube 28 having valves 11*c* and 11*d* therein near the respective ends thereof. Near the stern, the

branch 10*a* of said one tube 8 is connected to the other tube 8 by a cross tube 28*a* having valves 11*e* and 11*f* therein near the respective ends thereof. The valves 11*c*, 11*d*, 11*e*, and 11*f* may also be separately operated in the same way as valves 11.

When travelling ahead in a straight course, the propellers 12 are driven so as to draw the water into the tubes 8 at the bow and discharge it at the stern, all valves being closed except the valves 11. In backing, the same conditions exist, except that the propellers are reversed to draw the water into the tubes at the stern and discharge it at the bow. In turning to the right while travelling ahead, the valves 11*a* and 11*b* of the front branch 10 of the left tube 8, the rear valve 11 of the same tube, the front valve 11 of the right tube 8, and the valves 11*a* and 11*b* of the rear branch 10*a* of the right tube 8 are opened, the remaining valves being closed and the propeller 12 of the left tube only being reversed. Water is thus discharged through the left front branch 10 and the right rear branch 10*a* to respectively force the bow to the right and the stern to the left. A left turn ahead is similarly effected by reversing the propeller 12 of the right tube only and discharging the water only through the right front branch 10 and rear left branch 10*a*. In turning while backing, the same principle is used. To move sidewise only, water is only discharged through the branches 10 and 10*a* at one side of the boat. For instance, to move sidewise to the right, valve 11*a* of the left front branch 10, valves 11*c* and 11*d* of the front cross tube 28, front valve 11 of left tube 8, valves 11*a* and 11*b* of the rear left branch 10*a* and rear valve 11 of the right tube 8 are opened, the remaining valves being closed and the propeller in right tube 8 being reversed. Water is thus drawn in the rear end of right tube 8 and forced through the front left branch 10 by way of front cross tube 28, while water is also drawn in the front end of left tube 8 and discharged through the left rear branch 10*a*.

It will of course be understood that the number of tubes and associated elements may be increased to any multiple of two with the same number of tubes located at each side of the keel or longitudinal center of the boat, depending upon the size of the boat or other conditions or requirements. The simplest form embodying only two tubes has been illustrated merely for sake of simplicity.

From the foregoing description, it is believed that the construction, operation and advantages of the present invention will be readily understood and appreciated by those skilled in the art. Minor changes are contemplated, such as fall within the spirit and scope of the invention as claimed.

What I claim is:

A boat having, in combination, at least one tube extending from a point in the bow longitudinally of the boat to the stern thereof below the water line and at each side of the keel, adapted to conduct water through the boat, each longitudinal tube having front and rear lateral branches respectively adjacent the bow and stern of the boat and opening through the adjacent side of the latter, independently operable valves controlling the entrance and exit of water into and from each end of each longitudinal tube, a propeller arranged in each longitudinal tube between the branches thereof, means for driving the propellers selectively in opposite directions, each branch of each longitudinal tube having two spaced valves, a cross tube connecting the forward portion of one longitudinal tube to the front branch of the other longitudinal tube between the spaced valves of said front branch, a second cross tube connecting the rear portion of said other longitudinal tube to the rear branch of said one longitudinal tube between the spaced valves of said rear branch, independently operable valves in said cross tubes, each of said valves being of the iris type and having an operating handle, and a manually controlled reciprocating motor operatively connected to the handle of each valve for opening and closing the latter.

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