J. J. OTTO.

MEANS FOR CONTROLLING A BOAT.

APPLICATION FILED JULY 27, 1914.

1,207,990.

Patented Dec. 12, 1916.

2 SHEETS—SHEET 1.

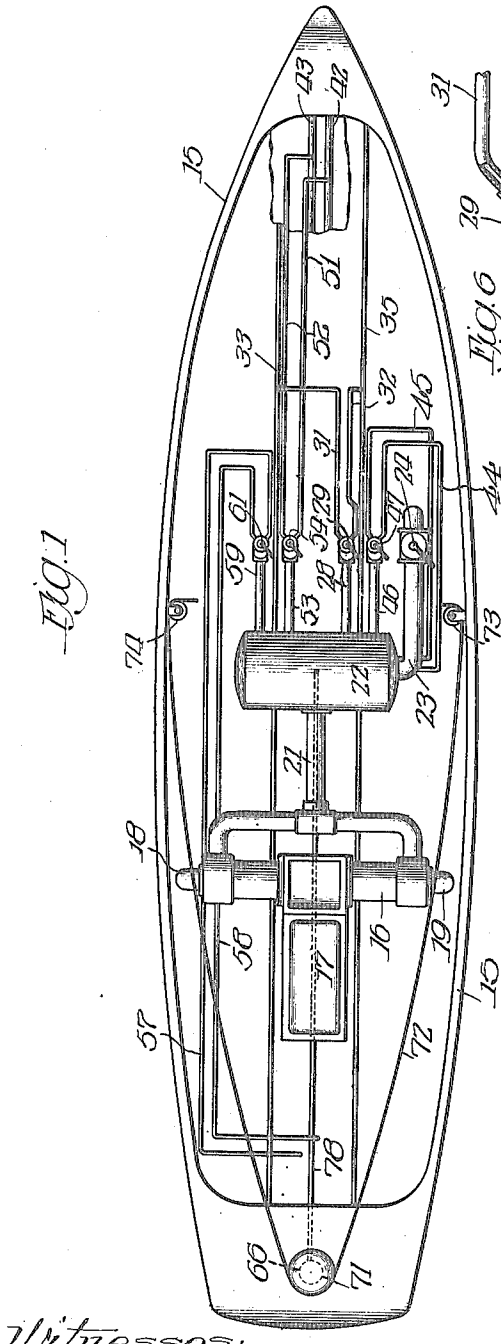


Fig. 1

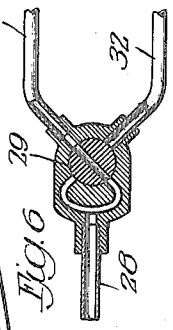


Fig. 6

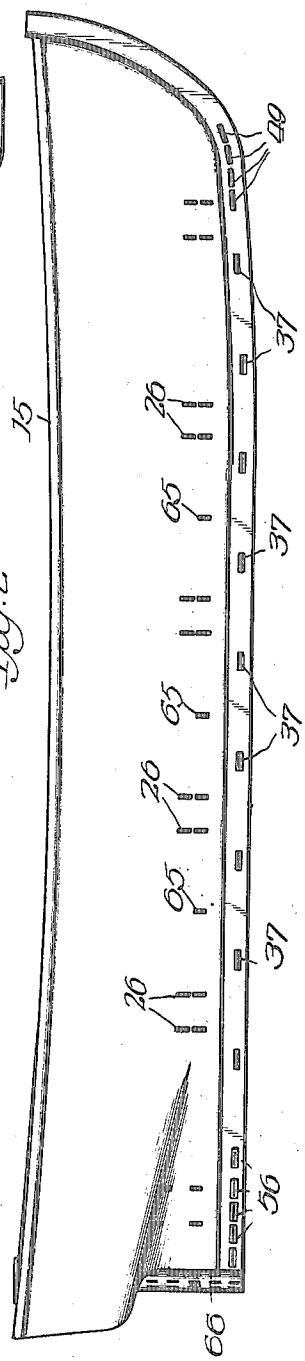


Fig. 2

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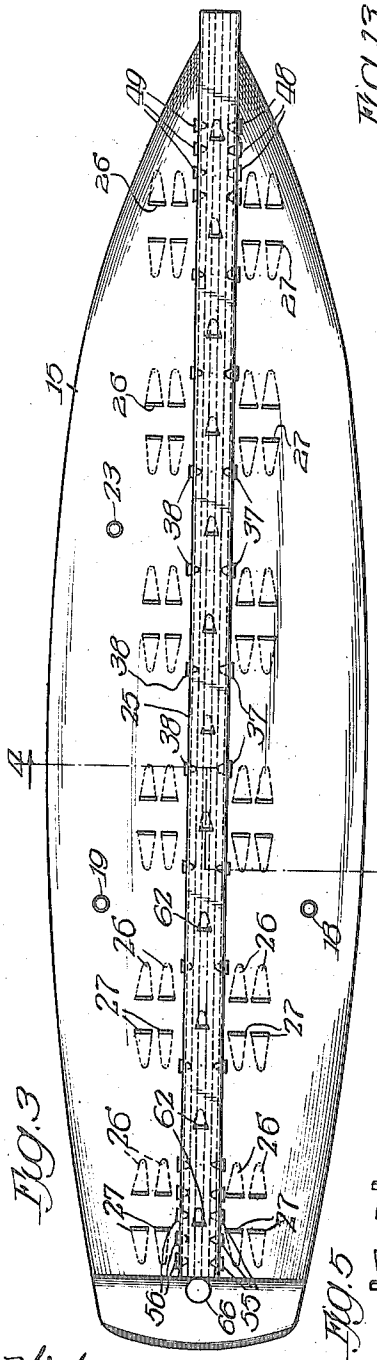


FIG. 3.

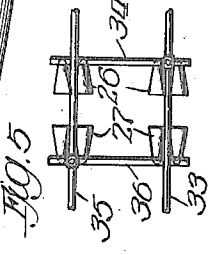


FIG. 5.

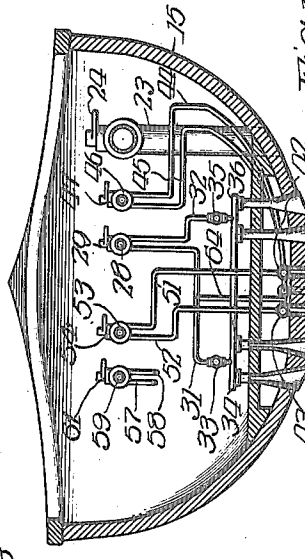


FIG. 4.

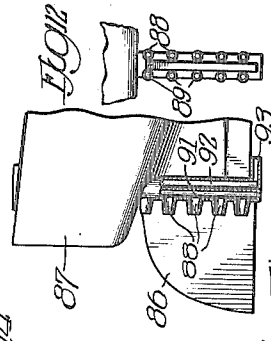


FIG. 12.

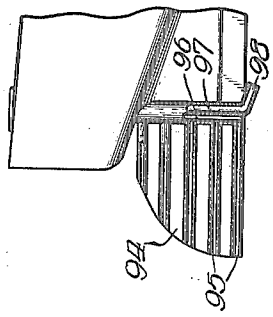


FIG. 13.

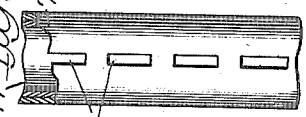


FIG. 9.

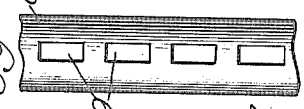


FIG. 8.

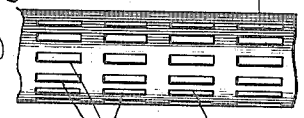


FIG. 7.

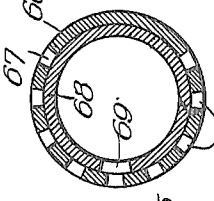


FIG. 10.



FIG. 11.

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UNITED STATES PATENT OFFICE.

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MEANS FOR CONTROLLING A BOAT.

1,207,990. Specification of Letters Patent. Patented Dec. 12, 1916.

Application filed July 27, 1914. Serial No. 853,531.

To all whom it may concern:

Be it known that I, JOHN J. OTTO, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Means for Controlling a Boat, of which the following is a specification.

This invention relates in general to the propulsion and control of boats and aims to provide a means by which a boat may be readily propelled in any desired direction and may be controlled in a positive manner by simple apparatus which can be cheaply installed and will be efficient and economical in operation.

One of the primary objects of this invention is to eliminate from a boat structure all the propelling screws and paddle wheels which have been customarily employed for propelling a boat, and to substitute therefor as a means of propulsion, jets of water which will be discharged from nozzles under pressure below the water line at such an angle as will propel the boat in the desired direction.

Another object is to provide several simple and efficient controlling mechanisms by means of which the water under pressure may be directed to the required nozzles so as to impart the desired motion to the boat.

A further object is to so control the boat that it will have a greater latitude of movement than it is possible to obtain by the ordinary means of control. In other words, my invention aims to so control a boat that it may be moved forwardly, backwardly, laterally in either direction, may be swung in a circle with the stern as an axis, may be swung in a circle with the bow as an axis, or may be turned about within its own length with the center of the boat as an axis.

Another object of the invention is to provide novel means adapted to be employed in lieu of the usual rudder for controlling the direction of the boat when moving forwardly.

Other objects and many of the attendant advantages of this invention will be readily apparent as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings.

Referring to the drawings Figure 1 is a plan view of a boat equipped with means for carrying out my improved system of control; Fig. 2 is a side elevation thereof; Fig. 3 is a bottom view of the boat shown in Figs. 1 and 2; Fig. 4 is a transversely sectional view taken on the line 4—4 of Fig. 3; Fig. 5 is a fragmentary detail view showing the arrangement of the nozzles for propelling the boat forwardly and backwardly; Fig. 6 is a detail sectional view of one of the controlling valves; Fig. 7 is a fragmentary elevation of the casing of one form of my improved steering device; Fig. 8 is a similar view of the valve disposed within said casing; Fig. 9 is a similar view of a modified form of steering device; Fig. 10 is a transverse sectional view of a steering device showing the parts disclosed in Figs. 7 and 8 in assembled position; Fig. 11 is a similar view of a combined steering and propelling device; Fig. 12 is a fragmentary rear elevation of another form of propelling and steering device; Fig. 13 is a side elevation partly in section of the structure shown in Fig. 12, and Fig. 14 is a view similar to Fig. 13 of still another form of propelling and steering device.

On the drawings reference character 15 designates generally the hull of a boat which may be of any design, shape and construction adapted for the particular purpose for which the boat is to be employed. In carrying out my invention I contemplate the utilization of water, under pressure, which is ejected from suitably disposed nozzles beneath the water line into the surrounding water in a direction opposite from that in which it is desired that the boat shall travel. The resistance to the jets afforded by the surrounding water will cause the boat to move through the water away from the direction of ejectment, and, by controlling the direction of discharge of the jets I am enabled to cause the boat to travel in any desired direction. One form of mechanism for accomplishing this result comprises a pump 16, preferably of the double acting type, driven by a motor 17 and having two inlet pipes, 18 and 19 respectively, located in any desired position below the water line. The discharge from the pump is conducted by a pipe 21 to a pressure chamber 22 from which the pipes to the various jets lead. A main discharge pipe 23 discharges directly through the bottom of the hull, said pipe being equipped with a hand valve 24 which is open when all of the other leads are closed to thereby permit the water from the con-

tinuously acting pump to be discharged directly and with little resistance so that no movement of the boat is produced.

For the purpose of moving the boat forwardly or backwardly I employ a series of sets of nozzles distributed over the bottom of the hull. The nozzles are arranged preferably in pairs on each side of the keel 25, the rearwardly discharging nozzles, which propel the boat forwardly, being indicated by reference character 26, and the forwardly projecting nozzles, by means of which the boat is propelled rearwardly, being indicated by reference character 27. The water under pressure is delivered to these nozzles from the pressure tank 22 through a system of piping which will now be described. Referring to Figs. 1 and 4, it will be observed that a main pipe 28 connected with the reservoir 22 is equipped with a two-way valve 29 (Fig. 6) by means of which water under pressure may be directed to the branches 31 and 32 at will. The branch 31 is connected with a pipe 33 extending longitudinally of the boat adjacent the bottom thereof, said pipe 33 being connected by branches 34 with the nozzles 26 located at intervals in the bottom of the boat and adapted to propel the boat forwardly as the jets of water issue therefrom under pressure. The branch 32 is connected with a similar longitudinally disposed pipe 35 communicating through branches 36 with the forwardly opening nozzles 27 adapted to propel the boat rearwardly as the jets of water are ejected therefrom under pressure in a forward direction. It will be manifest that by manipulation of the valve 29 the water under pressure may be directed either to the nozzles 26 or 27, so that the boat will be propelled forwardly or rearwardly as desired.

For the purpose of propelling the boat laterally, as would be desirable in moving to or away from a dock, I have provided a series of nozzles 37 opening laterally from the keel 25, a similar set of nozzles 38 being located at the opposite side of the keel to move the boat in the opposite direction. These nozzles are connected by conduits 39 and 41 with longitudinally extending pipes 42 and 43 respectively, said pipes being plugged or stopped by suitable devision walls or plugs beyond the end nozzles 37 and 38 for a purpose to be later explained. Water is supplied to the pipes 42 and 43 through branches 44 and 45 leading from a main pipe 46 equipped with a two-way valve 47 similar to the valve 29 by means of which water from the pressure reservoir may be diverted to either set of laterally projecting nozzles, as required. When the boat is being propelled forwardly or rearwardly in a straight line obviously the nozzles 37 and 38 will not be used and the valve 47 will be set in closed position.

For the purpose of moving the prow of the boat laterally in either direction so that the boat may be swung about the stern as an axis, I have provided near the front end of the keel sets of oppositely disposed laterally opening nozzles 48 and 49 connected with the pipes 43 and 42 in front of the partition or plug previously mentioned. These portions of the pipes are connected by branches 51 and 52 with a main pipe 53 leading from the supply reservoir and also equipped with a two-way valve 54. When the valve is positioned to direct the water to the jets 48 the boat will be swung to the right, viewing Fig. 1, at its prow and when water is delivered to the nozzles 49 the prow of the boat will be moved to the left. It will be obvious that lateral movement of the prow in either direction may be readily effected by manipulation of the valve 54. In a similar manner the stern of the boat may be moved laterally in either direction by means of sets of oppositely disposed nozzles 55 and 56, also connected to the pipes 42 and 43 at the rear of the plugs or partitions which divide the rear ends of the pipes from the central portions. Water is supplied to the nozzles 55 and 56 through branches 57 and 58 respectively, connected with a main pipe 59 leading from the pressure reservoir 22 and similarly equipped with a two-way valve 61. By manipulating the valve 61 the stern may be swung in either direction, and it will be obvious that the jets 48 and 55 may be used in conjunction with the side nozzles 37 to move the boat laterally in one direction and that jets 49 and 56 may be used in conjunction with the nozzles 38 to move the boat laterally in the opposite direction. Furthermore, nozzles 48 and 56 may be employed simultaneously to swing the boat in a circle about its center as an axis in a clockwise direction, viewing Fig. 1, and nozzles 49 and 55 may be employed simultaneously to swing the boat in a circle about its center as an axis in the opposite direction.

The action of the jets 26 to propel the boat forwardly may be augmented by auxiliary rearwardly projecting nozzles 62 disposed in the bottom of the keel and connected to a longitudinally extending pipe 63 which receives its water through a branch pipe 64 connected with the branch 31. The side of the boat above the keel may be provided with laterally opening nozzles 65 connected with the pipe 42 to operate in conjunction with the nozzles 37, and the opposite side of the boat may be equipped with a similar series of nozzles (not shown) adapted to coöperate with the nozzles 38.

A boat equipped with nozzles distributed in position as above described may be propelled and guided without any rudder, if desired. I prefer, however, to employ a steering device which will take the place of

the usual rudder and which is constructed as best shown in Figs. 7, 8 and 10. This steering device comprises an outer cylindrical casing 66 provided with a series of radially disposed ports 67, the casing being mounted at the stern of the boat in the position usually occupied by the rudder, as shown in Fig. 2. A cylinder 68 provided with one row of ports 69 is mounted to turn within the casing 66, so as to aline the ports 69 with the required ports 67 through which water under pressure supplied to the cylinder 68 will be projected to act substantially as a rudder.

The upper end of cylinder 68 carries a wheel 71 around which a steering rope 72 is wound, said rope being trained over pulleys 73 and 74 and wrapped about a helm wheel or other suitable steering mechanism (not shown). It will be manifest that when the cylinder 68 is positioned as shown in Fig. 10 the jets of water will be projected rearwardly to not only maintain the boat in a directly forward line of travel but said jets will also assist in propelling the boat. When the cylinder 68 is turned to the right or the left of the position shown in Fig. 10 so that the water jets will be discharged through the laterally disposed ports 67 the stern of the boat will obviously be swung in a direction away from the issuing jets, thereby changing the course of the boat.

In Fig. 9 I have disclosed another form of steering device which comprises a cylinder 75 provided with ports 76, this cylinder being substantially like cylinder 68, and the operation being similar, the casing 66, however, being omitted. When it is desired to completely shut off the steering device shown in Figs. 7, 8 and 10 the cylinder 68 is turned so that the ports 69 are completely covered by the solid front portion of casing 66. In order to close the ports 76 of the cylinder 75 a sector-shaped portion 77 of a cylinder is disposed within the cylinder 75 so that when cylinder 75 is turned through an angle of 180 degrees from the position shown in Fig. 9 the ports 76 will be closed by the sector-shaped portion 77. Water under pressure is supplied to the cylinder 68 or the cylinder 75 as the case may be, through a pipe 78 connected at one end with said cylinder and at its other end directly with the pressure reservoir 22.

For small boats in which the large number of jets in the bottom of the boat would be unnecessary, or the construction would be too expensive, and for boats already constructed to which the jets could not be readily applied I prefer to employ a device which will act both as a propeller and steering device. One form of such a construction is shown in Fig. 11, in which reference character 79 indicates a fragment of a stern of a boat to which a casing 81 equipped with ports 82, similar to the casing 66, is secured. A cylinder 83 having ports 84 similar to cylinder 68 is disposed within the casing 81 and is operated in the same way to propel and steer the boat. In order that the boat may be reversed the casing 81 is provided with forwardly opening ports 85 and when port 84 is alined therewith jets of water will be projected forwardly through these ports to move the boat rearwardly.

In Figs. 12 and 13 I have shown another form of propelling and steering device, particularly adapted for small boats. In this instance a rudder 86 is mounted on the boat body 87 and a plurality of nozzles 88 and 89 are disposed at opposite sides of said rudder to discharge jets of water rearwardly parallel with the rudder. The nozzles are mounted to turn with the rudder so that the issuing jets not only propel the boat but also assist in the steering. Water under pressure is supplied to the jets from a pipe 91. Another pipe 92 terminates in a forwardly projecting nozzle 93, and when it is desired to reverse the boat the water is shut off from pipe 91 and admitted to pipe 92 so that it will issue from the nozzle 93 to move the boat rearwardly.

In Fig. 14 I have shown another form of propelling and steering device in which the rudder 94 is equipped with a series of nozzles 95 opening at the rear edge thereof. These nozzles are supplied with water under pressure from a pipe 96 and another pipe 97, terminating in a forwardly projecting nozzle 98, is utilized to reverse the direction of travel of the boat.

It is believed that my improved method of propelling and controlling a boat and one embodiment of means for carrying this method into effect will be fully understood from the foregoing without further description, and it should be understood that my invention is capable of considerable variation without departing from the spirit of the invention as set forth in the following claims.

I claim:

1. The combination of a boat hull, comprising a keel, nozzles distributed throughout the length of said keel and arranged to discharge from the bottom and sides thereof, the laterally discharging nozzles being arranged closer together at the ends of the keel, and means for supplying fluid under pressure to said nozzles.

2. The combination of a boat hull comprising a keel, nozzles distributed throughout the length of said keel and arranged to discharge from the bottom and sides thereof, the laterally discharging nozzles being arranged closer together at the ends of the keel and each of said nozzles having a flattened discharge orifice, and means for supplying fluid under pressure to said nozzles.

3. The combination of a boat hull, a tubular member positioned at the rear thereof and provided with a plurality of rows of openings arranged in rows longitudinally and circumferentially of the member, a pipe rotatably mounted inside said member and provided with a single longitudinal row of openings adapted to be alined with any of the surrounding rows in said member, means for supplying fluid under pressure to said pipe, means whereby said pipe may be turned so as to discharge the fluid from said member in any desired direction.

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