April 28, 1953 B. B. JOHNSON 2,636,467

HYDRAULIC JET MARINE PROPULSION SYSTEM

Filed May 31, 1949

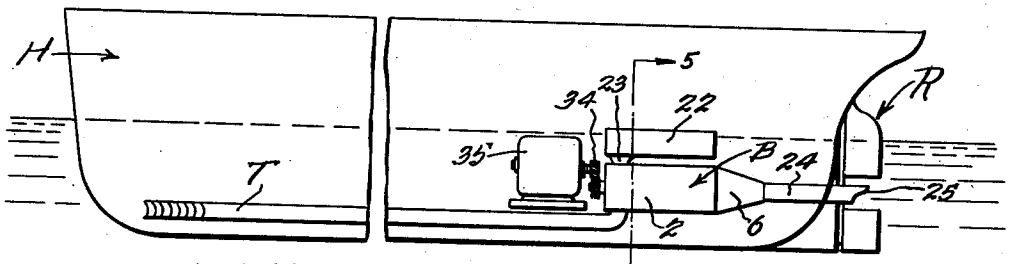


Fig. 1.

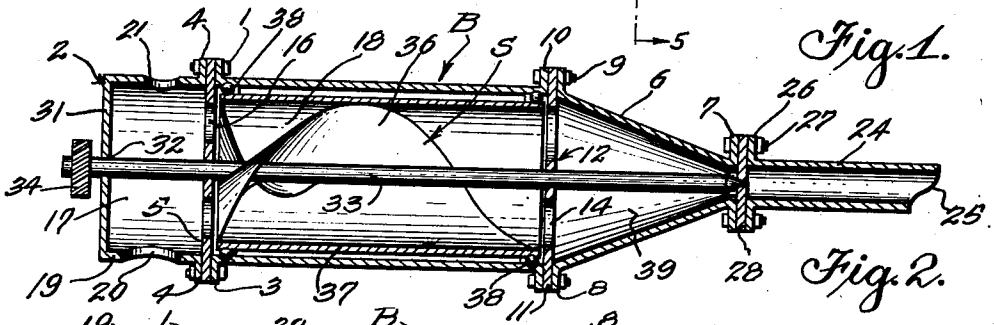


Fig. 2.

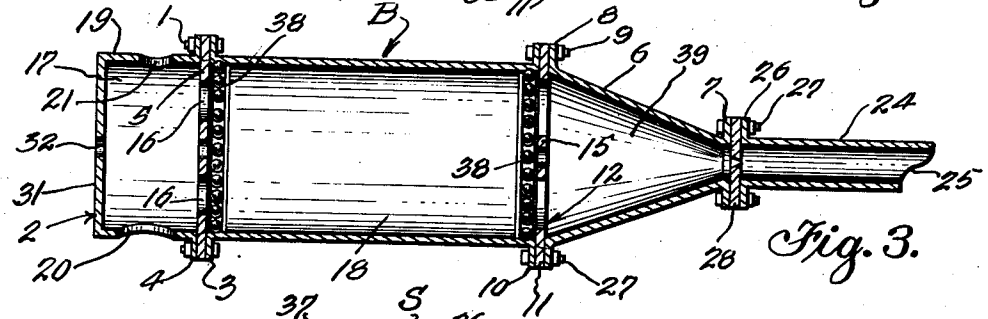


Fig. 3.

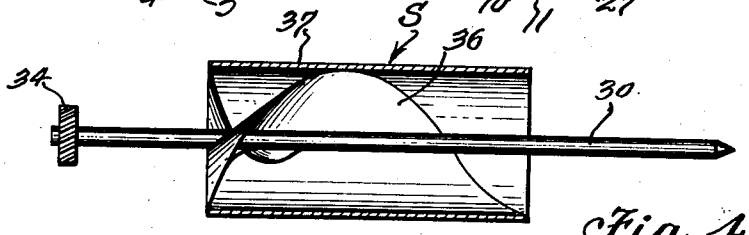


Fig. 4.

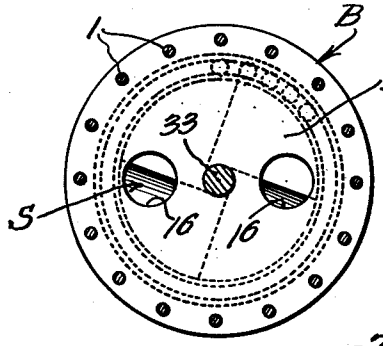


Fig. 5.

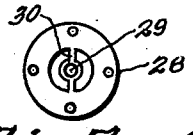


Fig. 7.

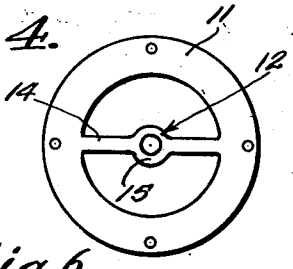


Fig. 6.

INVENTOR.
Bruce B. Johnson.
BY
Wilfred E. Lawson
ATTORNEY.

Patented Apr. 28, 1953

2,636,467

UNITED STATES PATENT OFFICE

2,636,467

HYDRAULIC JET MARINE PROPULSION SYSTEM

Bruce B. Johnson, Pasadena, Calif.

Application May 31, 1949, Serial No. 96,521

5 Claims. (Cl. 115—16)

1

This invention relates to ship screw propulsion means and it is primarily an object of the invention to provide a means of this kind to increase speed as well as to assure greater maneuverability.

It is recognized by modern authorities that the ordinary method of propulsion of deep water craft by means of propellers is less efficient than might otherwise be the case, for the reason that such propellers do scarcely more than slice the water through which the craft is being propelled, with a resultant loss of potential speed and power. It is an object of the invention to improve upon methods of propulsion of deep water craft, by means of elongation and enclosure of the propeller mechanism, and by impounding the water against which this elongated propeller mechanism expands it force, so that instead of the propeller mechanism coming into direct contact with the open seat, it tends rather to force a stream of this impounded water through an elongated tube before it impacts the sea, and whereby the impact of this impounded water against the sea takes place under the stern of the deep water craft.

The invention also has for an object to provide a propulsion unit to be mounted on the hull of a vessel and including a housing in which a driven screw propeller is mounted and wherein the housing aft of the screw propeller is reduced in diameter to form a conical enclosure continued by an ejection tube of a length to extend from the applied housing to the stern of the hull.

A still further object of the invention is to provide a propeller means of this kind including a driven screw having the blade of varying angular deviation.

The invention consists in the details of construction and in the combination and arrangement of the several parts of my improved ship screw propulsion means whereby certain advantages are attained, as will be hereinafter more fully set forth.

In order that my invention may be better understood, I will now proceed to describe the same with reference to the accompanying drawings, wherein:

Figure 1 is a view in side elevation and of a diagrammatic character illustrating a ship screw propulsion means in accordance with an embodiment of the invention;

Figure 2 is a sectional view taken longitudinally through the barrel and associated parts as herein comprised, certain of the parts being in elevation and the ejecting tube in fragment;

Figure 3 is a longitudinal sectional view taken through the barrel and the inner portion of the ejecting tube, the screw and its housing being omitted;

2

Figure 4 is a view partly in elevation and partly in section of the screw assembly herein comprised; and

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 1 with parts omitted;

Figure 6 is an elevational view of the rear or aft bearing member unapplied;

Figure 7 is an elevational view of the aft bearing member unapplied.

In the invention as illustrated by the accompanying drawings, B denotes an elongated barrel of desired dimensions and open at both ends. Bolted, as at 1, or otherwise rigidly held to the fore end of the barrel B is a cup-like head 2. The bolts 1 are disposed through the outstanding surrounding flange 3 carried by the fore extremity of the barrel B and through the surrounding flange 4 at the inner or open end of the head 2. The bolts 1 also pass through the marginal portion of a bulk head or plate 5 which is disposed across the fore open end of the barrel B.

The barrel B is cylindrical as is also the head 2 and secured to the aft end of the barrel B is a conical head 6. The apex of the applied member 6 is outwardly disposed and open and said open apex is defined by a surrounding flange 7 at right angles to the axis of the head 6.

The inner or larger end of the head 6 is also defined by an outstanding surrounding flange 8 substantially perpendicular to the axis of the head 6 and through which are disposed the holding bolts 9 or the like which also pass through the outstanding surrounding flange 10 defining the aft end of the barrel B. The bolts 9 also pass through the annular flat rim 11 of a bearing member 12. The rim 11 is rigidly connected by the two radially aligned spokes 14 with the central flat bearing hub 15. The rim 11, spokes 14 and hub bearing 15 are co-planar.

The bulk head or plate 5 is provided therethrough with the openings 16 so positioned to readily admit a flow of water from the intake chamber 17 provided by the cup like head 2 into the main chamber 18 of the barrel B and in harmony with the rotary motion of the screw propeller unit S to be hereinafter more particularly referred to.

The side wall 19 in the lower portion thereof is provided with an intake port 20 and in the upper portion of said side wall 19 is a second inlet port 21.

Delivering into the intake chamber 17 through the port 20 is a forwardly extending elongated intake tube T. The outer or eduction end of the

tube T preferably has associated therewith a suitable screen to substantially eliminate sealife of any kind or other foreign matter passing into the chamber 17. As the screen may be of any character desired and an obvious expedient, it is not believed necessary that the same be described or illustrated.

Overlying the barrel B is a reserve reservoir 22 of desired capacity and which is in communication with the intake chamber 17 through the port 20 through the connecting conduit 23.

Leading from the open outer or apex end of the head or "jetty" 6 is an ejection tube 24 and of a length in practice to extend through and beyond the stern of the ship hull and terminating adjacent to the rudder R. The outer extremity of the tube 24 is provided with the cowled vent 25.

The inner end of the tube 24 is defined by an outstanding surrounding flange 26 to permit attachment to the flange 7 of the head 6 by the bolts 27 or the like. The bolts 27 are also disposed through the outer flat rim 28 concentric to a bearing hub 29 and connected thereto by the spokes 30 (see Figure 7). The rim 28 is interposed between the flanges 7 and 26.

The outer wall 31 of the head 2 is provided with an opening 32 through which snugly but freely engages an end portion of a shaft 33 comprised in the screw propulsion unit S. This shaft 33 is of a length to extend axially through the barrel B and the heads 2 and 6 with its inner end operatively engaged with the bearing hub 29 at the outer or apex end of the head 6. The shaft is also disposed through the plate or bulk head 5 and the hub 15 of the bearing member 12 and thus maintaining the shaft in effective position.

The shaft 33 extends outwardly beyond the head 2 and said extended portion of the shaft 33 is operatively engaged, as at 34, with a suitable driving medium generally indicated at 35 in the drawings and which may be one of the ship motors.

That portion of the shaft 33 within the barrel B carries a spiral screw propeller 36. The propeller is of angular deviation and of a length substantially coextensive in length with the barrel B.

The propeller 36 is housed within a sheath or sleeve 37 rigidly secured to the outer edges of the propeller for rotation therewith. The sheath or sleeve 37 is coextensive in length with the propeller 36 and of a major diameter closely approaching the inner diameter of the barrel B. Interposed between the barrel B and the sheath or sleeve 37 at the extremities thereof are the anti-friction assemblies 38 which may be as desired.

As is shown in Figure 2 of the drawing the forward end of the propeller 36 closely approaches the adjacent plate or bulk head 5, which may also be termed a valve plate and therefore the propeller 36 rotates in close tolerance to said valve plate or bulk head 5 and thus assures a closed surface passing at all times over the openings 16. This serves to enclose the water passing through the sheath or sleeve 37 and thus substantially eliminating backwash of such water and assuring the water being effectively driven out through the reducing chamber 39 provided by the head 6 and out through the ejection tube 24.

The propeller 36 at the forward end portion thereof or that portion immediately adjacent to the valve plate or bulk head 5 is on an angle approximately thirty (30°) degrees and after about a one half turn this angle increases rearwardly to reach at its aft end an angle approximately seventy (70°) degrees. The purpose of this varying angular deviation is to force the water rearwardly with a thrust which will give whirling action to the water as it enters the conical chamber 38 of the reducing head or "jetty" 6.

The tube T is within the hull H and below the water level and close to the level of the keel and opens through the hull at the prow or nose thereof. The other parts of the assembly are also suitably mounted within the hull with the ejection tube extending out through the stern of the boat, as hereinbefore explained.

The shaft 23 is driven by the motive power of the craft and the propeller or spiral blade 36 tends to create a potential vacuum condition in the barrel B thereby drawing water through the tube T, intake chamber 17 and through the openings 16 of the valve plate 5 into the sleeve or sheath 37. The water is forced by the propeller or blade 36 into the reducing chamber 39 of the head or "jetty" 6 and into and out through the ejection tube and into the sea under the stern of the craft. The cowl 25 at the outer or discharge end of the ejection tube 24 is so disposed to throw the water discharged from the tube 24 downward and rearward whereby the force of the water as discharged from the tube 24 is prevented from exhausting its force with a resultant loss of power which would otherwise be the case if the discharge water were allowed to spill upward and create a foaming wake.

In operation, the reservoir 22 is maintained substantially full with the water content under a certain degree of air pressure. This condition is maintained by the water drawn into the intake chamber 17. The reservoir 22 is provided to assure and equalize the supply of water from the chamber 17 to the sheath or sleeve 37 and especially under weather conditions wherein the nose of the craft may be lifted momentarily out of the water.

From the foregoing description it is thought to be obvious that a ship screw propulsion means constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated.

I claim:

1. An apparatus of the character described, and in combination with a vessel's hull of a propulsion unit comprising a fixed housing mounted in said hull, an intake tube extending longitudinally along and parallel to the vessel's keel and opening outside the hull at one end and connected to the housing at the other end thereof, a shaft, a spiral screw propeller blade of varying angular deviation on said shaft rotatably mounted therewith coaxially within said housing, a sheath fixed to and circumferentially enclosing said blade, driving means mounted in said hull cooperatively engaging said shaft, means mounted transversely within said housing and cooperatively associated with the forward end of said blade to provide a valve means, said housing aft of said blade diminishing in diameter forming a conical enclosure, and an ejection tube extending from the aft end of said conical enclosure parallel to said keel and through the hull at the stern.

2. An apparatus as set forth in claim 1 wherein a cowled vent is provided at the outer extremity of the ejection tube.

3. An apparatus as set forth in claim 1, wherein the housing in advance of the valve means constitutes an intake chamber with which the

intake tube communicates, and a reservoir independent of the intake tube in communication with the intake chamber.

4. A propulsion unit including a housing, an intake tube in communication with one end portion of the housing, the opposite end portion of the housing being continued by a conical extension providing a reducing chamber, an ejection tube leading from the apex portion of the conical extension, a spiral screw propeller mounted for rotation within the housing forward of the conical extension, a sheath fixed to and surrounding the propeller, said propeller being of varying angular deviation, means for rotating the propeller, means within and disposed transversely of the housing forward of but in close proximity to the propeller and cooperatively associated with the propeller to provide a valve means, the portion of the housing in advance of said valve means constituting an intake chamber, and an intake tube in communication with the intake chamber.

5. A unit as set forth in claim 4, wherein the means mounted within and transversely of the

housing comprises a plate having openings therethrough.

BRUCE B. JOHNSON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
94,463	Aubert	Sept. 7, 1869
617,969	Plecher	Jan. 17, 1899
776,416	Norden	Nov. 29, 1904
1,023,515	Graves	Apr. 16, 1912
1,104,963	Coanda	July 28, 1914
1,239,009	Hicks	Sept. 4, 1917
1,326,730	Helguera	Dec. 30, 1919
1,545,723	Zewisler	July 14, 1925
1,687,360	Bolgiano et al.	Oct. 9, 1928
2,467,022	Forlano	Apr. 12, 1949

FOREIGN PATENTS

Number	Country	Date
390,774	Germany	Mar. 3, 1924