June 20, 1961 E. P. JOHNSON 2,988,880

BOAT PROPELLING MEANS

Filed Oct. 6, 1959

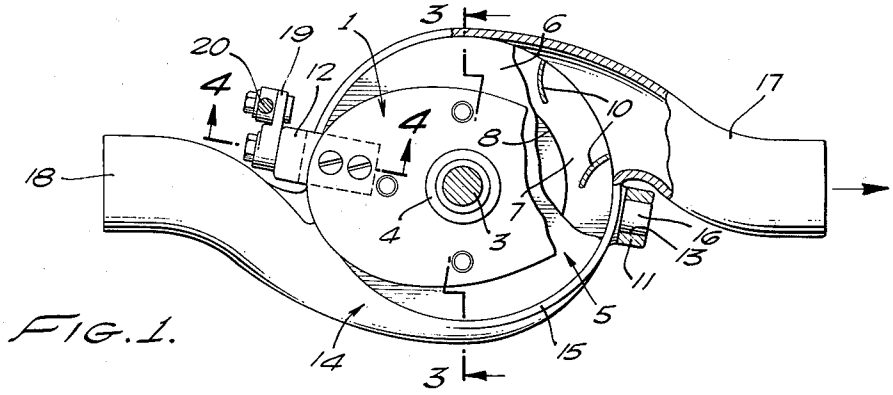

FIG. 1.

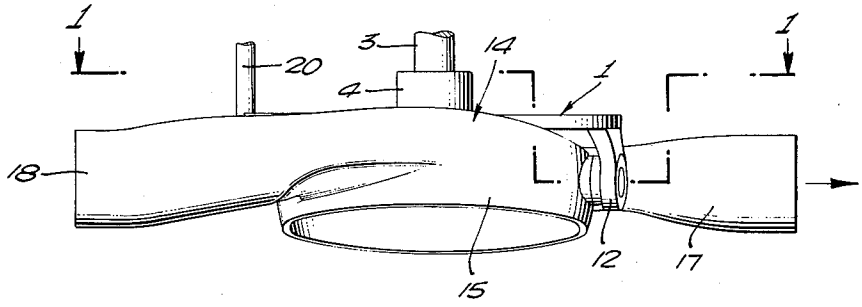

FIG. 2.

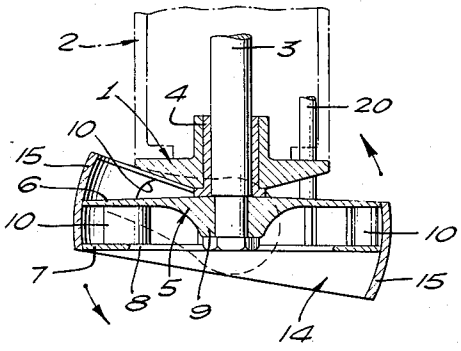

FIG. 3.

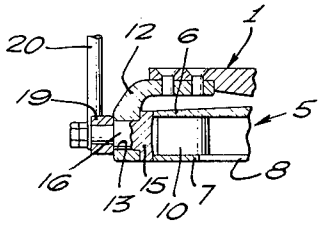

FIG. 4.

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United States Patent Office 2,988,880
Patented June 20, 1961

2,988,880

BOAT PROPELLING MEANS

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Filed Oct. 6, 1959, Ser. No. 844,671
3 Claims. (Cl. 60—35.55)

This invention relates to boat propelling means, more particularly to means whereby a boat is propelled by a water jet.

Included in the objects of this invention are:

First, to provide a boat propelling means which may be adapted to installation at the lower end of the propeller shaft of an outboard motor in place of the conventional propeller, and when so arranged effects steering of the boat by turning the outboard motor in a conventional manner.

Second, to provide a boat propelling means of the water jet type, which incorporates a novel means for reversing the direction of the water jet and is operable without affecting the motor drive, so that the reversing means may be utilized as a brake to slow movement of the boat as well as to effect reversal of movement.

Third, to provide a boat propelling means of the water jet type which is safe as well as protected from floating or submerged objects, in that all moving parts are enclosed and guarded.

Fourth, to provide a boat propelling means which is capable of propelling a boat through weeds and water plants which would foul a conventional propeller, and which requires a minimum of draft to permit passage of the boat in water too shallow for use of conventional propellers.

With the above and other objects in view, as may appear hereinafter, reference is directed to the accompanying drawings in which:

FIGURE 1 is a partial top view, partial sectional view thereof taken substantially along 1—1 of FIGURE 2;

FIGURE 2 is a side view thereof with the propeller shaft and control rod shown fragmentarily;

FIGURE 3 is a transverse sectional view through 3—3 of FIGURE 1;

FIGURE 4 is a fragmentary sectional view through 4—4 of FIGURE 1.

The boat propelling means as illustrated is arranged for connection to a conventional outboard motor in place of the conventional propeller. For this purpose a mounting plate 1 is provided which is shaped for mounting at the lower end of a conventional propeller shaft housing 2, indicated fragmentarily by broken lines in FIGURE 3. A propeller shaft 3 extends downwardly through the housing 2 and may be conventional except that its lower end may be modified to pass through a bearing 4 provided in the mounting plate 1 and arranged for drive connection to a rotor 5.

The rotor 5 is in the form of a pump impeller and includes a top disk 6 and a bottom disk 7 of equal diameter. The bottom disk is provided with a large, circular inlet 8. The top disk is provided with a central hub 9 which flares upwardly and outwardly to direct water entering upwardly through the inlet 8. The propeller shaft 3 is secured in the conventional manner within the hub 9. Between the peripheral portions of the top and bottom disks 6 and 7 are impeller blades 10 for forcibly directing water radially from the rotor 5. The forward and rearward extremities of the mounting plate 1 extend beyond the rotor 5 and are provided with depending brackets 11 and 12, one of which may be removable. The brackets 11 and 12 are bored to form bearings 13 which define an axis passing at right angles through the axis of rotation of the propeller shaft 3 and approximately midway between the top and bottom disks 6 and 7.

The rotor 5 is encased in a rotor housing 14 which includes a shell 15 in the form of a spherical zone. The zone shell 15 is provided with diametrically extending journal pins 16 which fit within the bearings 13 so that the zone shell pivots about the axis of the bearings 13.

In the region of the bearings 13, the vertical thickness of the zone shell 15 is substantially equal to the vertical thickness of the rotor 5. The zone shell increases in vertical dimension from the axis of the bearings 13 and journal pins 16 until it points at right angles thereto, the zone shell having a vertical dimension approximately twice that of the rotor 5, as shown best in FIGURE 3. Stated otherwise, the zone shell 15 comprises two zones equal to the height of the rotor 5, which define acutely related planes shearing the common axis of the bearings 13 and journal pins 16.

Extending tangentially from each of the zones thus defined, and in diametrically opposite relation to each other, is a pair of discharge tubes 17 and 18. The discharge tubes are circumferentially elongated at their root ends and curve outwardly from the zone shell 15 so as to bring their extended ends into coaxial relation, and directed rearwardly and forwardly, respectively.

One of the journal pins 16 extends beyond its bearing 13 and is provide with a lever 19 arranged for connection to an upwardly directed control rod 20 so that the rotor housing 14 may be tilted a limited amount about the common axis of the bearings 13 and journal pins 16.

Ideally, the common axis of the bearing 13 and pins 16 should coincide with the common axis of the discharge tubes 17 and 18. However, to facilitate construction of the rotor housing 14, the journal pin axis may be displaced from the common discharge tube axis, as shown in FIGURE 1.

Operation of the boat propelling means is as follows:

When the spherical zone shell 15 of the housing 14 is in one extreme position, such as shown in FIGURE 3, water is drawn upwardly through the inlet 8 of the rotor 5 and discharged through the tube, the root end of which is in the zone coinciding with the rotor 5.

In the drawing the rotor housing 14 is shown in a position wherein water is discharged from the rearwardly directed tube 17 so as to propel the boat forwardly. If the housing is rocked to the opposite extreme position from that shown, for example, in FIGURE 3, the water is discharged from the forwardly directed tube 18 so as to propel the boat rearwardly. Normally, the water is discharged from the tube 17 so as to propel the boat forwardly, and the boat is steered by turning the outboard motor and its propeller shaft housing 2 in the conventional manner.

The direction of thrust may be instantly changed at any time by tilting the rotor housing 14, with the result that an effective braking action is accomplished. If it is desired to diminish the effective thrust of the propelling means without changing the speed of the outboard motor, the motor housing 14 may be tilted to any appropriate intermediate position. Thus the rotor housing 14 may be moved to a "neutral" position in which the thrust in opposite directions is balanced.

While the boat propelling means is particularly adapted for connection to conventional outboard motors in place of the conventional propeller, it will be noted that the boat propelling means is also adapted for connection to conventional inboard motor installations by the use of appropriate adapters so as to provide a vertical shaft for the rotor 5.

It will be observed that the rotor 5 is substantially protected by the housing 14 so that debris or submerged objects and water cannot engage or damage the rotor. Also

it should be observed that the shrouding of the rotor permits use of the boat propelling means in areas frequented by swimmers without danger to the swimmers.

While a particular embodiment of this invention has been shown and described, it is not intended to limit the same to the exact details of the construction set forth, and it embraces such changes, modifications, and equivalents of the parts and their formation and arrangement as come within the purview of the appended claims.

What is claimed is:

1. A boat propelling means mounted at the lower end of a propeller shaft housing containing a propeller shaft, comprising: a mounting structure secured to the lower end of said propeller shaft housing; a rotor mounted on the lower end of said propeller shaft; a rotor housing enveloping said rotor having an axial end defining an intake port and diametrically oppositely directed discharge ducts having entrances disposed in different annular zones of said rotor housing; and means for supporting said rotor housing from said mounting structure to tilt said rotor housing about an axis transverse to said propeller shaft thereby to bring either of said discharge ducts into operative relation with said rotor.

2. A boat propelling means, comprising: a rotor defining central intake and peripheral discharge passages for the flow of water; a housing structure defining two annular zones surrounding said rotor and disposed in angularly related planes passing through a common axis through the median plane of said rotor, and a discharge duct emerging from each of said zones; and means for tilting said housing structure about said common axis to bring either of said annular zones into cooperative relation wtih said rotor.

3. A boat propelling means, comprising: a rotor having a substantially vertical axis of rotation, a central water intake port at its under side and peripheral discharge ports; a housing member including an annular shell surrounding said rotor and defining two annular and angularly related zones having planes sharing a common axis passing transversely through said rotor axis whereby, on tilting said housing structure about said common axis, either of said zones is brought into registry with said rotor, and a jet discharge duct emerging from each of said zones.

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