DEVICE FOR BOAT PROPULSION, STEERING AND REVERSING OF SAME

William C. Aubrey, Schenectady, N.Y., assignor of one-fifth to Murray M. Jaros, Albany, N.Y.

Filed June 14, 1961, Ser. No. 117,666

1 Claim. (Cl. 115—35)

This invention relates to a device for boat propulsion, steering and reversing of same to be utilized for pleasure craft, boats and the like.

In conventional outboard motors, drive results from the use of a propeller located beneath the surface of the water.

The problems in the art are the recurring factor of broken shear pins upon those occasions when the propeller engages a foreign object other than the water, the weight factor arising out of the use of reversing gears and housing of same for reverse drive, the factor of limitability of operation range arising out of the necessity of water of sufficient depth for engagement by the drive propeller and the factor of safety present with a whirling propeller and when the boat is used for water skiing, as examples of this latter factor.

An object therefore of this invention is to eliminate the factor of the conventional propeller that is wont to engage foreign objects, such as submerged tree stumps, by the elimination of the submerged propeller.

Another object of this invention is to eliminate the weight factor of the reverse drive train and housing for same in the outboard motor by eliminating the reverse gearing and housing for same.

A further object of this invention is to greatly increase and extend the range of operation of pleasure craft and boats by providing a device whose range of operation is limited to only minimal water depth and which further has no projections below the plane of the bottom of the boat.

A still further object of this invention is a completely safe device for boat propulsion wherein parents need not be concerned with their small children respecting the conventionally exposed whirling propeller.

These objects and further objects of this invention should be appreciated from the detailed specification in conjunction with the drawings, in which the reference numerals refer to similar parts, in which:

FIG. 1 is an isometric projection of the invention;
FIG. 2 is a top view of the device showing the steering and the reversing mechanisms;
FIG. 3 is a side view of the device showing portions of the steering and the reversing mechanisms;
FIG. 4 is a top view showing the base plate and upstream inlet.

The device generally referred to by 1 has a base plate 3 to which is secured two lateral plates 5. Two transom arms 7 depend from their respective lateral plates 5 and cooperate with transom clamps 9 to secure the device to the transom of the boat (not shown). Secured to the lateral plates 5 is transom arm reinforcement member 11 to provide structural rigidity to the lateral plates 5 and transom arms 7.

As secured to the base plate 3 does not project below the plane of the bottom of the boat. An upstream inlet 13, shown more clearly in FIG. 4, is provided in base plate 3 to allow entrance of the water in the operation of the device. A suitable screen (not shown) can be secured over the upstream inlet 13 to prevent the entrance of foreign objects into the upstream inlet duct 15.

This upstream inlet duct 15 is secured to the edges of the upstream inlet 13 provided in base plate 3 and rises angularly to the uppermost portion of propeller 17 and with the lowermost portion of propeller 17 the upstream inlet duct 15 terminates as a circular cowling for the propeller 17. It should be appreciated that the configuration of the upstream inlet duct 15 provides a closed system for conducting water from the upstream inlet 13 to the propeller 17. It should be further appreciated that suitable inlet guide vanes may be utilized within upstream inlet duct 15 to improve the flow distribution to the propeller 17.

Along with propeller 17 is shown propeller drive shaft housing 19, propeller drive shaft 21 and propeller housing seal and support 23. The propeller housing seal and support 23 is utilized to prevent upward movement of upstream inlet duct 15 and to provide a tight seal for propeller drive shaft housing 19 with respect to the conformably configured cut out portion in the upstream inlet duct 15 for reception of the propeller drive shaft housing 19.

Propeller drive shaft 21 is received within the propeller drive shaft notch 25 formed in the transom arm reinforcement member 11. On each side of propeller drive shaft notch 25 are propeller drive shaft clamp receivers 27 for the purpose of securing the propeller drive shaft 21 to the device by means of a suitable clamp (not shown).

From the downstream portion of the device or outward from the propeller 17, the lateral plates 5 extend angularly outward and are referred to as downstream lateral plates 31. Reinforcement members 29 conformably configured and secured to the lateral plates 5 and the downstream lateral plates 31 provide structural rigidity for same.

Downstream outlet duct 33 having its extreme outward portion similarly configured to the extreme outward portion of base plate 3 is suitably secured and configured to the cowling portion of upstream inlet duct 15 at propeller 17. It should be appreciated that suitable dewhirl vanes downstream of the propeller 17 can be utilized to straighten the flow of the water and thereby improve the performance of the device.

Reinforcement cross support member 35 is secured at 37 to the reinforcement members 29. Reversing baffle guide rods 39 are secured likewise at 37 and at 41 to base plate 3. Reversing baffle 43 has a reversing baffle reinforcement member 45 secured to the mid portion thereof for the purpose of imparting structural rigidity to the reversing baffle 43.

Reversing baffle sleeves 47 secured to the reversing baffle 43 are provided for reciprocation within the limits of the reversing baffle guide rods 39.

Crankshaft 49 mounted within two bushings 51 secured to downstream lateral plates 31 has squared end portions 53 extending from the bushings 51 to which squared end portions 51 are secured bell cranks 55 having slots 57 therein for engagement with pins 59 secured to the upper portions of the reversing baffle sleeves 47 thereby by means of arms 61 pivotally mounted with respect to bell cranks 55 at 63 providing upon reciprocation of arms 61 by a suitable tension cable system (not shown) controlled reciprocation of reversing baffle 43.

Two steering vanes hinge members 65 secured by screws 67 on each side of the lateral portions of the downstream outlet duct 33 carry steering vane hinge member sleeves 69. Two steering vane sleeves 71 are secured to the two steering vanes 73 mounted for lateral movements within the downstream portion of the device by means of two rods 75 suitably secured to steering vane sleeves 71 but freely movable within steering vane hinge member sleeves 69.

The squared end portions 77 of the steering vane rods 75 allow bell cranks 79 to be secured therewith. The ends of an adjustable member 81 pivotally mounted at
83 to the arms of the bell cranks 79 permit of equal angular lateral movement of the steering vanes 73.

Two arms 85 pivotally mounted with respect to the bell cranks 79 at 87 permit of controlled lateral movement of the steering vanes 73 by means of a suitable tension cable system (not shown).

Reversing baffle top portion 89 and reversing baffle bottom portion 91 are complementarily configured to the respective downstream end portions of downstream outlet duct 33 and base plate 3.

Upon being mounted on the transom of the boat as heretofore described and drive having been transmitted to the propeller 17, which acts as an impeller in this device, water is drawn through upstream inlet 13 and conducted by means of upstream inlet duct 15 to propeller 17. Propeller 17 forces the water outwardly downstream thereby transmitting forward motion to the boat.

In the forward motion of the boat the reversing baffle 43 will of course be raised in order not to impede the water forced outwardly by the propeller 17. Steering of the boat is controlled by use of the steering vanes 73.

Reversing movement of the boat is effected by downward movement of reversing baffle 43. The water will then be forced against reversing baffle 43 to the sides thereof thereby resulting in the rearward movement of the boat.

The steering vanes 73 can in fact be utilized with reversing baffle 43 to effect a steered rearward movement of the boat.

It should further be appreciated that this device can be used to convert existing outboard motors to the impeller device of the present invention.

Having described my invention, I claim:

In a device attachable as a unit to a boat to provide propulsion, steering and reversing of same, comprising a base plate lying substantially in the plane of the bottom of the boat with which said device is utilized, said base plate having an upstream inlet for entrance of water in a closed upstream inlet duct to an impeller discharging water downstream and thereby providing propulsion for the boat, the downstream portion of said base plate and a downstream outlet duct providing direction to the discharge of water from said impeller; vertically arranged steering vanes having an adjustable member pivotally mounted therebetween movable in a plane normal to the plane of said base plate to direct lateral discharge of water from said impeller thereby steering said boat, said steering vanes being pivotally mounted with respect to said downstream outlet duct; and a reversing baffle reciprocable in a direction normal to the plane of said base plate, the lateral terminal portions of said reversing baffle having sleeves for reciprocation upon guide rods secured downstream of said device, with controlled reciprocation thereof provided by bell crank having slots for driving engagement with pins secured to said sleeves.

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