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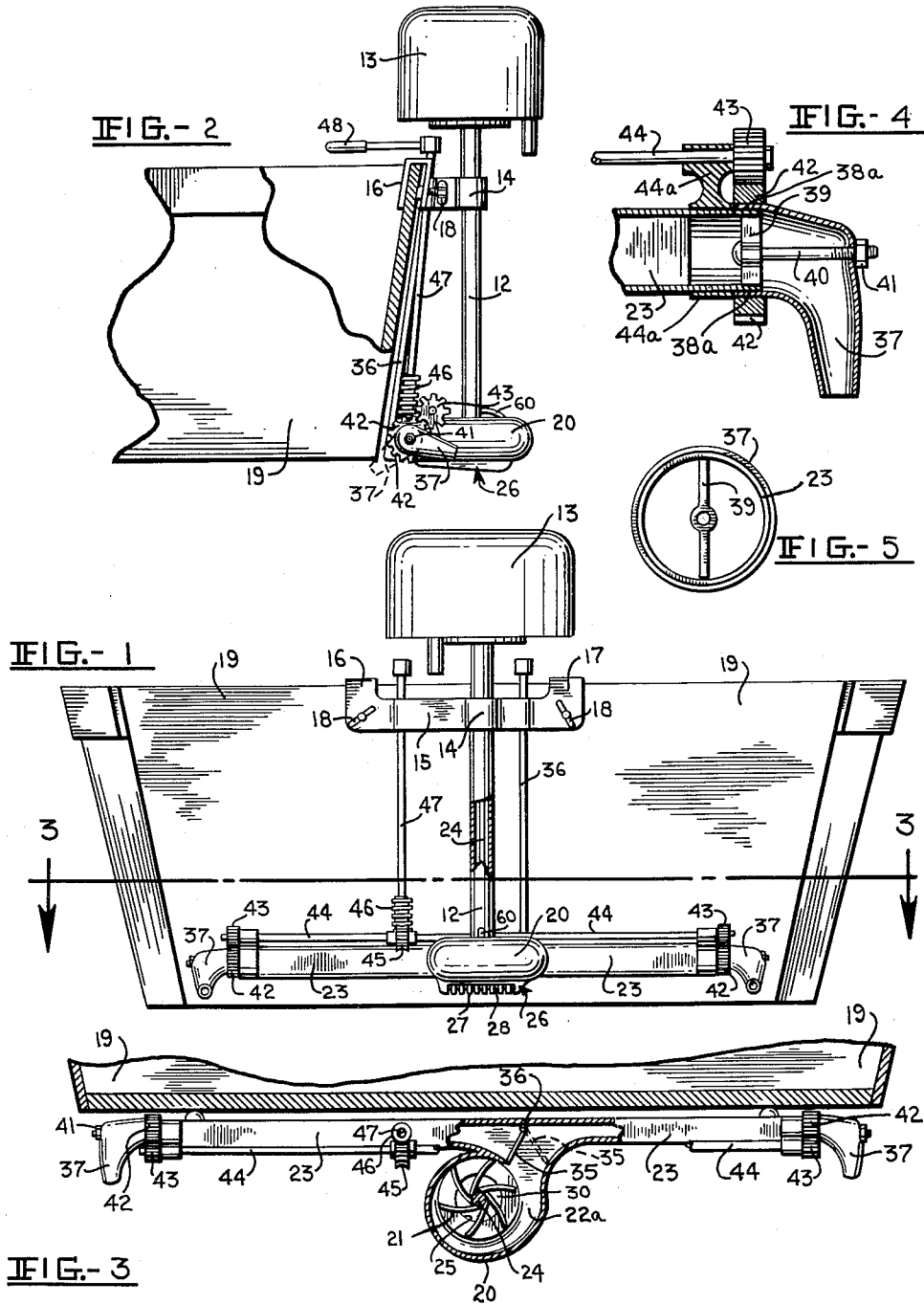
K. H. BURGIN

3,046,735

WATER JET DRIVE FOR BOATS

Filed April 10, 1961

2 Sheets-Sheet 1



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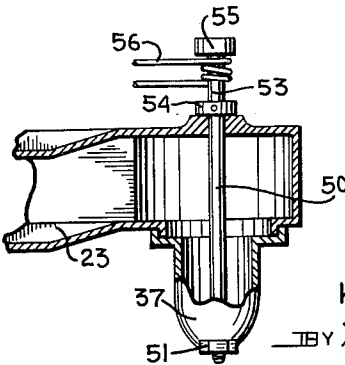
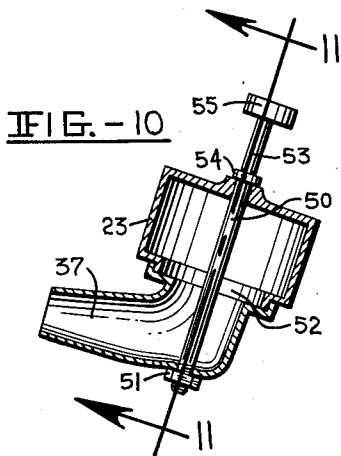
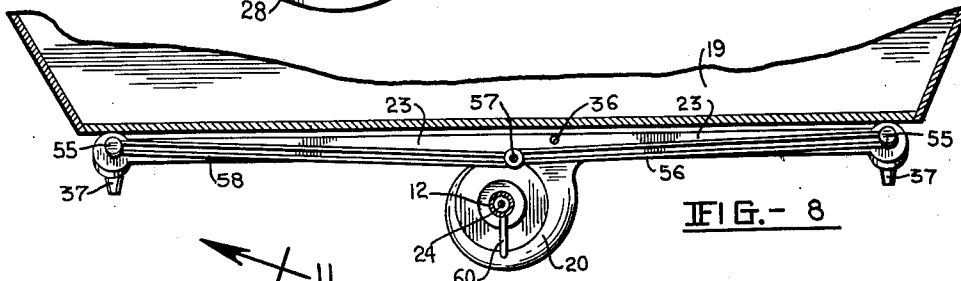
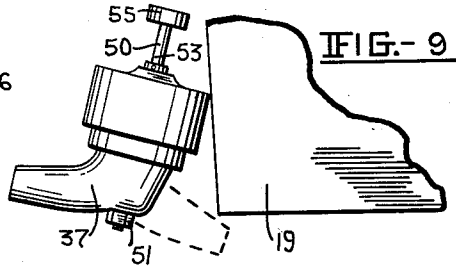
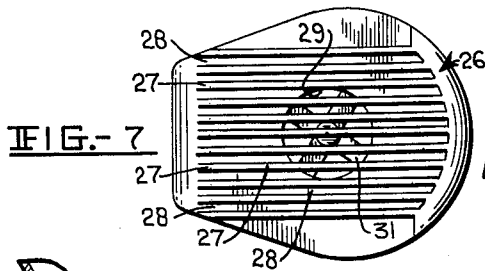
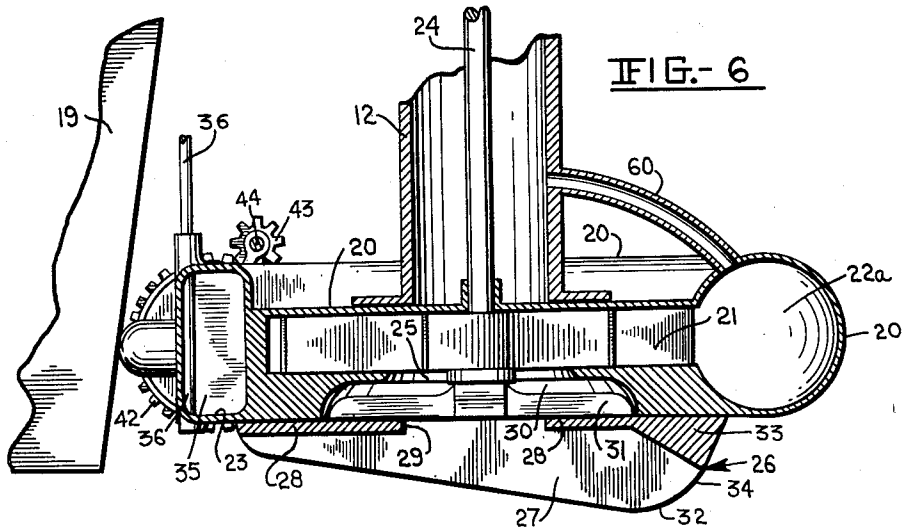
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WATER JET DRIVE FOR BOATS

Filed April 10, 1961

2 Sheets-Sheet 2



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3,046,735

WATER JET DRIVE FOR BOATS

Kermit H. Burgin, R.R. 1, Whitestown, Ind., assignor, by direct and mesne assignments, of forty percent to Frederick B. Cline, and twenty-five percent to Florence T. Cline, both of Indianapolis, Ind., and ten percent to Guernsey Van Riper, Jr.

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6 Claims. (Cl. 60—35.55)

This invention relates to a motor driven device to be demountably fixed preferably to small boats, taking the place of what is normally called an outboard, or for that matter, an inboard motor with a propeller for propulsion. In the present invention, the drive is had by taking in water through a pump and bringing that taken in water under pressure and driving it out through nozzles to get a reactive effect. The invention also incorporates means for reversing the direction of jet nozzles for fore and aft travel.

A primary advantage of the invention as briefly outlined above resides in the simplicity and compactness of the overall construction, and its relative light weight. The mechanism extending from a motor supplying the power may be made entirely out of light metal.

A further advantage of the invention resides in the fact that the device may be operated to drive boats through weed beds and the like without choking up the water pump. These and many other objects and advantages of the invention will become apparent to those versed in the art in the following description of one particular form which is more or less diagrammatically illustrated in the accompanying drawings, in which

FIG. 1 is a view in rear elevation and partial section of a device incorporating the invention as applied to a boat;

FIG. 2 is a view in side elevation and partial section on a reduced scale;

FIG. 3 is a transverse section on the line 3—3 in FIG. 1;

FIG. 4 is a detail on an enlarged scale in vertical section through a rockable jet nozzle;

FIG. 5 is a detail in vertical elevation of the discharge end of a conduit from a water pump;

FIG. 6 is a vertical section on an enlarged scale through the pump end of the structure embodying the invention on an enlarged scale;

FIG. 7 is a bottom plan view on reduced scale of a weed strainer attachment;

FIG. 8 is a transverse section similar to FIG. 3 but with a modified form of jet reversing means;

FIG. 9 is a detail in outer end elevation of a jet with the modified means applied thereto;

FIG. 10 is a view in vertical central section in a fore and aft direction of the nozzle structure shown in FIG. 9; and

FIG. 11 is a view in section on the line 11—11 in FIG. 10.

A tube 12 is employed to carry a motor 13 on its upper end in fixed position relative to the tube 12. The tube 12 carries a bracket 14 which is fixed to a clamp bar 15 having hooks 16 and 17 engaging over the stern end of the boat in the usual manner, and being demountably engaged therewith by the usual thumbscrews 18.

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The tube 12 extends downwardly toward the bottom of the boat which is generally designated by the number 19. The lower end of the tube 12 is fixed to a pump housing 20. The pump within the housing 20 may be of suitable construction, but as herein shown as being a centrifugal pump generally designated by the numeral 21 having a plurality of arcuate blades 21 taking in water from the under central side and discharging it into a spiral passageway 22a which discharges into a manifold 23 extending laterally in both directions from the housing 20 toward each side of the boat 19.

Within the tube 12 there extends axially a shaft 24 fixed by its lower end to the blades 21 and extending upwardly through the housing 20 to be drivingly connected with the engine 13. The housing 20 has an under opening 25 providing the intake opening to the blades 21.

A weed strainer generally designated by the numeral 26 is fixed to the underside of the housing 20. This strainer 26 is vertically slotted from its underside FIGS. 1 and 7. The slots terminate by their upper end portions in a web 28. This web 28 is slotted between the vertical webs 27, the slots in the web 28 terminating by ends forming a circle 29.

In the housing 20, on its underside, there is a chamber 30 with the opening 25 at its upper side under the blades 21 as above indicated. The circle 29 has a diameter less than the diameter of the chamber 30. A weed cutter 31, herein shown as having four blades, FIG. 7, bears by its underside against the topside of the web 28 and revolves therearound with a shearing action over the exposed upper edges in that circle 29 of the vertical webs 27. This cutter 31 is secured to the shaft 24 under the blades 21. The underside of the strainer 26 slopes from a forward end of the web 28 downwardly and rearwardly to a lowermost zone 32, FIG. 6, the under edges of the webs 27 forming this slope. The rear end of the web 28 is thickened across the rear ends of the webs 27, by a portion 33, so as to give a downwardly and rearwardly inclined surface 34 between adjacent webs 27.

The manifold 23, FIG. 3, has a valve blade 35 rockably mounted on the lower end of the steering post 36. This blade 35 is so arranged within the manifold 23 at the discharge zone at the spiral passageway 22a that by turning it to the left as indicated in that view, the discharge from the blades 21 is cut off from flow in the left hand portion of the manifold 23 and is directed through the right hand end of the manifold. With the shaft 36 properly turned, the blade 35 is positioned centrally in the discharge flow from the spiral passageway 22a, FIG. 3, so as to divert the flow of water into both left and right arms of the manifold 23.

As indicated in FIGS. 1-3, a substantially right angle turned nozzle 37 is swivelly mounted, one at each of the outer ends of the manifold 23. One particular method of mounting the nozzle 37 in each instance is indicated in FIG. 4 wherein there is an annular end 38 carried by the manifold 23, and a bar 39 is carried thereacross and therewithin. The nozzle 37 has a base 38a which telescopes over the member 38, and is secured to rotate therearound by means of a bolt 40 passing through the bar 39 and outwardly through the nozzle 37 to carry a nut 41 compressively urging the nozzle 37 over the member 38.

A spur gear 42 is fixed around the base 38a of each

nozzle 37. A shaft 44 is rotatably carried by brackets 44a fixed around the members 38 and against which brackets, the nozzle bases 38a bear. A pinion gear 43 is held in constant mesh with the spur gear in each instance by being mounted on ends of the cross shaft 44 which carries a worm wheel 45 in constant mesh with a worm 46 in turn fixed to a vertically disposed reversing shaft 47 by rotating the shaft 47 on its own axis by any suitable means such as by the hand lever 48, FIG. 2. The shaft 44 is rotated in turn, through the gears 42, 43 rock the jet nozzles 37 from rearwardly directed positions as indicated in FIGS. 2-3, to downwardly and forwardly directed positions as suggested by the dash line position, FIG. 2. A modified means for reversing the directions of the nozzles 37 is indicated in FIGS. 8-11.

This reversing means includes a slightly different method of mounting the nozzles 37. In this form, the body of the manifold 23 is shifted by rotation slightly so that a bolt 50 is inclined from the vertical, FIG. 10, to pass through an end portion of the manifold 23 and outwardly through the nozzle 37 to have a nut 51 engage on a bolt to draw the nozzle 37 up against the annular flange 52 extending from the manifold 23. The bolt 50 extends on through the manifold 23 to have an exposed length 53, carrying a collar 54 as a bearing against the backside of the manifold as an abutment to hold the bolt 50 against longitudinal travel relative to the manifold. The bolt 53 preferably carries a circular head 55 on its upper end. A cable 56 is given several turns about the bolt portion 53 and is carried to a reversing shaft 57 whereby rotation of the shaft 57 will rotate the bolt 50 and in turn rotate the nozzle 37 from the solid position to the dash line position as indicated in FIG. 9. A like cable 58 is wrapped around the bolt of the other nozzle 37, and carried therefrom around the reversing shaft 57 in the same direction so that both nozzles 37 work in unison to be positioned selectively from the rearwardly directed position to the forwardly directed position for forward and reverse speeds respectively.

Operation

Assuming that the engine 13 and its depending parts above described are mounted on the boat 19, and the engine is set in motion, and the boat is to be driven straight ahead, the shaft 36 is rotated to position the valve blade 35 midway of the discharge passage from pump blades 21 so that there is substantially an equal pressure at each of the nozzles 37. Also the nozzles 37 are positioned as indicated in FIGS. 1-3 to be pointing substantially rearwardly. Then as the engine 13 is speeded up, water will be drawn in through the strainer 26, between the webs 27, discharging upwardly through the openings in the web 28, and to the pump blades 21 which revolve to carry the water outwardly into the passageway 22a and hence through the manifold 23 to the two nozzles 37, whereby the reaction of the discharge from those nozzles will drive the boat forwardly. As the boat 19 travels through the water, any weeds or grass will be swept over by the webs 27, and normally diverted from entering therebetween and entering the chamber 30. Since the cutter 31 is revolving at the speed of the shaft 24, any grass or weeds tending to pass into the chamber 30 will be sheared off by the cutter 31 and only small pieces will be permitted to pass to the blades 21 which may be readily discharged outwardly in the normal flow of the water. As the drawings indicate, the bottom of the strainer 26 will be located substantially in the plane of the bottom of the boat 19, or possibly just slightly therebelow so as not to allow the grass or weeds to tend to build up on the forward end of the strainer 26.

Then in order to steer the boat, the shaft 36, is rocked so as to rock the blade 35 to either side from the central position so as to divert more of the water flow to the nozzle on one side than goes to the other, or completely

cut off the flow to the one nozzle whereby the passage of the water from the one nozzle will cause that side of the boat to turn around in the one direction, and accordingly, by shifting the valve 35 to the other side as indicated by the dash line FIG. 3, the water will be diverted to the left hand nozzle 37 for turning the boat in the opposite direction.

Water for cooling the engine 13 may be had through a tube 60 leading from the pump passageway 22a into the column 12 through which the water may flow to the engine.

Finally in order to reverse the boat direction of travel, the shaft 47 in the one instance and 57 in the modified form will be rotated to direct the nozzles forwardly of the boat so that the reactive effect of the discharging water will be in the opposite direction tending to push the boat rearwardly. In this modified form, the boat may also be steered by rotating the shaft 57 to turn the nozzle 37 only to that degree for the desired direction short of reversing.

In summary the structure embodying the invention has four primary advantages, namely a jet drive which will provide stable steering at low boat speeds as well as at high speeds; dispose of weeds; have a reverse drive; and be readily steerable in reverse drive.

Therefore it is to be seen that the structure defined above presents a simple, but most effective drive for a boat with the entire mechanism carried in unison with a drive engine or motor, and all of the mechanism below the engine is confined to the outside stern end of the boat wherein there are two spaced apart jet nozzles at or just below the water line. While I have defined the invention in more or less minute detail, in the form illustrated, I do not desire to be limited to that precise form beyond the limitations which may be imposed by the following claims.

I claim:

1. In a boat drive the combination with a pump housing having a water intake opening from an under side; a water wheel in the housing taking water from through said opening; a grill carried by said housing across and under said opening and comprising a plurality of spaced apart slots extending in parallel alignment in fore and aft direction of travel of said housing; said grill having apertures through said slots across said opening; a rotating weed cutter carried by said housing and traveling in shearing action across said apertures and over said grill; and means entering said housing and driving said cutter; said cutter shearing off weeds entering said apertures when said grill rides over and combs weeds in water along said slots into alignment and the weeds are carried upwardly by weed end portions through said apertures by current of water generated by said wheel entering said housing opening, the sheared-off weed portions reaching said wheel.

2. The structure of claim 1 in which said housing opening is smaller in diameter than is said wheel; and said cutter driving means comprises a shaft driving both said wheel and said cutter.

3. The structure of claim 1 in which said housing has a major chamber within which said wheel rotates, and there is a minor chamber immediately under the major chamber in which minor chamber said cutter rotates; and there is a central opening between said two chambers of less diameter than that of both chambers.

4. A boat water jet drive structure comprising an approximately vertically disposed tube; a motor at the tube top end; a housing at the tube lower end, the housing having a water inlet opening in its bottom end; a pump bladed member in said housing rotating across said opening; a drive shaft interconnecting said motor and said member through said tube; a weed strainer fixed to the underside of said housing; said housing having a chamber between its said opening and said strainer; a weed cutter rotating in said chamber across said grill; said chamber having a central bottom opening; said shaft interconnecting

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with said cutter; said grill being vertically slotted from its underside and open therethrough from its bottom to top across a central portion of said cutter; and jet nozzles receiving discharge from said bladed member; water flow being induced by said member through said grill, said chamber, and said bladed member to discharge through said nozzles accompanied by weeds sheared off by said cutter.

5. The structure of claim 4 in which said grill slots are closed over by webs at their upper ends beyond said chamber opening; said grill serving as a comb aligning weeds passed over by the grill; and the underside of said grill being inclined downwardly and rearwardly from front to back thereof.

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6. The structure of claim 5, in which the undersides of said webs incline downwardly and rearwardly from the rear side of said chamber opening.

References Cited in the file of this patent

UNITED STATES PATENTS

6,468	Ruthven	May 22, 1849
55,773	Kinkel et al.	June 19, 1866
2,319,947	Oswood	May 25, 1943

FOREIGN PATENTS

672,648	France	Sept. 23, 1929
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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,046,735

July 31, 1962

Kermit H. Burgin

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, lines 2 to 5, for "assignor, by direct and mesne assignments, of forty percent to Frederick B. Cline, and twenty-five percent to Florence T. Cline, both of Indianapolis, Indiana, and ten percent to Guernsey Van Riper, Jr.," read -- assignor, by direct and mesne assignments, of forty percent to Frederick B. Cline, fifteen percent to Florence G. West, ten percent to Florence T. Cline, all of Indianapolis, Indiana, and ten percent to Guernsey Van Riper, Jr., --; lines 14 and 15, for "Kermit H. Burgin, Frederick B. Cline, Florence T. Cline, and Guernsey Van Riper, Jr., their heirs" read -- Kermit H. Burgin, Frederick B. Cline, Florence G. West, Florence T. Cline and Guernsey Van Riper, Jr., their heirs --; in the heading to the printed specification, lines 3 to 7, for "assignor, by direct and mesne assignments, of forty percent to Frederick B. Cline, and twenty-five percent to Florence T. Cline, both of Indianapolis, Ind., and ten percent to Guernsey Van Riper, Jr." read -- assignor, by direct and mesne assignments, of forty percent to Frederick B. Cline, fifteen percent to Florence G. West, ten percent to Florence T. Cline, all of Indianapolis, Ind., and ten percent to Guernsey Van Riper, Jr. --.

Signed and sealed this 18th day of December 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents