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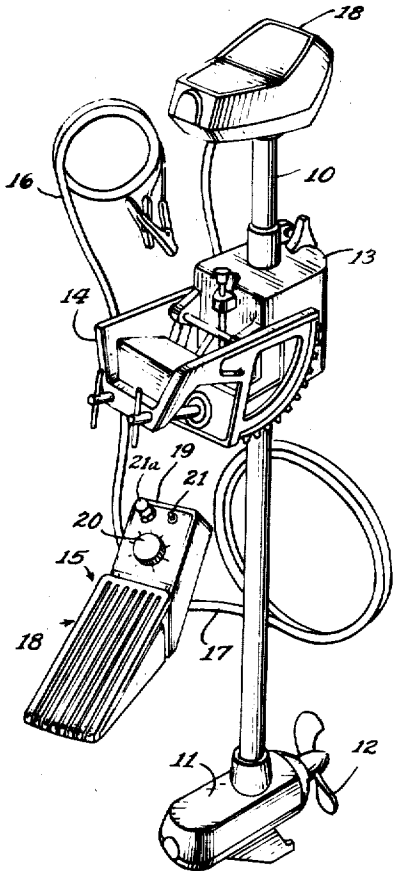
[54] **PEDAL OPERATED CONTROL FOR ELECTRIC FISHING MOTORS**  
7 Claims, 8 Drawing Figs.

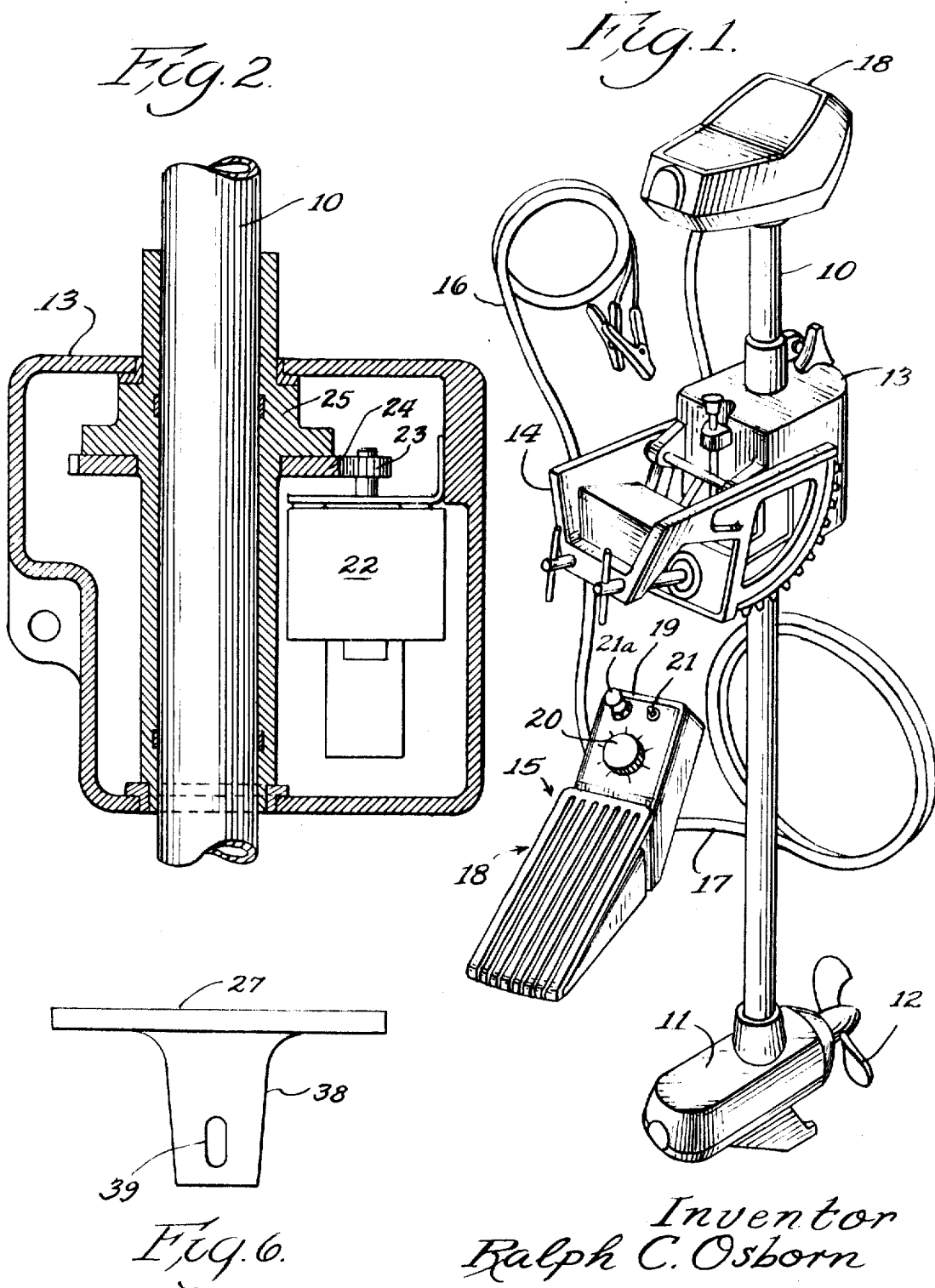
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[51] Int. Cl..... **H01b 3/14**  
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86.5; 114/144 R, 144 A; 115/18 R

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**ABSTRACT:** A pedal control for electric outboard fishing motors having a first motor for driving the propeller and a second motor for rotating the propeller support for steering. A single pedal is mounted for selective engagement with an on-off switch for the propeller drive motor and forward and reverse switches for the steering motor and is mounted on a control unit which may be easily carried about a boat for a remote control. The unit includes speed control and directional elements which may be foot-actuated.

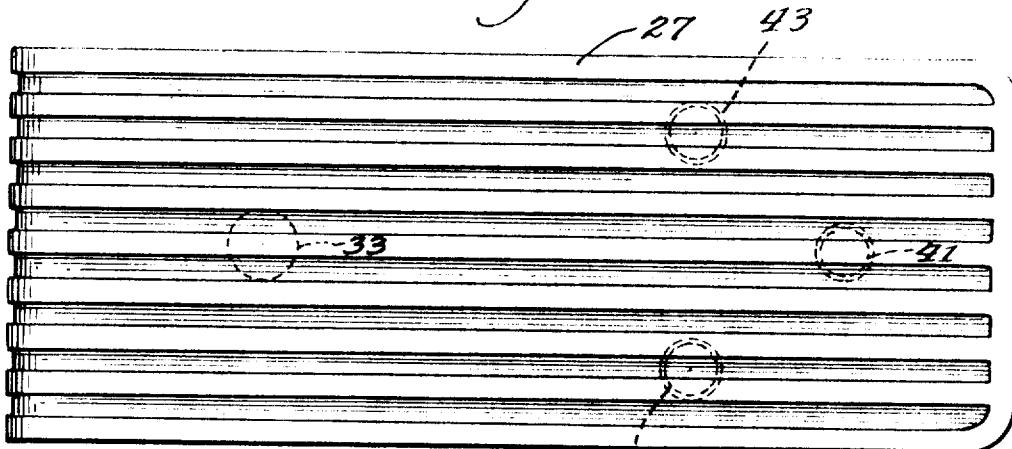




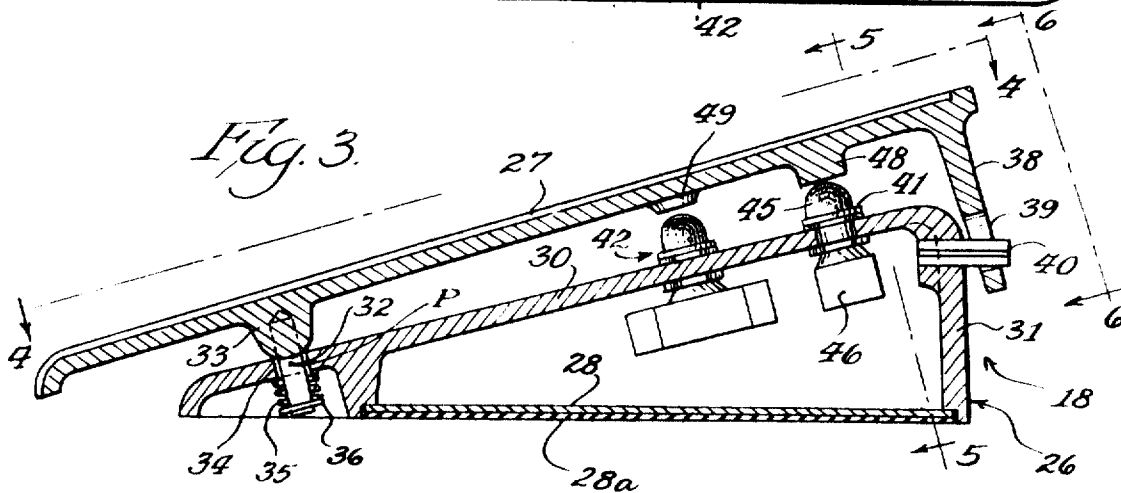
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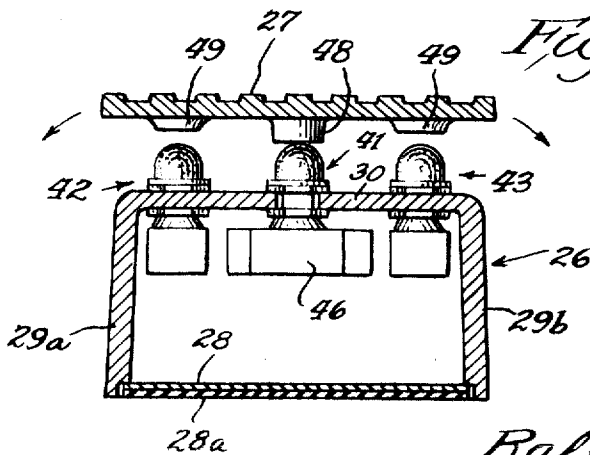
Fig. 4.



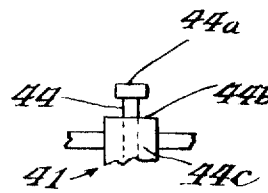
*Fig. 3.*



*Fig. 5.*



*Fig. 7.*



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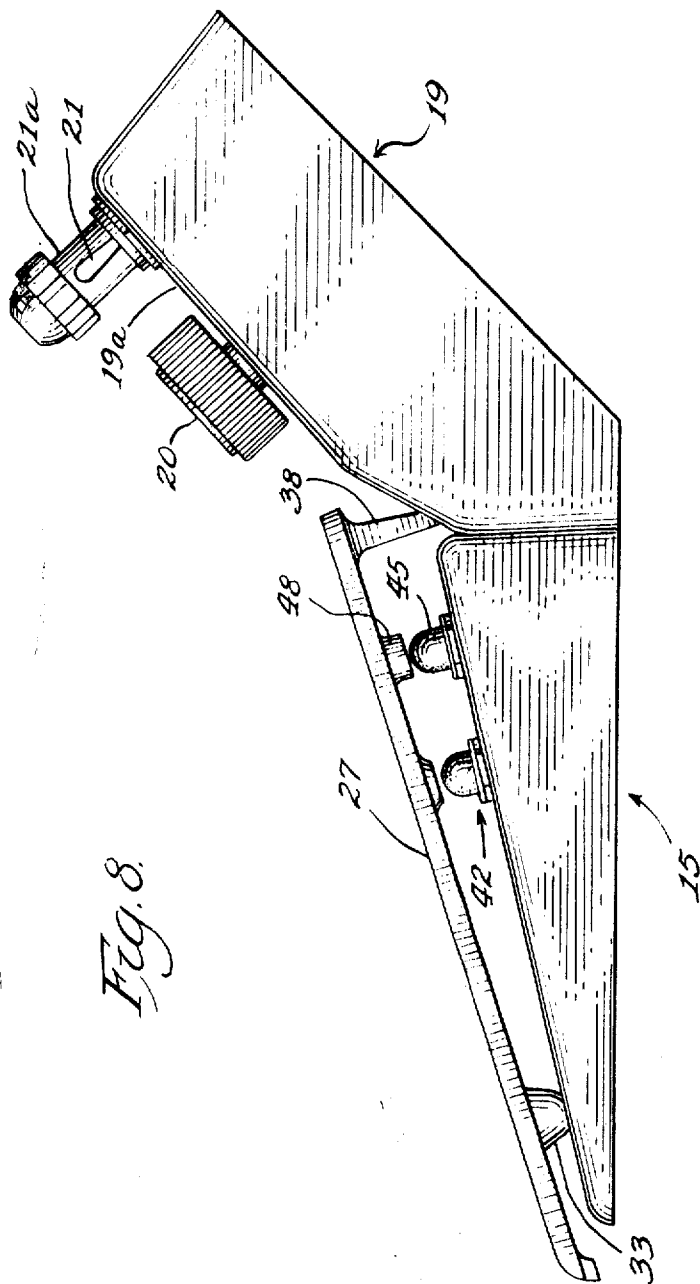


Fig. 8.

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# **PEDAL OPERATED CONTROL FOR ELECTRIC FISHING MOTORS**

The present invention is directed to new and useful improvements in controls for electric outboard fishing motors of the type using a first motor for driving the propeller and a second directional motor for rotating the propeller support and changing the direction of thrust of the propeller for steering purposes.

Moser U.S. Pat. No. 2,804,838 illustrates an electric outboard motor of the foregoing type having three pedals which are foot-operated so as to control on-off, forward and reverse switches for the directional control motor and an on-off switch for the "driving motor." The present invention is directed to improvements in a pedal control for controlling such steering and on-off switches.

The major purposes of the present invention are to form a simplified and inexpensive pedal control assembly for effecting both steering of a boat and propulsion thereof and in such a way that the user of the control may position the control at any location within a boat and have full control of propulsion, steering and speed with simple foot or hand movements.

These and other purposes will become more apparent in the course of the ensuing specification and claims when taken with the accompanying drawings, in which:

FIG. 1 is a perspective view of a typical electric outboard motor assembly provided with the control of the present invention;

FIG. 2 is a sectional view illustrating a steering motor arrangement for the assembly of FIG. 1;

FIG. 3 is a cross-sectional view of a portion of the pedal control subassembly illustrated in FIG. 1;

FIG. 4 is a top view of the pedal subassembly illustrated in FIG. 3 while looking in the direction of the arrows 4-4 of FIG. 3;

FIG. 5 is a sectional view of the pedal subassembly illustrated in FIGS. 1-4 and looking in the direction of the arrows 5-5 of FIG. 3;

FIG. 6 is an end view of the pedal illustrated in FIG. 3;

FIG. 7 is a detail view of certain switch elements used in the pedal control; and

FIG. 8 is a side view of the pedal control assembly illustrated in FIG. 1.

Like elements are designated by like characters throughout the specification and drawings.

With specific reference to the drawings, and in the first instance to FIG. 1, the numeral 10 designates a supporting column or shaft for an electric drive motor 11 at the lower end thereof. Motor 11 is a battery-operated DC motor and may be a permanent magnet motor. The output shaft of motor 11 is adapted to rotate a propeller 12. The column 10 is supported on a bracket assembly 13 which is in turn pivotally mounted upon a cradle 14. Cradle 14 is adapted to be clamped to a portion of a fishing boat, as for example the gunwale.

A pedal control subassembly generally designated at 15 has a cable 16 adapted to be connected to battery terminals and a cable 17 leading through a housing 18 on the upper portion of shaft 10 and through the shaft 10 to the drive motor 11 and to a steering motor positioned within the bracket 13. The control assembly 15 includes a pedal control portion 18 and a housing 19 fixed thereto, which housing provides operative circuit connections between certain switches carried by pedal portion 18, cables 16 and 17, and a speed controlling rheostat for motor 11. An actuating knob for the rheostat is illustrated at 20. The control housing 19 may include a reversing switch 21 for motor 11 and a combined light and heating element 21a.

The housing 19 extends upwardly above the pedal portion 18 so that the actuating knob 20, switch 21 and element 21a face the operator when the operator has his foot on the pedal portion 18. Switch 21 and element 21a are above the knob 20.

FIG. 2 schematically illustrates a steering arrangement wherein a reversible direct current steering motor 22 is used

to rotate shaft 10 and thus change the direction of thrust of the propeller 12 for steering purposes. Motor 22 is supported within the housing bracket 13 and has a pinion 23 on its output shaft in driving engagement with a gear 24 held by a hub 25 which is keyed to the shaft 10. It should be understood that the illustration of the steering motor housing bracket, cradle, supporting shaft, motors and propeller illustrated in FIGS. 1 and 2 should be taken as generally representative of motor driven and motor-steered electric outboard motors of the type known to the art and to which the present pedal control assembly is applied.

In accordance with the present invention the pedal unit 18 illustrated in FIG. 1 includes a base 26 and a movable pedal 27 mounted on the base. Both base 26 and pedal 27 are generally rectangular when viewed from the top. Base 26 is generally triangular in cross section as viewed from the side (as illustrated in FIG. 3). Base 26 is defined by a lower flat plate 28, sidewalls 29a and 29b, an inclined upper wall 30, and a forward wall 31. The forward wall 31 and sidewalls 29a and 29b of the base may be formed as downwardly directed extensions of the upper wall 30 and as a single casting. The lower plate 28 may have a rubber pad 28a attached to the lower surface thereof.

Pedal 27 may have a series of parallel ribs formed in the upper surfaces thereof as is illustrated in FIGS. 4 and 5 to minimize foot slippage thereon. Pedal 27 is mounted on base 26 in spaced relation to the upper surface of wall 30 by means of a pin 32 carried within a downwardly projecting boss 33 on pedal 27. Pin 32 is received through an enlarged aperture 34 in the upper wall 30. Boss 33 has a lower surface which is spherically formed for a bearing engagement with the portion of the wall 30 around aperture 34. A coil spring 35 surrounds this pin beneath the wall 30 and extends beneath the undersurface of the wall 30 and an abutment 36 on the lower end of the pin. Spring 35 biases pedal 27 toward a position where pin 32 is perpendicular to wall 30 while pedal 27 is equally spaced from wall 30 on opposite sides of the pin. The loose connection between pin 32 and the aperture 34 allows swinging movement of pedal 27 generally about a transverse axis directed through the point designated at P in FIG. 3. The enlarged aperture also allows rocking movement or tilting movement in the direction of the arrows illustrated in FIG. 5 and generally about an axis extending parallel to the longitudinal axis of pedal 27. The front end of pedal 27 has a downwardly projecting guide projection 38. The lower portion of this guide projection has a slot 39 within which is received a pin 40 which is carried by the downwardly directed wall portion 31. The pin and slot connection thus provided prevents pivotal movement of the pedal 27 about the axis of pin 32 while allowing the swinging movement and tilting or rocking movement aforementioned.

The upper wall 30 of base 26 carries a first pushbutton on-off switch 41 for motor 11 and second and third directional and energizing switches 42 and 43. Each of these switches includes a pushbutton actuating arm 44 (FIG. 7) and these actuating arms are preferably covered with a rubber domelike cover 45. The actuating arm 44 of switch 41 includes an upper flange 44a which abuts against the opposed rim 44b of support 44c in the closed position of the switch. Downward swinging movement of the pedal is thus limited by the abutment of the flange of the switch arm with the rim 44b. In either the lower position or upper position of the pedal rocking movement of the pedal may take place about an axis extending generally between the top of arm 44 of switch 41 and the center of curvature of the lower surface of boss 33. The actuating arm 44 of each switch 41, 42 and 43 is spring biased toward an upper position corresponding to a normal unenergized position. One of the switches 42 is connected in the circuit to the steering motor 22 for rotation of the motor in one direction while the other switch 43 is connected in the circuit of the steering motor 22 for rotation of the motor in the opposite direction. It should be understood that the switch casings 46 for each of the switches 41, 42 and 43 are connected through suitable electrical leads (not shown) to the control box 19 for ap-

propriate electrical connection between cables 16 and 17 to their associated motors. Wiring connections between an on-off switch for the drive motor and between directional switches for a steering motor are known to the art and for this reason they are not illustrated herein.

It is preferable to locate the switch 41 forwardly of the two directional switches 42 and 43.

The undersurface of pedal 27 includes a downwardly directed boss 48 which is located directly above switch 41, while bosses 49 of shorter extent are positioned directly above each of the switches 42 and 43. Thus, upon simple swinging movement of pedal 27 about the axis P, switch 41 will be actuated while switches 42 and 43 are not. In this regard, simple downward swinging movement of pedal 27 about the axis P is limited by abutment of the flange 44a of switch 41 with the rim 44b of that switch. Spring 35 helps to maintain the pedal 27 in equally spaced relation to the switches 42 and 43 during such movement. Switches 42 and 43 may also have similar limit abutments but they are not necessary as long as the engagement between pin 32 and the wall of the aperture 34 limit rocking movement to an amount slightly greater than that necessary to actuate one of the switches 42 or 43.

Rocking movement of the pedal about the longitudinally extending axis aforementioned enables one boss 49 or the other to contact its associated switch. At the same time this may be accompanied by downward swinging movement about the axis P depending upon manipulation of the operator's foot to the extent of actuating switch 41. The abutment in switch 41, together with the abutment of pin 32 with the wall of aperture 34 limits the downward movement and prevents actuation of both switches 42 and 43 at the same time. For example, the compound movement may be such as to actuate switch 43 and 41 (FIG. 5) but the support is such that the other boss cannot contact its switch 42 unless pedal 27 is rocked out of contacting engagement with switch 43. The return springs in the switches and spring 35 bias the pedal toward the upper, deenergized position illustrated in FIG. 3.

It should be understood that the bosses 49 may be eliminated altogether as long as the spatial relation between the pedal and the switches is such as to allow selective operation of the switches as described. Also boss 48 may be eliminated while switch 41 is made so that the actuating arm 44 projects to a greater height above wall 30 than the switches 42 and 43. In this event, switch 41 is also actuated by simple swinging movement about axis P with the abutment in the switch 41 preventing sufficient downward movement to actuate both of the switches 42 and 43 at the same time while allowing actuation of one or the other of the switches 42 and 43 through rocking movement in one direction or the other.

The important thing is that when pedal 27 closes switch 41, a rocking axis for the pedal is established while the pedal 27 is not depressed far enough to actuate either switch 42 or 43 as long as the opposite sides of the pedal are spaced equidistantly from the upper wall 30.

The face 19a of the control housing which carries the actuating knob 20, switch 21 and element 21a, extends from a point immediately forward of the pedal 27 to a position spaced thereabove, whereupon these elements are positioned above the pedal. This face is inclined to the upper surface of the pedal as shown in FIG. 8. Knob 20 is positioned on this face so that the lower side surface is coincident with or a short distance above the plane of the upper surface of the pedal whereby the toe of a user's foot positioned on the pedal may frictionally engage the cylindrical side surface of knob 20 and rotate the same and thereby change the resistance value of the rheostat. The rheostat is in series with the windings of the motor 11 so that a change in its resistance changes the voltage and speed of the motor.

The cylindrical surface of knob 20 may be provided with ribs or other frictional means to enhance use by the operator's foot.

The particular pedal control herein illustrated is simple and economical to manufacture. The user of a pedal assembly, as

described herein, can easily control both the energization of the boat driving propeller and the direction of its thrust with his foot in the same overall position on the pedal. A simple downward movement of the toe of his foot will energize switch 41 to energize drive motor 11. Rocking movement of the foot in the same overall position and to one side or another will actuate switch 42 or 43 to energize motor 22 for rotation in the proper direction to bring about the desired direction of thrust of propeller 12. The control assembly is easily carried about the boat and may be positioned at any convenient location in the boat.

At any position the operator has full control of the steering, speed and propulsion of the boat. Since the actuating knob 20 of the rheostat and the directional switch 21 are positioned above the pedal 27, the actuating knob 20 and switch 21 are easily manipulated by the operator. Knob 20 may be manipulated by the toe of the user's foot positioned on the pedal at the same time that the operator is using pedal 27 to control propulsion and steering. The reversing switch 21 may be moved by foot pressure, although the operator must disengage his foot from pedal 27 to do this. The controls may of course be manipulated by hand.

The unitary and compact nature of the controls together with the positioning of the various parts for foot operation is a great convenience to a fisherman having both hands occupied by fishing.

Switches 41, 42 and 43 may be single-pole single-throw switches although it is preferred that switches 42 and 43 be double pole, single throw snap acting switches to insure positive action and minimize arcing.

I claim:

1. In an electric outboard fishing motor drive of the type having a first electric motor carried by a shaft and adapted when energized to rotate a propeller carried by said shaft and a second motor carried by a support for said shaft and formed and adapted when energized to rotate the shaft about the axis thereof for steering purposes, the improvement comprising a pedal operating assembly for controlling said motors, said pedal assembly including a base and a pedal, means mounting said pedal on said base for swinging movement of said pedal about one end of said base and toward and away from the other end of said base and for tilting movement toward one side or another of said base, a first pushbutton switch carried by said base and having an actuating arm positioned above the surface of said base for actuation by the undersurface of said pedal upon said swinging movement of said pedal toward said base, and second and third switches mounted on said base and having actuating arms extending above the upper surface of said base for selective engagement with the undersurface of said pedal upon said tilting movement of said pedal, said first switch being a start-stop switch for said first motor and adapted to energize said motor when actuated, said second and third switches being connected to forward and reverse energizing circuits for said second motor so that when one is actuated said second motor rotates said shaft in one direction while upon actuation of the other said second motor is operated to turn said shaft in the other direction, the actuating arms of said second and third switches projecting above said base to generally uniform spacings from the undersurface of said pedal, the actuating arm of said first switch being spaced more closely to an undersurface portion of said pedal in the deactivated position thereof than said second and third switches, said first, second and third switches and actuating arms therefor being located near the other end of said base, and limit abutment means to limit the pedal's downward swinging movement and rocking movement to one side or the other whereby said first switch may be actuated along with actuation of a single one of the said second and third switches through combined swinging and tilting movement of said pedal without allowing simultaneous actuation of both of said second and third switches.

2. The structure of claim 1 wherein said pedal is swingably and tiltably mounted on said base by a pin carried by said pedal and loosely received within an aperture in said base.

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3. The structure of claim 2 characterized by and including a spring surrounding an end of said pin projecting through said aperture in said base and extending between an undersurface of said base and an abutment on the end of said pin.

4. The structure of claim 3 wherein said abutment means is defined in said first switch and by said pin and aperture.

5. The structure of claim 1 wherein said pedal has a depending slotted guide on the end thereof remote from said pin and said base has a pin received within the slot of said guide to thereby provide support for that end of said pedal.

6. The structure of claim 1 characterized by and including a speed control housing carried by the other end of said base, said speed control housing having a rheostat therein for controlling the speed of said first electric motor, said housing projecting above said pedal and having an actuating element therefor positioned above said pedal for selective operation thereof by an operator foot positioned on said pedal.

7. In an electric outboard fishing motor drive of the type having a first electric motor carried by a shaft and adapted when energized to rotate a propeller carried by said shaft and a second motor carried by a support for said shaft and formed

and adapted when energized to rotate the shaft about the axis thereof for steering purposes, the improvement comprising a pedal-operating assembly for controlling said motors, said pedal assembly including a base and a pedal, means mounting said pedal on said base for swinging movement of said pedal about one end of said base and toward the other end of said base and for tilting movement toward one side or another of said base, switch means carried by said base for selective operation by said pedal upon swinging and tilting movement thereof to start and stop said first electric motor and to selectively operate said second motor for steering purposes, said base carrying a speed control housing at the other end of said base and projecting upwardly above said base, said speed control housing including a rheostat therein and having an outer wall facing said pedal and extending upwardly in inclined relation thereto, said housing including an operating element for said rheostat carried by said wall at a location above said pedal whereby the toe of an operator foot on said pedal may operate said element in any position of said pedal.

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