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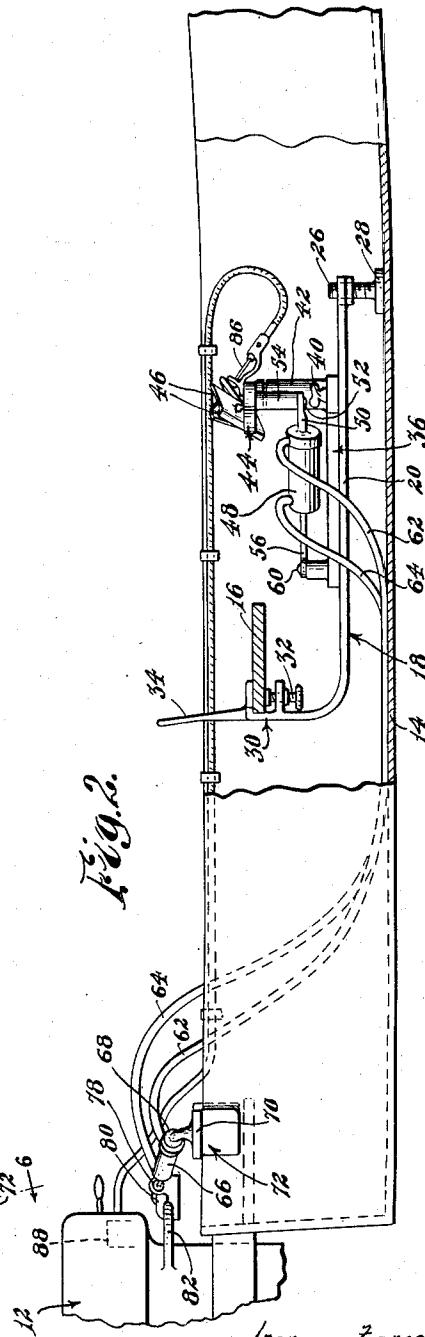
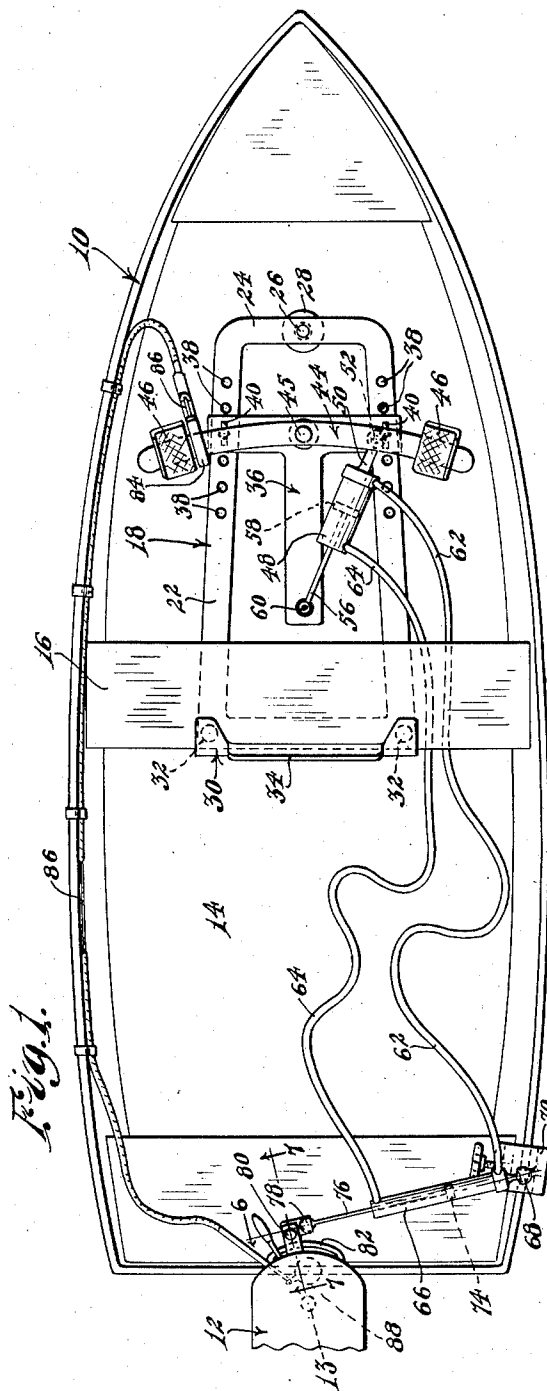
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2,829,616

FOOT-RESPONSIVE BOAT-CONTROL APPARATUS

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2 Sheets-Sheet 1



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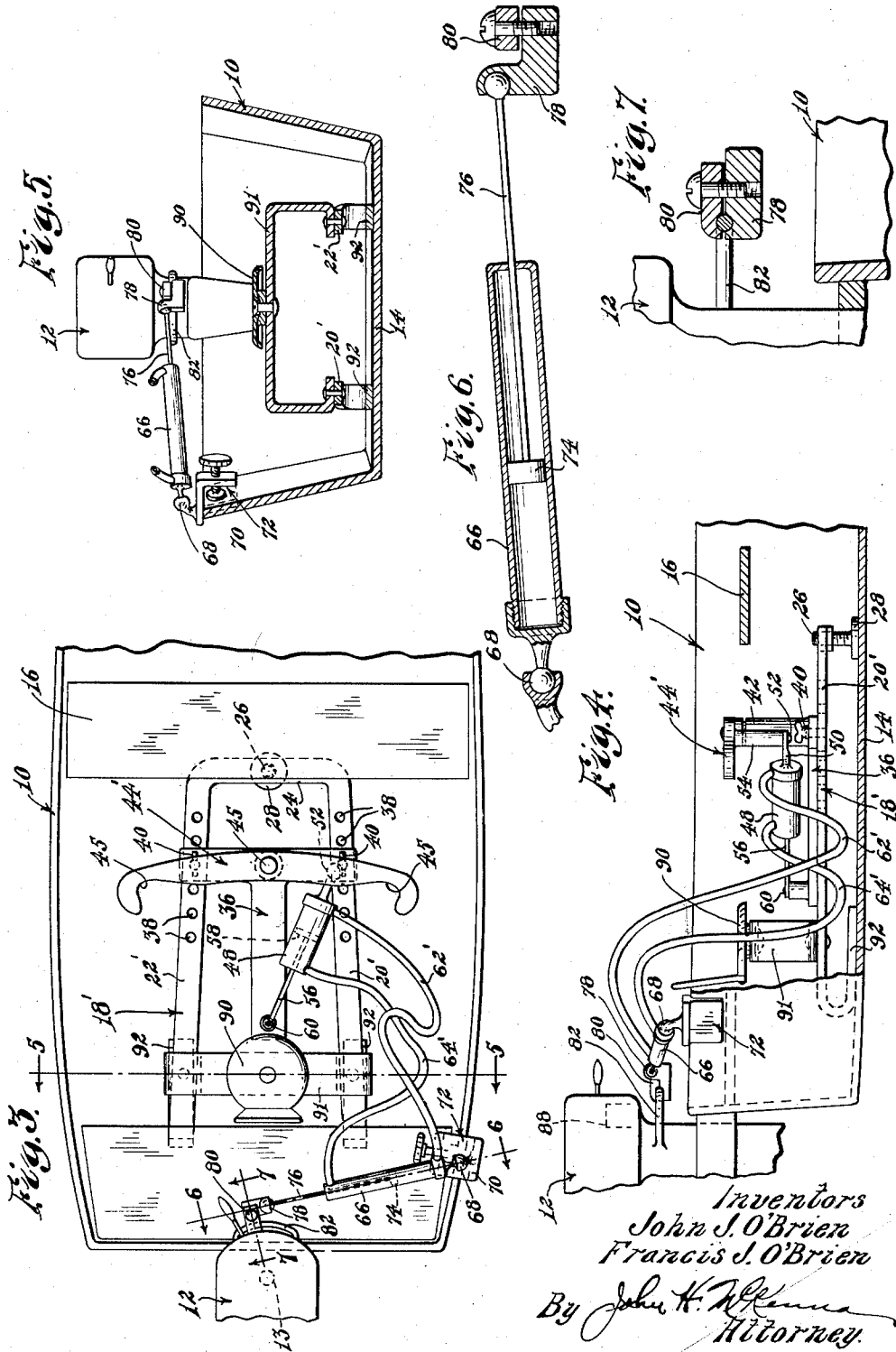
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FOOT-RESPONSIVE BOAT-CONTROL APPARATUS

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2 Sheets-Sheet 2



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FOOT-RESPONSIVE BOAT-CONTROL APPARATUS

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4 Claims. (Cl. 114—150)

This invention relates to improvements in boat controlling apparatus and provides, more particularly, improved apparatus whereby a person may effectively control the direction and rate of travel of an outboard motor boat, or the like, while both of his hands are left free for other activities, such as for reeling in a fish, for example. The invention provides improved apparatus of the mentioned general variety which has the important attribute of being readily portable and easily removably mountable on any of the more common varieties of outboard motor boats.

It has been variously proposed heretofore to provide foot steering means for outboard motor boats, and the like, which have employed ropes or cables for actuating the outboard motor in response to foot-actuations of pedals pivotally mounted at fixed locations in a boat. Such rope and cable control devices have proven unsatisfactory in that the operator, when effecting an intended slight swing of the outboard motor in response to foot-pressure on one pedal must restrain and limit the swing with the other pedal to avoid a water-induced over-swing of the motor due to changed directions of water currents. Frequently, an intended slight swing of the motor continues into a maximum swing with the operator helpless to control or limit it. Also, anything like precision foot control of steering is not attainable with the prior rope and cable control devices because of stretching of the tensile elements and frequent pulling away at guide points due to imposition of undue stresses on the tensile elements.

It is among the objects of the present invention to provide a foot-steering apparatus for an outboard motor boat, or the like, wherein boat-steering actuations of the outboard motor, or comparable power means, are in response to displacement of fluid in a closed circuit whereby there is a constant cushioned resistance to steering actuations of the motor and the operator can effectively restrain and limit the motor actuations with an ever present feel of being in complete control of the course of the boat.

Another object of the invention is to provide a foot-responsive fluid-flow closed circuit fluid propulsion boat-steering apparatus wherein a relatively small foot-actuation of a pedal means produces a relatively large steering actuation of an outboard motor, with the fluid in said closed circuit constantly restraining and cushioning the motor actuations.

A further object of the invention is to provide a foot-control apparatus for outboard motor boats, and the like, which is readily portable for being carried to any particular boat, and which is easily and quickly mountable on the boat and connectable to the outboard motor for effective foot-control of the direction of movement of the boat.

Yet another object of the invention is to provide a foot-control steering apparatus for an outboard motor boat, or the like, which includes an accelerator pedal and a connection therefrom which is attachable to the carburetor of the motor for foot-control of the operation of

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the motor in conjunction with the foot-control of the course of the boat.

It is, moreover, our purpose and object generally to improve the structure, effectiveness and utility of foot-responsive controls for outboard motor boats, and the like, and more especially to provide such foot-controls which are portable in nature and readily mountable in operative condition of any conventional outboard motor boat equipped with any of the conventional varieties of outboard motors.

In the accompanying drawings:

Fig. 1 is a top plan view of an outboard motor boat having foot-responsive control apparatus embodying features of the invention operatively mounted thereon;

Fig. 2 is a side elevation of the boat of Fig. 1 with a portion of the boat broken away to more clearly show the control apparatus;

Fig. 3 is a top plan view of the rear portion of the boat of Figs. 1 and 2 having a modified form of our foot-steering apparatus therein;

Fig. 4 is a side elevation of the boat of Fig. 3 with a side portion of the boat broken away to show the apparatus interiorly of the boat;

Fig. 5 is a cross-sectional view on line 5—5 of Fig. 3;

Fig. 6 is a cross-sectional view on line 6—6 of either Fig. 1 or Fig. 3, on a larger scale; and

Fig. 7 is a cross-sectional view on line 7—7 of either Fig. 1 or 3, on the scale of Fig. 6.

Referring to the drawings, the illustrated boat, indicated generally at 10, is representative of fishing boats of the general class which are powered by an outboard motor, indicated generally at 12.

The invention provides conveniently portable apparatus which may be readily mounted in a de-mountable fashion on any particular boat of the mentioned general class thereby to condition the boat for control thereof entirely by the feet of a fisherman, or other person, in the boat. Both hands are entirely free for holding and manipulating a fishing rod and reel, or for performing any other required or desired action.

The boat 10 has a generally flat bottom 14 and is equipped with a conventional seat 16.

The apparatus of the invention as shown in Figs. 1 and 2 comprises a relatively rigid frame 18 having the substantially spaced apart side members 20, 22 which are connected together by the member 24 at their ends which are forward in the boat as viewed in Figs. 1 and 2. Member 24 has a depending part for engaging and resting on the bottom 14 of the boat, the depending part being shown in the form of a screw 26 having a broad head or disk 28 on its lower end for engaging the bottom of the boat. The threaded shank portion of the screw is screwed into member 24 of the frame and is adjustable therein for selectively positioning the forward end of the frame in a predetermined spaced relation to the bottom 14 of the boat. The other ends of the frame side members 20, 22 are rigidly connected together by channel means, indicated generally at 30, whose channel walls are adapted to be engaged over the rear edge margin of the seat 16, as best seen in Fig. 2. Clamping screws 32 are threaded through the lower side wall 30a of the channel means and are adapted to be tightened against the underside of the seat to secure the frame to the seat. Preferably, the channel means 30 will have an upwardly projecting part 34 thereon for constituting a back-rest for a person sitting on seat 16.

A generally T-shaped element 36 is mounted on frame 18 for selective adjustment fore and aft along the side members 20, 22. As shown, each of the side members has a series of threaded holes 38 therein, and the outer ends of the T-arm of element 36 have holes therein

through which thumb screws 40, or the like, may be passed and screwed into selected ones of the holes 38 in side members 20, 22, thereby to secure the T-element 36 in any selected position of adjustment on frame 18.

Centrally between the ends of the T-arm of element 36 is a rigid standard 42 which projects substantially vertically upward for pivotally supporting, at its upper end, the pedal-carrying bar 44. Preferably, the standard 42 includes ball-bearings, or the like, for reducing frictional resistance to movements of bar 44 about its pivot at 45 on standard 42. Pedals 46 are swivelly mounted on bar 44 at opposite sides of the pivot of the bar.

According to the invention, the outboard motor 12 is actuated about the axis 13 of its conventional pivotal support, for steering the boat, in response to movements of pedal-bar 44 acting through a closed fluid circuit which includes a master cylinder and piston and a so-called slave cylinder and piston. The master cylinder 48 has a rigid projection 50 on one end and this projection is pivotally connected at 52 to a depending rigid element 54 on bar 44 at a location substantially to one side of the pivot 45 of the bar. The other end of cylinder 48 has a piston rod 56 projecting therefrom, the inner end of the rod being connected to a piston 58 within the cylinder and the outer end of the rod being pivotally connected at 60 to the free end portion of the leg of T-element 36. A flexible conduit 62 is connected to one end of cylinder 48 and a similar flexible conduit 64 is connected to the other end of cylinder 48.

The slave cylinder 66 has one end swivelly connected at 68 to a bracket part 70 of a clamp which is indicated generally at 72. The clamp is adapted to be removably secured on a suitable aft portion of the boat. Cylinder 66 has substantially the same fluid capacity as master cylinder 48 but is longer and of smaller diameter so that its piston 74 can have a longer stroke than the piston 58 in cylinder 48. A piston rod 76 is connected to piston 74 and extends out of the free end of cylinder 66 with its outer end swivelly connected at 78 to a screw clamp 80, or the like, which readily may be clamped to an available part 82 of the outboard motor. Flexible conduit 62 is connected to one end of cylinder 66 and flexible conduit 64 is connected to the other end thereof.

Preferably, the swivel connections at 68 and 78 will be ball and socket or other comparable universal connections to facilitate mounting and connecting of the slave cylinder and piston in operative relationships to any particular outboard motor on any particular boat.

The flexible conduits 62, 64 may extend loosely within the boat between the cylinders 48 and 66, each conduit having a suitable excess of length for accommodating any desired adjustments of T-element 36 on frame 18.

It will be apparent from the foregoing description of the illustrated boat-steering apparatus that the apparatus is of a portable nature which enables a fisherman, or other person, to bring along his own foot-steering apparatus when going on a fishing expedition, or the like, in any conventionally equipped outboard motor boat. The apparatus quickly and easily may be installed in the boat and may be operatively connected to any of the conventional varieties of outboard motors.

A suitable quantity of fluid, which may be liquid or gas, will be sealed within the closed circuit which comprises the two cylinders 48, 66 and the two flexible conduits 62, 64. Assuming that the pedal-bar 44 is in its neutral position of Fig. 1, a relatively small foot-induced swing of the pedal bar in either direction about its pivot or axis 45 will cause fluid in cylinder 48 to be forced from cylinder 48 into one or the other of the flexible conduits 62 or 64. If the swing of the pedal-bar is counterclockwise in Fig. 1, fluid in cylinder 48 will be forced into and through conduit 64 to propel piston 74 in the slave cylinder 66 in direction to effect a clockwise swing of the outboard motor 12 about its

pivot or axis 13, and the stroke of piston 74 will be substantially greater than the relative movement of piston 58 in master cylinder 48. Hence, a relatively slight angular swing of pedal-bar 44 produces a substantially greater angular swing of the outboard motor, and the direction of swing of the motor is determined by the direction of swing of the pedal-bar 44. There is an inherent cushioned firmness of the foot-control guiding of the travel of the boat and both hands of the fisherman, or other person, are left entirely free for handling his fishing gear, or for doing whatever else he may desire to do with his hands.

Preferably and conveniently, even control of the operation of the outboard motor may be under foot control by including an accelerator pedal 84 on pedal-bar 44, with a conventional encased push-pull wire 86 engaged at one end by pedal 84 and having any suitable means at its other end for connection to the usual control arm or lever of the motor carburetor diagrammatically represented by dotted lines at 88. The accelerator pedal 84 may be spring-biased to a condition for idling of the outboard motor 12 and the speed of the motor may be increased and controlled by foot pressure on the pedal 84 which, conveniently, may be located on pedal-bar 44 close to one of the pedals 46, so that the two closely adjacent pedals may be actuated by the same foot with a relatively slight shifting of the position of the foot on the steering pedal 46.

Figs. 3-5 illustrate a modification in which a frame 18' is generally similar to the frame 18 of Figs. 1 and 2 but has its own seat 90 mounted at a rear portion of the frame so that the frame 18' may be entirely supported on the bottom 14 of the boat. The rear ends of the spaced side members 20', 22' of frame 18' may be turned downwardly and forwardly to provide the foot portions 92 for resting loosely on the bottom of the boat. Hence, the frame 18' requires no connection to the boat and may be placed rearward of the boat seat 16 from which location a person sitting on frame seat 90 conveniently may reach the conventional means (not shown) for controlling the operation of the outboard motor 12. The flexible conduits 62', 64' may be considerably shorter than the conduits 62, 64 in Figs. 1 and 2. There is no need for an accelerator pedal in the Figs. 3-5 embodiment, and the pedal bar 44' in this embodiment merely has the foot-notches 45 therein for reception of the operator's feet.

The frame 18' is held in place within the boat by the weight of a person sitting on the frame seat 90, which latter may be rotatably mounted on supporting member 91. The master and slave cylinders and their pistons, and their connections, in the Figs. 3-5 embodiment, may be the same as described for the Figs. 1 and 2 embodiment.

Various changes in details of construction may be made within the scope of the appended claims, and it is intended that the patent shall cover, by suitable expression in the appended claims, whatever features of patentable novelty exist in the invention disclosed.

We claim as our invention:

1. Control apparatus for an outboard motor boat, comprising a relatively rigid frame adapted to be removably arranged within a boat and to have substantial fore-and-aft extent adjacent to the bottom of the boat, a pedal-bar pivotally mounted on a forward portion of said frame and having extent generally transversely of said frame, the pivot of said pedal-bar being substantially centrally between the ends of the bar, means adjustably connected to an aft portion of said frame including a back-rest for a person seated in said boat in position to effect foot-actuation of said pedal-bar, a master cylinder with a piston therein having a piston rod extending out of said cylinder at one end thereof, the other end of said cylinder and the outer end of said piston rod being pivotally connected to different ones of said frame and said pedal-bar, a slave cylinder adapted to be pivotally mounted

detachably on an aft portion of the boat, a piston in the slave cylinder having a piston rod projecting out of an end of the slave cylinder, means pivotally connected to the outer end of the latter said piston rod and adapted to be connected detachably to an outboard motor is pivotally mounted on the boat, and conduit means inter-connecting the two said pistons and providing with said pistons a closed fluid circuit whereby, when said pivoted means on the slave cylinder piston rod is connected to the outboard motor, an actuation of said pedal-bar in either direction about its pivot produces a fluid-induced actuation of said outboard motor about its pivot, said slave cylinder having substantially smaller interior diameter and substantially greater length than said master cylinder for producing a relatively large rotational actuation of said outboard motor in response to a relatively small rotational foot-actuation of said pedal-bar.

2. In an outboard motor boat having its motor swingable about a generally vertical axis for steering the boat, foot-control apparatus removably arranged on the bottom of the boat comprising a frame extending fore and aft within the boat, a seat at a predetermined fixed location relative to said frame, said seat having a back-rest portion connected to an aft portion of said frame and removable therewith, a pedal-bar pivotally mounted on a forward portion of said frame with its pivot at a mid-location along the bar, means for selectively varying the fore-and-aft-distance between said seat and the pivot of the pedal-bar, means providing a closed fluid circuit including a master cylinder and piston and a slave cylinder and piston, means pivotally connecting said master cylinder and its piston rod to different ones of said frame and pedal-bar with the pivotal connection to said pedal-bar outward from the pivot of the bar, means at an aft location on said boat pivotally supporting said slave cylinder, said slave cylinder having a piston rod extending out of the slave cylinder and the outer end thereof being pivotally connected to the outboard motor for swinging the latter about its said axis in response to movement of said slave cylinder piston within the slave cylinder, a said movement of the slave cylinder piston occurring in response to relative movement of the master cylinder piston within the master cylinder when said pedal-bar is actuated in either direction about its said pivot on said frame, said slave cylinder having substantially smaller interior diameter and substantially greater length than said master cylinder for producing a relatively large rotational swing of said outboard motor in response to a relatively small rotational foot-actuation of said pedal-bar.

3. In an outboard motor boat having its motor swingable about a generally vertical axis for steering the boat, foot-control apparatus removably arranged on the bottom of said boat comprising a frame extending fore and aft within the boat, a pedal-bar pivotally mounted on said frame with its pivot at a mid-location along the bar, a back-rest adjustably connected to an aft portion of said frame for supporting the back of a person seated in the boat in a position to effect foot-actuations of said pedal-bar, means providing a closed fluid circuit which includes a master cylinder and a slave cylinder of which the master

cylinder is pivotally connected to one of said frame and pedal-bar and the slave cylinder is detachably pivotally connected to an aft portion of said boat, a master cylinder piston having a piston rod extending out of the master cylinder and pivotally connected to a different one of said frame and pedal-bar from the one to which said master cylinder is pivotally connected, a slave cylinder piston having a piston rod extending out of the slave cylinder and detachably pivotally connected to the outboard motor of the boat, for actuating the motor about its pivot in response to movements of the slave cylinder piston within the slave cylinder, flexible conduits connecting the opposite ends of said master and slave cylinders and providing with said cylinders, a closed fluid circuit, whereby an actuation of said pedal-bar in either direction about its pivot effects propulsion of fluid within said closed circuit and resulting movement of said slave cylinder piston within the slave cylinder, thereby to actuate said outboard motor about its pivot, said slave cylinder having substantially smaller internal diameter and substantially greater length than said master cylinder whereby a relatively small foot-induced movement of the piston in said master cylinder produces a substantially larger movement of the piston in said slave cylinder.

4. Foot-steering mechanism for outboard motor boats, comprising a frame adapted to be arranged removably within a boat to have substantial fore and aft extent adjacent to the bottom of the boat, a pedal-bar disposed generally transversely of the frame and pivoted between its ends on said frame, a seat connected to an aft portion of said frame, means for selectively varying the fore-and-aft distance between said pedal-bar and said seat, a closed fluid circuit including a master cylinder having a piston therein and a slave cylinder having a piston therein, means pivotally connecting the master cylinder and its piston respectively to different ones of said frame and pedal-bar with said pivotal connection to the pedal-bar spaced appreciably from the pivot of the bar, means associated with said slave cylinder adapted to connect the slave cylinder pivotally and removably to an aft portion of the boat, a piston within the slave cylinder and having a piston rod extending out of the cylinder, means on the outer end of the latter said piston rod for removably pivotally connecting said outer end of the latter said piston rod to a pivotally mounted outboard motor on said boat, whereby a foot actuation of said pedal-bar in either direction about its pivot effects an actuation of said outboard motor about its pivot, said slave cylinder having substantially smaller interior diameter and substantially greater length than said master cylinder to substantially increase the magnitude of the actuation of said motor as compared with the magnitude of a said foot-actuation of said pedal-bar.

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