Nov. 4, 1969 A. H. OLDHAM 3,475,985

OUTBOARD MOTOR CONTROL

Filed April 5, 1967 3 Sheets-Sheet 1

FIG. 1

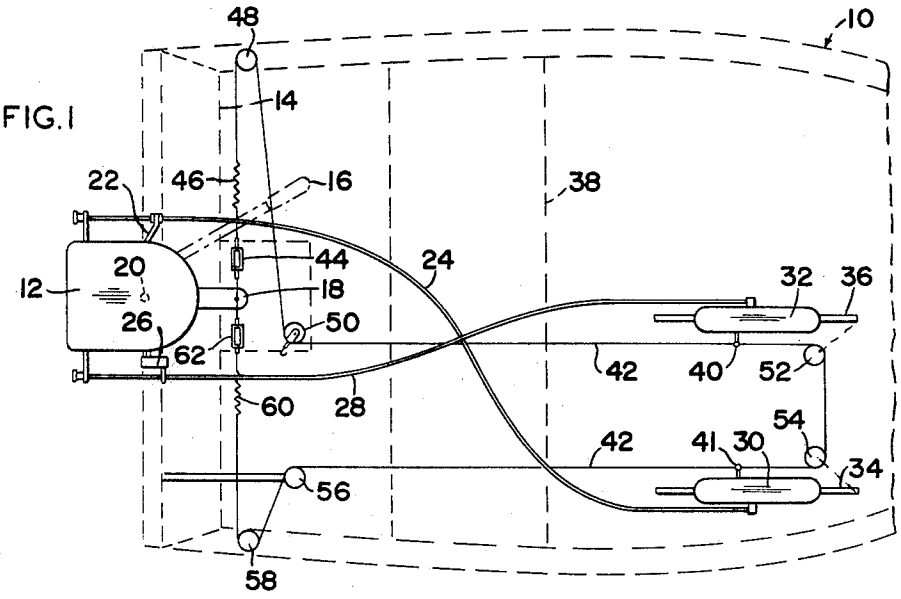


FIG. 2

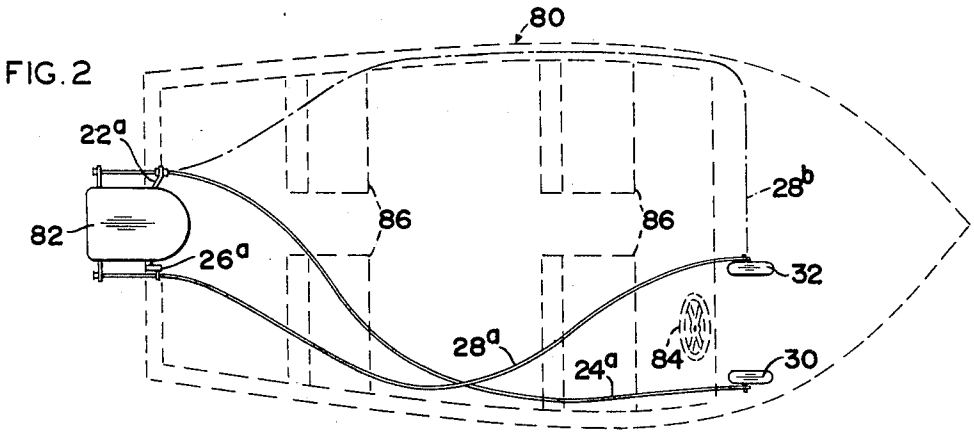
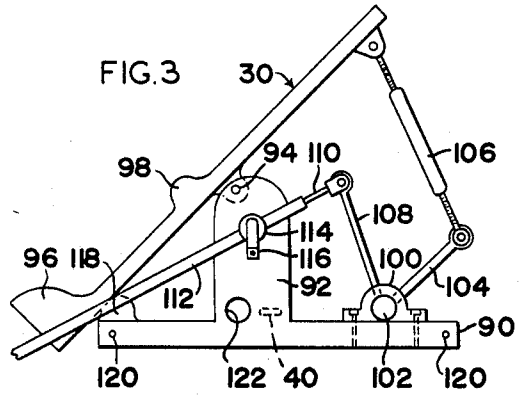


FIG. 3



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FIG. 4

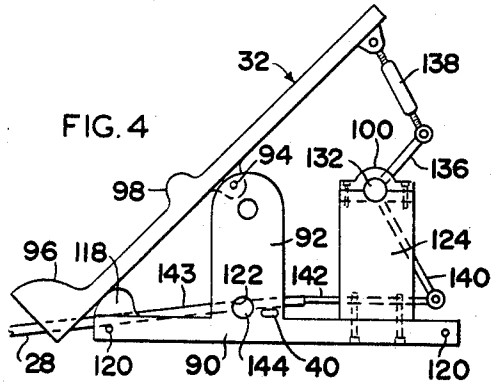


FIG. 4a

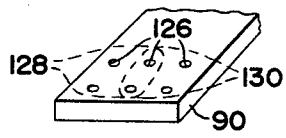


FIG. 5

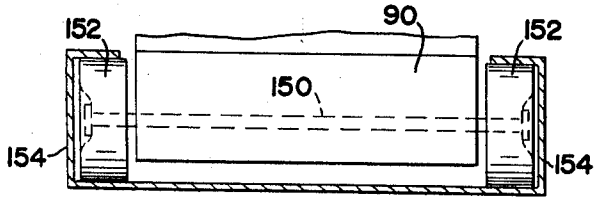


FIG. 6

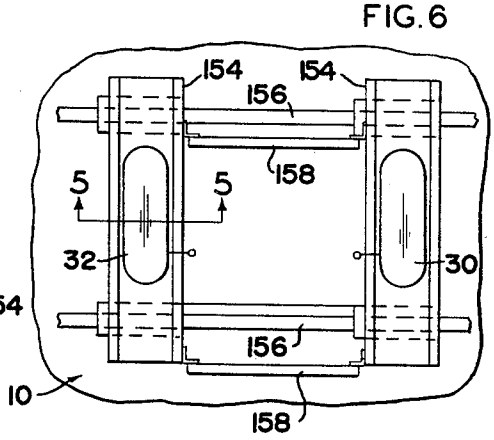


FIG. 7

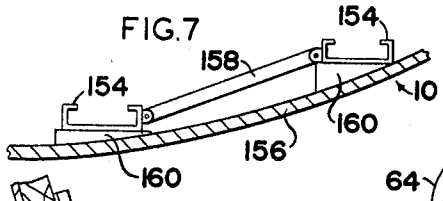


FIG. 8

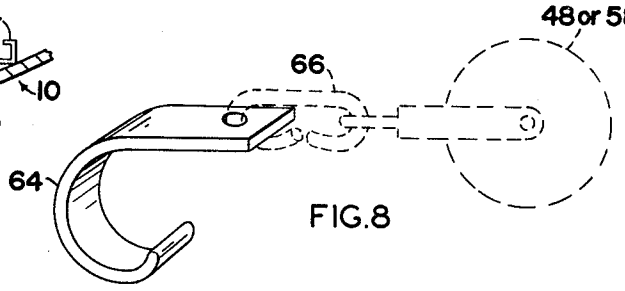


FIG. 9

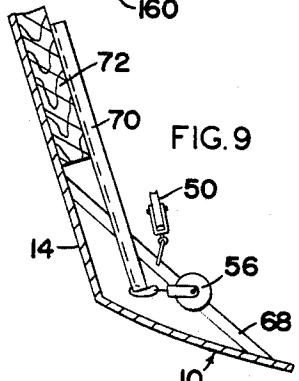


FIG. 10

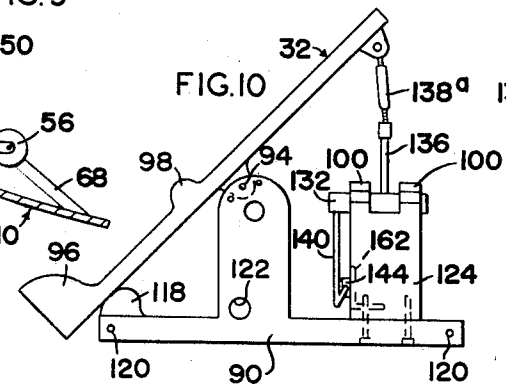
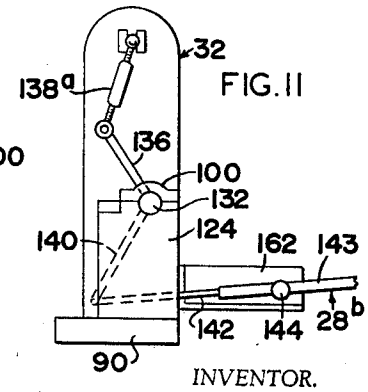


FIG. 11



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FIG.12

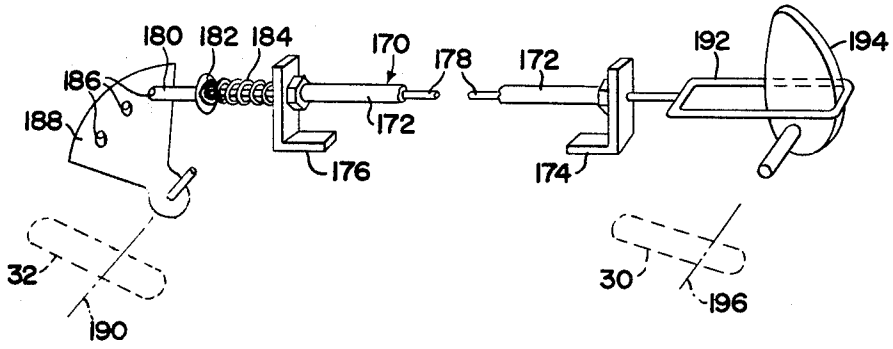


FIG.13

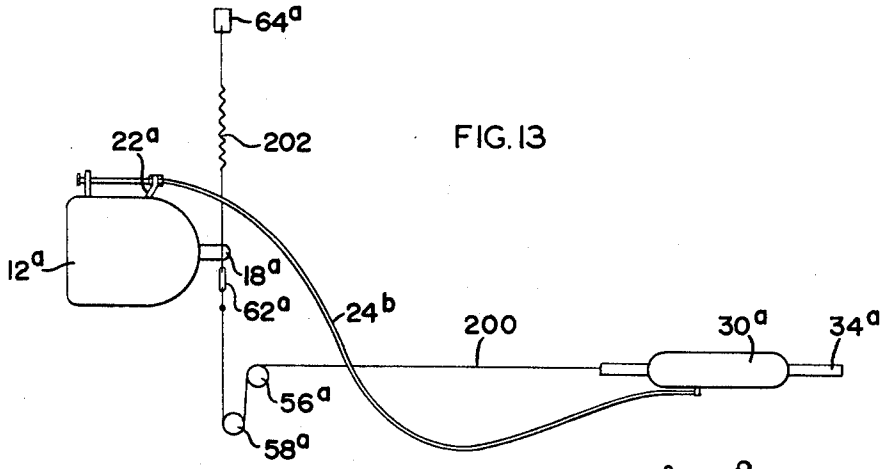


FIG.14

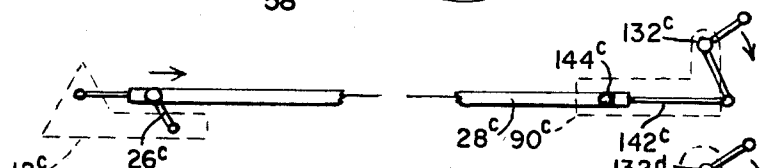
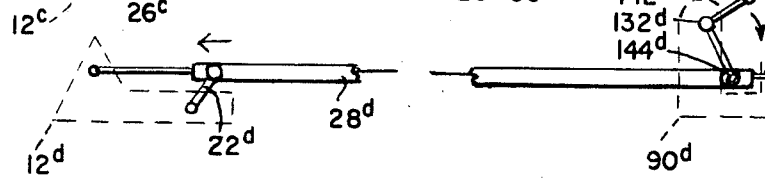


FIG.15



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OUTBOARD MOTOR CONTROL

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Int. Cl. G05g 1/14
U.S. Cl. 74—512 8 Claims

ABSTRACT OF THE DISCLOSURE

Apparatus for steering, throttling and/or clutching an outboard motor entirely by the feet wherein a pair of foot operated pedals are mounted to the deck of the boat. The pedals are operatively connected by cable means to the motor whereby the motor turns about a steering axis upon fore and aft movement of the pedals and the throttle and/or clutch of the motor are controlled by tilting movement of the pedals about a horizontal axis.

This invention relates to improved foot operated controls for steering, throttling, and/or clutching outboard and like motors.

Prior art, such as U.S. Patent Nos. 2,749,872; 2,757,630; 2,901,918; and 2,988,930, disclose mechanism for foot steering of an outboard motor, but make no provision for throttle or clutch control, and are open to other objections. U.S. Patent No. 2,804,838 shows a foot control for steering and controlling the speed of an electric motor outboard, but is not capable of internal combustion engine control.

It is the general object of the invention to overcome the difficulties of and objections to the foregoing and other prior art by the provision of an improved, easily installed, and readily operated apparatus usable in selected position in boats of various size for steering, throttling, and/or clutching an outboard motor entirely by the feet, and characterized by long, maintenance free operation even when used in the presence of salt and sand.

In the drawings:

FIG. 1 is a diagrammatic plan view, partially broken away, showing the apparatus of the invention installed in a boat to effect steering, throttle, and clutch control;

FIG. 2 is a view similar to FIG. 1 but showing the apparatus of the invention installed in a boat and controlling only the throttle and clutch;

FIG. 3 is a side elevation of the throttle control pedal;

FIG. 4 is a view like FIG. 3 but showing the clutch control pedal;

FIG. 4*a* shows in fragmentary perspective a portion of the pedal base with two sets of mounting holes;

FIG. 5 is a cross-sectional view on enlarged scale, taken on line 5—5 of FIG. 6 and illustrating how either or both pedals can be mounted for sliding movement;

FIG. 6 is a plan view showing a clutch control pedal and a throttle control pedal mounted in slides in a boat which is largely broken away;

FIG. 7 is an end elevation of the apparatus of FIG. 6 but with the pedals removed;

FIG. 8 is an enlarged perspective view of a typical mounting bracket for steering pulley incorporated in the form of the apparatus in FIG. 1;

FIG. 9 is a vertical cross section through the transom of a boat showing the mounting of other steering pulleys in the form of the apparatus of FIG. 1;

FIG. 10 illustrates a modification of the clutch control pedal of FIG. 4 wherein the control movement of the pedal is at right angles to that of FIG. 4;

FIG. 11 is an end elevation of the pedal of FIG. 10;

FIG. 12 illustrates an interlock between the clutch and throttle pedals permitting shifting of the motor only on substantially closed throttle;

FIG. 13 is like FIG. 1 but shows a modification of the invention using only a throttle control pedal; and

FIGS. 14 and 15 are diagrammatic illustrations how a pedal linkage, for example that of FIG. 4, can be used to produce either a push or a pull.

In FIG. 1 of the drawings the numeral **10** indicates in dotted lines a boat, having portions thereof broken away, and with an outboard motor **12** mounted in standard manner on the transom **14** of the boat. The usual motor tiller **16** can be removed but preferably is left in place to provide normal hand control of the motor. The motor **12** either has a short steering lever **18** built is as original equipment, or such a lever is supplied as an extra by the motor manufacturer whereby the motor can be rotated about a substantially vertical axis **20**.

Also built into the motor **12**, or obtainable as an extra, is a throttle control operable by a Bowden cable **24**. Built into the motor, or obtainable as an extra is a clutch control (forward, neutral, and reverse) **26** operable by a Bowden cable **28**.

The pedals **30** and **32** are mounted in slides, indicated diagrammatically at **34** and **36**, on the floor or bottom of the boat in a selected position therein, as in front of one side of the boat seat **38**. The slide mounted pedals **30** and **32** each have brackets **40** and **41** extending laterally from the top of the pedal base and these brackets are connected to a convention, plastic covered, flexible steering cable **42**. This cable extends in an endless path from steering lever **18**, through a turnbuckle **44**, tensioning spring **46**, around pulleys **48** and **50**, to bracket **40**, around pulleys **52** and **54** to bracket **41**, around pulleys **56** and **58** and back through tensioning spring **60** and turnbuckle **62** to lever **18**.

Pulleys **48** and **58** quickly mount on the gunnels of the boat by means of brackets **64** and hooks **66**, shown in FIG. 8, in alignment laterally, but often not vertically with lever **18** cable connection hole. Pulley **50** mounts with a hook **66** in a hole drilled in transom brace **68**, as seen in FIG. 9, with pulley **50** in substantial alignment with the side pedal **32**. Pulleys **52** and **54** mount with hooks on slides **36** and **34**, respectively. Pulley **56** mounts in alignment with side of pedal **30** with a hook **66** on the bottom of a channel **70** secured by screws or bolts at its upper end to the top of the transom well above the water line. Often the transom is reinforced with a wood strip **72** which facilitates securing the channel **70** to the transom. Should there be no transom brace **68** then pulley **50** is mounted with another channel **70**.

The combination just described provides very positive steering control of motor **12** by an operator sitting on seat **38** with one foot on each pedal and pushing the pedals back and forth. Simultaneously the right foot of the operator controls the motor throttle by tilting pedal **30**, and the left foot controls the clutch by tilting pedal **32**.

The form of the invention just described is used primarily for casting or trolling slowly along a shore. The pedals **30** and **32** are constructed, as hereinafter described, so that pedal **32** is at the most comfortable foot angle, about 45° with the horizontal, when at closed throttle, i.e., slow speed, but can be depressed to give a burst of greater speed if wind or current tends to swing the boat too near or too far from shore for best fishing position. Pedal **30** is constructed so that when at the most comfortable position for the foot, i.e., about 45°, the motor is in forward gear. However, the operator can easily tilt the pedal forward to throw the motor into neutral to better fish a little cove, or can tilt the pedal

still further forward to shift into reverse, to go back and retrieve a bottom snag, or the like.

In the form of the apparatus shown in FIG. 2, the numeral **80** indicates a larger boat such as one used for water skiing rather than fishing, and powered with a large outboard or similar motor **82** mounted on or near the transom. The boat **80** is steered with a steering wheel **84** and has seats **86**. In a boat such as described, the clutch pedal **32** and the throttle pedal **30** are mounted without slides directly on the floor of the boat beneath the steering wheel and a little forward thereof in a position to be comfortably reached by the feet of the boat operator. A Bowden cable **24***a* connects the throttle pedal to the throttle **22***a* of the motor **80**, and a Bowden cable **28***a* connects the clutch pedal **32** with the clutch **26***a* of the motor. It is often desirable in this installation to have the Bowden cable **28***a* connect to the pedal **32** at about right angles thereto as shown in chain-dotted lines **28***b* so that the cable does not lie in the middle of the boat floor. The design of pedal **32**, as hereinafter described, will provide this. All pedals and control cables mount fully above the floor of the boat so that they are very easily installed.

The invention as illustrated in FIG. 2 provides for the control of the large motor clutch and throttle entirely with the feet of the operator in much the same fashion as a car is controlled, and eliminates the removal of a hand from the steering wheel which has always been necessary to operate the conventional hand controls for clutch and throttle. The installation of FIG. 2 is preferably made with the clutch pedal at the most comfortable position, i.e., about 45°, when in forward gear, and with the throttle pedal in the most comfortable position, about 45°, with full open throttle, this being the position in which the boat is most often operated. Then to slow down the boat the throttle pedal is tilted forward with an action not unlike pressing on a brake. To get this action, which is just opposite to the action of the throttle on the fishing boat control, it is most convenient to use a clutch type pedal for the throttle as well, which will become evident as the pedals are described.

FIG. 3 shows the throttle control pedal **30** comprising a base **90** provided with an upright portion **92** bifurcated at its upper end to receive an ear or ears on the underside of the pedal **30**. A pivot pin **94** connects the pedal and the base portion **92** so that the pedal is movable about the substantially central pivot from about the full line 45° position to almost a horizontal position. Inasmuch as this tilting movement is obtained by a forward and back rocking motion of the ankle of the operator, and this motion is limited, the pedals are constructed so that movement of the pedal only through about 30° effects full motor control movement of the Bowden cables. The pedal **30** is preferably made with a heel receiving cup **96** and an arch engaging rib **98** whereby slippage of the foot on the pedal is avoided and either heel or toe forces can be applied to rock the pedal.

A strap bearing **100** pivotally secures an offset arm bell crank **102** to the base **90**. The shorter arm **104** of the crank **102** is centrally beneath the upper end of the pedal **30** and is pivotally connected thereto by an adjustable length link **106**. The longer arm **108** of the crank **102** is in alignment with the side usually the right side of the pedal and pivotally connects to the sliding core **110** of the Bowden cable **24**. The casing **112** of the Bowden cable **24** has a cylindrical boss **114** received in a hole in the upright **92** and held in place by a clamp **116** removably mounted on the upright **92**. The Bowden cables described are conventional and have long been on the market for use with standard hand controls for outboard clutch and throttle.

The arrangement of the pedal parts is such that a 30° tilting movement of the pedal moves the core **110** a standard 3 inches outwardly in the fixed casing **112** to fully open the motor throttle from fully closed position. Casing **112** of course rocks slightly in an angular direction about the pivoting boss **114** upon the swinging of arm **108**. The base **90** may be provided with a stop **118** to engage the lower end of the pedal when in closed throttle position. The base **90** is also formed with holes **120** for mounting rollers if the pedal is to be slidably mounted, and is formed with holes **122** on either side of the bottom of the upright **92** to receive the boss of a clutch control Bowden cable. In other words, the pedal and its base are the same but are adapted to mount linkage for either throttle or clutch control.

FIG. 4 shows the clutch pedal **32** and its base identical to the throttle pedal already described in detail. However, an extra block or spacer **124** is provided which is fastened in certain of the same holes in the base as received the strap bearing **100**. Actually, as shown in FIG. *4a*, six holes **126** are provided in the base **90**. One set, marked **128**, mounts the strap bearing **100** for the throttle control. Another set, marked **130**, mounts the block **124** when the same design base is used for the clutch control. In this manner the bell crank **102** is mounted center and right of the base and the bell crank for the clutch control is mounted center and left of the base. A strap bearing **100** pivotally secures an offset arm bell crank **132** on top of the block with the shorter arm **134** thereof centrally below the end of the pedal **32** and pivotally connected thereto by an adjustable length link **136**. The longer arm **138** of crank **132** at the left or back side of the base **90** is pivotally secured to the slidable inner core **140** of the Bowden cable **28** extending to the motor clutch. The casing **142** of the cable **28** has the standard cylindrical boss **144** pivotally received in the hole **122** formed on the left side of the upright **92** near the base. The parts operate so that about a 30° forward and downward tilt of the pedal from the approximate 45° full line position shown pushes the core **142** of the Bowden cable **28** a full three inches inwardly to move the motor clutch from forward, to neutral, to reverse.

In the form of the invention shown in FIG. 2 it is advisable to use two pedals of the type shown in FIG. 4, one to control the clutch and the other to control the throttle. This provides the fully open throttle with the pedal at 45°. The bell crank **132** of the throttle control pedal can be made of opposite hand so that the longer arm **140** comes to the right of base **90** as well as the Bowden cable which puts the cable more out from under the operator's feet.

It will be understood that the pedals as described are constructed to be used without slides as shown in FIG. 2 or with slides as seen in FIG. 1. FIG. 5 shows how the pedals are slidably mounted. Axles **150** are slid into the holes **120** of the base **90** and nylon or like rollers **152** are rotatably secured to the ends of the axles by snap rings. The rollers **152** roll in flat C-shaped channels **154** of a length to normally bridge at least two ribs **156** often present in a boat, such as a conventional aluminum boat **10**. A pair of channels are normally provided, one for the clutch pedal **32**, and one for the throttle pedal **30**. The pair of channels **154** are pivotally connected together by angle strips **158** at front and rear to hold the pedals a comfortable distance apart. Pivotally connecting the channels allows each to be mounted horizontally on a flat or a curved boat bottom. Individual wooden wedges **160** are easily cut and positioned between the channels **154** and the curved ribs **156**, with both the wedges and the channels being secured in place by a single sheet metal screw extending through the channel and wedge into the ribs at a total of four points for the complete installation.

FIG. 8 shows clamp **64** for holding pulley **48** (and also a similar clamp for pulley **58**) on the gunnel of the boat. The clamp can be bent more open or shut with a hammer or pliers to snugly fit on most boat gunnels. Positive affixing to the gunnel can be obtained with a bored hole and a screw but is normally not necessary as the pull of the steering cable **42** is in such a direction that there is

very little tendency for the clamp to shift along the gunnel.

FIG. 10 illustrates the simple manner of modifying the clutch pedal **32** to have the thrust of the linkage in a direction at right angle to the pedal rather than forward and back of the pedal. Specifically, pedal **32** is pivotally mounted on the standard base **90** and block or spacer **124** is used as before. However, strap bearing **100** is simply turned through a right angle, as is bell crank **132**, and is secured in the same four mounting holes. Now the short arm **136** of crank **132** is connected by a ball joint link **138***a* to the outer end of the pedal **32**. The long arm **140** of crank **132** now moves sideways in front of block **124** and is pivotally connected to the sliding core of Bowden cable **28***b* which extends into the side of the pedal as best seen in FIGS. 11 and 12. It is now necessary to secure a bracket **162** to the lower side of the block **124** which pivotally receives and holds the cylindrical boss **144** of the casing **143** of the Bowden cable **28***b*.

It may sometimes be advisable to provide an interlock between the throtle and clutch pedals to prevent shifting of gears except at closed throttle. FIG. 12 illustrates how this is obtained. A Bowden cable **170** extends freely between the pedals and of sufficient length to allow full sliding movement of the pedals. One end of the casing **172** of the cable **170** is fastened to a bracket **174** on the throttle pedal base, and the other end of the casing **172** is fastened to a bracket **176** on the clutch pedal base. The sliding core **178** of the cable **170** has a pin **180** and a plate **182** fastened to one end and a compression spring **184** bearing between the bracket **176** and plate **182** normally resiliently holds pin **180** in one of three holes **186** formed in an arcuate plate **188** mounted on the side of the clutch pedal **32** on the axis **190** of tilt of the pedal. The three holes are positioned to lock the pedal **32** in forward, neutral, and reverse. The other end of the core **178** is provided with a yoke **192** which surrounds a cam **194** mounted on the axis **196** of the throttle pedal **30**, with cam **194** and pedal **30** tilting together. The cam **194** has a contour such that when at closed throttle the high portion of the cam engages yoke **192** to pull pin **180** out of any hole **186** compressing spring **184** and leaving clutch pedal **32** free to be operated. But when throttle pedal **30** is moved to open the throttle the low portions of cam **194** move under yoke **192** allowing spring **184** to move pin **180** into a locking hole **186**.

FIG. 13 illustrates a modification of the invention wherein only a throttle pedal **30***a* is utilized mounted in a slide **34***a*. The pedal **30***a* connects to a steering cable **200** extending around pulleys **56***a* and **58***a* and to a turnbuckle **62***a* connected to the steering bracket **18***a* of the outboard motor **12***a*. A long tension spring **202** is secured to the other side of the steering bracket **18***a* and to a clamp **64***a* on the boat gunnel. A Bowden cable **24***b* connects the throttle pedal **30***a* to the throttle **22***a* of the motor. In this arrangement of apparatus spring **202** normally biases motor **12***a* fully to the left and pushing forward on pedal **30***a* moves the motor fully to the right. Releasing pressure on the pedal again moves the motor towards the left. Steering is thus effected. In actual practice it has been found that there is enough friction in the system, which friction is partially adjustable at the turning friction plate present in most motors, so that the operator's foot can be removed from the pedal and the pedal and motor will stay at the selected position. When the foot is again placed on the pedal only a little pressure by the heel against the pedal heel plate causes the pedal to slide back and spring **202** again turn motor to the left.

It can also be stated that with respect to the form of the invention of FIG. 1 there is enough friction in the system, usually with some adjustment of the steering friction plate in the motor, that the steering pedals move easily fore and aft but hold in any selected position even though the operator's feet are removed.

Removal of the motor from the boat in any of the embodiments of the invention is easily effected. The Bowden cables are conventionally quickly detachable. Loosening the turnbuckle in the form of FIG. 1 allows the turnbuckles to be unhooked from motor lever **18** and hooked to each other whereupon the motor can be removed. In the form of the invention of FIG. 13 the turnbuckle **62***a* and spring **202** are simply unhooked from the motor.

The form of the invention shown in FIGS. 14 and 15 illustrates how a single pedal, such as that of FIG. 4, can be utilized to effect either a push or a pull on an associated Bowden cable. Specifically, FIG. 14 shows bell crank **132***c* connected to the inner core **142***c* of Bowden cable **28***c*, with boss **144***c* of the outer cover of the cable anchoring in the base **90***c* of the pedal. The other end of the core of the Bowden cable anchors to the motor frame **12***c* and the boss of the outer cover of the cable connects to the clutch arm **26***c* of the motor. Movement of the bell crank in the direction of the arrow moves clutch arm to the right as shown by the arrow.

In FIG. 15, the end of the inner core **142***d* of the Bowden cable connects to the pedal base **90***d* and the boss **144***d* of the outer cover of the Bowden cable connects pivotally to the downwardly extending arm of the bell crank **132***d*. The other end of the Bowden cable **28***d* has the inner core connected to the motor frame **12***d* and the boss of the outer cover of the cable connected to, for example, the throttle lever **22***d* of the motor. Now movement of the bell crank in the direction of the arrow moves lever **22***d* to the left in the direction of the arrow.

The arrangement described in FIGS. 14 and 15 has the advantage that a single pedal and linkage structure can be substantially duplicated to control clutch and throttle.

While certain representative embodiments and details have been shown for the purpose of illustrating the invention, it will be apparent to those skilled in this art that various changes and modification may be made thereon without departing from the scope or spirit of the invention.

What is claimed is:

1. Apparatus for steering, clutching, and throttling outboard and like motors including

(a) a pair of pedals,

(b) means mounting each pedal for substantially a fore and aft movement,

(c) cable means adapted to connect the pedals to an outboard motor and turn it about a steering axis upon fore and aft movement of the pedals,

(d) means mounting each pedal for tilting movement about a substantially horizontal axis,

(e) a pair of Bowden cables, one to be connected to the outboard motor throttle, and one to be connected to the outboard motor clutch,

(f) means connecting the other end of the clutch control Bowden cable to one pedal for operation of the cable upon tilting movement of the pedal, and

(g) means connecting the other end of the throttle control Bowden cable to the other pedal for operation of the cable upon tilting movement of the pedal.

2. The combination defined in claim **1** wherein one connecting means operates to push the Bowden cable in, and the other connecting means operates to pull the Bowden cable out, upon tilting of the pedals.

3. The combination defined in claim **1** wherein the cable means to turn the outboard motor about a steering axis form a closed, i.e., endless path.

4. The combination defined in claim **1** wherein the clutch control pedal is in forward gear when at about 45°, and is tilted forward to reach first neutral and then reverse with a total movement of about 30°, and the throttle control pedal is at about 45° when at closed

throttle, and is tilted forward through about 30° to effect fully open throttle.

5. The combination defined in claim 1 wherein each pedal is slidably mounted in a channel to provide for the fore and aft movement, and means pivotally holding the channels in spaced parallel relation whereby each channel can be mounted laterally horizontal although at a different elevation on a curved boat bottom.

6. The combination defined in claim 1 wherein interlock means are provided between the pedals so that the clutch pedal can be operated only when the throttle pedal is at substantially closed throttle position.

7. The combination defined in claim 1 wherein each pedal is slidably mounted in channel means to provide for the fore and aft movement.

8. A foot pedal unit for controlling the clutch or throttle of an outboard or like motor including a base, a pedal, means extending upwardly from the base, pivot means connecting the last-named means to the pedal on a substantially horizontal axis near the center of the pedal, connector means mounted to the base for selectively receiving and anchoring in relation to the base either the inside core element or outside case element of a Bowden control cable, linkage means mounted entirely above

the base and connected to the pedal and connecting the other of the two elements of the Bowden cable for operating the Bowden cable upon tilting movement of the pedal to provide a push or pull of the Bowden cable depending upon whether the connector means is anchoring the inside core element or the otuside case element of the Bowden cable.

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