

June 29, 1954

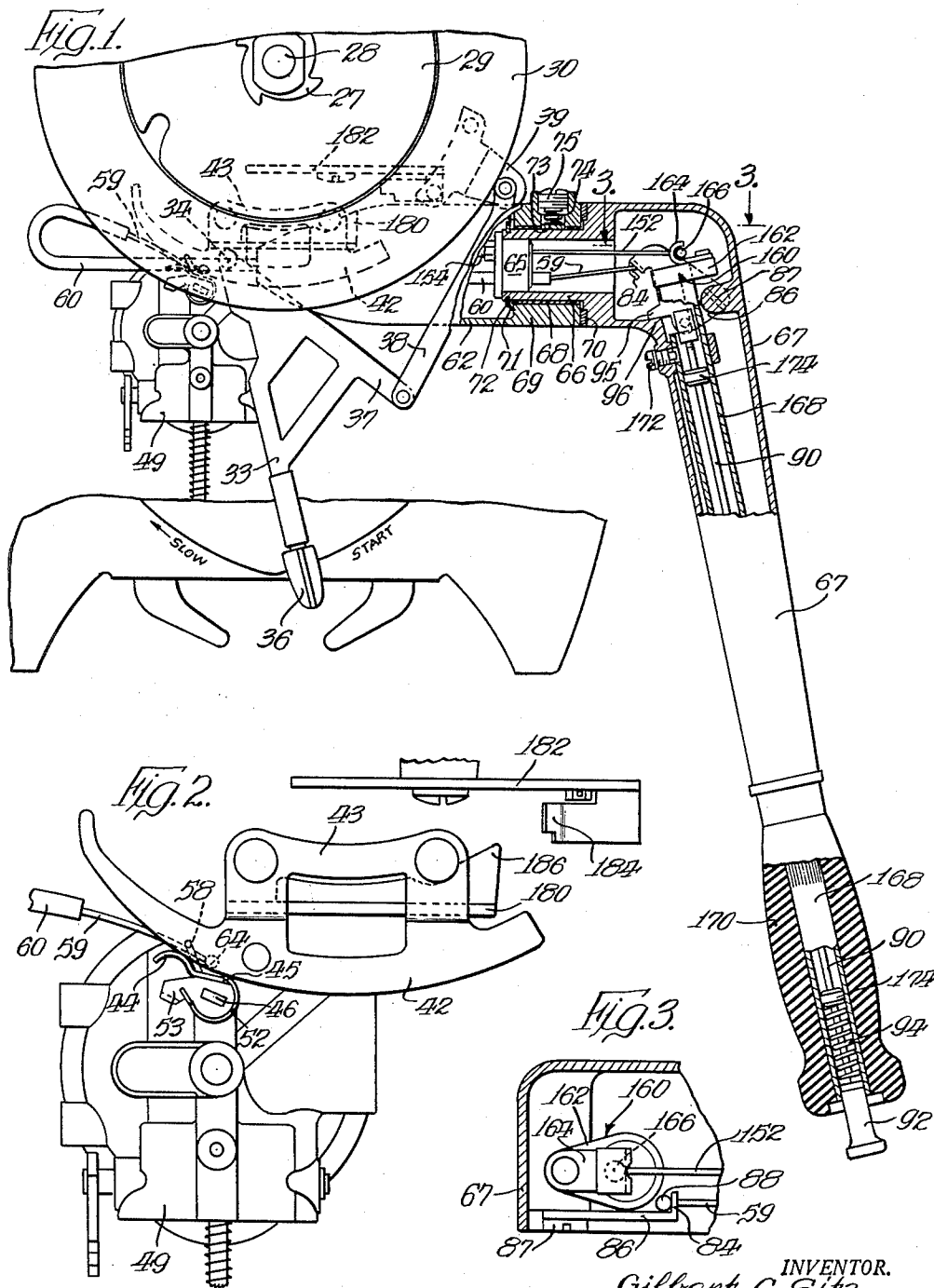
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2,682,248

CONTROL MECHANISM FOR OUTBOARD MOTORS

Filed Dec. 27, 1951

4 Sheets-Sheet 1



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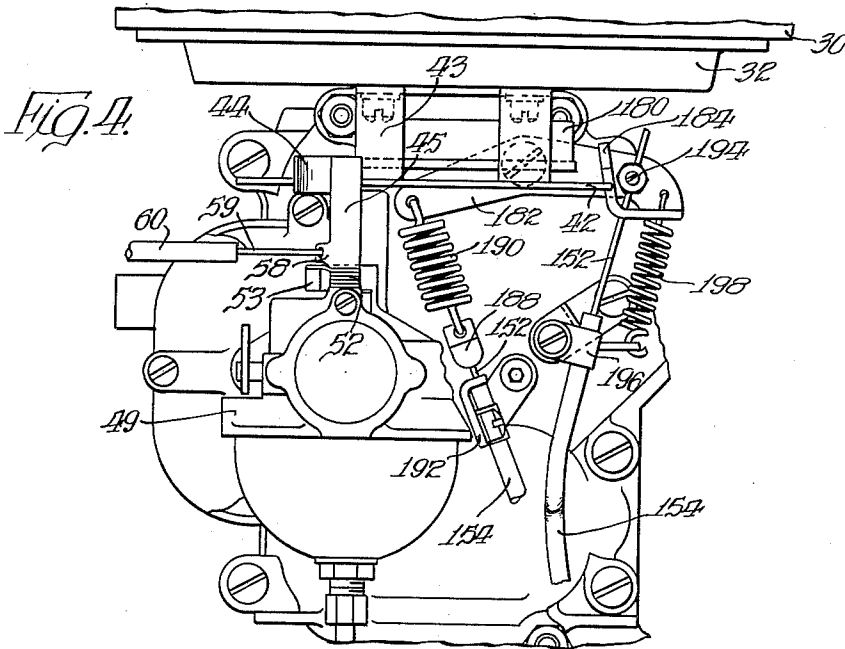
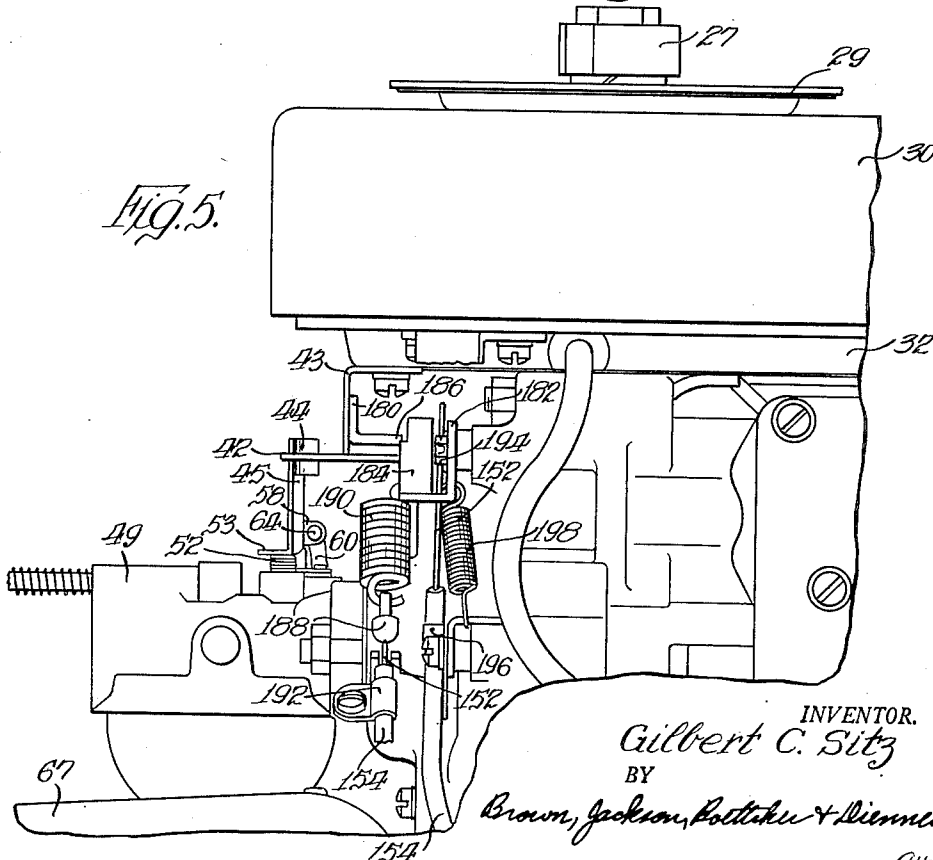
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CONTROL MECHANISM FOR OUTBOARD MOTORS

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4 Sheets-Sheet 2



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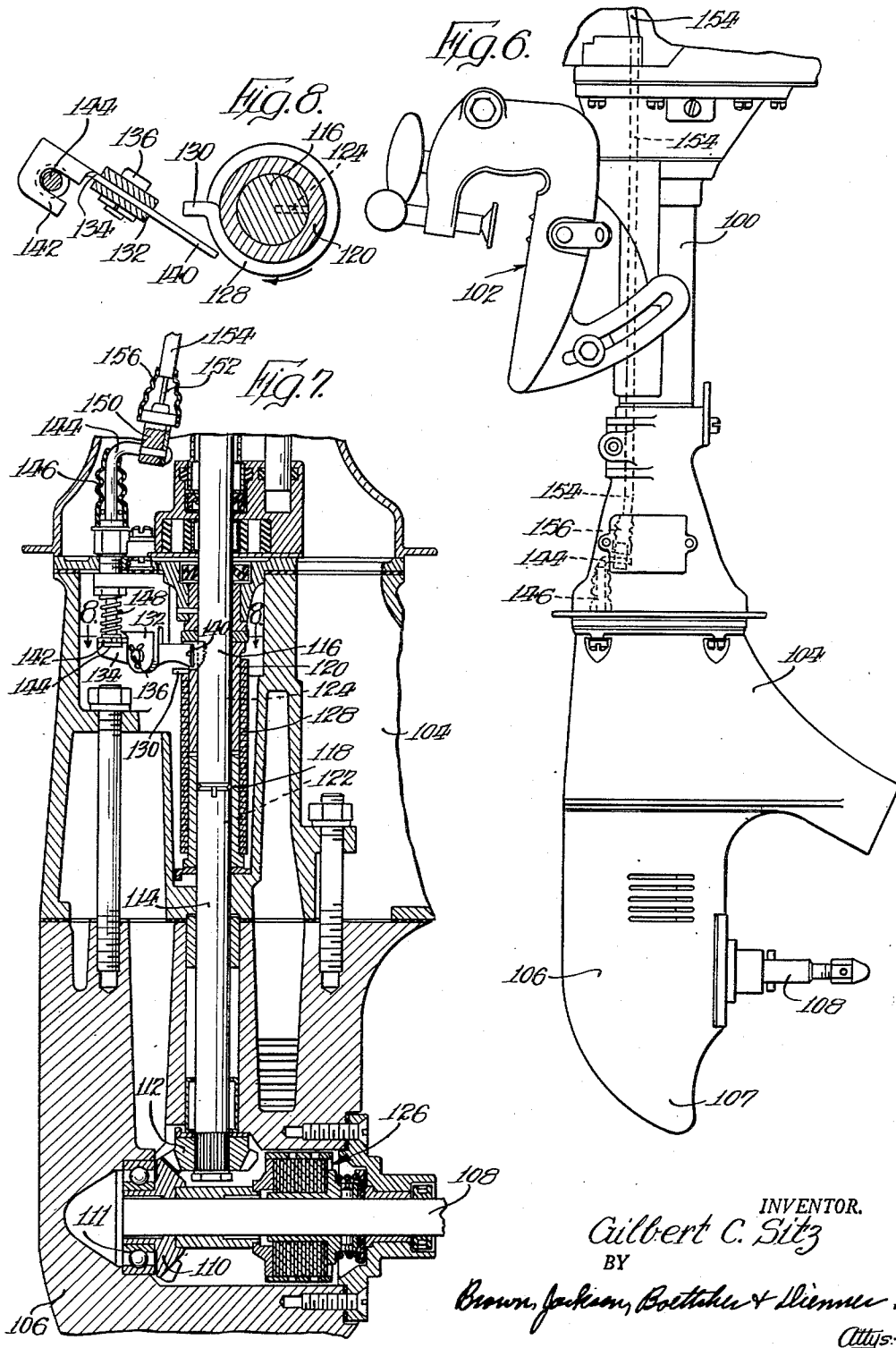
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CONTROL MECHANISM FOR OUTBOARD MOTORS

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4 Sheets-Sheet 3



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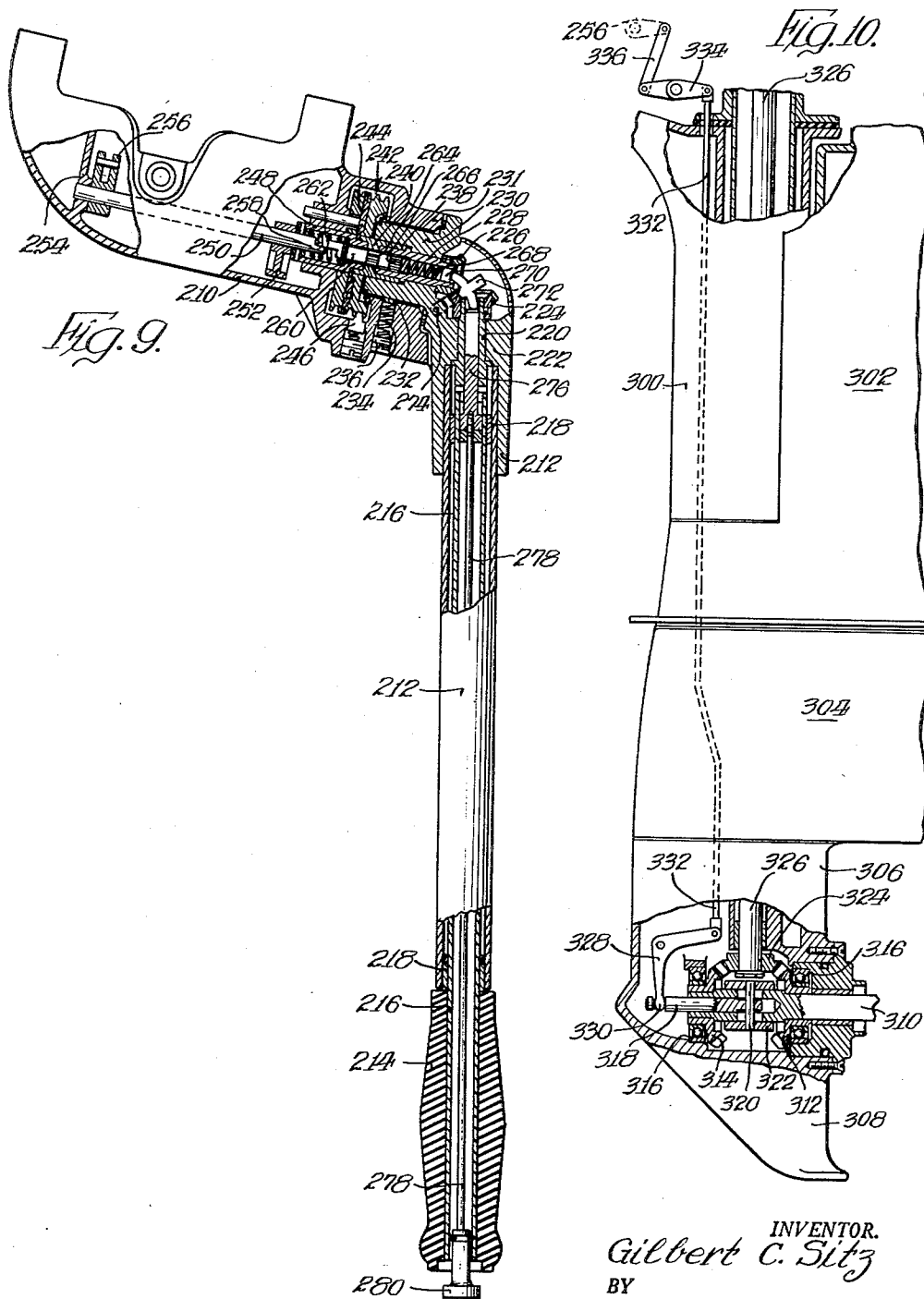
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CONTROL MECHANISM FOR OUTBOARD MOTORS

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,682,248

CONTROL MECHANISM FOR OUTBOARD MOTORS

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Application December 27, 1951, Serial No. 263,530

15 Claims. (Cl. 115—18)

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The present invention relates to outboard motor units and particularly to combined control mechanisms therefor.

With respect to the conventional control features thereof, outboard motors are customarily mounted on boats for movement about a vertical axis in a generally horizontal arc so that the motor may be utilized as a rudder for the boat. To effect movement of the motor in the said horizontal arc, outboard motors are provided with a steering handle projecting forwardly from the motor into the boat. The conventional throttle control for outboard motors consists of a lever positioned a substantial distance from the steering handle and closely adjacent the body of the motor. The lever is usually secured to the stator plate of a magneto, usually housed within the engine flywheel, to effect movement of the stator plate in either direction about the axis of the engine crank shaft to advance or retard the spark. The stator plate carries a cam member cooperating with the carburetor throttle lever for opening and closing the throttle valve in synchronism with the advancement and retardation of the spark.

When operating a boat equipped with an outboard motor, the motor operator faces toward the bow of the boat and sits somewhat ahead of the steering handle so that the operator may observe the course of the boat and readily swing the handle in either direction to steer the boat. When operating at high speeds, the operator must sit or dispose himself as far forwardly in the boat as possible to counteract the stern dipping-bow raising effect of the motor. In this position, the operator extends one arm rearwardly of his body to grasp a hand grip on the steering handle. Accordingly, with conventional motors, the operator's hand and body are spaced substantially from the throttle control so that when it becomes necessary to decrease the speed of the boat, or to effect any throttle control, the operator must contort his body to reach the control lever. This has proven highly objectional and in many cases extremely dangerous, particularly in emergencies, since substantial effort is required to move the stator plate.

The copending application of Gilbert E. Buske, Serial No. 224,574, filed May 4, 1951, now Patent No. 2,627,836 of February 10, 1953, which application is assigned to the assignee of the present application, discloses throttle control means adapted to be disposed in the steering handle, as a push button in the end of the hand grip of the handle, for actuating the throttle lever inde-

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pendently of, or without resistance from, the spark and throttle control means previously described. The spark and throttle control is maintained and is operable independently of, or without resistance from, the said throttle control means, but same merely defines the maximum speed at which the engine may run for any particular setting of the spark and throttle control lever. The throttle control button in the steering handle is adapted to control the speed of operation within the range from intermediate to the maximum speed for which the spark and throttle control lever is set. Accordingly, the operator of the motor may control both the speed and direction of travel of the boat without appreciably shifting his position. The push button control is normally biased to the fullest throttle position accommodated by the spark and throttle control means so that to increase speed, the operator need only release the push button and advance the spark, and to decrease speed, need only push the button inwardly of the steering handle. Once the spark has been fully advanced, the push button controls the speed of operation of the motor. This additional or supplementary throttle control has overcome the disadvantages of conventional throttle controls and provides for ease and facility of outboard motor operation. Since the supplemental control need not move the stator plate, the same is actuated with a minimum of energy.

An object of the present invention is to provide improved control means or mechanisms for outboard motors including the features hereinbefore enumerated and additional features, as will be pointed out hereinafter.

One object of the present invention is to provide improved clutch means for outboard motors to accommodate disconnection of the motor shaft and the propeller shaft, so that the motor may, in effect, be shifted into neutral.

A second object of the invention is to provide improved transmission means for outboard motors so that the motor may be shifted into and out of neutral and may drive the propeller in one or more forward speeds and in reverse.

The present invention, in accomplishing the foregoing objects, provides an outboard motor adapted for universal use. By providing the said clutch means, the boat may be stopped at any time, particularly at docks and the like, without necessitating stopping of the motor. This prevents overuse of the motor starting mechanism and provides a facility and ease of

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operation heretofore unappreciated. By providing the said transmission means, the motor has the advantages above stated and, in addition, may be utilized to back the boat out of narrow slips, to back the boat off sand bars, to provide various ratios of forward speeds so that the motor may be operated at an economical or practical speed for any desired boat speed and so on.

Another object of the present invention is to provide convenient control means for the clutch and transmission means of the present invention. More specifically, it is an object of the present invention to utilize the hand grip of the motor steering handle as the clutch or transmission control means. In addition, it is an object of the present invention to combine the steering, throttle and shift controls in a single unit so that all motor controls may be effected with one hand by the motor operator.

In carrying out the foregoing objects of the present invention, I provide, preferably, control linkages or motion transmitting mechanisms extending between the clutch or transmission means and the steering handle so that relative movement of the handle hand grip with respect to the handle will effect actuation of the clutch or transmission. In one of the embodiments of my invention disclosed herein, I combine the transmission or clutch control means with the throttle control means disclosed in the hereinbefore identified application of Gilbert E. Buske. In a second embodiment of the invention, I effect both throttle control and transmission or clutch control by relative movement of the hand grip with respect to the steering handle.

A further object of the present invention is to provide an automatic interlock between the clutch or transmission means of the present invention and the throttle control so that the motor cannot be run above a predetermined speed when the clutch or transmission is shifted to neutral and so that the clutch or transmission cannot be shifted out of gear when the motor is operating above said predetermined speed.

A still further object of the invention is the provision of improved combined control mechanisms for outboard motors and particularly combined steering, throttle and shifting controls therefor incorporated in a single control instrumentality.

Other objects and advantages of the present invention will become apparent in the following detailed description of preferred embodiments of the invention, wherein reference is made to the accompanying drawings, in which:

Figure 1 is a fragmentary top view, partly in plan and partly in section, of the power head and steering handle of an outboard motor, the conventional casing or housing and the pull starter for the motor being removed and portions of the motor frame being broken away;

Figure 2 is a plan view, on an enlarged scale, of the motor carburetor, cam and stop members associated with the magneto stator plate and a stop member or lever included in the transmission control mechanism of the present invention and comprising, with the stator stop member, an automatic interlock;

Figure 3 is a cross-sectional view, on an enlarged scale, of the elbow in the steering handle, the view being taken substantially on the line 3—3 of Figure 1;

Figure 4 is a fragmentary front elevation, on an enlarged scale, of the motor power head;

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Figure 5 is a fragmentary side elevation of the apparatus shown in Figure 4;

Figure 6 is a side elevation, on a reduced scale, of the mounting and underwater portions and the associated apparatus of the outboard motor;

Figure 7 is a vertical cross-section, on an enlarged scale, of the lower portion or part of the underwater portion of the motor and showing the transmission or clutch assembly for the motor;

Figure 8 is a horizontal cross-section, on a further enlarged scale, of the transmission or clutch assembly, taken substantially on the line 8—8 of Figure 7;

Figure 9 is a top view, partly in plan and partly in section, of a steering handle and associated apparatus comprising a second embodiment of the control mechanism of the present invention; and

Figure 10 is a side view, on a reduced scale, partly in elevation and partly in section, of a modified underwater portion of the motor and including a second embodiment of the transmission means of the present invention.

The control mechanisms of the present invention may, in their broader aspects, be applied to any suitable outboard motor unit. By way of example, I have shown, in Figures 1 to 8, one embodiment of my invention as applied to an outboard motor unit similar to the motor disclosed in Patent No. 2,494,742, issued January 17, 1950, to Gilbert E. Buske, which patent is assigned to the assignee of the instant application, and including the throttle control means of the hereinbefore identified copending application of Gilbert E. Buske. In Figure 9, I have shown a second embodiment of the steering handle control means of the present invention, which may be applied to a similar outboard motor unit, and in Figure 10, I have shown a second embodiment of the power transmission means of the present invention as incorporated in a conventional motor underwater portion.

Referring now to the drawings, and particularly to Figures 1 to 8, I have shown, as stated, the transmission means and the control therefor, according to the present invention, in combination with previously disclosed apparatus. To render the present invention and the combination thereof with conventional or known apparatus readily understandable, the following description shall deal firstly with the previously disclosed apparatus and then with the preferred embodiments of the present invention. For a detailed description of the previously disclosed apparatus, reference is made to the said copending application and to the said patent. Generally, however, a ratchet wheel 27 is secured on the upper end of a crank shaft 28 of the outboard motor for cooperation with one member of a conventional pull starter for the motor. A notched disc 29 is secured on the crank shaft 28 between the ratchet 27 and a flywheel 30, also secured on the shaft 28. The disc 29 may be used, with a pull rope or lanyard, for starting in emergencies, in case the conventional pull starter is broken or otherwise rendered ineffective.

The flywheel 30 is of cupped formation and houses a magneto including a stator plate 32. A control lever 33 is pivoted at 34 on a stationary portion of the motor frame and extends forwardly therefrom for manual actuation. The lever 33 is provided at its forward end with a hand grip or handle 36 for convenience in operating same. The lever 33 is also provided with an arm 37 extending forwardly from the pivotal

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mounting 34 and connected, at its forward end, by a link 38, to an angle bracket 39 secured to and extending downwardly from the stator plate 32. The plate 32 may turn in either direction about the axis of the shaft 28, by means of the control lever 33, for advancing and retarding the motor spark, for starting the motor and for controlling the speed thereof, as is known.

A cam member 42, of generally arcuate shape in plan, is mounted on the stator plate 32 by means of an angle bracket 43 secured to the stator plate and extending downwardly therefrom. Referring to Figure 2, the cam member 42 extends forwardly from the stator plate and is disposed to contact an arcuate cam element 44 provided at the upper end of a throttle valve member 45. The throttle valve member 45 is secured, at its lower end, to the upper end of a shaft 46 adapted to actuate a throttle valve disposed within a carburetor 49 which is bolted to the crank case of the motor. The carburetor 49 may be of any suitable construction and, in the operation of the motor, delivers a fuel-air mixture thereto, as is known.

The valve shaft 46 is urged in valve opening direction, clockwise as viewed in Figures 1 and 2, by a torsion spring 52 disposed about the shaft 46 beneath an angle finger 53 at the lower end of the throttle lever 45. One end of the spring 52 is hooked over the finger 53 and the other end thereof is disposed stationarily with respect to the carburetor 49. When the control lever 33 is in "start" position, the cam member 42, through the members 44 and 45, holds the throttle valve in about half-open position. By moving the control lever 33 clockwise, as viewed in Figure 1, toward "slow" position, the throttle valve is moved by the cam member 42 in a closing direction. When the control lever 33 is moved in a counterclockwise direction, as viewed in Figure 1, beyond the "start" position and to such an extent that the cam member 42 clears the cam element 44 of the throttle lever 45, the throttle valve is turned to its full open position by the torsion spring 52, such opening movement of the throttle valve being limited by contact of the finger 53 with portions of the carburetor. From what has been said, it will be seen that the control lever 33 is effective for adjusting the magneto stator plate and also adjusting the throttle valve, as required, in a known manner. Likewise, it will be appreciated that the stator plate moves or is moved in accordance with the speed of the motor.

The throttle lever 45 is provided, adjacent its lower end, with a tab 58 extending rearwardly therefrom at an angle in underlying relation to the cam element 44. The tab 58 slidably receives the inner end portion of a flexible cable 59 slidable through a guide tube or sheath 60, the inner end portion of which may suitably be secured by a clip to the motor frame. The sheath 60 curves downward and toward the right, as viewed in Figure 1, and passes into a hollow handle bracket or handle base portion 62 bolted to the motor body beneath the carburetor 49 and extending toward the right outwardly a short distance beyond the motor body. A stop member 64, in the form of a bead, is secured on the inner end of the cable 59 and is disposed to contact the tab 58 when the throttle valve is in its full open position, the throttle lever 45 being then free of the cable 59 for movement independently thereof in a closing direction under actuation of the cam member 42.

The outer end of the sheath 60 extends through

the base portion 62 of the handle and through a mounting bracket 65 into a reduced tubular neck 66 provided at the rearward end of a hand grip portion 67 of the motor steering handle. The handle portion 67 is substantially angular or L-shaped in plan. The neck 66 of the handle portion 67 is mounted for turning movement with respect to the handle base portion 62 through a bushing 68 provided in an inner annular shoulder 69 of the bracket 62 and the outer end thereof. A brass washer 70 is disposed between the adjacent ends of the bracket 62 and the handle portion 67 and a second brass washer 71, disposed about the inner end of the neck 66, is confined between the inner end of the shoulder 69 on the bracket 62 and a retaining snap ring 72 engaging in a circumferential groove in the neck 66 of the handle 67, thus restraining the handle 67 against outward movement with respect to the base portion 62. The bushing 68 is provided with an opening accommodating a brass friction disc 73 held in pressure contact with the neck 66 by means of a compression spring 74 confined between the disc 73 and a screw 75 threaded into a boss extending outwardly from the shoulder 69 of the base portion 62, the boss being suitably bored for the reception of the spring 74. The hand grip portion 67 of the motor steering handle is movable between a horizontal steering position, as is shown in Figure 1, and a raised position wherein the steering handle portion 67 extends substantially vertically upward. The two handle portions are preferably provided with cooperating stop members or the like, not shown, to limit movement of the two handle members with respect to one another. The disc 73 provides, in conjunction with the compression spring 74, friction means for retaining the handle 67 in its raised position or any desired position intermediate its fully raised and fully lowered positions.

The steering handle portion 67 is preferably of channel cross-section for the major portion of its length, as shown in Figures 1 and 3, with the channel opening downwardly and being closed by a cover plate, not shown, which is preferably removably secured to the handle by means of a plurality of screws passing through the removable plate and threading into suitable bosses provided in the handle. The outer end of the cable 59 extends through the neck 66 of the handle 67 and passes through a slotted finger 84 extending outwardly from the rear end of one arm of a bell crank lever 86. The bell crank lever 86 is preferably pivotally mounted, as at 87, in the steering handle 67 adjacent the angle thereof. A stop member 88, in the form of a bead, is clamped on the cable 59 in contact with the inner face of the finger 84 so that same may be actuated by the bell crank lever to effect actuation of the throttle lever 45.

The other leg or arm of the bell crank lever 86 is pivotally connected at its outer end, by means of a clevis 89, with one end of a rigid rod 90 extending through the hollow handle portion 66 and terminating adjacent the free forward end of the handle. The rigid rod 90 is guided for reciprocal movement substantially axially of the handle 67 in a manner described more fully hereinafter and is provided at its free end with a push button 92 extending beyond the free end of the handle portion 67. A spring 94 is suitably associated with the rod 90 and the push button 92 and normally biases the push button to its outermost position.

To limit outward movement of the push button

92 and the rod 90 with respect to the handle 67, the bell crank lever 86 is provided with an integral tab or stop portion 95 adapted to abut against a shoulder 96 in the handle 67.

When the button 92 is in its normal projected position, the throttle valve may be opened or closed to any desired extent under control of the cam member 42, without any interference from the supplementary throttle control means comprising the button 92 and the means connecting it to the throttle lever 45. On the other hand, when the throttle valve is in either fully opened or partially opened position, it may be moved in closing direction to any extent desired by pushing the button 92 inwardly or rearwardly of the steering handle 67 and independently of the cam member 42. By having the control button 92 at the forward end of the steering handle 67, the throttle valve may be operated by the thumb of the hand grasping the handle and the operator may, therefore, sit well forward in the boat, which is desirable when traveling at high speeds.

The magneto stator plate control described hereinbefore is conventional in substantially all respects and is one type of stator control with which the throttle control and the control means of the present invention are adapted for use. However, the stator control or any means for advancing or retarding the motor spark may be utilized in combination with the present invention, as will become apparent hereinafter. Likewise, the particular supplementary means for controlling the throttle as described hereinbefore, which means are those described in the hereinbefore identified copending application of Gilbert E. Buske, are preferred for utilization with the control mechanisms of the present invention, as will become apparent hereinafter. However, any suitable throttle control means may be utilized, it being preferable that the control means provide for actuation of the throttle from a point remote from the motor carburetor and particularly from a position adjacent the free end of the motor steering handle.

Referring now to Figure 6, I have shown a conventional outboard motor unit mounting and underwater portion comprising a motor support tube 100 mounted for pivotal or swiveling movement within a stern clamp 102 which is adapted for mounting the motor unit on the transom or sill of a boat in a known manner. The underwater portion of the motor unit comprises an intermediate housing 104 and a gear housing 106 presenting, at its lower end, a conventional skeg 107. The underwater portion of the motor and the motor block comprise the body of the motor, as referred to herein. The gear case housing 106 rotatably supports a propeller shaft 108 adapted for the reception of a propeller or screw for propelling the boat with which the motor unit is associated.

The preceding description is directed to previously disclosed and/or known outboard motor apparatus. As pointed out hereinbefore, the said known or previously disclosed apparatus is preferred for use in combination with the present invention, but it will be appreciated, as the description proceeds, that the present invention is not limited in application to the specific details of construction shown in the drawings and to be described immediately hereinafter.

With regard to the particular details of construction of a preferred embodiment of the present invention, reference is made to Figure 7. The propeller shaft 108 is mounted for rotation

within the gear case 106 and carries adjacent one end thereof a bevel gear 110. The bevel gear 110 may be suitably splined to the propeller shaft 108 and is rotatably supported, and supports the shaft for rotation, within the gear case by means of a ball bearing 111. The gear 110 meshes with a pinion 112 fixed to the lower end of a driven shaft 114. The driven shaft 114 is aligned with and juxtaposed with respect to a drive shaft 116 extending downwardly through the underwater portion of the motor unit. The drive shaft 116 suitably comprises a continuation of the motor crank shaft 28 and is constantly driven when the motor is in operation. The shafts 114 and 116 carry sleeves 118 and 120, respectively, keyed thereto, as indicated at 122 and 124, respectively. The shafts 114 and 116 are independently supported for rotation within the housing members 104 and 106 and the driven shaft 114 is preferably braked with respect to the drive shaft 116 by means of a friction brake, indicated generally at 126, associated with the propeller shaft 108.

To couple or operatively connect the driven shaft 114 and the drive shaft 116, I provide a transmission or clutch means in the form of a torsion spring 128 having portions thereof engaging the shafts 114 and 116 through the sleeves 118 and 120, respectively. The spring 128 is tightly wound on each of the shafts so as to securely or positively connect the shafts together to effect actuation of the propeller shaft 108 when the motor is in operation. The torsion spring is such as to normally effectively connect the shafts 114 and 116 for conjoint rotation of the shafts and the springs 128.

As pointed out hereinbefore, it is extremely desirable to provide means for shifting the motor into a neutral position wherein the motor will continue to run, but the propeller will not be actuated. This may readily be accomplished by disconnecting the shafts 114 and 116 in accordance with the objects of the invention set forth hereinbefore. To effect disconnection of the shafts, the spring 128 is provided at one end, preferably at its upper end, with a tab 130 projecting outwardly therefrom. The housing 104 is provided adjacent the upper end of the spring 128 with a bifurcated boss 132 to which a lever 134 is pivotally secured by a pin or cotter key 136. The lever 134 is provided at one end thereof with a cam-like surface 140 adapted to be moved into the path of rotation of the tab 130 on the spring 128. When the lever 134 is pivoted so that the end 140 thereof is disposed within the path of rotation of the tab 130 and with the shafts rotating in the direction indicated by the arrow in Figure 8, the tab 130 of the spring 128 is stopped with respect to the drive shaft 116 by the cam surface 140 of the lever 134 so that continued rotation of the shaft 116 under the drive power of the motor operates to unwind or loosen the spring 128 on the drive shaft 116. Accordingly, loosening of the drive connection is effected so that positive connection or driving connection between the shafts 116 and 114 is discontinued, upon the occurrence of which, the brake 126 stops the propeller shaft 108 to cease operation of the screw or propeller mounted on the shaft 108.

In view of the foregoing, it will be appreciated that the clutch or transmission means provided by the spring 128 and the lever 134 accommodates the ready and convenient disconnection of the drive shaft 116 and the driven shaft 114 so that the outboard motor unit may readily be shifted

into neutral and shifted into driving gear at any time it is so desired. Accordingly, the present invention provides advantages in that the propulsion of the boat with which the motor unit is associated may be disconnected at any time, such as when bringing the boat alongside a dock or in emergencies, without necessitating a discontinuation of the operation of the motor so that the motor is constantly available to continue its propulsion effect immediately upon shifting the lever 134 out of the path of rotation of the tab 130 on the spring 128.

From the foregoing, it will be appreciated that the spring 128 and the lever 134, in combination, comprise a clutch or a transmission wherein the spring 128 is the power transmitting mechanism and the lever 134 is the shiftable member of the transmission. The shiftable member of the transmission, the lever 134, may be actuated in any desired or suitable manner from any location on the outboard motor unit and may be used in combination with or independently of throttle control means or the like. It is preferred, however, that the transmission mechanism be utilized in combination with the throttle control described hereinbefore or other suitable throttle controls and that the mechanism for actuating the transmission include a motion transmitting system terminating in actuating means disposed adjacent the free end of the steering handle. The motion transmitting system may be of any desired form or association, but in the preferred embodiment of the present invention, the lever 134 is provided with a slotted tab 142 adapted for the reception of the headed lower end of a rod 144. The rod 144 extends upwardly through a partition at the upper edge of the intermediate housing 104 and is provided adjacent its upper end with a flexible sealing sleeve 146. A spring 148 is suitably confined between the partition and the lever 134 to maintain the lever out of the path of movement or rotation of the tab 130 to normally accommodate coupling of the drive shaft 116 and the driven shaft 114.

At its upper end, the rod 144 is turned to provide a lateral bearing member adapted for engagement by a connector 150 which is suitably pivotally connected to the rod 144 at its lower end and is secured at its upper end to a flexible cable 152. The flexible cable 152 extends upwardly through the motor support tube 100 through a sheath or guide tube 156. At its lower end, the sheath or guide 154 is provided with a flexible tubular sealing member 156 to prevent entry of water or extraneous matter into the sheath 154 between the sheath and the flexible cable 152.

As stated, the flexible cable 152 and the sheath 154 extend upwardly through the motor support tube and into adjacency with respect to the block of the motor. The flexible cable may extend directly into the steering handle 67 of the motor or may be provided with, or associated with, various mechanisms, such as an interlock to be described hereinafter. It will be apparent, however, that the flexible cable 152, 154 may extend from the motor support tube 100 directly into the base portion 62 of the steering handle 67. At its outer end, the sheath 154 is secured to and supported by the support and guide member or bracket 65 in the reduced tubular end portion of the hand grip portion 67 of the steering handle. The cable 152 extends into the handle portion 67 to a position adjacent the bend or angle of the handle and at that point is connected to a

crank or eccentric, indicated generally at 160. The crank or eccentric 160 preferably comprises a crank member 162 and a hook member 164 secured to the crank member 162 and having a slot or aperture therein adapted to receive the free outer end of the cable 152, which may be suitably secured or fastened to the hook member 164 by means of a head member in the form of a bead 166 on the end of the cable 152.

The crank 160 is secured in any suitable manner to the inner end of a hollow rod or tube 168 which is journaled in the hand grip portion 67 of the steering handle. The tube or hollow rod 168 is supported for rotation within the handle and with respect to the handle by means of suitable supports provided at either end thereof. At its outer end, the tube 168 extends into and is secured to a hollow hand grip member 170. The hand grip is supported on or fixed to the tube 168 for rotation with respect to the handle so that rotation of the hand grip 170 will effect rotation of the tube 168 and the crank 160. Adjacent its inner end, the tube 168 is slotted for the reception of a threaded stud 172 comprising a stop member adapted to limit rotation of the tube 168 and the hand grip 170 and to define a path of oscillatory movement for the hand grip and the tube. As pointed out, rotation of the hand grip 170 effects rotation of the tube 168 and the crank 160. The crank 160 comprises, as is well known, a motion translating means for translating the rotary movement of the hand grip to linear movement of the cable 152, whereby rotation of the hand grip 170 is effective to actuate the shiftable member or lever 134 of the transmission to effect connection and disconnection of the shafts 114 and 116.

Referring again to the throttle control described hereinbefore, the rod 90 is supported for reciprocation within the tube 168 by a plurality of collars or annular members 174 engaging the inner walls of the tube 168 and the outer peripheral surface of the rod 90. The spring 94 is suitably confined between one of the annular members or collars 174 and the push button 92 so as to normally urge the push button and the rod into their outermost position as defined by the co-operating stop members 95 and 96 of the bell crank lever 86 and the handle 67.

The bell crank lever 86 is disposed generally beneath the rod 90, the tube 168 and the crank 160, as is shown in Figure 3, so that no interference between the throttle actuating mechanism and the transmission actuating mechanism will exist. The rod 90 preferably terminates short of the crank 160 and is provided with means extending through the tube 168 for connection with the one arm of the bell crank lever 86. Preferably, the tube 168 is slotted adjacent its inner end for the passage of the pivotal connection means between the clevis 89 and the bell crank lever 86.

From the foregoing, it will be appreciated that the present invention provides a clutch or transmission means adapted for ready and convenient actuation solely upon slight oscillatory or rotary movement of the hand grip 170 at the forward or free end of the steering handle 67. Likewise, the push button 92, extending forwardly of or beyond the free end of the steering handle 67, provides convenient means, under the control of the thumb of the motor operator, for controlling the speed of the motor.

In operation, the motor is started by moving the control lever 33 to the "start" position indi-

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cated in Figure 1 by means of the handle 36. The motor is then started by operating the pull starter normally associated with motor units of the general character referred to or by winding a lanyard or line about the notched disc 29 and pulling thereon. It will be appreciated from the foregoing, that movement of the lever 33 to the "start" position advances the spark to a certain degree and opens the throttle valve partially so that proper spark and fuel-air mixture feed for effective starting operation will be provided. Once the motor has been started, the lever 33 can be maintained in the "start" position and the throttle may readily be controlled by means of the push button 92 at the free end of the steering handle 67. If desired, however, the lever 33 may be shifted in either direction from the position shown in Figure 1 to either slow down or speed up operation of the motor. As previously pointed out, release of the push button 92 will accommodate, through the torsion spring 52 and the spring 94, opening movement of the throttle valve of the carburetor 49 to the extent defined by the cam member 42. Accordingly, the cam 42 defines the maximum speed at which the motor may operate for any setting of the lever 33. Therefore, if the lever 33 be moved to the "start" position, the operation of the motor may be controlled between the speeds of zero and the maximum speed permitted by the cam member 42 for that particular setting of the lever 33. To increase the speed of operation of the motor, it is necessary to advance the lever 33 to a position beyond the "start" position in which case releasing of the push button 92 will result in faster operation of the motor. It will be appreciated, however, that regardless of the position of the lever 33, the push button 92 is effective to slow down the operation of the motor. When the motor is in operation on a boat, it is a simple and convenient matter to reach back to the handle 36 to advance the lever 33, to advance the spark and the maximum speed setting of the cam 42, so that the speed range of the motor under the control of the push button 92 may be increased. Thereafter, the motor operator may lean as far forwardly in the boat as desired and will at all times have the complete range of speed control of the motor within the control of his thumb, at the end of the steering handle 67, merely by actuation of the push button 92. Accordingly, complete and convenient control of the speed of operation of the motor is under the control of the operator at all times during the operation of the motor without requiring any inconvenience or quick shifting or the like on the part of the motor operator.

In conjunction with the remote or supplementary throttle control means, the present invention provides means for disconnecting the motor shaft and the propeller shaft merely by actuation of suitable means, in the form of the hand grip 170, at the forward or free end of the steering handle 67. As will be appreciated from the foregoing, the actuation of the transmission or clutch means to effect connection and disconnection of the motor shaft and the propeller shaft may readily be accomplished by slight rotation in opposite directions of the hand grip 170 with respect to the handle 67. Upon rotation of the hand grip 170 in one direction, the crank 160 will be actuated to effect a pulling force on the cable 152 to move the one end of the lever 134 upwardly and to move the cam end 140 of the lever downwardly into the path of rotation of the tab 130

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on the spring 128. Engagement of the tab 130 with the cam end 140 of the lever 134 effects loosening of the spring 128 on the drive shaft 116 to effect disconnection of the drive shaft 116 and the driven shaft 114, as pointed out hereinbefore. Upon rotation of the hand grip 170 in the opposite direction, the cable 152 is released so that the spring 148 may rapidly shift the cam end 140 of the lever 134 upwardly and out of the path of the tab 130 on the spring 128 to effect a connection of the drive shaft 116 and the driven shaft 114 and thereby to effect propulsion of the boat with which the outboard motor unit is associated. The hand grip 170 and the tube 168 are preferably so mounted with respect to the steering handle 67 that frictional resistance to turning the handle exists to prevent accidental turning of the handle and shifting of the transmission means. Likewise, actuation of the push button 92 is preferably resisted by the frictional engagement of the various parts of the motion transmitting means so that the button 92 will not be accidentally actuated.

From a consideration of the foregoing description and of Figure 1 of the drawings, it will be apparent that the hand grip portion 67 of the steering handle may be readily rotated with respect to the base portion 62 of the handle at any desired time without effecting energization or actuation of either the throttle control means or the transmission.

While the transmission means may be actuated at any speed of the motor, if such control be desired, it will be apparent that the lever 134 and the spring 128 will be subjected to extreme abuse if actuation of the clutch or transmission means be accommodated at any speed of the motor. To prevent or substantially reduce such wear and abuse, it is preferred that an automatic interlock be provided between the transmission actuating system and means responsive to the speed of the motor, so that actuation of the clutch cannot be accommodated above a predetermined speed of the motor. Likewise, it will be apparent that it is highly undesirable to operate the motor at high speeds unless the propeller shaft is connected to the motor drive shaft, particularly in those instances wherein the propeller shaft operates a water pump for driving cooling water through the motor. Accordingly, it is desirable to provide automatic interlock means between the transmission actuating means or system and means responsive to the speed of the motor, so that the motor may not be operated above a predetermined speed when the drive shaft and driven shaft are disconnected.

In conventional outboard motor units, the advancement or retardation of the spark is directly proportional to increase or decrease in the speed of the motor. Control of the spark is effected by rotation of the stator plate 32 of the magneto with respect to the motor body. Accordingly, it is convenient to utilize the magneto stator plate as the prime control element of the automatic interlock provided by the present invention. In the manual control means disclosed in Figure 1 of the accompanying drawings, the stator plate 32 is advanced in direct proportion to the maximum speed setting or limit of the throttle valve and, accordingly, the disposition of the stator plate with respect to the motor body will determine the maximum speed at which the motor may be operated, under the control of the push button 92, for that particular setting of the stator plate and the cam 42 carried thereby. In in-

stances wherein automatic spark advancement and retardation may be provided in accordance with the speed of the motor, motor speed is controlled solely by throttle valve actuation and the disposition of the stator plate with respect to the motor body will be a substantially exact function of the speed of operation of the motor. Accordingly, the stator plate is particularly adapted as the prime control element of the automatic interlock provided by the present invention.

With respect to the details of construction of a preferred embodiment of the automatic interlock, a stop member 180 is secured to the stator plate 32, suitably by securing the stop member 180 to the vertically depending portions of the bracket 43 by means of which the cam 42 is secured to the stator plate. The stop member 180 is operatively associated with the motion transmitting means extending between the handle 67 and the transmission means so as to provide the control function defined. To this end, the motion transmitting system between the handle 67 and the transmission preferably includes a lever 182 pivoted to the motor block or body and including a tab or upstanding portion 184 comprising a second stop member adapted to cooperate with the stop member 180. The stop member 180 preferably includes a nose portion 186 adapted to engage the tab 184 on the lever 182 to effect control functions, as will be specifically defined.

As will be apparent from the foregoing, the stator plate 32 of the magneto moves about the axis of the motor shaft 28 in accordance with the speed of operation of the motor. The lever 182 is so mounted on the motor body that the tab 184 thereof has a path of movement intersecting the normal path of movement of the nose portion 186 of the stop member 180. The cable 152 and its sheath 154 extend inwardly toward the motor body from the handle and upwardly toward the lever 182. Adjacent the lever 182, the cable 152 terminates in a cap 188 which is connected to one end of the spring 190, the other end of which is connected to one end of the lever 182. Adjacent its end, the sheath 154 is secured in suitable position to the motor body by means of a clip 192 secured to the motor body. Adjacent its opposite end, the lever 182 carries a screw and nut mechanism 194 to which the end of the cable 152, extending from the transmission means, is adjustably secured. At that end of the cable, the sheath 154 is again secured to the motor body by means of a clip 196. At the end thereof adjacent the nut 194, the lever 182 carries a counterspring 198 having its opposite end connected to the motor body to counteract the force of the spring 190 and to render the lever 182 more readily actuable in response to turning movement of the hand grip 170. As will be apparent, the two portions of the cable 152, 154 and the lever 182 comprise a motion transmitting system or cable line extending between the steering handle and the transmission.

In operation, the nose portion 186 of the stop member 180 is adapted to be moved into the path of movement of the tab 184 on the lever 182 when the spark advancing lever 33 is moved to a position beyond the "start" position, so that if the clutch means is disconnected, the lever 182 will be so disposed with respect to the motor body that the end thereof carrying the tab 184 will be moved upwardly into the path of movement of the stop member 180. Accordingly, the nose 186 of the stop member 180 will engage the stop

member 184 to prevent advancement of the spark and opening of the throttle beyond the "start" position. When the clutch is engaged, the end of the lever 182 carrying the stop member 184 is moved downwardly so that the stop member 184 is disposed outside of the path of the nose 186 of the stop member 180, in which case, the spark and throttle may be advanced by movement of the lever 33 to any desired position. When the spark is advanced beyond the "start" position, the stop member 180 is disposed in the path of movement of the stop member 184 on the lever 182 so that the lever cannot be moved upwardly to effect disconnection of the clutch or transmission. Accordingly, it will be appreciated that the stop members 180 and 182 provide therebetween an interlock for preventing operation of the motor above a predetermined speed when the drive shaft and the driven shaft are disconnected and for preventing disconnection of the drive shaft and the driven shaft when the motor is operated above said predetermined speed.

The said predetermined speed may be any speed desired for any particular type of motor. As referred to hereinbefore, it is preferred that the "start" position be approximately the defining speed of the control functions effected by the interlock. In other words, it is preferred that the interlock be inoperative, or that the stop member 180 be disposed outside the path of the stop member 184, when the lever 33 is in the "start" position so that the motor may be started and run at speeds between stop and the speed accommodated at the "start" position whereby the propeller shaft of the motor unit need not be a drag upon the motor when attempts are made to start the same. Accordingly, starting of the engine may be readily accommodated by disconnecting the drive shaft and the driven shaft, advancing the lever 33 to the "start" position and actuating the pull starter, in which case the propeller will not constitute a drag upon the motor.

From the foregoing, it will be appreciated that the entire operation of the outboard motor unit provided with the apparatus of the present invention, particularly when the same is utilized in combination with the throttle control means described or similar throttle control means, is entirely under the control of one hand of the motor operator and that all controls, namely, steering, throttle, and shifting may be readily and conveniently effected without requiring contortion or bodily shifting on the part of the motor operator.

As pointed out hereinbefore, the clutch or transmission means of the present invention, as described hereinbefore, may be utilized independently of any particular throttle control or may be utilized with a plurality of supplementary controls provided in the steering handle of the motor. If desired, the transmission, the control means therefor and the automatic interlock may be utilized with motors having a throttle control adapted to actuate the stator plate so that the cam 42 alone controls motor speed, with motors having automatic spark control or ignition timing, or with motors having other types of control mechanisms.

Referring now to Figure 9, I have disclosed a second embodiment of a steering handle having throttle and shifting control means incorporated therein and wherein the steering handle comprising a base portion 210 and a hand grip or steering portion 212 pivotally connected to the base

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portion 210. The steering portion 212 of the steering handle supports an actuating means, in the form of a rotatable hand grip 214, adjacent the free end thereof. The hand grip 214 is suitably secured to a hollow rod or tube 216 extending axially through the steering portion 212 to a point adjacent the angle of the steering portion. The hollow rod or tube 216 is rotatably supported in the handle 212 by means of a pair of sleeves 218 disposed adjacent opposite ends of the tube. At its inner end, the tube 216 is clutched or splined to a sleeve 220 which is journaled within a thickened portion 222 of the hand grip portion 212 of the handle adjacent the angle thereof. At its inner end, the sleeve 220 carries a pinion 224 secured thereto by means of a set screw, the pinion being disposed at approximately the angle of the handle. The pinion 224 meshes with a pinion 226 carried at the outer end of a sleeve 228 journaled in a reduced neck portion 230 of the handle portion 212. The reduced neck portion 230 of the handle portion 212 is journaled in an enlarged end portion 231 of the base portion 210 of the handle. The enlarged end portion 231 of the base portion 210 is suitably bored and tapped for the reception of a friction disc 232 adapted to frictionally engage the reduced end portion 230 of the handle portion 212 and resiliently urged into engagement with the reduced portion 230 by means of a spring 234 confined between the friction disc and a stud 236 threaded into a suitably tapped bore provided in the base portion 210.

The reduced end portion 230 of the handle portion 212 rotatably supports a further sleeve 238 having an inwardly directed radial flange 240. The sleeve 238 rotatably supports a pulley, indicated generally at 242, for rotation within the enlarged end portion 231 of the base portion 210 of the handle. The pulley 242 comprises a plurality of plates and preferably includes a friction disc brake 244 associated therewith. The pulley also preferably includes a locating braking friction member 246 spring pressed into engagement with the peripheral surface of the pulley 242. The pulley 242 is adapted for the reception of a cable or suitable cables reeved over the pulley and extending toward the motor block. The cables may suitably be secured to the carburetor throttle valve or may be secured directly to the magneto stator plate for synchronous actuation of the stator plate and the throttle valve. The carburetor and associated apparatus is preferably of the type described hereinbefore, but may be of any suitable type as desired. Inwardly of the sleeve 238, a further sleeve 248 is rotatably supported in the enlarged end portion 231 of the base portion 210 of the handle and is pinned to a shaft or rod 250 journaled in supporting bosses 252 and 254 in the base portion 210. Adjacent its inner end, the shaft or rod 250 carries a crank or eccentric 256 comprising a motion translating means adapted to translate rotary movement of the hand grip 214 to reciprocal movement of a cable or rod or the like for effecting actuation of a suitable clutch or transmission means or the like. At its outer end, the shaft 250 is provided with a flat or flattened portion 258 adapted for clutching engagement with a similar portion of a second shaft 260 extending axially into the sleeves 248, 238 and 228. The shafts 250 and 260 are normally biased away from one another by means of a spring 262 confined between suitable collar members provided on the two shafts. The shaft 260 has two raised serrated portions 264

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and 266 each adapted for splined engagement with cooperating portions of the sleeves 228, 238 and 248. In particular, the serrated portion 266 on the shaft 260 is adapted for continuous splined engagement with the sleeve 228 and the serrated portion 264 is adapted for selective engagement with the inwardly directed radial flange 240 of the sleeve 238 and the sleeve 248. The shaft 260 is normally urged to a predetermined position, wherein the serrated portions 264 and 266 engage the flange 240 and the sleeve 228, respectively, by means of the spring 262 and a spring 268 confined between the shaft 260 and a plug 270 loosely disposed within the sleeve 228. The plug 270 normally is engaged by one tab or end of a lever 272 pivotally supported at the angle of the handle 212 by means of a pivot pin 274. At its opposite or outer end, the lever 272 engages a rod 276 positioned within the sleeve 220 for reciprocal movement therein. At its outer end, the rod 276 is secured to the inner end of a rod 278 supported for axial movement within the tube 216 and terminating at its outer end in a push button 280 extending exteriorly of the free end of the hand grip 214. As a modification of the arrangement shown, the hand grip 214 may be mounted on the handle 212 for both rotation and linear movement and the rod 278 may be secured to the hand grip for reciprocation upon linear movement of the hand grip to effect the control functions specifically defined hereinafter. As a further modification, the tube 216 may include a reciprocable portion adapted for actuation of the lever 272 or the shaft 260 directly.

In operation and use, the push button 280, or reciprocation of the hand grip 214, is adapted to control the effectiveness of rotation of the hand grip 214, but in and of itself is not adapted to effect any control function, such as throttle operation or transmission actuation or the like, but it will be appreciated that the structure may be modified to accommodate such action if desired. The springs 262 and 268, as stated, normally urge the shaft member 260 into a normal position, shown in Figure 9, wherein the splined portions 264 and 266 on the shaft 260 are in engagement with the radial flange 240 of the sleeve 238 and the sleeve 228, respectively. Upon actuation of the push button 280, or the hand grip, inwardly, the lever 272 is pivoted about its pivot 274 by inward movement of rods 278 and 276 to force the plug 270 inwardly with respect to the sleeve 228, thus, effecting compression of the spring 268 and movement of the shaft 260 inwardly with respect to the sleeves 228, 238 and 248. Such movement effects disengagement of the serrated portion 264 with the flange 240 of the sleeve 238 and effects engagement of the serrated portion 266 with suitable splines provided in the sleeve 248 and also effects engagement of the flattened or clutch portions of the shafts 250 and 260. Upon release of the push button 280, the shaft 260 and associated apparatus is immediately returned by the spring 262 to its normal position.

In the normal position of the shaft 260, rotation of the hand grip 214 will effect rotation of the tube 216, the sleeve 220, the pinion 224, the pinion 226 and the sleeve 228. Rotation of the sleeve 228 is transmitted by the splined portion of the sleeve 228 to the serrated portion 266 of the shaft 260 to effect rotation of the shaft. Upon rotation of the shaft 260, the serrated portion 264, due to its engagement with the flange 240 of the sleeve 238, will effect rotation of the sleeve 238 and the pulley 242 to effect actuation of the

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stator plate and throttle or like means with which the pulley is operatively associated. Upon inward actuation of the push button 280, the splined portion 264 of the shaft 260 is disengaged with respect to the sleeve 238 so that the sleeve 238 and the pulley 242 are braked and stopped in adjusted position by means of the brake members 244 and 246. When the shaft 260 is moved inwardly, the splined portion 264 of the shaft 260 is moved into splined engagement with the sleeve 248 and the clutch portions of the shafts 250 and 260 are moved into engagement so that rotation of the hand grip 214 is operative to effect rotation of the shaft 250 and the crank 256 mounted thereon to effect actuation of the transmission means or the like with which the crank 256 is operatively associated. Upon release of the push button 280, the shaft 260 is returned to its normal position and the friction disc 244 and the associated apparatus are adapted to maintain the sleeve 248 and the shaft 250 in adjusted position. In instances wherein the flattened or clutched portions of the shafts 250 and 260 are not in accurate alignment with one another, the spring 268 accommodates movement of the lever 272 with respect to the shaft 260 to prevent damage to any of the motion transmitting means disposed within the handle.

From the foregoing, it will be appreciated that the crank 256 and the pulley 242 each comprise an actuating means or member and that the shaft 260 and the sleeves 228, 238 and 248 comprise a clutch mechanism for selectively coupling or connecting the actuating members to the rotatable tube 216. It will also be appreciated that the clutch mechanism readily accommodates movement of the hand grip portion 212 of the handle with respect to base portion 210 of the handle.

The steering handle and associated control apparatus disclosed in Figure 9, may suitably be associated with means similar to the automatic interlock apparatus disclosed in the hereinbefore described embodiment of the present invention and may be utilized in effecting control of the transmission or clutch means described hereinbefore or of any suitable or desired transmission means or like controls.

In Figure 10, I have shown a second embodiment of the means referred to generally herein as the transmission means of the present invention. The transmission means disclosed in Figure 10 is adapted for actuation by the control mechanism disclosed in either embodiment of the steering handle described hereinbefore. As shown in Figure 10, another mounting underwater portion of a conventional outboard motor comprises a forward top housing 300, a rearward top housing 302, an intermediate housing 304 and a gear case 306 having a conventional skeg 308. The gear case 306 rotatably supports a propeller shaft 310 which is adapted for the reception of a suitable propeller or screw for propelling the boat with which the motor unit is associated. The housing members 300, 302, 304 and 306 together with the motor block comprise the body of the motor unit. The propeller shaft 310 rotatably supports and is rotatably supported by the sleeve portions of a first gear 312 and a second gear 314. The gears 312 and 314 are each supported in the gear case 306 by means of suitable ball bearings 316. At its inner end, the propeller shaft 310 is provided with a longitudinal axial bore and a transverse bore adapted for the reception of a tubular rod 318 or the like. A pin 320 extending transversely

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through the one end of the rod 318 and through the transverse bore in the propeller shaft 310 suitably secures a sleeve 322 to the rod 318. The rod 318, the pin 320 and the sleeve 322 are mounted for axial movement with respect to the propeller shaft 310, but are locked against relative rotational movement with respect to the shaft 310 by means of the pin 320 and, if desired, by means of suitable splines or the like. Each of the gears 312 and 314 is provided with a suitably splined recess or the like adapted for the reception of the sleeve 322 to selectively couple the gears 312 and 314 with the propeller shaft 310. The engagement between the gears and the propeller shaft accomplished by the sleeve 322 may be frictional or positive, as desired.

The gears 312 and 314 each mesh with a pinion 324 secured to the lower end of a drive shaft 326 which comprises a continuation of the motor crank shaft. The gears 312 and 314 are disposed on opposite sides of the pinion 324 so that same are rotated in opposite directions about the shaft 310. As will be appreciated from the foregoing, the gears 312 and 314 are each journaled on the propeller shaft 310 and are each adapted to be selectively coupled with the shaft to drive same. The gear 312 may be suitably adapted for driving the propeller shaft 310 in one direction, which may suitably be referred as a reverse direction, and the gear 314 is adapted to drive the propeller shaft in the opposite or forward direction. As will be apparent from Figure 10, the sleeve 322 is adapted to be moved into engagement with either of the gears 312 and 314 or may be moved to a position intermediate the two gears. Accordingly, it will be appreciated that when the sleeve 322 is in engagement with gear 314, the propeller shaft is connected with the drive shaft 326 for rotation in a forwardly direction. When the sleeve 322 is engaged with the gear 312, the propeller shaft is adapted for rotation by means of the drive shaft 326 in a reverse direction. When the sleeve 322 is disposed intermediate the gears 312 and 314, the propeller shaft 310 is disconnected with respect to the drive shaft 326 so that the motor unit is in neutral. Accordingly, the gears 312 and 314, the pinion 324 and the sleeve 322 comprise a transmission between the drive shaft 326 and the propeller shaft 310 adapted to be shifted into forward, neutral or reverse drive positions. As will be appreciated, other gears and gear trains may be utilized to provide a plurality of forward and reverse speeds. It is desirable, of course, to provide normally only a single reverse gear and a plurality of forward drive gear trains so that the speed of operation of the motor may be the optimum in economy for any particular speed of the propeller shaft. If desired, the transmission may include synchronizers and the like.

In the transmission just described, the rod 318, the pin 320 and the sleeve 322 cooperate to comprise a shiftable member for the transmission. The shiftable member of the transmission is adapted to be actuated by a suitable motion transmitting system linkage. The linkage is preferably formed of rigid members to provide for positive actuation of the transmission. As shown in the drawings, the linkage preferably includes a bell crank lever 328 pivoted within the gear case 306 and a rigid rod 332 associated with the lever. The bell crank lever 328 is provided with a bifurcated outer end portion 330 comprising two fingers adapted to be received within a circumferential groove provided in the rod 318 so that ac-

tuation or pivotal movement of the bell crank lever 328 will effect reciprocation or shifting of the shiftable member of the transmission. At its opposite end, the bell crank lever 328 is pivotally connected to the rigid actuating rod 332 which extends upwardly through the various housing members and into adjacency with the motor block or the steering handle of the motor unit. At its upper end, the actuating rod 322 is pivotally secured to one end of a lever 334 which may be suitably pivotally connected to the motor body or the like. At the opposite end of the lever 334, a suitable link 336 is pivotally connected thereto. The link 336 may suitably extend upwardly to an interlock mechanism such as that described in the embodiment of the invention described hereinbefore or may suitably be directly connected to the control mechanisms within the steering handle, such for example, as the crank 256 in the handle disclosed in Figure 9, as is indicated generally by dotted lines in Figure 10.

The transmission means disclosed in Figure 10 is particularly adapted for association with steering handle controls wherein the hand grip on the steering handle has three selective positions, namely, forward, reverse and neutral. It will be apparent, however, that the transmission means disclosed in Figure 10 may suitably be associated with any type of control means located at any desired position of the motor body.

From the foregoing, it will be appreciated that the present invention provides several advantageous features which may be utilized individually or in combination with other devices and control mechanisms. For example, the present invention provides transmission means for outboard motor units wherein the motor shaft may be disconnected from the propeller shaft and wherein the propeller shaft may be driven in forward and reverse speeds and in a plurality of forward speeds. Likewise the present invention provides control means for various types of apparatus wherein the control means are disposed within the steering handle of the motor and are adapted for actuation from the free or forward end of the handle under the control of one hand of the motor operator. A further feature of the present invention is the combination of the control mechanisms in the steering handle of the motor and the transmission means of the present invention. A further combination of the present invention is the utilization of the transmission means and steering handle control means in combination with throttle control means disposed within the handle and actuatable from a point adjacent, or at, the free or forward end of the handle. Accordingly, in its complete combination, the present invention provides for the complete control of an outboard motor unit from a point adjacent the free forward end of the steering handle and from which, steering, throttle control and transmission control may be readily effected by one hand of the operator. The advantages of the present invention may be enjoyed by all outboard motor users, since the present invention provides means whereby the boat operator may dispose himself as far forwardly in the boat as possible, to counteract the bow raising-stern lowering characteristics of the boat and motor and to provide a better riding characteristic for the boat, and may, at the same time, have complete control of the motor as to steering, throttle actuation and shifting with one hand without necessitating any bodily shifting or rapid movements on his part.

In the foregoing description, emphasis has been

placed on the control of various devices by rotation of the handle hand grip and on the control of other devices by linear movement of a push button projecting beyond the free end of the hand grip. It will be appreciated that with minor changes and variations, these controls and others may readily be effected by linear movement of a handle hand grip, by combined linear and rotational movement of the hand grip and so on.

Accordingly, while I have described what I regard to be preferred embodiments of my invention, it will be apparent that various changes, rearrangements and modifications, in addition to those enumerated, may be made therein without departing from the scope of the present invention, as defined by the appended claims.

I claim:

1. In an outboard motor, a drive shaft and a driven shaft, said shafts being juxtaposed and journaled for rotation about a common axis, a torsion spring having portions engaging each of said shafts and normally connecting said shafts for conjoint rotation, said spring having a tab extending outwardly therefrom at the end thereof engaging said drive shaft, a lever having a portion adapted to be moved into the path of movement of said tab to stop movement of said tab whereby said spring is loosened on said drive shaft to disconnect said shafts to accommodate continued rotation of said drive shaft and stopping of said driven shaft, and actuating means mounted on the motor and connected to said lever, whereby said means is adapted to move said lever into and out of the path of movement of said tab.

2. In an outboard motor, a drive shaft, a driven shaft, said shafts being juxtaposed, a torsion spring having portions engaging each of said shafts and normally connecting said shafts for conjoint rotation of said shafts and said spring, a tab carried by said spring and projecting outwardly from one end thereof, a lever mounted adjacent said spring and having a portion adapted to be moved into the path of rotation of said tab to stop said tab whereby said spring is loosened with respect to one of said shafts to disconnect said shafts, a steering handle for the motor, a hand grip mounted for rotation with respect to said handle adjacent the free end thereof, a rod journaled in said handle and secured to said hand grip, a crank secured to said rod within said handle, and a cable extending between and operatively connected at its ends to said crank and said lever, whereby actuation of said lever to effect connection and disconnection of said shafts is effected by rotation of said hand grip.

3. In an outboard motor, a drive shaft, a driven shaft, a power transmission between said shafts, said transmission including a shiftable member adapted to connect and disconnect said shafts, a magneto associated with said drive shaft, said magneto including a stator plate adapted for movement in accordance with the speed of operation of the motor, a steering handle for the motor, actuating means associated with said handle adjacent the free end thereof, a motion transmitting system extending between said actuating means and said shiftable member, and a stop in said motion transmitting system adjacent said stator plate, said stop cooperating with said stator plate to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when the motor is operated above said predetermined speed.

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4. In an outboard motor, a drive shaft, a driven shaft, a power transmission between said shafts, said transmission including a shiftable member adapted to connect and disconnect said shafts, a magneto associated with said drive shaft, said magneto including a stator plate adapted for movement in accordance with the speed of operation of the motor, a first stop member carried by said stator plate, a steering handle for the motor, a hand grip mounted for movement with respect to said handle at the free end thereof, and motion transmitting means extending between said hand grip and said shiftable member whereby movement of said hand grip effects actuation of said shiftable member, said motion transmitting means including a second stop member disposed adjacent said first stop member, said stop members being adapted for movement in intersecting paths and being adapted to cooperate with one another to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when the motor is operated above said predetermined speed.

5. In an outboard motor, a body, a magneto, said magneto including a stator plate supported by said body for movement in accordance with the speed of the motor, a drive shaft and a driven shaft journaled in said body, said magneto being operatively associated with said drive shaft, a power transmission between said shafts, said transmission including a shiftable member adapted to selectively connect and disconnect said shafts, a steering handle for the motor, a hand grip mounted for movement with respect to said handle at the free end thereof, a motion transmitting system extending between said hand grip and said shiftable member, said system including a lever pivotally mounted on said body adjacent said stator plate, the pivotal axis of said lever being disposed transversely of the axis of said magneto, and a stop member carried by said stator plate for movement therewith in a path intersecting the path of movement of said lever, said lever and said stop member having cooperating portions adapted for engagement to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when the motor is operated above said predetermined speed.

6. In an outboard motor, a drive shaft and a driven shaft, a power transmission between said shafts, said transmission including a shiftable member, a steering handle for the motor, actuating means mounted for movement with respect to said handle adjacent the free end thereof, said actuating means being mounted for rotation and for movement longitudinally of said handle, motion transmitting means extending between said actuating means and said shiftable member, a carburetor for the motor including a throttle, and motion transmitting means extending between said throttle and said actuating means, said actuating means being moveable independently of movement of said handle to actuate said shiftable member and said throttle.

7. In an outboard motor, a drive shaft and a driven shaft, a power transmission between said shafts, said transmission including a shiftable member, a steering handle for the motor, a hand grip mounted for movement with respect to said handle adjacent the free end thereof, a tube mounted in said handle and secured to said hand grip, motion transmitting means extending be-

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tween said tube and said shiftable member, a carburetor for the motor including a throttle, motion transmitting means extending between said throttle and said handle, and a rod extending through said tube in said handle, said rod terminating adjacent the free end of said handle for actuation exteriorly of the free end of said handle, actuation of said throttle being under the control of said rod.

8. In an outboard motor, a steering handle, a hand grip rotatably mounted on said handle adjacent the free end thereof, a tube journaled in said handle and secured to said hand grip, a rod extending through said tube in said handle and mounted therein for movement axially of said tube, said rod terminating adjacent the free end of said handle in a push button extending exteriorly of the free end of said handle, a carburetor for the motor including a throttle, motion transmitting means extending between said rod and said throttle, a drive shaft and a driven shaft, a power transmission between said shafts, said transmission including a shiftable member adapted to selectively connect and disconnect said shafts, and motion transmitting means extending between said shiftable member and said tube.

9. In an outboard motor, a steering handle, a hand grip rotatably mounted on said handle adjacent the free end thereof, a tube journaled in said handle and secured to said hand grip, a rod extending through said tube in said handle and mounted therein for movement axially of said tube, said rod terminating adjacent the free end of said handle for actuation exteriorly of said handle, a pair of actuating members journaled in said handle each adapted for actuation by said tube, a clutch member mounted for axial movement within said handle to selectively couple said actuating members to said tube, said clutch member being operatively associated with said rod for actuation thereby, a carburetor for the motor including a throttle, motion transmitting means extending between one of said actuating members and said throttle, a drive shaft and a driven shaft, a power transmission between said shafts, said transmission including a shiftable member adapted to selectively connect and disconnect said shafts, and motion transmitting means extending between said shiftable member and the other of said actuating members.

10. In an outboard motor, a drive shaft and a driven shaft, a transmission between said shafts, said transmission including a shiftable member, a steering handle for the motor, a hand grip mounted for movement with respect to said handle adjacent the free end thereof, a tube mounted in said handle and secured to said hand grip, motion transmitting means extending between said tube and said shiftable member, a carburetor for the motor including a throttle, motion transmitting means extending between said throttle and said handle, a rod extending through said tube in said handle, said rod terminating at the free end of said handle in a push button extending exteriorly of the free end of said handle, actuation of said throttle being under the control of said push button, a magneto associated with said drive shaft, said magneto including a stator plate adapted for movement in accordance with the speed of the motor, a first stop member secured to said stator plate, said motion transmitting means between said shiftable member and said tube including a second stop member disposed adjacent said first stop

member, said stop members being movable in intersecting paths and including cooperating portions adapted for engagement to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when the motor is operated above said predetermined speed.

11. In an outboard motor, a drive shaft and a driven shaft, said shafts being juxtaposed, a torsion spring having portions engaging each of said shafts and normally connecting said shafts for conjoint rotation of said shafts and said spring, a tab carried by said spring and projecting outwardly from one end thereof, a lever mounted adjacent said spring and having a portion adapted to be moved into the path of rotation of said tab to stop said tab whereby said spring is loosened with respect to one of said shafts to disconnect said shafts, a steering handle for the motor, a hand grip rotatably mounted on said handle adjacent the free end thereof, a tube journaled in said handle and secured to said hand grip, a crank secured to said tube within said handle, a cable line extending between and connected at its ends to said crank and said lever whereby actuation of said lever to connect and disconnect said shafts is effected by rotation of said hand grip, a first stop member connected in said cable line and adapted for pivotal movement upon rotation of said hand grip, a magneto associated with said drive shaft, said magneto including a stator plate adapted for movement in accordance with the speed of the motor, a second stop member carried by said stator plate for movement therewith in a path transversely of the path of movement of said first stop member, the path of movement of said second stop member intersecting the path of movement of said first stop member, said stop members having cooperating portions adapted for engagement to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when the motor is operated above said predetermined speed, a rod disposed within and extending through said tube in said handle and being mounted for movement axially of said tube, said rod terminating at the free end of said handle in a push button extending exteriorly of the free end of said handle, a second crank pivoted within said handle and being operatively associated with said rod for actuation thereby, a carburetor for the motor including a throttle, and a cable extending between said throttle and said second crank whereby said push button is adapted to effect actuation of said throttle.

12. In an outboard motor, a drive shaft and a propeller shaft, a power transmission between said shafts, said transmission including a pinion fixed to said drive shaft, a first gear journaled on said propeller shaft to one side of said drive shaft and meshed with said pinion, a second gear journaled on said propeller shaft to the opposite side of said drive shaft and meshed with said pinion, and a shiftable member mounted for axial movement on said propeller shaft and being held against rotation with respect to said propeller shaft, said member being adapted to be shifted into engagement with either of said gears and to a position intermediate said gears whereby said member is adapted to connect said propeller shaft with said drive shaft for rotation in either direction and to disconnect said shafts, a steering handle for the motor, a hand grip mounted for rotation with respect to said handle

at the free end thereof, a tube journaled in said handle and secured to said hand grip, a crank supported in said handle and adapted to be rotated by said rod, a motion transmitting linkage disposed between said crank and said shiftable member whereby said shiftable member is actuated upon rotation of said crank, a lever included in said motion transmitting linkage, a magneto associated with said drive shaft, said magneto including a stator plate adapted for movement in accordance with the speed of the motor, a stop member carried by said stator plate, said stop member and said lever being adapted for movement in intersecting paths, said lever and said stop member having cooperating portions adapted to be brought into engagement to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when said motor is operated above said predetermined speed, a rod extending through said tube in said handle and being mounted in said tube for movement in an axial direction, said rod terminating at the free end of said handle in a push button extending exteriorly of the free end of said handle, a pulley journaled in said handle and adapted to be rotated by said tube, a clutch member mounted for axial movement in said handle to selectively couple said crank and said pulley with said tube, said clutch member being operatively associated with said rod for actuation thereby, a carburetor for the motor including a throttle, means associated with said stator plate for controlling said throttle, and a cable connected to said stator plate and reeved over said pulley for actuation thereby when said pulley is clutched to said tube upon rotation of said hand grip.

13. In an outboard motor as set forth in claim 12, said handle comprising a base portion adapted to be secured to the motor and a hand grip portion angularly related with respect to said base portion, a pivotal connection between said handle portions whereby said hand grip portion is adapted for pivotal movement with respect to said base portion and the motor, said tube and said rod being disposed within said hand grip portion of the handle, said pulley and said crank being disposed within said base portion, said clutch mechanism including a sleeve journaled in said handle, a gear mounted on said sleeve, a gear mounted on said tube and meshing with said gear on said sleeve whereby rotation of said hand grip effects rotation of said sleeve, and a lever pivotally mounted in said handle and having portions thereof engaging portions of said clutch mechanism and said rod to operatively connect said rod and said clutch mechanism.

14. In an outboard motor, a drive shaft, a driven shaft, a power transmission between said shafts, said transmission including a shiftable member adapted to connect and disconnect said shafts, a magneto associated with said drive shaft, said magneto including a stator plate adapted for movement in accordance with the speed of operation of the motor, a steering handle for the motor, actuating means mounted for movement with respect to said handle adjacent the free end thereof, said actuating means being mounted for rotation and for movement longitudinally of said handle, first motion transmitting means extending between said actuating means and said shiftable member, a carburetor for the motor including a throttle, second motion transmitting means extending between said throttle and said actuating means, said actu-

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ating means being movable independently of movement of said handle to actuate said shiftable member and said throttle, and a stop in said first motion transmitting means adjacent said stator plate, said stop cooperating with said stator plate to prevent operation of the motor above a predetermined speed when said shafts are disconnected and to prevent disconnection of said shafts when the motor is operated above said predetermined speed.

15. In an outboard motor, a steering handle comprising a hollow base portion adapted to be secured to the body of the motor, a hollow outer portion journaled in said base portion, the hollows of said portions communicating with one another, a shiftable member mounted within said outer portion for movement longitudinally thereof, a rotary member journaled within said outer portion, motion transmitting means mounted within said base portion, said motion transmitting means being operatively associated with each of said members, the operative association of said motion transmitting means and said mem-

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bers accommodating pivotal movement of said outer portion with respect to said base portion, and actuating means mounted at the free end of said outer portion for rotation with respect to said outer portion and for movement longitudinally of said outer portion, said actuating means being operatively associated with each of said members.

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