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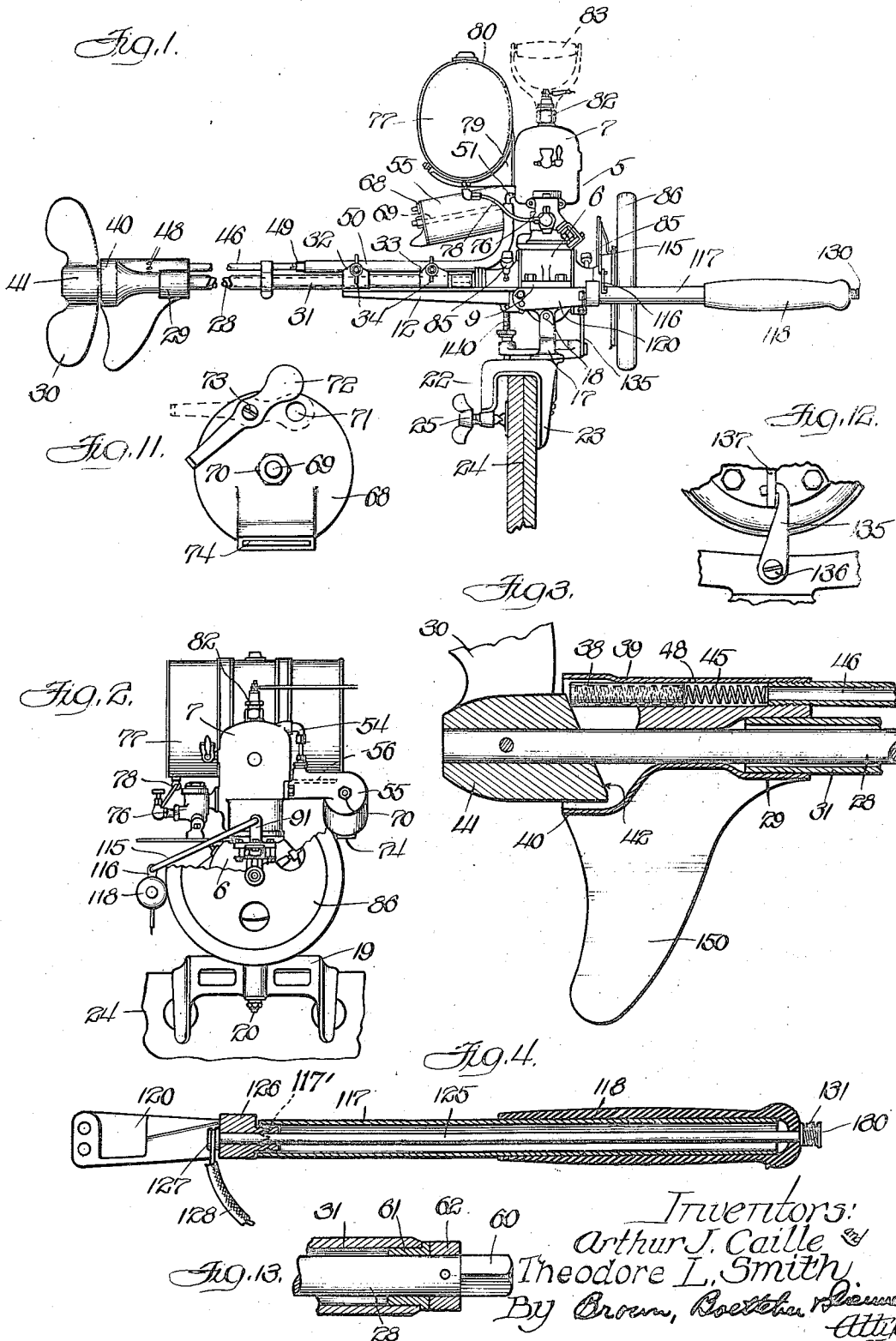
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A. J. CAILLE ET AL

MARINE MOTOR

Filed Oct. 11, 1922

2 Sheets-Sheet 1



Inventors:
Arthur J. Caille
Theodore L. Smith
By Brown, Roethlisberger & Co.
Attys.

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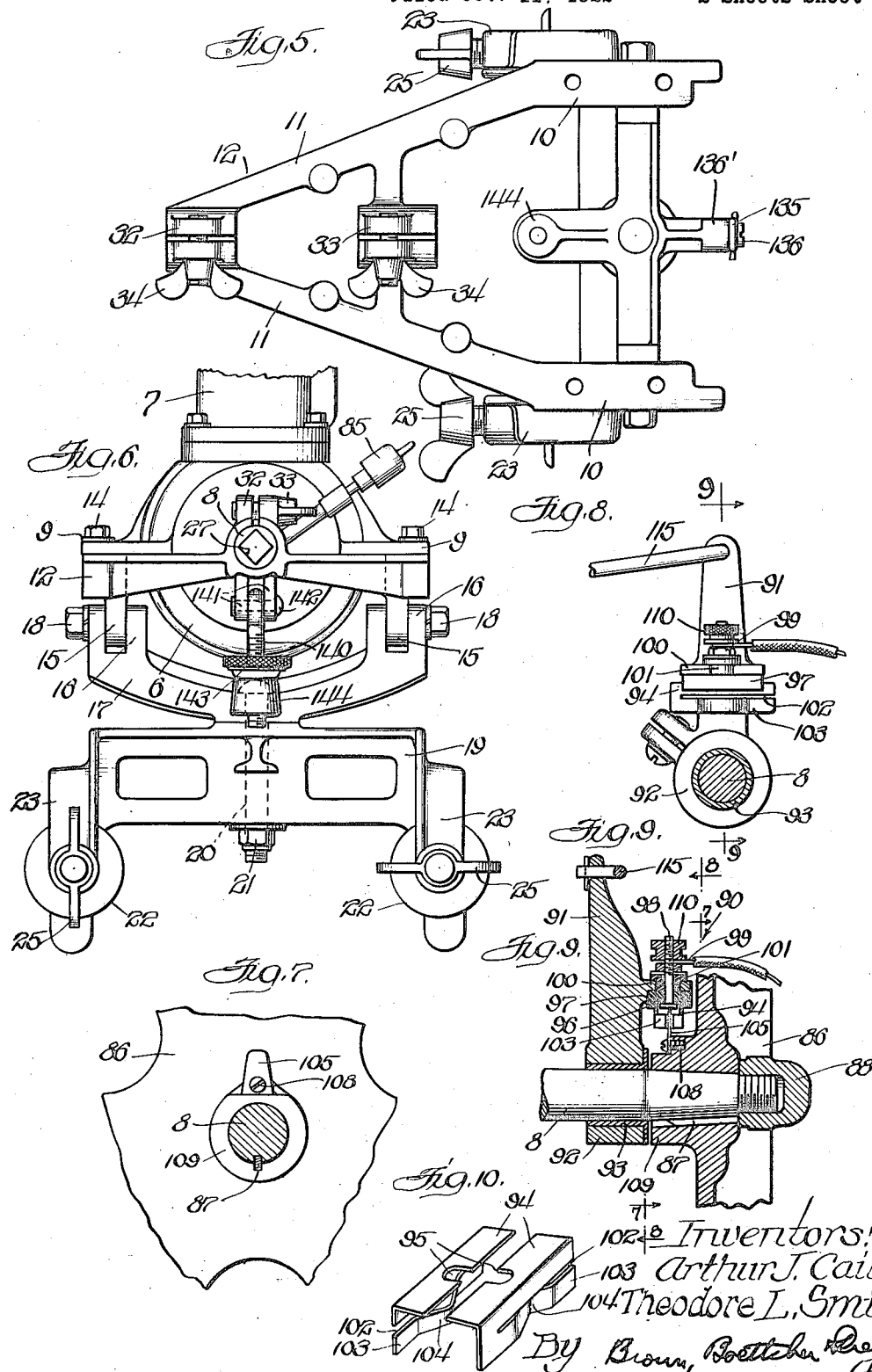
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UNITED STATES PATENT OFFICE.

ARTHUR J. CAILLE AND THEODORE L. SMITH, OF DETROIT, MICHIGAN.

MARINE MOTOR.

Application filed October 11, 1922. Serial No. 593,794.

To all whom it may concern:

Be it known that we, ARTHUR J. CAILLE and THEODORE L. SMITH, citizens of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a certain new and useful Improvement in Marine Motors, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to marine motors and more particularly to marine motors of the so-called outboard or portable type for small craft—canoes, rowboats and the like.

The chief object of our invention is the provision of a device of this sort that may be conveniently mounted to swing in horizontal and vertical planes for steering the craft, clearing obstructions and beaching or landing.

Another object is the provision of a simplified and improved construction and assembly.

A further object is the provision of a compact device having a low center of gravity, yet conveniently accessible and not subject to the action of the water.

A still further object is to minimize the shock and lines of vibration in such an equipment.

A more specific object is the provision of an improved mounting for the device.

Another more specific object is the provision of an improved water circulating pump.

Another specific object is the provision of an improved ignition circuit breaker for the motor.

A still further specific object is the provision of an improved adjustment for adjusting the inclination of the motor and holding the same in adjusted position.

A still further specific object is the provision of a steering handle for steering the craft, raising and lowering the motor, controlling the circuit breaker and completely interrupting the ignition circuit when so desired.

Further objects and advantages will appear from the following detailed description and the claims taken with an inspection of the accompanying drawings in which:

Fig. 1 is a side elevational view of an embodiment of the invention;

Fig. 2 is an inner end view of the same; Fig. 3 is an enlarged vertical axial section

through the pump mechanism at the outer end of the propeller shaft;

Fig. 4 is a longitudinal sectional view through the control handle and mounting bracket therefor;

Fig. 5 is a plan view of the frame or cradle and yoke in which the motor is mounted;

Fig. 6 is an outer end view of the same showing the motor in place;

Fig. 7 is a transverse section through the propeller shaft on the line 7—7 of Fig. 9;

Fig. 8 is a cross section on the line 8—8 of Figure 9;

Fig. 9 is an axial section through the circuit controlling mechanism on the line 9—9 of Fig. 8;

Fig. 10 is an isometric view of the stationary contact members of the circuit breaker;

Fig. 11 is an enlarged end view of the muffler;

Fig. 12 is a fragmentary elevational view showing the catch for holding the motor in horizontal position; and

Fig. 13 is an axial section through the inner end of the propeller shaft tube showing the coupling for engagement with the engine shaft.

In the embodiment selected for illustration, 5 designates a single cylinder internal combustion engine of the two cycle type. The engine 5 includes a crank case 6, cylinder 7, and crank or engine shaft 8.

The crank case 6 is provided with arms or flanges projecting from opposite sides thereof. These flanges 9 engage upon inner parallel portions 10 of diverging arms 11 of a V-shaped frame or cradle 12 in which the engine is adapted to be mounted as shown. Suitable bolts 14 secure the engine rigidly in place in the cradle. The inner ends of the parallel portions of the arms 11 are provided with lugs 15 which project downwardly into the upwardly projecting bifurcated ends 16 of a yoke member 17. Suitable pins or bolts 18 pivotally mount the cradle 12 in the yoke 17 for tilting or swinging movement in a vertical plane, for a purpose which will appear as this description proceeds. The formation of the cradle 12 and yoke member 17 and the pivotal connection provided therebetween permits suspension of the lower part of the crank case of the engine down between the upwardly projecting bifurcated ends 16 of the yoke member, providing a low center of gravity for the motor and disposing the propeller

shaft down in the plane of the cradle. This establishes an excellent balance which is essential in connection with the craft with which motors of this type are adapted for use and minimizes the propeller shaft inclination necessary to properly position the propeller in the water. At the same time the entire motor is positioned for convenient access and away from the water sufficiently so that it will not ordinarily be subject to the action thereof.

The yoke member 17 is mounted upon a bracket 19 for swinging or pivotal movement in a horizontal plane about the upper end of a pin or post 20, the lower end of which pin or post 20 extends down through the bracket 19 and engages in a suitable nut 21. The opposite ends of the bracket 19 are provided with clamps 22 for attaching the motor to the stern board of the boat or other suitable board or frame arranged to receive same. The clamps 22 comprise bracket members 23 adapted to be arranged over the stern board 24 as shown, and suitable screws 25 for securely and rigidly attaching the same in place.

One end of the engine or crank shaft 8 projects rearwardly from the boat and terminates when the engine 5 is mounted in the frame 11, just short of a split sleeve or hub 33 carried by the frame 11. The end face of the shaft 8 adjacent the split sleeve or hub 33 is provided with a squared socket 27 for the reception of a correspondingly formed end 60, (Fig. 13) of a removable propeller shaft 28. The insertion of the squared or non-circular end of the propeller shaft 28 into the squared socket 27 connects the propeller shaft for rotation with the engine shaft.

The opposite end of the propeller shaft 28 extends through a pump body 29 and carries a propeller wheel 30 suitably fixed upon the propeller shaft for rotation therewith, as by a diametrical pin, as shown. A tube 31 encloses the propeller shaft 28. The outer end of this tube 31 is secured in the pump body 29 as shown in Figure 3. The inner or opposite end of the tube 31 is provided with a bushing member 61 (Figure 13) and a collar 62 fixed upon the propeller shaft 28 between the squared end 60 thereof and the bushing member 61 serves to properly position the propeller shaft in the tube 31 and prevent longitudinal displacement of the propeller shaft from the tube. The propeller shaft 28 with its propeller wheel 30 and the tube 31 thereby comprise a unit which can be disconnected from and connected to the motor as desired.

To connect the propeller shaft with the engine shaft, the tube 31 with the propeller shaft retained against longitudinal displacement therein, as already pointed out, is in-

serted through split sleeves or hubs 32 and 33 carried by the frame 11 to properly engage the squared end 60 of the propeller shaft with the squared socket 27 of the engine shaft. Thumb screws 34 are then tightened up to clamp the hubs 32 and 33 securely about the tube 31 to hold the same in place and against possible loss. The collar 62 is shown as being of slightly less diameter than the tube 31 to prevent possible clamping of the propeller shaft against rotation. Loosening of the thumb screws 34 permits disconnection of the propeller shaft, tube, propeller and the other mechanism associated therewith from the motor.

The pump mechanism for supplying water to the water jacket of the engine, comprises a hollow plunger 38 mounted for reciprocation in a longitudinally extending bore 39 in pump body 29, the sleeve portion enclosing said bore constituting the cylinder of the pump. The end of the pump body is flared out as shown at 42 to embrace or encase the inwardly projecting portion of the hub 41 of the propeller 30. The inner end face of the hub 41 is formed with a cam rise 42 which engages the adjacent end of the plunger 38 and reciprocates the same longitudinally or axially along the propeller shaft 28 as the propeller shaft is rotated by the engine 5. A coiled spring 45 interposed between the plunger 38 and the end of a pipe or tube 46 threaded into the sleeve portion of the pump body 29, forces the plunger 38 out against the inner end of the propeller hub 41.

The sleeve or cylinder portion 39 of the pump body 29 is provided with a plurality of circumferentially arranged ports 48 through which the water enters the pump body as the plunger 38 is forced outwardly beyond the ports 48 by the spring 45. The opposite end of the pipe or tube 46 is adapted to be connected through a suitable coupling 49 with a rubber hose or flexible length of tubing 50, the opposite end of which is connected through a suitable connection 21 with the water jacket surrounding the cylinder 7. As the plunger 38 is forced inwardly against the spring 45 by the cam surface at the end of the propeller hub 41, the water admitted through the ports 48 is forced through the pipe 46 and hose 50 thru the water jacket of the engine.

The discharge of water from the jacket surrounding the cylinder 7 is thru a connection 54 at the upper end thereof into and thru the body of the muffler 55. The muffler 55 is of tubular formation having a tubular flanged elbow portion at one end bolted to the engine cylinder 7 with the exhaust port of the engine in communication with the interior of the muffler. A wall or baffle 56 directs the water into the muffler clear of the exhaust port of the engine.

The opposite end of the muffler 55 is provided with a cap 68 held in place by a headed bolt or rod 69 which extends axially thru the muffler and engages a nut 70. The cap 5 68 is provided with a cut-out opening 71 and an arm 72 pivoted at 73 for opening and closing said cut-out opening 71 as desired. The water is discharged from the muffler body 55 thru a spout 74 and the ex- 10 haust gases are discharged thru said spout 74 when the cut-out opening 71 is closed.

The reciprocation of the pump plunger longitudinally or axially along the propeller shaft eliminates such shock as has heretofore accompanied the working of a pump 15 plunger at right angles or normal to the propeller shaft. Where the propeller shaft is relatively long and the pump is arranged adjacent the end thereof for positioning in the water, this is a considerable advantage. 20 Furthermore, the working of the engine piston, the propeller and the pump plunger is thereby confined to two lines of action instead of three as is the case where the engine piston works along one line, the pro- 25 peller along another, and the pump plunger along still another. In addition the pump arrangement shown is an improvement from a structural and manufacturing standpoint. 30 By eliminating cross vibration at the outer end of the propeller shaft, gradual loosening of the clamps holding the propeller shaft in place and loss of the propeller is avoided.

The engine is supplied with combustible 35 mixture from a generator valve or carbureting device 76 which is connected with the lower end of a gasoline tank 77 by way of a connecting tube 78. The tank 77 is secured by straps 80 in a cradle 79 attached to the engine. The cylinder 7 is provided with a 40 spark plug opening 82 and a handle 83 adapted to be secured in the spark plug opening upon removal of the plug, is provided for carrying the motor. Grease cups 45 85 are provided for lubricating the main crank shaft bearings. The inwardly projecting end of the crank shaft 8 is tapered and a fly-wheel 86 is keyed or otherwise splined thereupon as shown at 87 and held against 50 longitudinal displacement by a nut 88.

The ignition circuit breaker is designated generally by the reference character 90. It comprises an arm 91 (Figures 8 and 9), having a split hub portion 92 by means of 55 which the arm is clamped upon the shaft 8 between the crank case of the engine and the fly wheel 86. The contacting portion of the timer comprises a pair of contact members 94 of angle formation. The upper flanges of 60 these contact members are provided with slots 95 which are adapted to register, when the contacts are arranged together in the groove 96 through the undersurface of block 97 of fiber or other suitable insulating ma- 65 terial. A screw 98 extends up through the

slots 95 and block 97 and engages at its upper end in a nut 99 to clamp the contact members 94 together and in the groove 96 and the contact members and insulating block 97 to the under-surface of a flange 100 70 projecting from the arm 91. The shank of the screw 98 extends up through a flanged sleeve of insulation 101 mounted in a slot in the flange 100. The sleeve 101 insulates the screw from the flange 100 and the arm 92. 75

The depending flanges of the contact members 94 are slotted longitudinally as shown at 102. The spring contact fingers 103 thereby formed are bent inwardly at 104 80 into close proximity or substantial engagement with one another for wiping contact with a contact finger 105 which is forced between the spring contact fingers 103 by rotation of the fly-wheel 86 and makes electrical contact therewith upon every rotation of 85 the fly-wheel to properly distribute the spark to the engine cylinder. The contact making finger 105 is secured by a screw 108 to the inwardly projecting hub portion 109 of the fly-wheel 86. The upper end of the screw 98 is provided with a terminal nut 110 90 between which terminal nut 99 the proper wire or circuit connection is adapted to be secured.

A rod 115 connected at one end with the 95 arm 92 and at its opposite end with a lug or ear 116, (Fig. 1), projecting radially from the steering handle sleeve provides a connection between the sleeve 117 and arm 92 for turning the same about the axis of the shaft 100 8 by rotation of the sleeve 117 to advance or retard the spark by positioning the contact 94 at the desired point in the path of rotation of the contact finger 105. The sleeve 105 117 is provided with a suitable grip 118 fitting over one end thereof as shown in Fig. 4.

The opposite end of the sleeve 117 fits over or embraces a stud like portion projecting from the steering bracket 120 which steering bracket is bolted to the side of one of the parallel portions 10 of the cradle 12. This end of the sleeve 117 is serrated at 117' for engagement with serrations or lugs in the 115 bracket member to normally hold the sleeve 117 against rotation. Longitudinal movement of the handle against the tension of spring 131 releases this engagement and permits rotation of the handle. A shaft or rod 125 arranged axially through the steering handle projects through the hub-like portion 126 of the bracket 120 and is provided with a contact button 127 normally in electrical contact with the hub-like portion 120 126 of the bracket 120. The wire 128 which extends from a suitable battery and coil unit is connected with the button 127 and thereby normally grounded to the bracket 120 so that upon engagement of the contact finger 105 with the contacts 94 the proper spark is 130

supplied to the engine cylinder. The opposite end of the shaft or rod 125 projects through the grip 118 and is provided with a head 130 between which head and the grip 118 a coiled spring 131 is interposed. This spring 131 normally maintains the contact piece 127 in engagement with the upper portion of the bracket member 120. The grounded connection of the ignition system is broken and the spark supplied to the engine cylinder stopped by pressing the button 130 to move the rod axially against the spring 131 and break the electrical contact between the contact piece 127 and the hub portion of the bracket 120. The attachment of the control handle to the cradle 12 through the bracket 120 provides for turning or swinging the entire motor, by means of the handle 118, about the pin or post 20 to steer the boat as desired and for tilting the motor about the pins or bolts 18 in clearing obstructions and beaching or landing. A downwardly extending fin 150 integral with the pump body 29 serves as a rudder and also to protect the propeller 30. Turning or rotation of the handle 118 to advance or retard the spark controls the speed of the engine. The single handle thereby provides for steering and controlling the speed of the engine and for making and breaking the ignition circuit and in addition for raising and lowering the motor when desired. This simplifies the structural and manufacturing details as well as the operation of the motor. Removal of the bolts clamping the bracket 120 in place permits removal of the entire control handle bracket, steering handle and electrical connections associated therewith as a unit from the motor.

A hook 135 (Fig. 12) pivotally secured to an arm 136' projecting from the yoke 17 by a screw 136 is adapted to be swung up into engagement with an opening in a flange 137 projecting from the inner end of the crank case to hold the motor with the propeller shaft extending rearwardly in a horizontal plane as shown in Figure 1.

To attach the motor to the boat the thumb screws 25 are loosened, the brackets 23 set over the stern board 24, and the screws 25 then tightened to rigidly clamp the motor in place. Arrangement of the screws 25 outside the boat is preferable. It allows more space between the fly-wheel and the bracket and makes cranking easier. Upon securing the motor in place the hook 135 is unfastened and the rear or outer end of the propeller shaft lowered until the propeller is properly positioned in the water.

The means for adjusting the inclination of the motor and propeller shaft comprises an adjusting screw 140 pivoted at its upper end upon a pin 142 secured in ears 141 formed integral with and projecting from the outer

crank case cover. The lower free end of the screw 140 extends into an opening in an arm 144 formed integral with an projecting from the motor carrying yoke. An adjusting nut 143 on the screw 140 is adapted to be threaded downwardly therealong in engagement with the arm 144 to raise the propeller and upwardly along the stem 140 to permit lowering of the propeller.

The arrangement of the parts of the above described structure are peculiarly adapted to the purpose of the device. For example, we wish to call attention to the arrangement of controlling handle, spark control and arrangement of the fly wheel structure with respect to each other. It will be noted that the handle bar 117 performs the dual function of a steering handle and a spark control. This handle is placed at the right hand side of the cradle 12, looking forward. When it is desired to start the motor, it is customary in a two cycle engine to rock the fly wheel back and forth several times to take a charge into the engine cylinder and then with the spark retarded to as late a point as possible, to rock the fly wheel and crank shaft backward against compression until the spark controlling contacts come into engagement creating a spark at the ignition plug and starting the engine off in the opposite direction. The operator usually turns three-quarters of the way around from normal position, that is, almost facing the fly wheel, and places his left hand upon the steering and spark control handle and with his right hand rocks the fly wheel back and forth, and when the cylinder is full of gas, either through priming or through the above described method of rocking the crank shaft back and forth, the operator places his hand and arm under the fly wheel, gripping the fly wheel and pulling the same back against compression, whereupon, ignition suddenly reverses the motion and turns the engine over in the proper direction. Now, at the same time, it is highly desirable that the spark be advanced in order that the starting may not be lost. Consequently, the operator is able by turning the wrist of the left hand to advance the spark and secure proper running of the engine, all without changing his position or changing hands which it might be difficult to do quickly enough to save the start of the engine.

Certain features of the present invention may be embodied otherwise than as shown and modifications and changes may be made without departing from the spirit and scope of the invention.

We claim:

1. In combination, an engine, a propeller shaft, and a circulatory pump, said pump having a plunger operable longitudinally along said propeller shaft.

2. In combination, an engine, a propeller shaft, a pump body along said shaft, said pump body having a bore extending in the direction of the length of said shaft, and a plunger reciprocable in said bore.

3. In combination, an engine, a propeller shaft, a circulatory pump, said pump having a plunger operable longitudinally along the propeller shaft, a propeller on said shaft, said propeller having a hub and cam means disposed on the end of said hub and engageable with said plunger to actuate the same.

4. In combination, an engine shaft, a propeller shaft, a circulatory pump, said pump having a plunger operable longitudinally along the propeller shaft, a propeller on said shaft, said propeller having a hub, cam means disposed on the end of said hub and engageable with said plunger to actuate the same and spring means in the pump body for maintaining said plunger in engagement with said cam means.

5. In combination, an engine, a propeller tube, a propeller shaft extending through said tube and from the end thereof, a pump body on the end of the propeller tube, said pump body having a bore extending in the direction of the length of the propeller shaft, a plunger operable in said bore and a propeller on the projecting end of the propeller shaft, said propeller having a hub with cam means on its inner end for actuating said plunger.

6. In combination, an engine, a propeller tube, a propeller shaft extending through said tube and from the end thereof, a pump body on the end of the propeller tube, said pump body having a bore extending in the direction of the length of the propeller shaft, a plunger operable in said bore, a propeller on the projecting end of the propeller shaft, said propeller having a hub with cam means on its inner end for actuating said plunger, the end of the pump body being flared out to embrace said hub portion and spring means in said bore for maintaining said plunger in engagement with said cam means.

7. In combination, a motor mounted for vertical and horizontal pivotal movement, a handle for swinging the motor as desired, a spark distributing device controlled by rotation of said handle and means associating with said handle for interrupting the circuit of said spark distributing device.

8. In a motor unit of the class described, a control handle, an ignition circuit, a spark distributing device arranged in said circuit and adjustable by rotation of said handle and a rod movable longitudinally through said handle for interrupting said circuit.

9. In combination, a yoke member, a motor tiltably carried thereby, a screw pivoted to the motor, an abutment, a nut thread-

able along said screw and cooperable with said abutment to tilt the motor and means carried by said yoke member and cooperable with the motor to hold the same against tilting movement.

10. In combination, a bracket member adapted for attachment to a boat, a yoke member pivotally carried thereby, a cradle pivotally connected with said yoke member and a motor mounted in said cradle and depending into said yoke member.

11. In combination, a bracket member adapted for attachment to a boat, a yoke member pivotally carried thereby, said yoke member having upstanding arms, a cradle having side portions with depending lugs pivotally connected to said arms and an engine having projecting arms cooperable with the side portions of said cradle to mount the engine therein and permit the same to depend between the side portions of the cradle and down between the upstanding arms of the yoke member.

12. In combination, a V-shaped supporting frame, an engine mounted upon the side portions of said frame and depending therebetween, a propeller shaft, and means carried by said V-shaped supporting frame for supporting said propeller shaft in substantially the plane of attachment of the engine to said frame.

13. In combination, a bracket member adapted for attachment to a boat, a yoke member pivotally carried thereby a V-shaped supporting frame tiltably carried by said yoke member, a motor mounted in said frame, a screw pivoted to the motor, an abutment carried by the yoke member, a nut threadable along said screw and cooperable with said abutment to tilt the motor and means cooperable with the motor to hold the same against tilting movement.

14. In a device of the class described, a transverse clamping base, a longitudinal engine cradle, a universal joint connection between said base and said cradle, an engine mounted in said cradle with its crank shaft extended longitudinally, a propeller shaft extending in line with the crank shaft, said engine having a fly wheel at the front end of the crank shaft, a handle extending parallel to the crank shaft and rigidly connected to the engine, said handle extending forward at the side of the fly wheel.

15. In a device of the class described, a transverse clamping base, a longitudinal engine cradle, a universal joint connection between said base and said cradle, an engine mounted in said cradle with its crank shaft extended longitudinally, a propeller shaft extending in line with the crank shaft, said engine having a fly wheel at the front end of the crank shaft, a handle extending parallel to the crank shaft and rigidly connected to the engine, said handle extending for-

ward at the side of the fly wheel, said engine having a spark time controlling contact and a movable member on said handle for operating said spark time controlling contact.

5 16. In a device of the class described, a transverse clamping base, a longitudinal engine cradle, a universal joint connection between said base and said cradle, an engine mounted in said cradle with its crank shaft
10 extending longitudinally, a propeller shaft extending in line with the crank shaft, said engine having a fly wheel at the front end of the crank shaft, a handle extending parallel to the crank shaft and rigidly connect-
15 ed to the engine, said handle extending forward at the side of the fly wheel, and spark controlling contact means back of the fly wheel on the engine shaft, and a sleeve on the handle connected to said contact means
20 for advancing or retarding the spark.

17. In an outboard motor, a transverse clamping base adapted to be clamped to the transverse rear board of a boat, a longitu-

dinal cradle connected by a universal joint connection to the transverse base, said cradle 25 having a motor supporting portion and a socket for a propeller shaft housing, a motor mounted on said motor supporting portion, said motor having a generally vertical cylinder and a generally horizontal crank shaft, 30 a fly wheel at the front end of said crank shaft, a relatively movable contact for controlling the timing of the ignition of the motor, said contact being pivoted on the engine concentric with the crank shaft, a lever con- 35 nected to said contact for adjusting the same, a controlling handle for moving the cradle on said universal joint connection, said controlling handle extending along one side of the fly wheel, parallel to the crank 40 shaft, a sleeve having a lever rotatable on said handle, and a link connecting said lever.

In witness whereof, we hereunto subscribe our names this 3rd day of October, 1922.

ARTHUR J. CAILLE.
THEODORE L. SMITH.