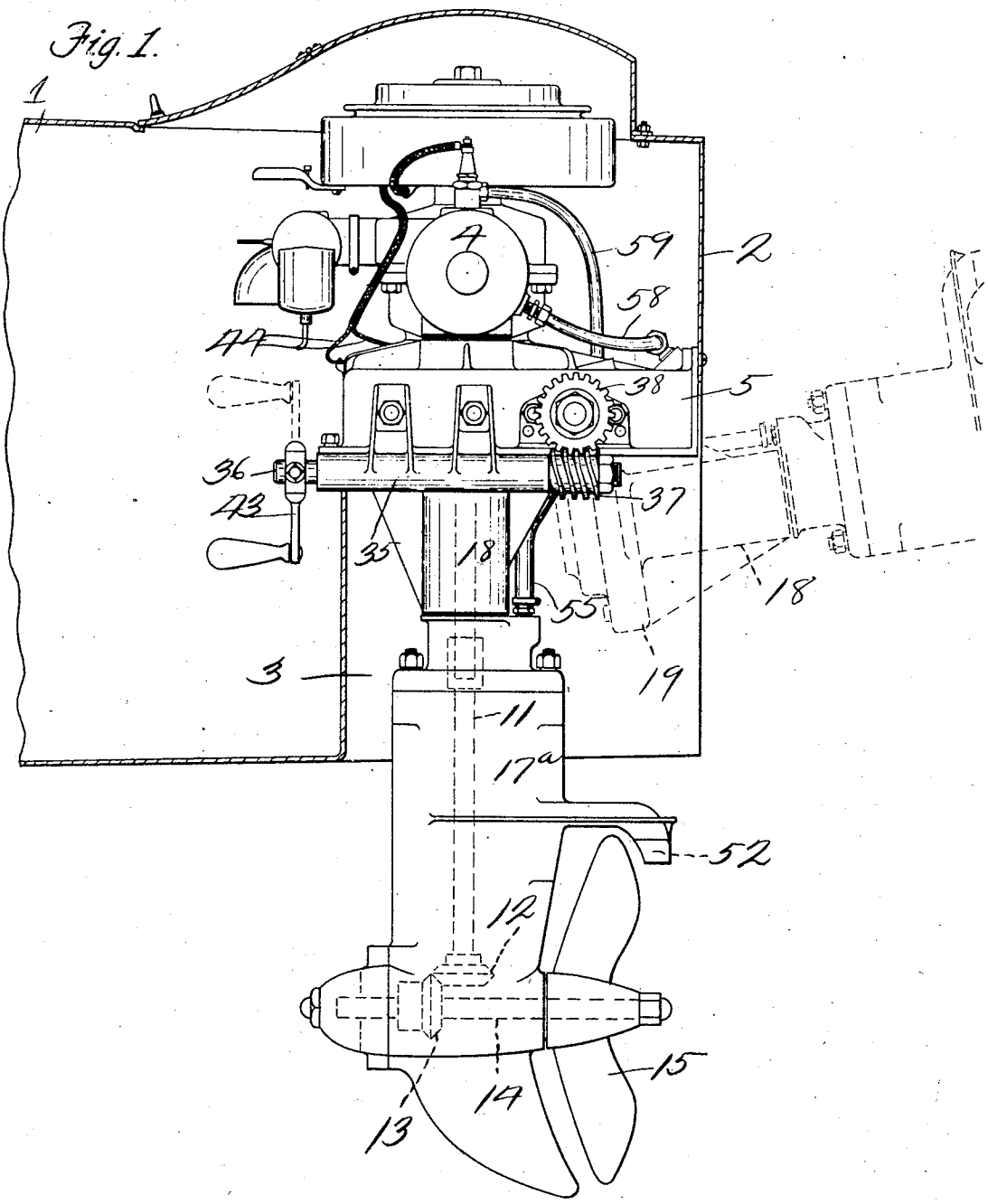
Sept. 22, 1931. H. L. JOHNSON 1,824,213

MARINE MOTOR

Filed Oct. 12, 1927 4 Sheets-Sheet 1

Fig. 1.



INVENTOR.

Harry L. Johnson

BY George J. Utech

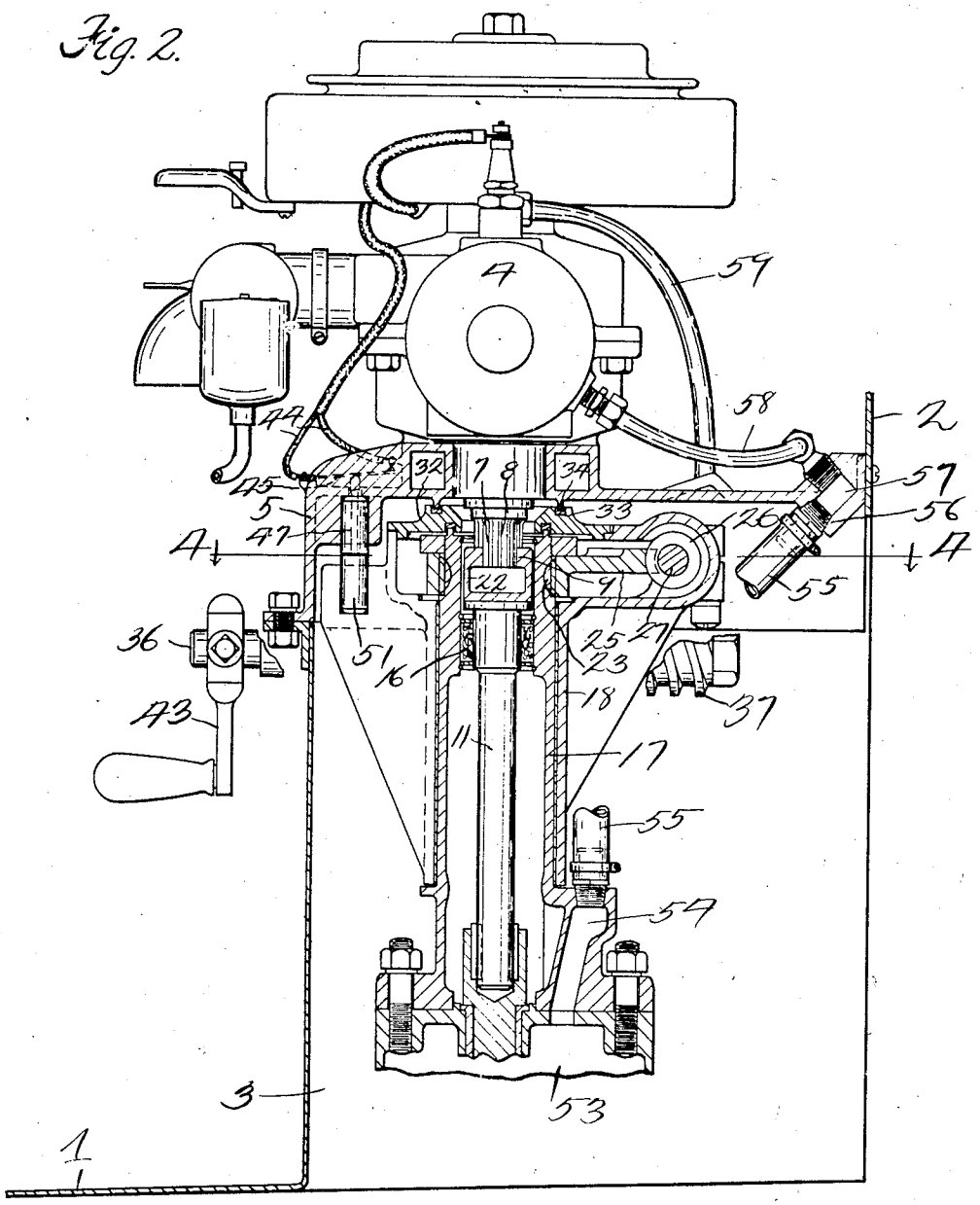
ATTORNEY.

Sept. 22, 1931. H. L. JOHNSON 1,824,213

MARINE MOTOR

Filed Oct. 12, 1927 4 Sheets-Sheet 2

Fig. 2.



INVENTOR.

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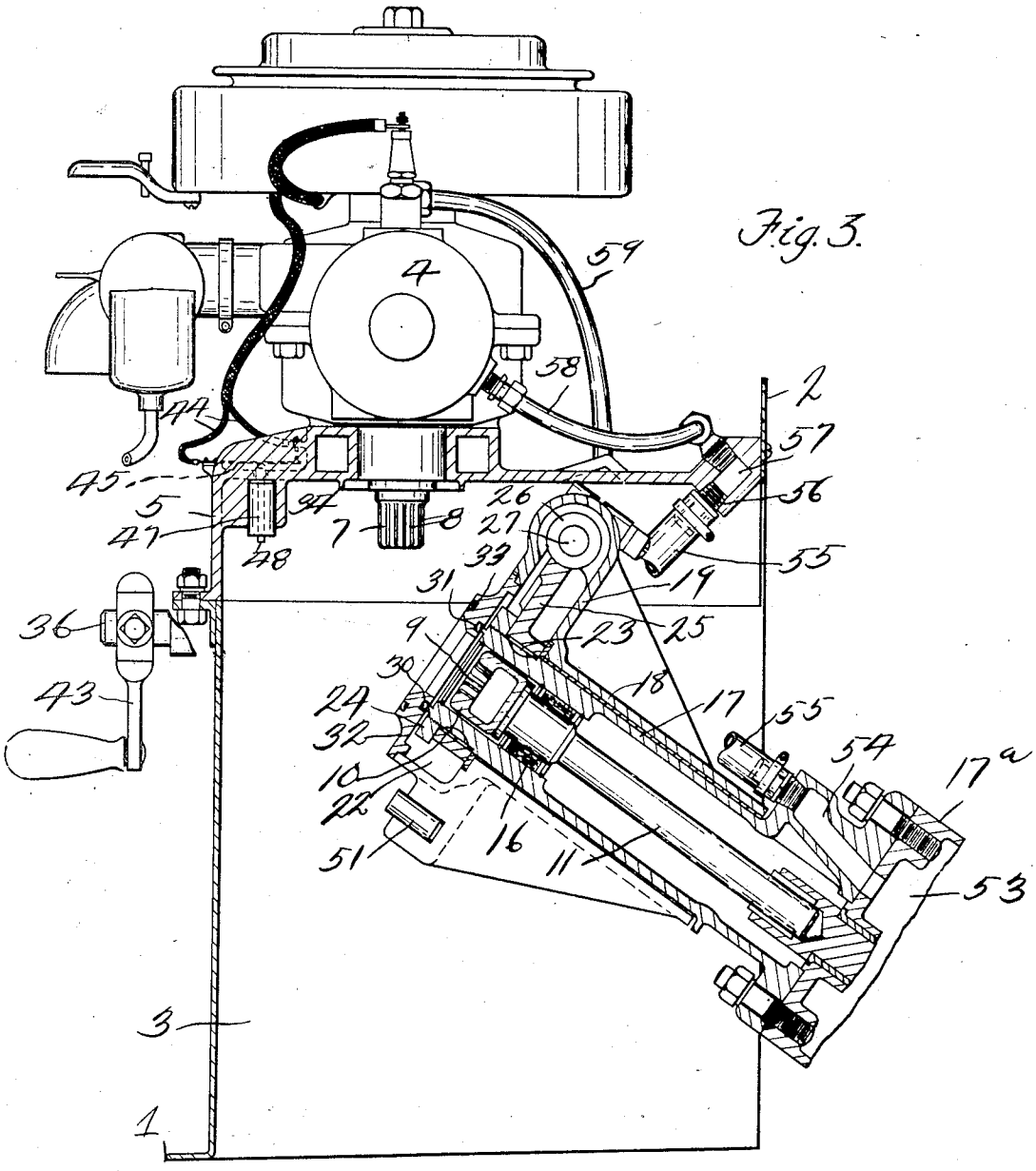
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Sept. 22, 1931. H. L. JOHNSON 1,824,213

MARINE MOTOR

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Fig. 3.



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Sept. 22, 1931. H. L. JOHNSON 1,824,213

MARINE MOTOR

Filed Oct. 12, 1927 4 Sheets-Sheet 4

Fig. 4.

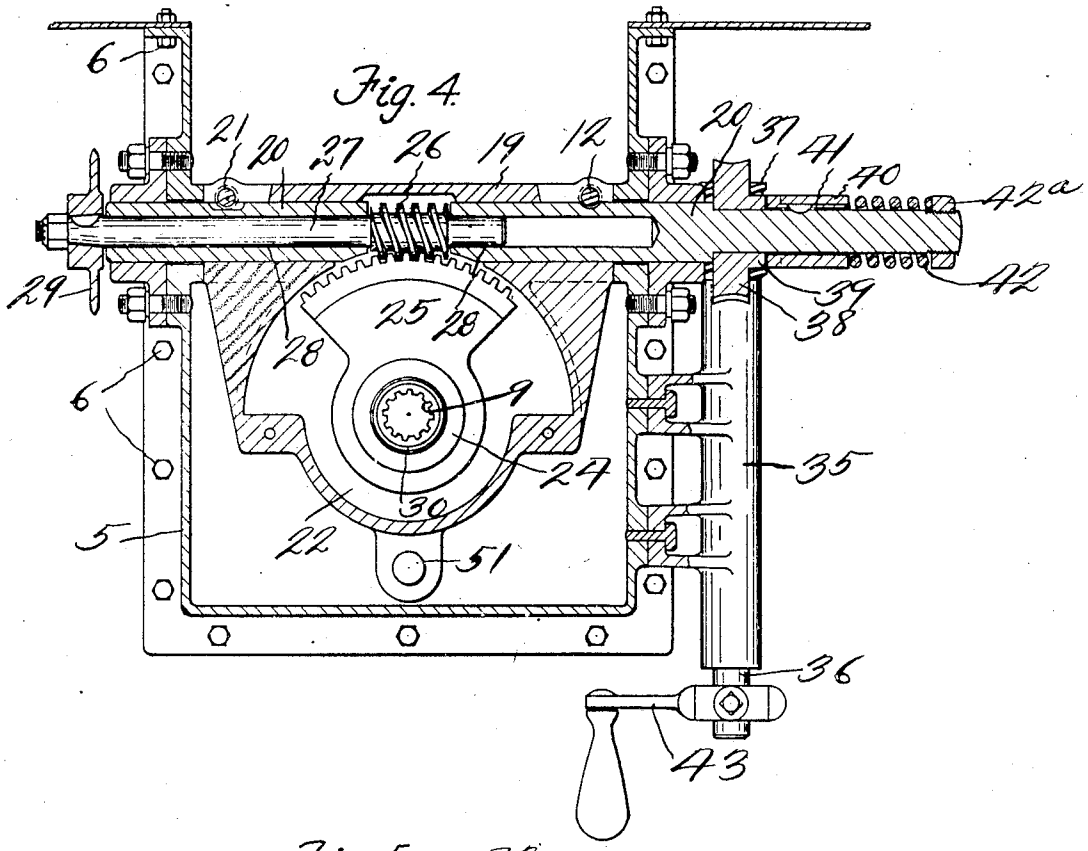


Fig. 5.

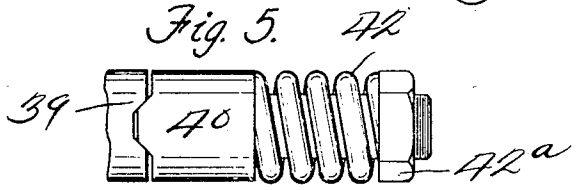
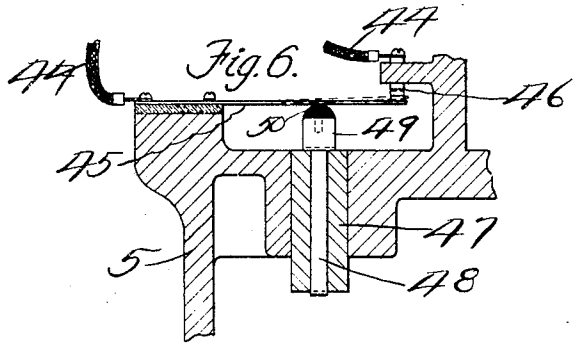


Fig. 6.



INVENTOR.
Harry L. Johnson
BY
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Patented Sept. 22, 1931

1,824,213

UNITED STATES PATENT OFFICE

HARRY L. JOHNSON, OF SOUTH BEND, INDIANA, ASSIGNOR TO JOHNSON BROTHERS ENGINEERING CORPORATION, OF SOUTH BEND, INDIANA

MARINE MOTOR

Application filed October 12, 1927. Serial No. 225,772.

The invention relates to marine motors of either the outboard or inboard type, and has for its object to provide a device of this character wherein the lower structure thereof which carries the propeller and drive shaft is pivotally mounted whereby when the propeller guard or lower portion of the device hits an obstruction, for instance the bottom of a stream or the like, said lower portion of the motor will be automatically disconnected from the motor and will pivotally move, thereby preventing damage to the motor parts.

A further object of my invention is to provide means automatically operable by the pivotal movement of the lower portion of the propeller and its shaft for controlling the motor which drives the propeller whereby to prevent racing of the motor.

A further object is to provide means whereby upon starting of the pivotal movement of the lower portion of the motor the ignition system to the drive motor will be broken or rendered inoperative, thereby stopping the motor during the disconnecting operation. Also to provide means whereby when the pivotal portion of the motor again moves to operative position, the ignition system will be rendered operative.

A further object is to pivotally mount the lower portion of the propeller drive shaft casing and to provide means whereby said casing can be pivotally moved for directional steering of the craft. Also to provide the pivoted portion of the casing with a gear segment with which a worm gear meshes, and which worm gear is rotated through any suitable mechanism of any part of the boat for steering purposes.

A further object is to provide the pivoted portion of the casing with a shaft rotatably mounted in a bearing structure, a worm on said shaft, said worm having a clutch element cooperating with a spring pressed clutch element mounted on the shaft, and a rotatable worm cooperating with the worm gear and forming means in connection with operating mechanism for manually swinging the pivoted portion of the motor to inoperative positions for repair and cleaning purposes. The clutch elements form means whereby upon striking of an obstruction by the lower portion of the motor, said elements will be declutched but under ordinary weight, for instance during manual operation, will remain clutched.

A further object is to mount the steering worm on a shaft, which shaft extends through and into sections of the pivot shaft and meshes with the steering segment, and is disposed between the adjacent ends of the pivot shaft, thereby forming a structure wherein the worm and segment are protected from foreign matter and particularly from water.

A further object is to provide the lower end of the motor drive shaft with a clutch element, which clutch element cooperates with a clutch element carried by the pivoted portion of the motor as a whole and having driving connection with the propeller.

A further object is to provide a marine motor particularly adapted for relatively heavy work and comprising a stationary drive motor generally of the outboard motor type and having its lower portion pivotally mounted and provided with clutch engagement with the drive shaft of the stationary motor and forming means whereby when the lower portion of the motor hits an obstruction it will swing rearwardly and upwardly, and declutch from the motor, thereby allowing and obtaining the advantages of the pivoted outboard motor in a relatively heavy motor, which could not be advantageously manipulated and pivoted incident to its weight.

A further object is to provide an outboard motor having a pivoted portion and a stationary drive portion normally in clutched relation and means whereby upon striking an obstruction the lower portion of the motor will pivotally move for riding over the obstruction and means for returning said motor portion, which has been pivotally moved, to operative relation to the stationary portion of the motor.

With the above and other objects in view the invention resides in the combination and arrangement of parts as hereinafter set forth, shown in the drawings, described and

claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing from the spirit of the invention.

In the drawings:—

Figure 1 is a vertical longitudinal sectional view through the stern of a conventional form of boat, showing the motor applied thereto and in side elevation.

Figure 2 is a vertical longitudinal sectional view through a portion of the motor on an enlarged scale.

Figure 3 is a view similar to Figure 2, but showing the lower portion of the motor swung rearwardly and upwardly.

Figure 4 is a horizontal sectional view taken on line 4—4 of Figure 2.

Figure 5 is a plan view of the spring pressed clutch element.

Figure 6 is a detail sectional view through a portion of the motor base showing the circuit maker and breaker.

Referring to the drawings, the numeral 1 designates the hull of a conventional form of boat and 2 the stern thereof. The motor hereinafter set forth is preferably adapted to be disposed within a chamber 3 in the stern of the boat, however it is to be understood that it may be applied in any manner desired.

The engine 4 is preferably of the type set forth in Patent No. 1,467,461, and is provided with a supporting base 5, secured within the stern by means of bolts 6, and extending downwardly from said motor 4 is a drive shaft 7 having a plurality of vertically disposed ribs 8 forming teeth, adapted to be received between the teeth 9 of the clutch member 10 carried by the propeller drive shaft 11 for imparting rotation to the shaft 11, which shaft is provided with a bevelled gear 12, which meshes with a bevelled gear 13 carried by the horizontal propeller shaft 14, on which is mounted a propeller 15, therefore it will be seen that when the clutch element 10 is in clutched relation with the engine drive shaft 7, rotation will be imparted to the propeller 15. The propeller drive shaft 11 is rotatably mounted within a packed bearing 16 within the tubular casing 17, and which casing is disposed within the tubular portion 18 of the pivoted casing section 19, which pivoted section is clamped and rigidly attached to the alined shaft sections 20 by means of bolts 21, therefore it will be seen that during the pivotal movement of the pivoted casing 19, which carries the lower structure, the shaft sections 20 will rotate therewith. Disposed within an oil chamber 22 in the upper side of the pivoted casing 19, and secured at 23 on the tubular casing 17, and also secured thereon by means of a nut 24 is a steering gear segment 25, with which a worm 26 meshes. The worm 26 is carried by a shaft 27 rotatably mounted in bearings 28 of the shaft sections 20, and the outer end of the shaft 27 is preferably provided with a sprocket 29 around which a sprocket chain is adapted to extend, leading to any conventional steering mechanism, located at any particular point within the boat, therefore it will be seen that during a steering operation, the worm 26 will be rotated for moving the steering segment 25 in either direction, consequently rotating the sleeve 17 to which the steering segment 25 is secured, and the lower casing section 17*a* carried thereby, thereby imparting a directional movement to either side of the propeller for steering purposes. This lower casing section 17*a* is detachably connected to the upper casing sleeve 17 by means of bolts easily accessible from the outside for removal, substitution, or repair of the lower or propeller carrying portion, and the propeller drive shaft 11 is also commonly provided with a key and socket releasable connection to facilitate separation of the casing and driving parts at this juncture. The upper end of the casing 17 is provided with ribs 30, which engage within an annular pack groove 31 in the plate 32, and the upper side of said plate 32 is provided with a pack groove 33, which receives the annular rib 34 surrounding the engine drive shaft 7 for forming a water tight joint. By providing the rib 30 and the plate 32, it will be seen that the plate 32 will form a closure for the upper side of the lubricant chamber 22, thereby preventing escape of lubricant, consequently the steering segment 25 and the worm 26 will operate in oil at all times.

The present motor is particularly designed as a heavy duty one for use particularly where the power desired requires a relatively heavy structure, which could not be easily tilted as is common with pivoted out-board motors. These pivoted motors generally swing in a vertical longitudinal plane, incident to engagement with the bottom of a stream when the boat gets in shoal water, or hits an obstruction. To permit the pivotal movement of the propeller portion of a relatively heavy high powered motor, the lower structure is adapted to pivot and disconnect from the engine as clearly shown in Figure 3, and during this pivotal movement the shaft 20 rotates, however it will be noted that the rotation is a slight one, but said rotation would, incident to the meshing of the steering segment 25 with the worm 26, impart a slight rotation or partial rotation to the shaft 27, consequently to the sprocket 29, and to the steering wheel, not shown, therefore it will be seen that the operator would immediately be warned that the engine structure had hit an obstruction or had hit the bottom in shoal water. Immediately upon starting of the pivoted action of the lower structure, the engine shaft 7 and the clutch element 9 are disengaged, therefore it will be seen that the propeller

15 will immediately stop rotating, and the possibility of breaking a propeller blade is obviated, incident to the continued rotation of the propeller as is the case in outboard motors as now constructed.

Rotatably mounted in a bearing sleeve 35 carried by one side of the engine base 5 is a shaft 36, which shaft is provided with a worm 37 below one of the shaft sections 20, and which worm meshes with a worm gear 38 rotatably mounted on said shaft section 20. One side of the worm gear 38 is provided with a clutch element 39, which meshes with a clutch element 40, slidably keyed at 41 on the shaft 20, and which clutch element 40 is maintained normally in clutched relation to the clutch 39 by means of an expansion spring 42, which is interposed between the clutch element 40 and the nut 42a, carried by the outer end of the shaft 20, therefore it will be seen that the worm gear 38 is normally in clutched relation through the clutch element 40 with the shaft 20, and the operator, when he desires to pivotally move the lower structure of the device for cleaning or repair purposes or for returning the lower structure to normally clutched relation, will only have to grasp the crank 43 and rotate the same, consequently the worm 37 will rotate, or partially rotate the worm gear 38, and as said worm gear has a clutched connection with the shaft 20, the pivoted casing 19 will be pivotally moved as it is locked to the pivoted shaft sections 20 by means of the bolts 12, and the lower motor structure will be swung upwardly or downwardly according to the direction of rotation of the crank 43. This lower motor structure is yieldingly held in driving position by the clutch elements 34, 40, 42 and 42a, and its yielding resistance to tilting may be varied by adjusting the tension of the spring 42a. When the pivoted portion of the motor engages the bottom of a stream or an obstruction, the rearward forces on the lower end of the motor will pivotally move said lower portion, and the shaft sections 20, and as the worm 37 is in engagement with the worm gear 38, it is obvious that the clutch element 40, incident to the bevelled engagement with the clutch element 39 will ride out of the clutch element 39 against the action of the spring 42, thereby allowing free rearward pivotal movement of the lower motor structure. Upon downward pivotal movement of the lower motor structure towards clutched relation with the engine drive shaft 7, said lower section and its propeller drive shaft 11 are clutched through the clutch element 9, and the ribs 8 on the engine drive shaft 7 to the engine.

The engine 5 is provided with the usual ignition system having circuit wires 44, reference being had particularly to Figure 6, and which wires are in circuit with each other through the medium of a leaf switch 45, which has a tendency to spring downwardly for breaking the contact at 46. Slidably mounted in a bearing sleeve 47 below the spring switch 45 is a shaft 48, which is preferably provided with a head 49 having a tip 50 on its upper end formed of insulation, and which tip engages the under side of the leaf switch 47. The lower end of the shaft 48 extends below the lower end of the sleeve 47, and is in the path of the stop pin 51 carried by the pivoted casing 19, therefore it will be seen that immediately upon the starting of the downward and rearward pivoted movement of the lower motor structure the stop pin 51 will move downwardly, thereby allowing downward movement of the shaft 48 under the influence of the leaf spring 45, thereby breaking the ignition circuit at 46, consequently stopping the motor or engine 5 and preventing racing thereof until the lower pivoted motor structure is again moved upwardly to operative position, and at which time the pin 51 will engage the shaft 48 and force the leaf spring switch 45 upwardly, thereby again closing the ignition circuit at 46. It will be noted that by stopping the engine, the declutching operation is rendered easy, and when the motor again swings to operative position the shaft 7 will be stopped, and the parts will easily interengage without stripping the teeth in the clutch element 9, and on the shaft 7.

The engine cooling system is preferably of the type whereby water is forced by the propeller blades through an intake port 52, which forces or conducts water to a water collecting chamber 53, from which the water passes through a port 54 to the flexible pipe 55, the upper end of which is connected at 56 within a port 57, which extends through the engine base 5, and from which port 57, the water passes over a pipe 58 to the engine 5. The discharge of water from the engine jacket may be in any suitable manner for instance through the pipe 59, however applicant does not limit himself to any particular engine cooling system.

From the above it will be seen that a marine engine is provided, of the internal combustion type, wherein upon hitting of an obstruction or the bottom of a stream by the lower end of the structure, the pivoted lower structure will be pivoted rearwardly, thereby preventing damage to the device, and at the same time the engine is automatically stopped and the helmsman is automa ically signalled through the partial rotation of the sprocket wheel 29 that there has been a disconnection, and the lower propeller structure has engaged the bottom of the stream or an obstruction, thereby immediately warning him so that he can take the proper steps under the circumstances. It will also be seen that immediately upon the movement of the

pivoted lower structure to clutched relation with the engine, the ignition system will be automatically closed for allowing operation of the device for propelling the boat. It will also be seen that by pivoting the lower structure, heavy duty motors may be provided, which would be too heavy when constructed as ordinary pivoted out-board motors, but all of the advantages of a pivoted out-board motor are obtained.

The invention having been set forth what is claimed as new and useful is:—

1. A marine engine comprising a motor, a base carried by said motor, a hinged section carried by said base, a propeller drive shaft in said hinged section, a propeller carried by said hinged section and driven by said drive shaft, a clutch connection between the motor and the drive shaft, the propeller carrying portion of the hinged section being pivotally mounted, a steering segment carried by said propeller carrying portion, a worm meshing with said segment and means for rotating said worm.

2. The combination with a marine motor comprising a stationary portion and a hinged propeller carrying portion having driving connections therebetween, an ignition circuit for said motor, said ignition circuit being controlled by the hinged section whereby upon movement thereof to disconnected position, said ignition circuit will be broken and means whereby upon movement of the hinged section to connected position said ignition circuit will be closed.

3. The combination with a marine engine comprising a stationary motor, a hinged propeller carrying section beneath said motor, interengaging clutch members carried by the motor and the hinged section and forming propeller driving connections therebetween, an ignition circuit, said ignition circuit being controlled by the hinged section, whereby upon disconnection thereof with the motor said ignition circuit will be broken and upon driving connections between the hinged section and the motor said ignition circuit will be closed.

4. The combination with a marine engine comprising a stationary motor, a hinged propeller carrying section, driving connections between said sections, of a pivot shaft for said hinged section, said pivot shaft being rotatable with said hinged section, a worm gear carried by said shaft and rotatable thereon, a clutch element carried by said worm, a clutch element slidably mounted on the shaft, spring means for normally forcing said clutch elements together, a worm meshing with said worm gear and means for rotating said worm.

5. The combination with a marine engine comprising a stationary motor section, a hinged propeller carrying section, detachable driving connections between said sections for the propeller, of a pivoted shaft carried by said hinged section and rotatable in bearings, a worm gear carried by said shaft and rotatable thereon, clutch connections between the worm gear and the shaft and an operating worm engaging said worm gear and forming means for partially rotating the shaft through the medium of the worm gear and its clutch connections with the shaft.

6. The combination with a marine motor comprising a stationary motor section and a hinged propeller carrying section, said propeller section having a pivot shaft, said shaft being rotatably mounted in bearings, manual means for rotating said shaft for pivotally moving the hinged section and clutch connections between the manual means and the shaft whereby the hinged section can hingedly move independent of the manual means.

7. The combination with a marine engine comprising a stationary motor and a hinged section, said hinged section having a shaft rotatably mounted in bearings, manual means for rotating said shaft and clutch connections between the manual means and the shaft whereby said hinged section may hingedly move independent of the manual means.

8. The combination with a marine engine comprising a stationary motor and a hinged propeller carrying section, said hinged section having a shaft rotatably mounted in bearings, manual means for rotating said shaft, clutch connections between the manual means and the shaft, whereby said hinged section may move independent of the manual means, a steering sector within the hinged section, a worm meshing with said sector, a shaft rotatably mounted in the first mentioned shaft and carried by the worm, and steering connections to said worm carried shaft.

9. The combination with a marine motor comprising a stationary motor, a hinged propeller carrying section between said motor, a portion of the propeller carrying section being pivotally mounted for steering purposes, a steering segment carried by the pivoted portion of the hinged section, a steering worm meshing with said segment, said worm being carried by a shaft on the hinging point of the hinged section and a steering connection carried by said shaft.

10. The combination with an outboard marine engine comprising a stationary motor and a hinged propeller carrying section between said motor and having slip clutch connections therewith, the propeller carrying portion of the hinged section being pivotally mounted, a shaft carried by said hinged section and rotatable in bearings, said shaft being formed in sections having adjacent ends, a worm between the adjacent ends of said shaft sections, a shaft carried by said worm and rotatably mounted within the shaft sections, steering connections carried by said worm carrying shaft and a gear segment car-

ried by the pivoted portion of the hinged section and meshing with the worm.

11. The combination with a boat, a marine engine, a steering mechanism, said marine engine having a hinged propeller carrying portion, of means whereby upon hinged movement of the propeller carrying portion said movement will be indicated through the steering mechanism.

12. A marine motor adapted to be mounted on a water craft and having a substantially vertically depending drive shaft a propeller shaft driven therefrom at its lower end, a propeller on said propeller shaft and pivotal means permitting the swinging of a portion of said vertically disposed drive shaft in a vertical plane for raising and lowering the propeller to avoid heavy obstructions and the like located in the water.

13. In combination with a water vehicle, a marine motor mounted thereon and having a substantially vertically depending drive shaft, a gear casing having a portion depending below the bottom of the water vehicle, said gear casing carrying a part of the vertical drive shaft and also carrying a propeller shaft a propeller and geared connections from said propeller shaft to the vertically depending drive shaft of the motor, and pivotal means for swingly mounting said gear casing so as to permit it to move in a substantially vertical plane upwardly to raise the propeller and gear casing substantially above the plane of the bottom of the motor vehicle.

14. A marine motor provided with an extended drive shaft, a casing surrounding said drive shaft and adapted to depend into the water, said casing carrying a portion of the vertical drive shaft and carrying an angularly disposed propeller shaft geared to the drive shaft, a propeller mounted on said casing, and means forming a hinged connection for the lower portion of the casing to permit it to swing relatively to the motor.

15. A marine motor having a vertically disposed drive shaft provided with a propeller connected to its lower end, and pivotal means permitting the swinging of the lower portion of said vertically depending drive shaft and said propeller relatively to the upper portion of said shaft.

16. The combination with a water vehicle, a marine motor mounted thereon and having a substantially vertically depending drive shaft provided with a bevel gear at its lower end, a propeller shaft rigidly mounted in fixed relation at substantially right angles to said drive shaft and having another bevel gear meshing with said first mentioned bevel gear, a propeller on said propeller shaft, and means for permitting said propeller shaft and propeller and a portion of said vertically disposed drive shaft to swing upwardly through the water relatively to another portion of said vertically disposed drive shaft whereby to permit said propeller to avoid obstructions and the like.

17. The combination with a water vehicle having a recessed portion forming a chamber in the stern of the boat, a marine motor mounted in the stern of said boat and having a vertically depending drive shaft, a gear casing mounted in said recess of the boat and carrying an extension drive shaft clutch connections on said drive shaft, a propeller shaft mounted in said casing and geared to the lower portion of the extension shaft, a propeller on said propeller shaft, said casing and said propeller extending below the bottom portion of the boat at the recess, and means forming a hinged connection for said casing whereby to permit said casing and the propeller to swing upwardly in said recess substantially above the bottom thereof and relatively to the motor so as to permit the propeller and the casing to avoid obstructions in the water.

18. A water vehicle provided with a recessed stern, a marine motor mounted on the stern of the vehicle and having a vertically extending shaft projecting into said recess, a casing carrying an extension shaft normally in line with said engine shaft, clutch connections between the adjacent ends of two such shafts for driving the extension shaft, a propeller mounted on said support and driven by said extension shaft, and means permitting the raising and lowering of said casing and propeller in the recess of said vehicle and relatively to the motor whereby to lift said propeller and said casing within the bottom plane of the boat whereby to permit said propeller and its mounting to avoid obstructions in the water.

19. A device of the class described comprising in combination, a marine motor having a drive shaft, formed with a clutch connection, an extension shaft carrying a cooperating clutch connection, a bevel gear on the lower end of said extension shaft, a propeller shaft having a second bevel gear meshing with said first mentioned bevel gear and being rigidly mounted with respect to said extension shaft and at right angles thereto, a propeller on said propeller shaft and means forming a pivotal mounting for said extension shaft relative to said drive shaft whereby to permit said extension shaft and propeller to swing relative to said drive shaft and to permit their disengagement.

20. A marine motor having a vertically depending drive shaft formed of relatively movable sections normally in a common line of driving engagement, a propeller operatively connected to the lower-most section and means permitting the automatic disengagement of said sections and the upward movement of the lower section whereby to swing the propeller driven thereby in an up-

ward direction and relative to the motor itself.

21. In combination with a water vehicle, a marine engine, a propeller and steering mechanism therefor, said marine engine having a propeller carrying portion shiftable relatively thereto and devices associated with said engine and steering mechanism whereby said steering mechanism is actuated to indicate the shifting of the propeller carrying portion.

22. The combination with a water vehicle, a marine engine therefor, said marine engine having a separable vertical shaft with a lower propeller carrying portion and a propeller driven thereby and the carrying portion tiltable relatively thereto about a transverse pivot, and devices associated with said propeller carrying portion and having a connection through the pivot for indicating when the carrying portion is tilted.

23. The combination with a marine motor, a propeller carrying section driven thereby and shiftable relatively to said motor, drive connections between said motor and propeller carrying section, and means for rendering the motor shaft and the propeller shaft inoperative upon movement of the propeller carrying section relative to the marine motor.

24. The combination with a marine motor including a drive shaft, a propeller carrying section having a driven shaft and adapted to be shifted relative to said motor drive shaft, driving connections between said shafts adapted to be clutched and unclutched, and means operable on the relative movement of said shafts for stopping the rotation of said motor drive shaft.

25. A propulsion device for water craft having a motor including a stationary depending drive shaft terminating in a clutch, an extension shaft normally aligned with said drive shaft and having an associated clutch, a pivotal mounting for said driven shaft whereby said driven shaft may swing in a vertical plane with respect to said drive shaft, said extension having a lower bevel gear, a propeler shaft disposed at a fixed angle to the extension shaft and having a second bevel gear meshing with the bevel gear on said extension shaft, and a propeller carried by said propeller shaft.

26. In a device of the class described, the combination of a marine motor and having a depending drive shaft terminating in a clutch, a support pivotally mounted relatively to said motor on a horizontal axis disposed substantially adjacent the clutch end of the drive shaft, said support including a tubular casing, a driven shaft rotatably mounted in said tubular casing and connected to a propeller on its lower end, said driven shaft having a cooperative clutch on its upper end.

27. In a device of the class described, the combination of a support, a marine motor mounted thereon and having a depending drive shaft terminating in a clutch, a second support pivotally mounted on said first support on a horizontal axis disposed substantially adjacent the clutch end of the drive shaft, said second support including a tubular casing, a driven shaft rotatably mounted in said tubular casing and carrying a propeller on its lower end, said driven shaft having a cooperative clutch on its upper end, said tubular casing including a packed bearing for said driven shaft and the upper portion of said tubular casing, and the lower portion of said first support having cooperating surfaces forming a substantial seal for said packed bearing in said tubular casing.

28. In a device of the class described, the combination of a support, a marine motor mounted thereon and having a depending shaft terminating in a clutch, said support carrying aligned and spaced apart shaft sections, a tubular casing pivotally mounted on said shaft sections, a driven shaft having bearings in said tubular casing, said driven shaft having a cooperative clutch on its upper end and a propeller on its lower end.

29. In a device of the class described, the combination of a support, a marine motor mounted thereon and having a depending shaft terminating in a clutch, said support carrying aligned and spaced apart shaft sections, a shaft mounted in said sections, a tubular casing pivotally mounted on said shaft sections, a driven shaft having bearings in said tubular casing, said driven shaft having a cooperative clutch driven from its upper end and a propeller on its lower end, a gear element on said tubular casing and a gear on the shaft mounted in said aligned shaft sections, said latter gear meshing with the gear on the tubular casing, and operative connection from said shaft to the steering mechanism.

30. In a device of the class described, the combination of a support, a marine motor mounted thereon and having a depending shaft terminating in a clutch, said support carrying aligned and spaced apart shaft sections, a shaft mounted in said sections, a tubular casing pivotally mounted on said shaft sections, a driven shaft having bearings in said tubular casing, said driven shaft having a cooperative clutch on its upper end and having a propeller operatively connected to its lower end, a gear element on said tubular casing and a gear on the shaft mounted in said aligned shaft sections, said latter gear meshing with the gear on the tubular casing, and manual operable means for rotating said shaft for shifting the tubular casing about the aligned shaft sections.

31. In combination with a marine vehicle,

a support thereon, a motor mounted on said support and having a depending driving shaft formed with a clutch, a second support shiftably mounted on said first support, said second support being formed as a tubular casing adapted to be normally in alignment with said driving shaft and having a pivotal axis extending horizontally on said first support adjacent the clutch of said driving shaft, the walls of the tubular casing being formed at its upper portions to provide a hollow chamber, a second shaft having bearings in said tubular casing, a gear element mounted on the upper end of said tubular casing and housed in the walls forming said hollow chamber, a clutch on the upper end of said second shaft adapted to mesh with the clutch operatively connected to the driving shaft, a propeller on the lower end of the second shaft, a worm on the horizontal axis of said first support, said worm meshing with the gear element on said tubular casing, said chamber in which said gear element is mounted being constructed and arranged to contain a quantity of oil.

32. In combination with a marine vehicle, a support thereon, a motor mounted thereon and provided with a depending driven shaft terminating in a clutch, a cross shaft on said support, a gear on said cross shaft, steering mechanism on said vehicle operatively connected with said cross shaft, a second shaft normally in alignment with the depending motor shaft, a support for the second shaft, a propeller shaft on said support and operatively driven from the second shaft, and a propeller on said propeller shaft, a gear element on said second shaft support meshing with said gear on the cross shaft, said support being pivotally mounted on said cross shaft, whereby said second shaft may be moved angularly by the operation of said steering mechanism and whereby said second shaft may swing bodily with respect to said power shaft.

33. In a marine motor, the combination of a prime mover having a driving shaft, a normally aligned second shaft, a propeller shaft, a clutch driving connection between said shafts, a propeller mounted on said propeller shaft, a support for said second and propeller shafts, a fourth shaft forming a pivotal bearing for said driving and second support, a geared connection between said fourth shaft and said propeller shaft support, means for rotating said fourth shaft for angularly turning the propeller shaft support and means for shifting said propeller shaft support pivotally about said shaft.

34. In a device of the class described, the combination of a marine motor having a lower support formed as a plate like element having an annular rib, said motor having a depending shaft projecting therethrough and provided with a clutch part, a second support carrying an extension of said shaft formed with a cooperative clutch part, said second support being shiftably mounted with respect to said first support, bearings for said shaft in said second support, said second support embodying a sleeve formed with an annular groove adapted to receive the annular rib of the plate of the first support, said packing groove and ribs concentrically surrounding the axis of said shaft whereby to provide a water tight joint when said supports are in closed position.

35. In a device of the class described the combination of an upper support, a marine motor mounted thereon, and provided with a drive shaft depending through the lower portion of said upper support, a second support pivoted to said first support and having its upper portion forming a lubricant containing reservoir, said second support being tubular in formation, a driven shaft in said tubular portion and projecting to the top of said second support, said drive and driven shafts having connectable clutch portions, gearing in said lubricant chamber for rotating said tubular support on its axis, the adjacent faces of said upper and lower supports being provided with sealing means disposed concentrically about said shaft for forming a water tight connection between said supports when closed and sealing the lubricant containing chamber.

36. In combination with a marine vehicle, a prime mover mounted thereon having a depending shaft carrying a propeller, means on said shaft for permitting the propeller carrying portion to shift automatically rearwardly when said propeller strikes an obstruction, means operated by the shifting movement of said propeller for altering the condition of one of the engine controls, and means for returning the propeller carrying portion of the shaft to normal position when desired.

37. In combination with a marine vehicle, a prime mover mounted thereon having a vertically depending shaft the lower of which is connected to a propeller, said shaft having means associated therewith permitting the lower portion of the shaft automatically to shift rearwardly when struck by an obstruction and to be disconnected from the engine, and manual means for reconnecting it to the engine.

38. In combination with a marine motor having a depending driving shaft formed with a clutch, a second shaft normally in alignment therewith and having an associated clutch, a support for said second shaft, bearing elements on which said second shaft support is pivotally mounted, a gear on said bearing elements, a third shaft having a gear meshing with the gear on said bearing elements, said gear on said bearing elements having a releasing clutch connecting it to said bearing elements and a propeller shaft

operatively connected to said second shaft.

39. In combination with a marine motor having a depending shaft, a second shaft, means extending transversely to the motor shaft forming a pivotal bearing and including a cross shaft, a support for the second shaft pivotally mounted on said cross shaft, a propeller on said support and operatively connected to said second shaft, the lower portion of said motor shaft having a clutch and the upper portion of said second shaft having an associated clutch, whereby when said propeller strikes an obstruction said second shaft support will automatically shift about said cross shaft, a third shaft having a geared connection with said cross shaft for manually turning the same to restore said second shaft support, said geared connection being constructed and arranged to yield during the automatic shifting of said second shaft support.

40. A marine motor having a depending drive shaft, a propeller, devices associated with said motor and propeller for permitting said propeller automatically to swing bodily relatively to said motor when said propeller strikes an obstruction, and manually operable devices constructed and arranged for returning said propeller to normal operative position.

41. A marine motor having a depending drive shaft, a propeller, devices associated with said motor and propeller for permitting said propeller automatically to swing bodily relatively to said motor when said propeller strikes an obstruction, and manually operable devices constructed and arranged for returning said propeller to normal operative position, said manually operable devices including yielding means for permitting the automatic shifting movement of said propeller.

42. In combination with a marine vehicle, a motor thereon, a propeller and devices associated with said propeller and motor for causing the propeller automatically to shift bodily with respect to said motor when said propeller strikes an obstruction, and automatic devices operated by the shifting movement of said propeller for altering the operation of the motor.

43. The combination with a marine vehicle, a motor, a propeller and devices associated with the propeller and motor for automatically permitting the propeller to shift bodily with respect to said motor when said propeller strikes an obstruction, and means for automatically cutting out the ignition circuit when said propeller shifts for preventing the engine from racing.

44. In combination with a marine vehicle, a motor, a propeller and devices associated with the propeller and motor for automatically permitting the propeller to shift bodily with respect to said motor when said propeller strikes an obstruction, and means for automatically cutting out the ignition circuit when said propeller shifts for preventing the engine from racing, manual operable means for returning said propeller to normal driving position, and automatic means for restoring the engine circuit.

45. In combination with a marine vehicle, a gas engine thereon having a water circulating system and including a driving shaft, a propeller carrying shaft mounted on said vehicle so as to shift bodily with respect to said driving shaft when struck by an obstruction, and means operated by said propeller for forcing water through the circulating system of the engine, said means being constructed and arranged to permit the shifting of said propeller shaft without interfering with the circulation of the water.

46. In combination with a marine vehicle, a gas engine mounted thereon having a water circulating system and a drive shaft, a propeller carrying shaft mounted to have bodily shifting movement with respect to said engine driving shaft, a flexible conduit having a mouth disposed adjacent the propeller whereby said propeller forces water through said conduit, said flexible conduit connecting with the water circulating system of the engine.

47. The combination with a motor having a relatively shiftable two-part driving shaft, a propeller shaft fixed relatively to one of said parts of the driving shaft and carrying a propeller, of a pivotally mounted support for said propeller shaft and one part of said driving shaft, and means actuable through the pivot of the support for bodily swinging the support in a vertical plane and for moving the support in a horizontal plane for steering movement of the propeller.

48. The combination with a motor having a relatively shiftable two-part propeller driving shaft, of a pivotally mounted support for said propeller and one part of said driving shaft, said support being free to tilt upon striking an obstruction, and means acting through the pivot of the support for returning the support to normal position.

49. The combination with a motor having a relatively shiftable two-part driving shaft, a propeller operatively connected thereto, of a pivotally mounted support for said propeller and one part of said driving shaft, said support being free to tilt upon striking an obstruction, means acting through the pivot of the support for returning the support to normal position, and associated means carried by said pivot and support operable for moving the support in a horizontal plane for steering movement of the propeller.

50. In a device of the class described, the combination with a marine motor having a water jacket and provided with a vertically depending drive shaft, a hollow casing car-

rying an extension shaft, there being clutch connections between the adjacent ends of said two shafts, a propeller operatively connected to the lower end of said extension shaft, means for pivotally mounting said hollow casing so as to permit the propeller to tilt relatively to the motor, and a water inlet passage on said hollow casing disposed beneath the normal water level and having a passage upwardly through a portion of said casing, and means connecting the upper portion of said passage with the water jacket of the engine, said connecting means permitting the free swinging movement of said casing during tilting.

51. In a device of the class described, the combination of a prime mover having a vertically depending shaft, a support carrying a normally aligned extension shaft and carrying a propeller driven thereby, said shafts having engageable clutch portions, a pivotal mounting for said extension shaft support whereby to permit the same to swing relatively to the first mentioned shaft, and means for turning said support and propeller about the extension shafts as an axis, said means including disengageable parts lying substantially in said pivotal axis.

52. In a device of the class described, the combination of a prime mover having a vertically depending drive shaft formed with a clutch member, a normally aligned extension drive shaft formed with an associated clutch member and a support for said extension shaft, a propeller carried by said support and driven by said extension shaft, substantially horizontally disposed means forming a pivotal axis for permitting the propeller carrying support and extension shaft to swing in a vertical plane to engage and disengage said clutches, and means for turning said extension shaft and propeller about the extension shaft as an axis, said means including a gear arrangement on said horizontally disposed means, another gear element on said support, said gear means being engageable during the pivotal movement of said support.

53. In a device of the class described, the combination of a prime mover having a drive shaft, and and an extension shaft normally in alignment therewith, a support carrying said extension shaft and carrying a propeller driven by said shaft, means for shiftably mounting said support whereby to permit said propeller to shift relatively to said prime mover, means for turning said support and propeller about the extension shaft as an axis for steering, and means constructed and arranged for disengaging said extension shaft from said drive shaft when said extension shaft and support and propeller are shifted relatively to said prime mover.

54. A prime mover having a vertically depending drive shaft, a support for a portion of said drive shaft, a propeller shaft carried by said support and driven from said drive shaft propeller on said propeller shaft, means for shifting said propeller and support relatively to the prime mover, means for turning said support and propeller about said drive shaft as an axis for steering and means constructed and arranged to disconnect said propeller from the prime mover and for maintaining the turning means operative when said propeller and support are shifted.

55. A propulsion device adapted to be mounted on water vehicles comprising a water jacketed motor having a substantially vertically depending drive shaft, an extension shaft therefor normally in line with said drive shaft, and normally coupled to said drive shaft, a lower unit associated with said extension shaft and carrying a propeller shaft geared to the lower end of the extension shaft, and a propeller mounted on said propeller shaft, said lower unit comprising an enclosing casing and means permitting the upward tilting of said lower casing with respect to the engine drive shaft to avoid obstructions, said lower casing having a water inlet disposed below normal water level, said water inlet communicating with a water passage formed in the lower casing and connected with the water jacket of the engine, said water connection being constructed and arranged to permit the upward tilting movement of said lower unit.

56. A propulsion device for water craft comprising in combination, a water jacketed motor adapted to be mounted on said water craft and having a substantially vertically depending drive shaft, a support surrounding said drive shaft, an extension shaft mounted in said support, means normally coupling said extension shaft to said drive shaft, said support terminating in a propeller carrying casing enclosing the extension shaft, a propeller shaft geared to the extension shaft and enclosed in said casing, a propeller on said shaft, means for turning the propeller carrying casing about the motor shaft as an axis for steering, and means permitting the upward tilting of said propeller carrying casing relative to said motor to avoid obstructions, said propeller carrying casing having a water inlet disposed below normal water level and connecting with an internal passage in said propeller casing, said internal passage in turn connecting with the water jacket of the engine, said connections being constructed and arranged to permit the turning of said propeller carrying casing for steering and the upward swinging of said propeller carrying casing for the tilting movement.

57. In combination with a water vehicle provided with a recess in its stern, said recess being open at its bottom and being open at its rear, of a gas engine stationarily mounted on said craft, said motor having a drive shaft

depending downwardly into said recess, a support swingably connected to said motor and depending downwardly in said recess, said support including a propeller carrying lower unit projecting normally below the bottom of the craft adjacent said recess, said support carrying an extension shaft aligned with the motor shaft, said motor shaft and aligned shaft having disengagable clutch portions, means for turning said propeller carrying casing about the drive shaft as an axis for steering and means permitting the tilting of said propeller carrying casing from a position normally projecting downwardly through the open bottom of said recess to a position wherein said propeller carrying casing swings upwardly in a vertical plane through the rearward opening of said recess whereby to permit the propeller and the casing to avoid obstructions.

58. A marine motor having a vertical drive shaft formed of upper and lower sections, means forming a disengageable clutch connection between said sections, and a hinged connection between the upper and lower drive shaft sections whereby said lower section may swing upwardly.

59. A marine engine comprising a stationary motor, a hinged propeller carrying section, a vertical propeller driving shaft carried by said section, and a clutch connection between the motor and said shaft to allow the shaft to tilt upwardly with respect to the motor.

60. The combination with a boat and a stationary engine mounted in the stern of a propeller drive therefor including a vertical shaft, a clutch connection between the engine and shaft, and means forming a pivoting mounting for the propeller drive and shaft for tilting them upwardly with respect to the engine to avoid obstructions at the bottom of the boat.

61. A marine motor having a drive shaft section and a vertically depending propeller driving shaft section, a propeller operatively connected to the latter section, and means to permit the automatic disengagement of the sections and the upward tilting movement of the latter section relative to the motor itself.

62. The combination with a boat, of a stationary engine therefore having a shaft portion with a clutch at the end, a propeller and a connected vertical propeller driving shaft having a clutch to engage the engine shaft clutch, and a pivotal mounting for the propeller driving shaft whereby said shaft may swing in a vertical plane with respect to the engine shaft.

63. The combination with a boat, of a marine motor having an engine with a stationary mounting in the boat and a drive shaft section terminating in a clutch element, a support pivotally mounted to swing relatively to said shaft section on a horizontal axis, a propeller and a vertical driving shaft therefor carried by the support, and a clutch element at the upper end of the driving shaft to engage the engine drive shaft clutch element when the driving shaft is in vertical position.

64. The combination with a boat, of an engine mounted therein, a propeller and a normally vertical depending drive shaft therefor, means for mounting the propeller and shaft to tilt rearwardly when engaged by an obstruction and to disconnect the shaft from the engine, and manual means for reconnecting it to the engine.

65. A marine motor having a relatively shiftable two part driving shaft, a propeller operatively connected thereto, a pivotally mounted support for the propeller and one part of the driving shaft, said support being free to tilt upon striking an obstruction, and means acting through the pivot of the support operable to move the support for steering.

66. A marine motor comprising an engine with water cooling jackets a propeller carrying casing pivoted to tilt rearwardly with respect to the engine, means forming a separable driving shaft connection between the parts, and for the propeller a water inlet passage in the casing to receive cooling water when the propeller is driven by the engine, and means independent of the pivotal connection for connecting the inlet passage with the water jacket.

67. A marine motor having a substantially vertically depending drive shaft, a casing housing a portion of said drive shaft, a propeller shaft mounted within the lower portion of said casing and geared to said drive shaft, a propeller on the end of said propeller shaft, and pivotal means permitting said casing to swing bodily with respect to the motor.

68. A marine motor having a power head, a propeller unit therefor having a hinged connection adapting it to tilt, means for manually controlling the tilting movement, and a clutch for releasing the manual controlling means.

69. A marine motor having a power head, a hinged propeller unit hinged thereto, a separable driving connection between the head and the unit, and means for enclosing the upper end of the propeller unit against the entrance of water.

70. A marine motor having a combination engine power head, a propeller unit hinged thereto, and an ignition circuit for the engine having a switch controlled by the hinged movement of the propeller unit.

71. A marine motor having a water cooled engine, a propeller unit therefor having a hinged and rotatable driving connection with the engine, and water circulating means for the engine from the unit independent of said connection.

72. A marine motor having a water cooled engine, a propeller unit hinged thereto, and means for conveying cooling water between the propeller unit and the engine.

73. A marine motor having a power head, a propeller unit hinged thereto, cooperating driving parts in the head and unit, and a packing joint between the adjacent faces of the head and unit.

74. A marine motor comprising relatively stationary and movable parts joined by a hinged connection, means for adjusting the parts in any relative hinged position, and a clutch mechanism to release said means upon impact.

75. A marine motor having a substantially vertically depending drive shaft, a hollow casing surrounding said drive shaft and turnable relatively thereto, a propeller shaft mounted in said casing and maintained in rigid relation to the lower portion of said drive shaft, driving means between said drive shaft and propeller shaft, a propeller on said propeller shaft, and pivotal means for permitting said drive shaft to swing relatively to the motor in a vertical plane substantially parallel to the longitudinal axis of a vessel in which the motor is mounted, and means for turning said casing about the vertically disposed drive shafts as an axis.

76. The combination with a boat, of a marine motor having a fixed mounting therein and a vertical propeller drive shaft at the stern, and means for mounting the shaft to tilt upwardly with respect to the motor in a vertical plane disposed substantially in a fore and aft line of the boat.

77. A marine motor having a substantially vertically depending drive shaft, a vertically extending housing enclosing a portion of said drive shaft and turnable axially about the drive shaft for steering, a propeller shaft mounted within the lower portion of said casing, and geared to said drive shaft, a propeller on the end of said propeller shaft, and pivotal means permitting said casing to swing with respect to the motor bodily upwardly in a plane substantially fore and aft with respect to a boat in which the motor is mounted.

78. A marine motor having a drive shaft, a vertical extension shaft and a clutch connection therebetween; a propeller operated by the extension shaft; and means forming a pivotal mounting for said extension shaft to permit the extension shaft and propeller to swing relative to the drive shaft and to permit disengagement of the clutch connection.

79. The combination with a boat, of a stationary marine engine, a vertically disposed driving shaft, a propeller shaft and a propeller connected thereto, a separable clutch connection between the engine and said driving shaft, and means forming a pivotal mounting for said driving shaft and said propeller shaft to tilt them upwardly and rearwardly in a plane substantially parallel to the longitudinal axis of the boat to swing the propeller free from obstructions at the bottom of the boat.

80. A marine motor having a power head, a vertical propeller unit having a hinged connection therewith, and a clutch mechanism in the hinged connection adapting the propeller unit to swing rearwardly in a vertical fore and aft plane.

81. The combination with a boat and a marine motor having a stationary power head mounted in the boat, and a vertically disposed propeller unit hinged to the head and tiltable upwardly and rearwardly about its upper end.

82. The combination with a boat and a marine motor having a stationary power head mounted in the boat, and a vertically disposed propeller unit hinged to the power head to swing in a fore and aft plane and having a portion rotatable for steering.

83. The combination with a boat and a marine motor having a stationary power head mounted in the boat, and a vertically disposed propeller unit having a connection with the power head for tilting in a vertical plane substantially parallel to a fore and aft line of the boat and rotatable for steering.

84. A marine motor having a drive shaft, a vertical extension shaft and a clutch connection therebetween; a propeller operated by the extension shaft; means forming a pivotal mounting for said extension shaft to permit the extension shaft and the propeller to swing relative to the drive shaft and to permit disengagement of the clutch connection; and means for yieldingly holding the said clutch normally in driving relation.

85. The combination with a boat and a marine motor having a stationary power head mounted in the boat, a vertically disposed propeller unit hinged to the head and tiltable upwardly and rearwardly about its upper end, and means for providing yielding resistance to the tilting movement of the unit.

86. The combination with a boat and a marine motor having a stationary power head mounted in the boat, a vertically disposed propeller unit hinged to the power head to swing in a fore and aft plane and having a portion rotatable for steering, and geared means in connection with said rotatable portion for operating it in steering.

In testimony whereof I affix my signature.

HARRY L. JOHNSON.