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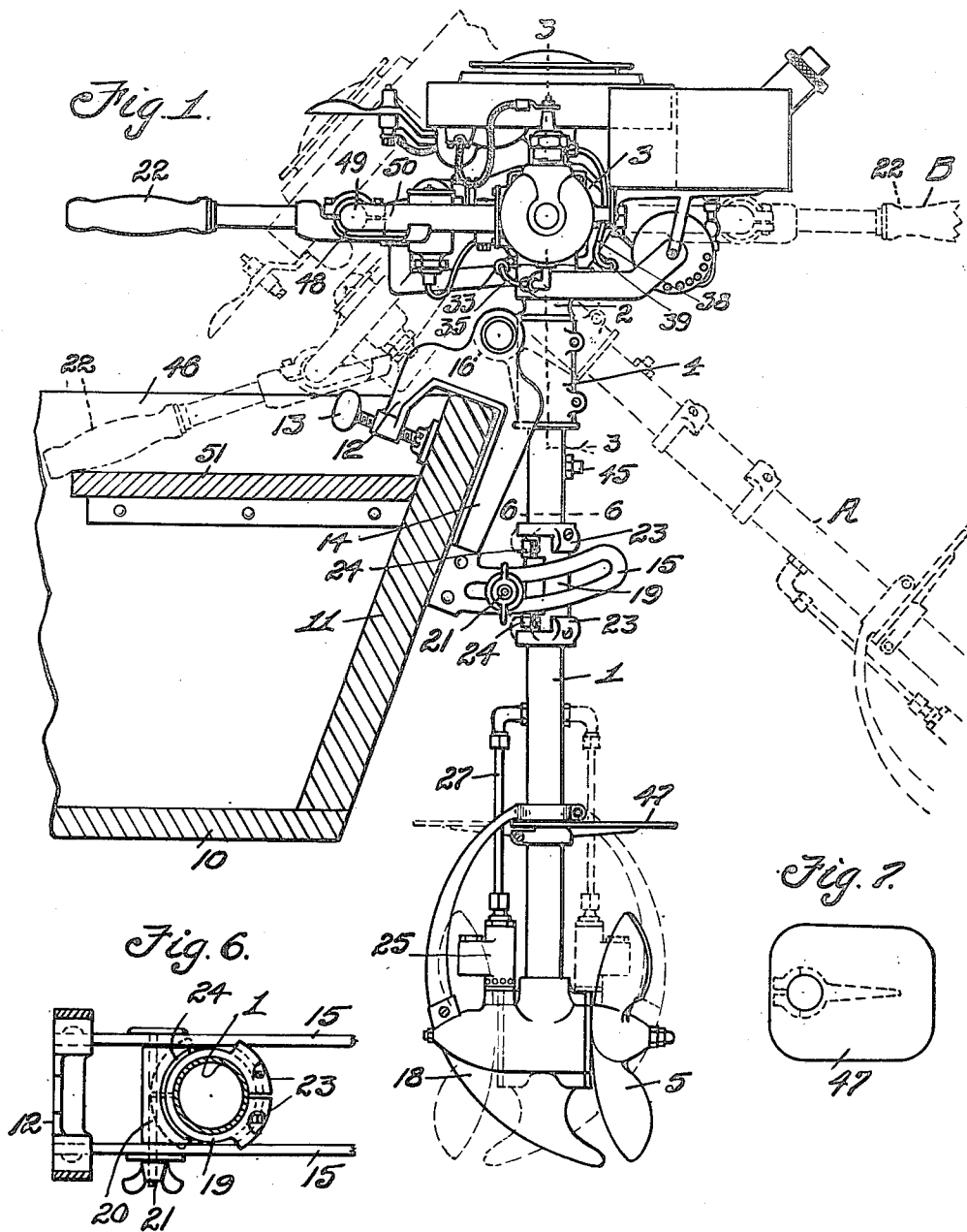
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L. J. JOHNSON

OUTBOARD MOTOR FOR SMALL CRAFT

Filed Jan. 27, 1922

3 Sheets-Sheet 1



INVENTOR.

Louis J. Johnson

BY

George J. Johnson

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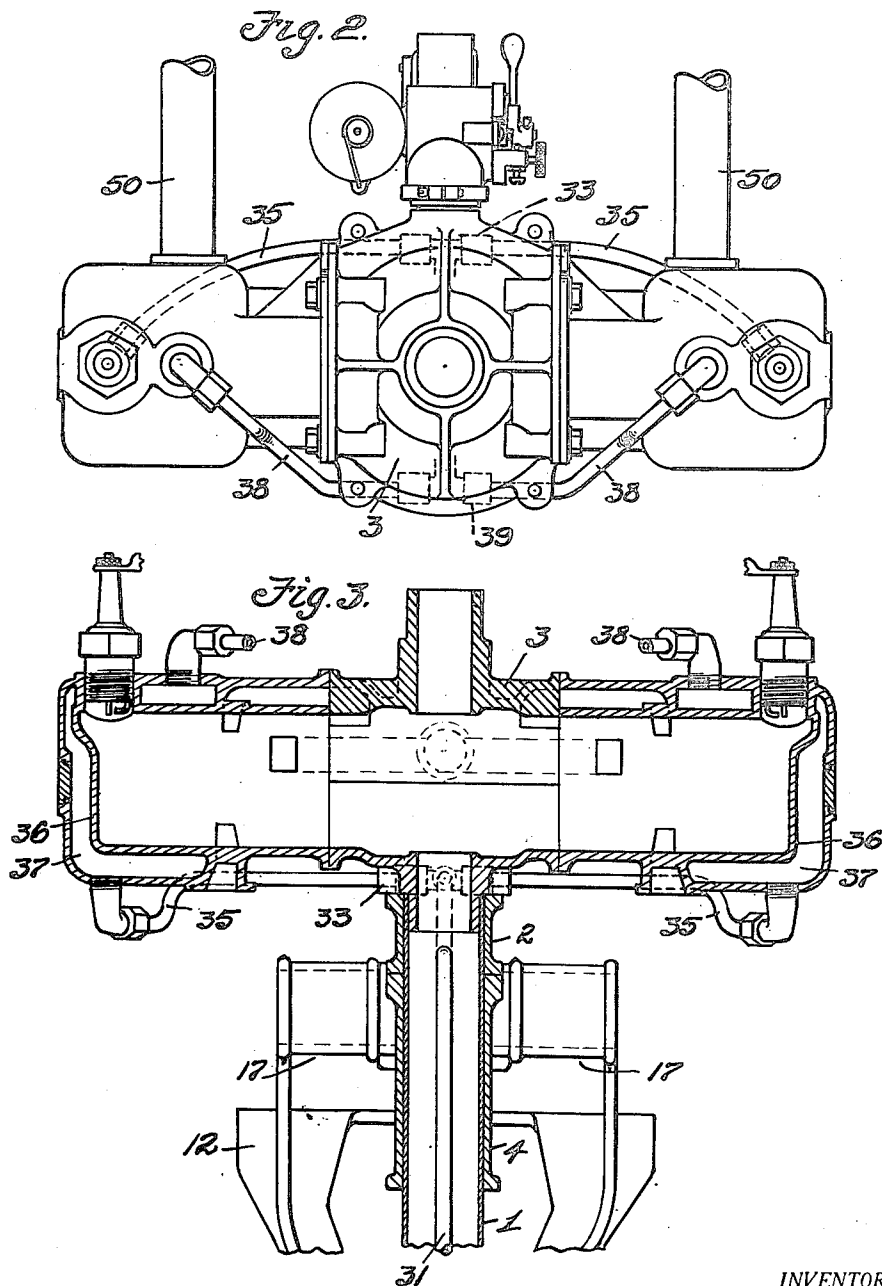
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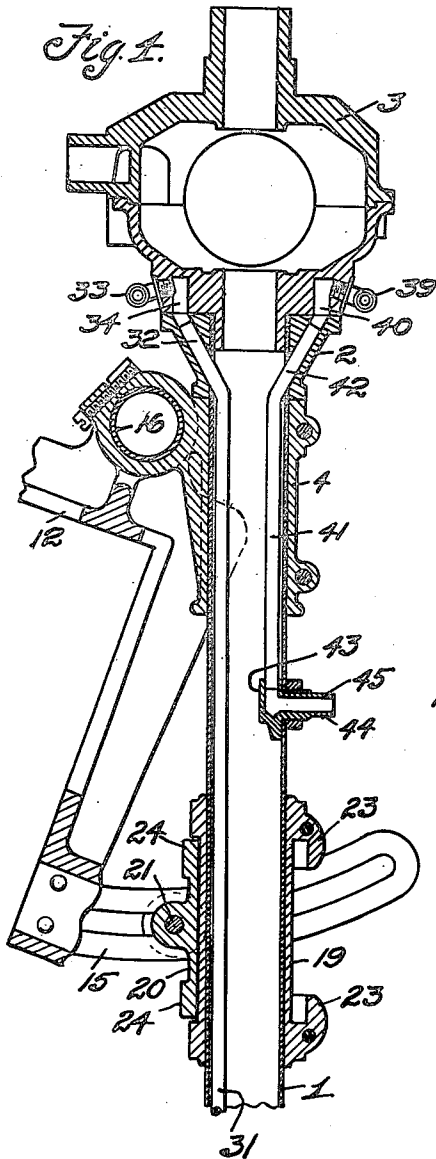
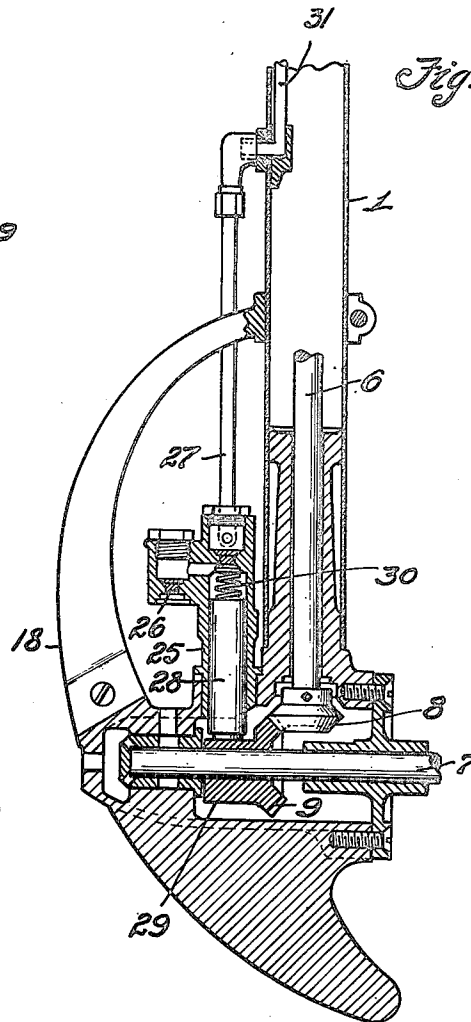
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OUTBOARD MOTOR FOR SMALL CRAFT

Filed Jan. 27, 1922

3 Sheets-Sheet 3



INVENTOR.

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## UNITED STATES PATENT OFFICE.

LOUIS J. JOHNSON, OF MISHAWAKA, INDIANA, ASSIGNOR TO JOHNSON BROS. ENGINEERING CORPORATION, OF SOUTH BEND, INDIANA.

## OUTBOARD MOTOR FOR SMALL CRAFT.

Application filed January 27, 1922. Serial No. 532,340.

*To all whom it may concern:*

Be it known that I, LOUIS J. JOHNSON, a citizen of the United States, residing at Mishawaka, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Outboard Motors for Small Craft, of which the following is a specification.

The invention relates to out-board motors for small craft, and has for its object to provide a device of this character which is pivoted to a detachable bracket carried by the gunwale, and pivotally mounted in a sleeve in such a manner that the device may be moved entirely around or for 360 degrees in a horizontal plane. Also to provide the attaching bracket with outwardly extending slotted arms concentric with the pivotal point of the device with the detachable bracket, said arms having adjustably mounted therebetween a segmentally shaped plate, which plate limits the forward movement of the tubular shaft casing and at the same time allows the tubular shaft casing and the device as a whole to be tilted in a vertical plane.

A further object is to provide the tubular casing with a sleeve having inwardly extending segmentally shaped flanges, which flanges are so positioned that when the tubular casing has been rotated for placing the propeller in reverse position, for instance in backing, the inwardly extending flanges will engage over segmentally shaped ribs on the segmentally shaped plate, thereby holding the device against movement in a vertical plane during a backing operation.

A further object is to provide in connection with a pivoted out-board motor, which motor is pivoted to move in a horizontal plane or a vertical plane and comprising a tubular casing on the upper end of which is mounted a motor, and the lower end provided with a propeller driven by shafting from the motor and extending through the tubular casing, a cooling circuit for the motor substantially entirely encased in such a manner that the piping from the pump located adjacent the propeller passes through the tubular casing to a point above the pivotal points of the device, and thence to the engine jacket. Also to provide a pipe connection to the engine jacket, which pipe connection extends downwardly through the

tubular casing and discharges through the tubular casing wall at a point below the gunwale of the boat, and preferably above the water line, thereby preventing discharge of water into the boat when the boat is backing or when the device is being used not only for driving, but for steering purposes.

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 sectional view through the stern of a conventional form of row boat, showing the out-board motor applied thereto.

Figure 2 is a top plan view of the motor.

Figure 3 is a vertical sectional view through the motor, and a portion of the supporting bracket and the tubular casing.

Figure 4 is a vertical sectional view through the upper end of the device, showing its supporting sleeve and bracket in section.

Figure 5 is a vertical sectional view through the lower end of the device, showing the pump actuated thereby.

Figure 6 is a horizontal sectional view taken on line 6—6 of Figure 1.

Figure 7 is a top plan view of a plate disposed above the propeller and carried by the tubular casing for preventing cavitation.

Referring to the drawings, the numeral 1 designate a substantially vertically disposed tubular casing, which casing at its upper end has secured thereto a tapered sleeve 2, and supported on the tapered sleeve and on the tubular member 1 is a motor casing 3. The tubular sleeve 1 is pivotally mounted in a sleeve 4, in such a manner that the tubular member may be turned entirely around in the sleeve 4 for reversing the position of the propeller 5 or during a steering operation when the boat is cleared by driving. The tubular casing 1 houses the drive shaft 6, which drive shaft is driven by the motor located within the motor casing 3, which motor may be of any conventional form, however it drives the shaft 6 and thereby drives the propeller shaft 7

through the medium of the bevel gear 8, which bevel gear meshes with the bevel gear 9, carried by the propeller shaft. It will be seen that when the drive shaft 6 is rotated the propeller 5 will be rotated, and that when the tubular casing 1 is rotated in the sleeve 4 substantially 180 degrees, that the propeller 5 will be positioned for reversing the direction of movement of the boat 10, on the stern board 11 of which the motor as a whole is supported by means of the bracket 12. The bracket 12 is provided with a thumb screw 13 which forms means whereby the bracket 12 may be easily and quickly placed in position or removed. The arm 14 of the bracket 12 extends downwardly and terminates in spaced rearwardly extending segmentally shaped arms 15, between which the tubular casing 1 is disposed, and moves. The sleeve 4 is provided with a rearwardly extending apertured lug 16, which is pivotally mounted in the arms 17 of the bracket 12 in such a manner that it may pivot and move in a vertically plane, thereby allowing the lower end of the device to freely move upwardly and rearwardly when the propeller guard 18 comes in engagement with an obstruction or the like, thereby preventing breakage of the device, and at the same time allowing the device to rise when going over shoal places.

Secured to the tubular casing 1 and disposed between the segmentally shaped arms 15 is a sleeve 19, the rear face of which engages a segmentally shaped plate 20 disposed between the arms 15, and held in various positions therebetween by means of the bolt 21. The plate 20 may be adjusted inwardly and outwardly to various positions according to the angle of the stern board 11 of the boat, thereby allowing the tubular member to be positioned substantially vertically, and be limited in its forward movement during the propelling operation by the engagement of the sleeve 19 with the plate 20. The segmentally shaped plate however does not prevent the device from being tilted in a vertical plane to the position shown in dotted lines A in Figure 1, or to be positioned in reverse position for backing the boat. However when it is desired to back the boat the operator grasps the handle member 22, rotates the device as a whole until it has been moved substantially 180 degrees, and the handle member 22 moved to the dotted line position B; this action will cause the tubular casing 1 to rotate, and the propeller to be moved 180 degrees to a position where the propeller will cause the boat to back, said position being shown in dotted lines in Figure 1. However it is obvious that when the device is rotated 180 degrees, it will be necessary to provide means for

holding the device from rearward movement at its free end. To accomplish this result the sleeve 19 is provided with segmentally shaped flanges 23 which extend toward each other, and which flanges, when the tubular casing 1 is rotated, engaged, over segmentally shaped flanges 24 carried by the upper and lower ends of the plate 20, therefore it will be seen that the tubular member and the device as a whole will be held against pivotal action in a vertical plane during the backing operation.

Heretofore in outboard motors the cooling of the motor casing 3 has been accomplished by flexible connections, such for instance as a hose connection between the pump 25 and the engine casing 3. It is obvious that such a connection prevents rotation of the device in its bearings and interferes with the pivoting of the device in a horizontal plane for 360 degrees and interferes with the pivotal action of the device while being used for steering purposes. To overcome this difficulty the water from the pump 25, after being sucked through a check valve 26, is discharged upwardly through the pipe 27. The pump 25 comprises a reciprocating piston 28 actuated by the eccentric collar 29, which forces the piston upwardly thereby compressing the spring 30, which spring maintains the lower end of the piston 28 in engagement with the eccentric collar 29 at all times. The water is forced through the pipe 27, which pipe at a point, preferably slightly above the propeller guard 18 is in communication with a pipe 31 within the tubular casing 1 adjacent one side thereof. The pipe 31 extends upwardly through the tapered sleeve 2 as at 32 at a point above the supporting sleeve 4 and is in communication with a T 33 through the port 34 in the engine casing. It will be seen that the water pumped passes upwardly through the tubular casing 1 past the pivotal and supporting points of the device, thereby eliminating the use of external pipe or flexible hose as is the present practice. Connected to the T 33 are outwardly extending pipes 35, which pipes extend under the cylinders 36 of the engine casing 3 and are in communication with the water jackets 37. The water is forced into the water jackets 37 and passes out of the same through the pipes 38 in communication with the upper sides of the water jackets, which pipes extend downwardly and are connected to the T 39, which is in communication with a port 40 in the engine casing 3, and through which port the water passes to the pipe 41, disposed within the tubular casing 1 and having its upper end 42 extending through the tapered sleeve 2 and its lower end disposed in the upwardly extending arm 43 of a discharge L 44, the arm 45 of which extends through the tubu-

lar casing 1 at a point below the gunwale 46 of the boat, thereby discharging the cooling water at a point where it will not blow into the boat or be discharged into the boat when the device is pivoted in its bearings during a steering operation.

The lower end of the tubular member 1 is provided with a horizontally disposed plate 47, which prevent cavitation, especially when the device is being used on the gunwales of the boat. The device is provided with a pivoted handle, said handle being designated by the numeral 22 and pivoted at 48 on the transverse portion 49 of a U-shaped member 50 carried by the engine casing. By pivoting the handle 22 it will be seen that if the propeller guard 18 hits an obstruction and the device is suddenly pivoted in a vertical plane that if the handle member 22 comes into engagement with an obstruction, such for instance as the rear seat 51, that a pivotal action will be taking place at 48, as clearly shown in dotted lines in Figure 1, thereby preventing breakage of the device and allowing full swing of the motor and device without interference from the operating handle.

From the above it will be seen that an out-board motor is provided which is simple in construction, movable in a vertical plane and so constructed that it may be continuously rotated in a horizontal plane in either direction without interference from flexible pipe connections between the pump and the water jackets of the engine cylinders.

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

1. An out-board motor comprising a vertically disposed tubular member, said tubular member adjacent its upper end being pivotally mounted in a collar, a bracket for supporting said collar and to which bracket the collar is pivoted, a limiting member engaging the inner face of the tubular member, means for adjusting said limiting member, means carried by the tubular member and interlocking with the limiting member when the tubular member is rotated, a propeller carried by the tubular member adjacent its lower end, a motor carried at the upper end of the tubular member and means for driving the propeller from the motor through the tubular member.

2. The combination with a pivoted out-board motor pivoted to a bracket carried by a boat, said motor driving a propeller through a tubular casing, of spaced arms between which the tubular member is disposed, an adjustable limiting member disposed between the arms and adjustable inwardly and outwardly and members carried by the tubular casing and adapted to engage members carried by the limiting member and prevent movement of the tubu-

lar member pivotally in a vertical plane upon movement of the tubular member in a horizontal plane.

3. The combination with a pivoted tubular casing supporting a motor and a propeller and having driving mechanism through the casing from the motor to the propeller, said tubular casing being pivotally movable in a horizontal plane and in a vertical plane, of means for limiting the movement of the casing inwardly and allowing movement of the casing in a vertical plane, and means whereby upon a movement of the tubular casing in a horizontal plane it will be locked against pivotal movement in a vertical plane.

4. The combination with the vertical casing of an out-board motor, said casing being movable pivotally in a vertical and a horizontal plane, of means for preventing the movement of said vertical casing, said means comprising spaced arms having slots therein, said casing being disposed between said arms, an adjustable plate between the arms with which one side of the casing engages and is limited in its movement, a flange carried by the casing and segmentally shaped, a segmentally shaped member carried by the plate and positioned whereby it will be engaged and held by the flange carried by the casing upon a partial rotation of the casing.

5. The combination with an out-board motor pivoted to move in a horizontal and in a vertical plane, of means for limiting the downward movement in a vertical plane and means cooperating with the first mentioned means for preventing movement upwardly in a vertical plane upon a partial pivotal movement of the motor.

6. The combination with an out-board motor pivoted to move in a vertical plane or in a transverse plane, of means below the pivotal point for limiting the downward movement of the free end of the motor, and means whereby upon a partial rotation of the motor the upward movement of the free end thereof will be prevented.

7. The combination with an out-board motor comprising a vertically disposed tubular propeller drive shaft casing pivotally mounted, a motor carried by the upper end of said casing and having a water jacket, a pump disposed adjacent the lower end of the casing and actuated from the motor, of a pipe connection between the pump and the water jacket of the motor and passing through the vertically disposed propeller drive shaft casing, a discharge pipe connected to the water jacket, said discharge pipe extending downwardly through the tubular propeller drive shaft casing and discharging through the wall of propeller drive shaft casing.

8. The combination with an out-board motor comprising an engine having a water

jacket, a pivoted tubular propeller drive shaft casing supporting said engine, a propeller at the lower end of the tubular propeller drive shaft casing and driven from the motor, a pump driven by the propeller driving mechanism, a pipe connection between the pump and the water jacket of the engine, said pipe passing through the tubular propeller drive shaft casing, a pipe connection between the water jacket and extending downwardly through the tubular propeller drive shaft casing and discharging through the side thereof.

9. The combination with an out-board motor comprising an engine supported on a tubular propeller drive shaft casing and cooled from a pump-adjacent the lower end of the tubular casing, of a pipe connecting the pump and the engine cooling system, said pipe extending through the tubular propeller drive shaft casing to one side of the center of the casing.

10. The combination with an out-board motor comprising a motor casing having a water jacket and spaced intake and discharge ports, said casing being detachably supported on the upper end of a tubular propeller drive shaft casing, a pump located adjacent the lower end of the tubular propeller drive shaft casing, of supply and discharge pipes disposed within the drive shaft

casing, the upper ends of the pipes being in registration with the ports of the engine casing, one of said pipes being in communication with the pump.

11. The combination with an outboard motor pivoted to turn axially of its propeller shaft and to swing bodily in a vertical plane, of means for limiting the downward movement in a vertical plane, and means adapted upon a directional movement of the propeller to engage the first mentioned means to lock the movement of the propeller in a vertical plane.

12. The combination with a motor including a propeller and a propeller drive shaft adapted to move in a horizontal plane and in a vertical plane, of means controlled in the angular adjustment of the propeller for locking the latter against movement in a vertical plane.

13. The combination with a motor, of a tubular casing supporting a propeller, driving connections between the motor and the propeller through the casing, said tubular casing being movable axially and in a vertical plane, and means whereby upon an axial turning of the casing it will be locked against movement in a vertical plane.

In testimony whereof I affix my signature.

LOUIS J. JOHNSON.