May 12, 1959 J. M. HAWTHORNE 2,885,990

MANEUVERING PROPELLER MEANS FOR SHIPS

Filed Oct. 24, 1955 3 Sheets-Sheet 1

FIG. 2

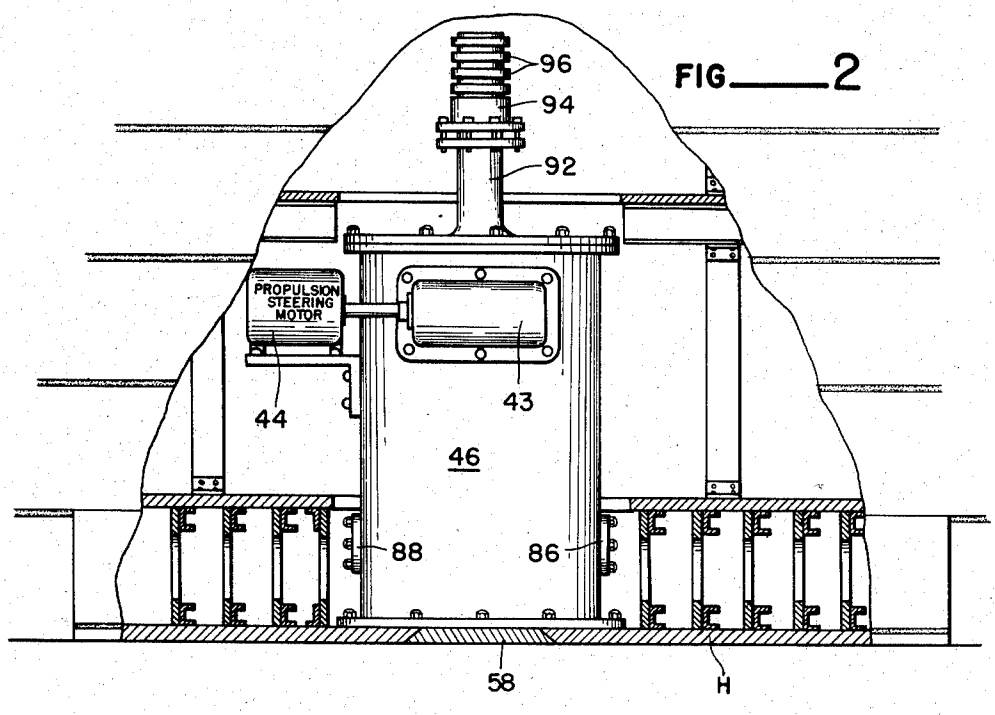
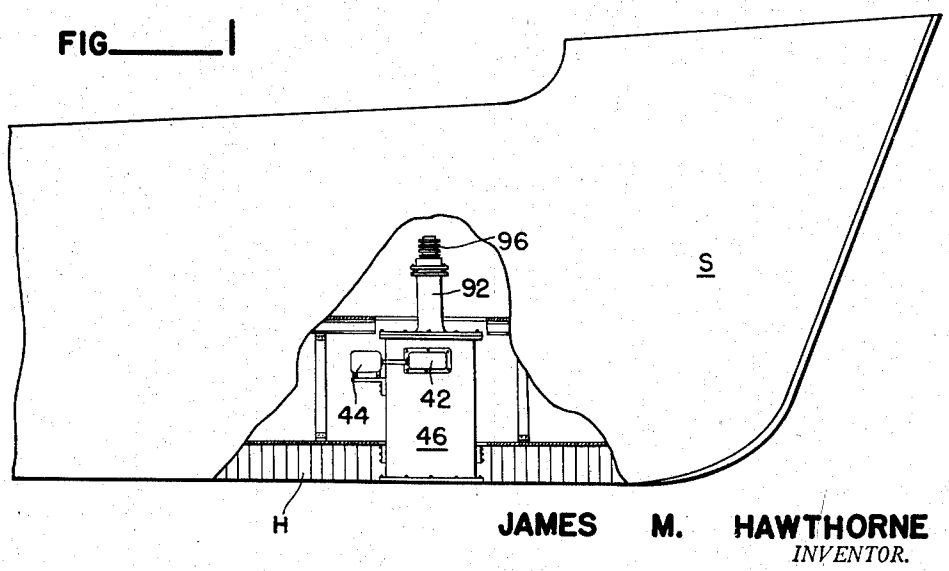


FIG. 1



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Filed Oct. 24, 1955 3 Sheets-Sheet 2

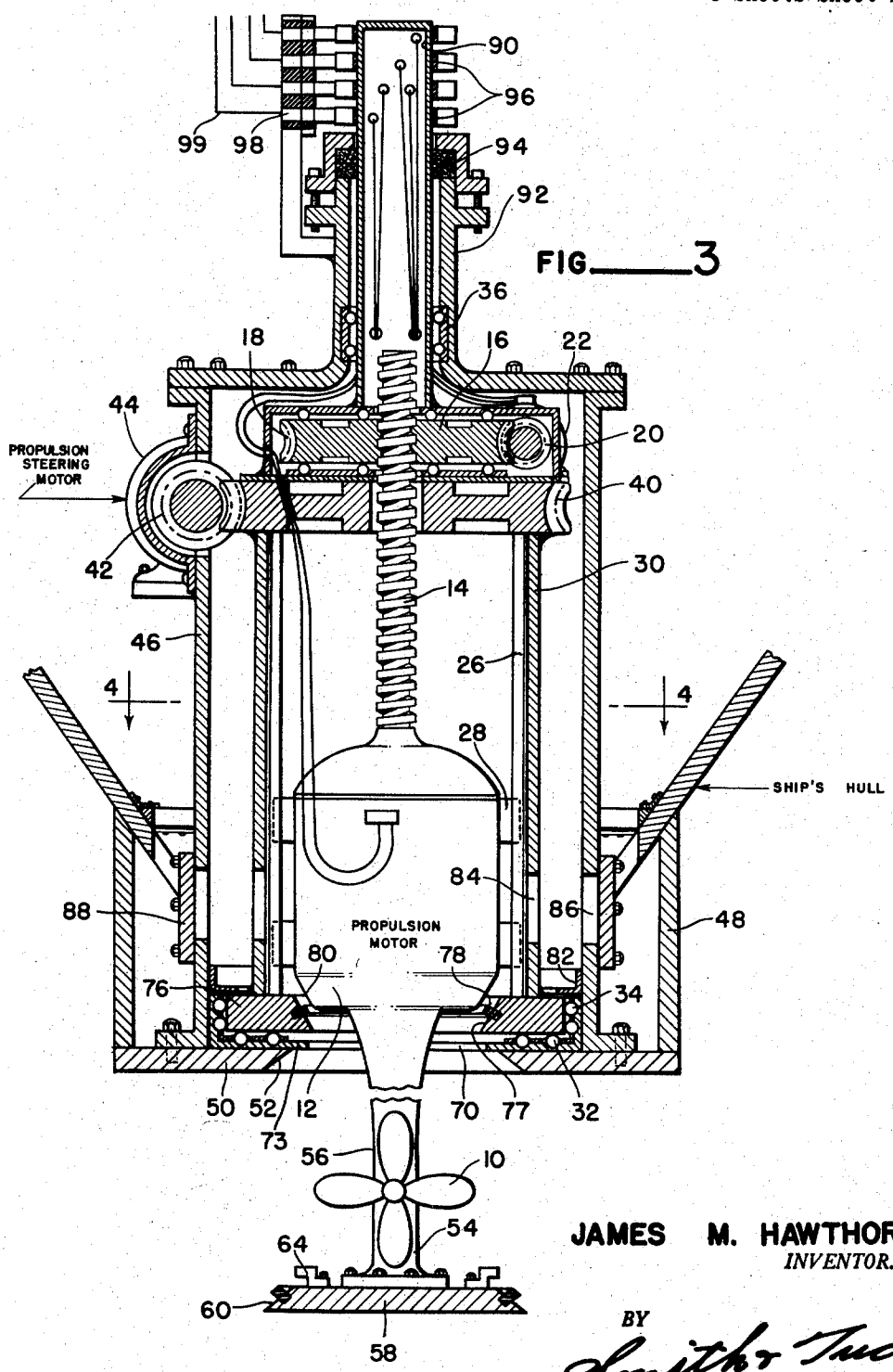


FIG. 3

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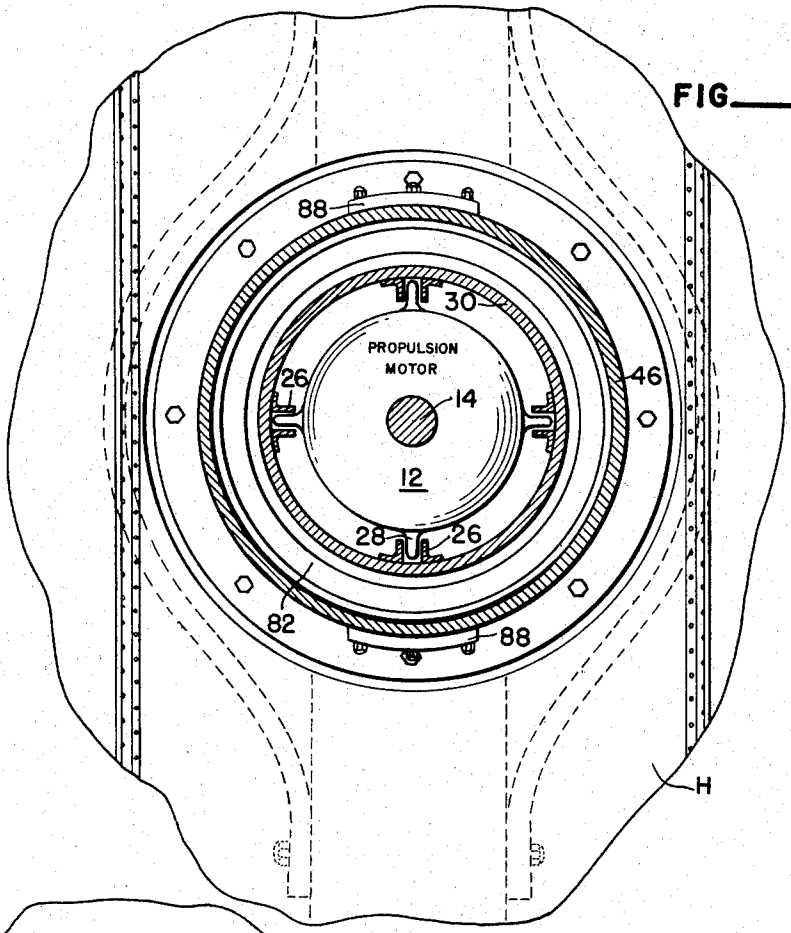
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MANEUVERING PROPELLER MEANS FOR SHIPS

Filed Oct. 24, 1955 3 Sheets-Sheet 3

FIG. 4



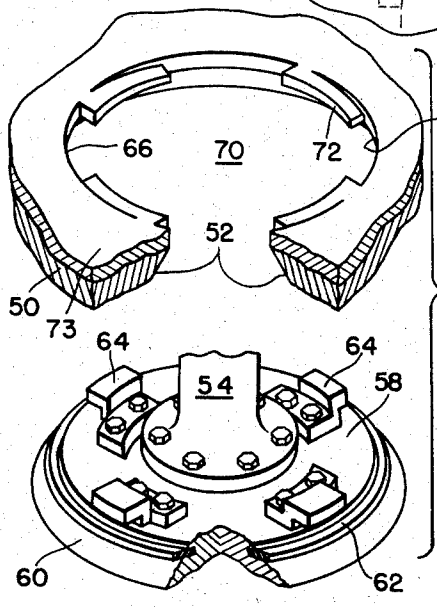


FIG. 5

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MANEUVERING PROPELLER MEANS FOR SHIPS

James M. Hawthorne, Seattle, Wash.

Application October 24, 1955, Serial No. 542,153

6 Claims. (Cl. 115—35)

This present invention relates to the general art of propellers as employed in the driving and maneuvering of ships. More particularly this invention relates to what would normally be an auxiliary means which would be employed in addition to the main propulsion engines of a ship and which will admit of ready maneuvering of a ship under trying conditions of wind and tidal action. The invention comprises a screw propeller that is mounted for extension outwardly from within a ship during the period it is employed and which is further provided with means for retracting the same after its period of use is over and sealing the port through which the propeller has passed.

In the past the problem of supplying means for maneuvering ships under trying conditions has been the subject of considerable study and many devices have been provided with the intention of assisting in the maneuvering of ships, as in landing or departing from a dock, and to assist them in maneuvering through confined passageways especially under unusual wind and current conditions. This present invention is intended as a solution of this very perplexing problem and while it might provide this sole propulsion effort required to move a ship in case of failure or damage to the main propulsion unit, it is intended primarily as an auxiliary means, and one which normally would be employed near the bow of the ship. This device is provided with means so that the propeller thrust may be directed through the full horizontal plane and that its efforts may be applied at any point throughout a 360 degree range.

Our most common knowledge on the difficulties of maneuvering boats is shown in many pictures of tugs maneuvering liners and freighters into dockage, such as occurs in New York harbor for instance, where tidal action and current and winds are encountered. This, however, is a limited field for equipment of this order. There are, throughout the world, hundreds of ports in which the maneuvering of a ship is a very difficult problem and one which requires great skill on the part of the ships masters if they are to effect their landings and departures without damage to their ships. Probably the most difficult situation of this order is in the Arctic or sub-Arctic areas where the harbors are usually beset by currents from streams or tidal action and which most frequently are of a terrain which encourages the gusty heavy winds, such as the Williwaw of Alaska, where a wind may spring up very quickly and develop velocities up to eighty or ninety miles an hour. It has been found that under these conditions even a twin-screw ship is truly at the mercy of the elements. Other conditions call for the exact maneuvering of the ship. Particularly illustrative of these conditions are the special ships that are made to haul loaded vehicles or loaded freight cars and which must discharge them upon trackage or roadways that require that the ship be accurately positioned with respect to the exit thoroughfares. This present equipment is particularly adapted to solve this difficult problem.

The principal object of this present invention therefore

is to provide a maneuvering propeller means which may be wholly contained within the hull of a ship and then extended out of the hull for use and because of its character may be placed in the bow of the ship where its propeller will have the greatest possible effect in assisting the main propulsion means in maneuvering of the ship.

A further object of this invention is to provide a maneuvering propeller means which is retractable and which may exert force to thrust the propeller throughout the whole 360 degrees about its vertical axis.

A further object of this invention is to provide a retractable propeller arrangement wherein the housing for the power means may be sealed from the outside waters during its period of inactivity or when it is working, thus permitting the evacuation of dirty water around the power mechanism to the end that a long useful life can be expected of the same.

A further object of this invention is to provide a retractable propeller unit employing an electric propulsion motor which is retractable with the propeller unit to the end that the motor can be close to the propeller and thus reduce the connecting mechanism to a minimum.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

Figure 1 is a fragmentary elevation of the bow portion of a ship, broken away and sectioned in part, to show a preferred location of this present maneuvering propeller means;

Figure 2 is a view similar to Figure 1 but in enlarged scale and in more detailed section so that certain features of the equipment may be more clearly brought out;

Figure 3 is a vertical sectional view through the transverse axis of a unit made after the teachings of this equipment and showing all the essential elements thereof;

Figure 4 is a cross-sectional view taken along the line 4—4 of Figure 3;

Fig. 5 is a bracketed, perspective view showing, in section and exploded relationship, the sealing means employed at the outer surface of a ship's hull to provide an adequate seal for the same to the end that the motor compartment and the like can be un-watered after the equipment has served its purpose and is retracted for, possibly, extended periods.

Referring more particularly to the disclosure in the drawings, the numeral **10** designates the propeller used with this equipment. Propeller **10** may conform to the best types employed in normal ship propulsion. Propeller **10** is driven by, preferably, an electric propulsion motor **12**. This motor would be supplied with a vertical coaxial shaft and be operatively connected to the shaft upon which propeller **10** revolves by suitable conventional gearing. The propulsion motor **12** is mounted for vertical movement and may be raised or lowered or held in predetermined position by means of the threaded screw **14** and the gear nut **16**. The outer periphery of nut **16** is formed as a worm gear at **18**, and is then suitably engaged with a worm **20** which in turn may be driven by a water-proofed electric motor, as is indicated at **22**. Worm **20** and motor **22** are disposed within the revolvable housing **30**. The propulsion motor **12** is disposed in vertical guideways **26**, which engage, in sliding relationship, the outstanding lugs **28** formed as part of the propulsion motor housing. Guideways **26**, of which a plurality are employed, are secured to the inner housing member **30**.

Member **30** is provided with anti-friction bearings as at **32** and **34**, at its lowermost end and the angular anti-friction bearing **36** at its upper end. This whole housing **30**, the propulsion motor and the retracting gearing and motor **22** are therefore all revolvable entirely around

their vertical axis. The movement of housing 30 and the positioning of it, when the proper angular travel has been reached, is provided by the worm gear 40 and its associated worm 42. A separate propulsion steering motor 44 is provided. Motor 44 and worm 42 are suitably secured to the fixed outer housing 46, which is concentric with the inner housing 30. Suitable housing 43 is provided for worm 42.

Outer housing 46 is fixedly secured to the hull H of the ship S and the manner of securing it in place will be a function of the cross-section of the ship's bottom at the point where the installation is made. In many ships the bottom will be flat at that point and installation is relatively simple. Ships which carry a sharp entrance in the lower part of their hull may need to resort to the construction illustrated in Figure 3 in which a preferably, streamlined outer hull housing 48 is provided which is secured to the hull by conventional means, as by welding thereto or being riveted thereto.

It is desirable that the outer housing or the ship's bottom be provided with a relatively heavy valve seating plate 50, and that a valve seat, as 52, be provided therein. A suitable valve or sealing means is illustrated in Figures 3 and 5 in which an extension as 54 is provided for the propeller gearing housing 56, and this extension provides means for mounting the valve member proper 58. This valve member and its seat are illustrated in Figure 5 in which the valve has an angular valve face 60 adapted to coact with valve seat 52 to form a substantially water-tight joint. Such joints, however, are difficult to maintain water-tight and it is preferred that a heavy sealing gasket, as 62, be inset in the face 60 of valve 58 as an angular ring therein. On the upper face of valve 58 are provided a plurality of lugs 64 and these lugs are adapted to pass through openings 66 in plate 73. The final sealing is then achieved by partially rotating valve 60 within the propeller opening 70 and having the overhanging lugs 64 cammed upwardly by the camming surfaces 72, of which one should be provided for each of lugs 64. Camming surfaces 72 are formed, preferably, in a separate annular plate ring 73 which is fixedly secured to plate 50. This will effectively form a water-tight joint that will keep out any sea water from entering housings 46 or 30 and permit the evacuation of any water that has entered during the period valve 58 is open.

At its lower end housing 30 is provided with a bearing and valve seat plate 76. This plate has a dual function in that it forms a bearing race for the angular bearing 34 and the thrust bearing 32 and on its inner surface a tapered valve seat is provided at 77, and this seat is preferably provided with a compressible sealing gasket, as 78. The propulsion motor 12 has its lower housing shaped as a valve, with the valve portion 80 of the same bevel and adapted to coact with valve seat 77, so that water can be evacuated from housing 30 after the motor seats in seat 76. One convenient means of evacuating the water from housing 30 and housing 46 is by air pressure introduced in the upper portion of these housings expelling the water through a partial opening of the valves. An angular retainer member 82 is provided as a means of retaining plate 76 and bearing 34. This ring 82 is removably secured to the inner surface of housing 46. It is desirable that hand hole plates be provided so that access can be had to ring 82 and the bearings disposed below it and to this end alignable man-holes 84 and 86 are provided in the housings 30 and 46, respectively. The hand holes in housing 46 are preferably covered by hand hole covers 88.

Formed as part of or secured to inner housing 30, is the upwardly extending housing member 90. This member, of course, is revolvable with housing 30 whereas the housing extension 92 of housing 46 is, at all times, fixed with the hull of the ship. Consequently, it is desirable to provide suitable packing as at 94, so that these members can be revolved with respect to each other. Extension 90 provides a sealed-in housing for screw 14 when the propeller assembly is retracted and further provides a convenient manner of carrying the electric current conductors down to the propulsion motor and to the retraction motor 22. One satisfactory way of achieving this is to provide on extension 90 a plurality of conductor rings, as 96, to which the suitable leads conducting the current to the propulsion and retraction motors are secured. Exteriorly of rings 96 are brush contact members, as 98, which in turn have secured to them the feed conductors 99.

This equipment enables a ship's captain to employ the unit at any time it is needed but otherwise it is normally retracted by means of motor 22, screw 14 and the connecting gearing. When in use the propulsion stream from propeller 10 may be directed at any angle in the horizontal plane and may thus be used to maneuver the bow of the ship, to stop the ship or to provide an emergency drive to move the ship in lieu of the normal power plant.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of a maneuvering propeller means for ships.

Having thus disclosed my invention, I claim:

1. Maneuvering propeller means for a ship, comprising: a water-tight compartment formed in the forward lower hull of the ship and having a downwardly open port therefrom to below the ship, a housing in said compartment and rotatably supported therein to be turned about a vertical axis central of said port, power means acting between compartment and said housing manually controllable to adjust the rotary position of said housing about its axis, a waterproof propulsion motor in said housing and vertical guide means between said motor and said housing supporting said motor for vertical movement relative said housing and preventing relative rotary movement therebetween, manually controllable power driven means between said housing and said motor operative to raise and lower said motor, said motor having depending therefrom a gear housing and a propeller on an axis laterally outstanding from said housing and movable with said motor from an upper position completely in said housing to a lower position beneath said hull.

2. The subject matter of claim 1 in which the power means between said housing and compartment include an annular worm gear on said housing and a worm secured to said compartment and engaged with the gear, and in which the power driven means for raising and lowering said propulsion motor include a vertical screw, a nut engaged with said screw and rotatably supported in the upper end of said housing to rotate about a vertical axis and a worm drive provided by worm gear threads formed on the perimeter of said nut and a worm on said inner housing adapted to raise or lower said motor and propeller assembly and secure it in its adjusted position.

3. The subject matter of claim 1 in which said housing has an upstanding extension above said nut to receive said screw in its upper position and said compartment having an upwardly extending portion making a sealed engagement with the housing extension below the upper end of the housing extension, and electrical connections for said propulsion motor and for the power driven means for raising said motor connected to a conductor ring and brush assembly at the upper end of said inner housing extension and leading down therethrough to said inner housing.

4. The subject matter of claim 1 in which there is a valve seat plate above said port and having an opening aligned therewith and said valve seat plate carrying an annular gasket forming a seal with the lower end of said propulsion motor in the lower position thereof whereby a seal of the compartment can be effected and the inner housing and compartment can be evacuated of sea water

when the motor and propeller are lowered to the lower operating position.

5. A maneuvering propeller assembly for a ship, comprising: a compartment formed in the lower hull of the ship, a housing rotatably mounted in said compartment for adjustment in position around a vertical axis, said compartment and housing having lower aligned openings to the water below said hull and a waterproof motor vertically positioned in said housing carrying a depending propeller gear housing, right angle drive gears and a propeller operatively disposed on a horizontal drive shaft and a valve plate supported by the gear housing below said propeller and the motor being positioned in said housing by guide means guiding lowering and raising thereof and preventing relative rotary movement therebetween, manually controllable power means acting between said housing and said compartment for adjusting the position of said housing, motor and propeller about a vertical axis, manually controllable power means between said motor and said housing for raising and lowering said motor between a first lower position in which said propeller is in position

to engage water below said hull and a second upper position in which said valve plate makes a sealed contact with the openings to said compartment and said housing and facilitates evacuating water from said compartment and said housing.

6. The subject matter of claim 1 in which there are means for sealing the lower opening to said compartment when said propeller is in either its upper or in its working position.

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