May 26, 1931. E. H. FAHRNEY 1,806,968

PUMP PRIMING DEVICE

Filed Jan. 26, 1929 2 Sheets-Sheet 1

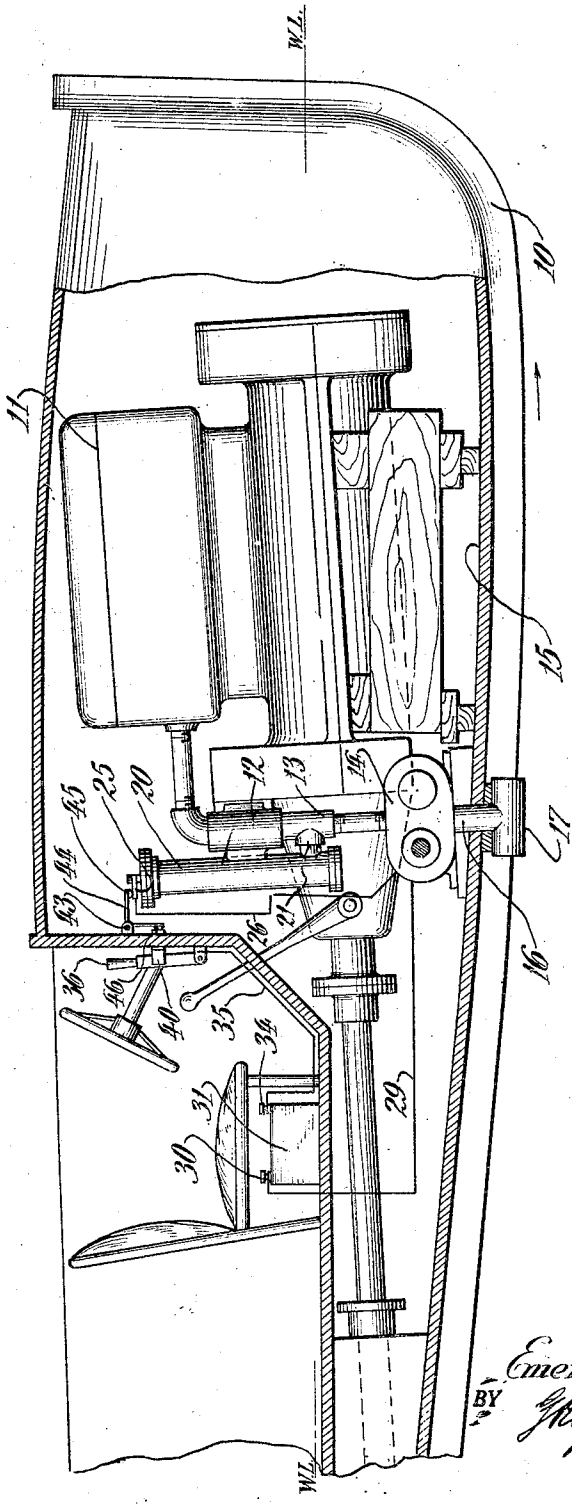


Fig. 1.

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Filed Jan. 26, 1929 2 Sheets-Sheet 2

Fig. 3.

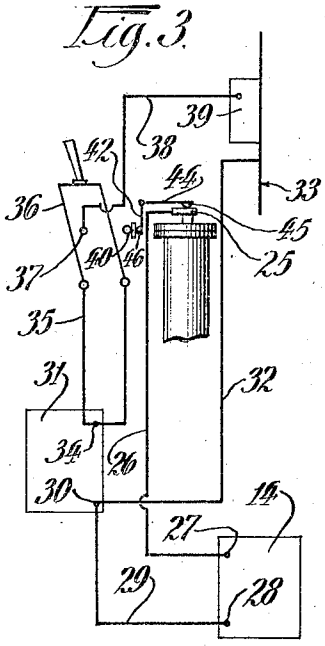


Fig. 2.

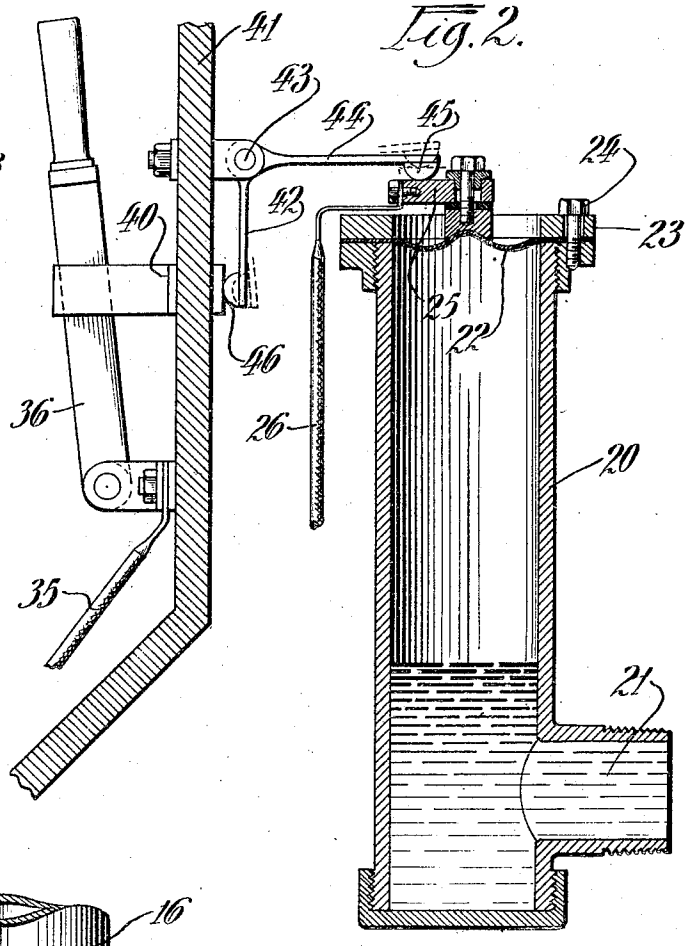


Fig. 4.

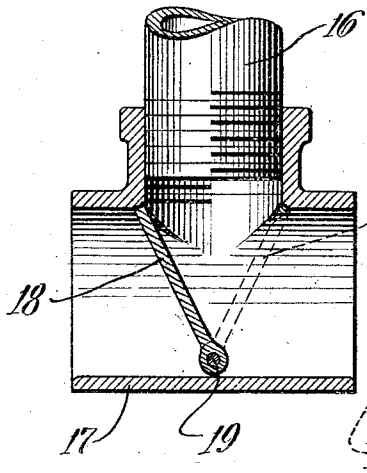
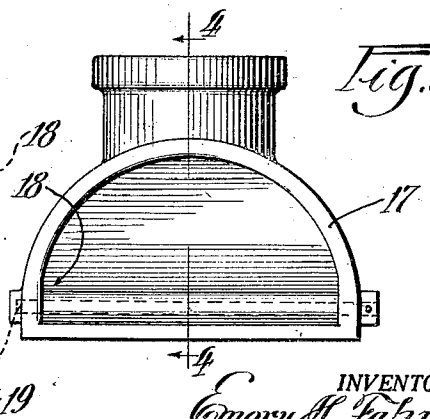


Fig. 5.



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UNITED STATES PATENT OFFICE

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PUMP PRIMING DEVICE

Application filed January 26, 1929. Serial No. 335,254.

This invention relates to improvements in devices for facilitating the priming of pumps, particularly adapted, though not necessarily limited in its use, in connection with marine engines.

It is well known that with marine engines the pump for circulating the cooling liquid is located in the boat above the water level, with the result that the inlet to the pump will also, at times be above the water level, and with the further result that the vacuum or suction in said pump will fall too low to supply the pump with the necessary liquid, thereby necessitating the filling or priming of the pump before it will operate.

It is one of the objects of the present invention to provide improved means, such as a supplemental pump, for priming the centrifugal pump and which supplemental pump is disposed in a position lower than the centrifugal cooling pump so that it will be below the water line and so that the inlet of the priming pump will be always submerged.

A further object is to provide an improved hydraulic, pneumatic and electrical control for the supplemental pump.

A further object is to provide an improved inlet for the supplemental pump and improved valve mechanism for controlling such inlet.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which

Figure 1 is a view partly in longitudinal section, partly in elevation and partly broken away of a boat with an engine therein having a pump priming device constructed in accordance with the principles of this invention applied thereto.

Figure 2 is an enlarged detail vertical sectional view of the hydraulic, pneumatic and electrical control device.

Figure 3 is a diagrammatic view of the circuits of the device.

Figure 4 is a vertical sectional view taken on line 4—4, Figure 5.

Figure 5 is an end elevation of Figure 4, with parts omitted.

Referring more particularly to the drawings the numeral 10 designates a boat or water craft in which the ordinary marine engine 11 is located, the engine being above the water line and the numeral 12 designates the ordinary centrifugal acting pump for circulating the cooling liquid.

To the inlet of the pump 12 is connected a pipe 13 which has communication with the discharge outlet of a supplemental pump 14, the latter being of any desired type, but preferably the centrifugal type.

The pump 14 is located below the pump 12 and in close proximity to the bottom 15 of the boat so that the pump 14 will always be below the water line.

The inlet 16 of the centrifugal pump extends below the bottom 15 of the boat preferably by extending through a suitable opening in the bottom of the boat, and connected with the bottom of the inlet pipe 16 is a tubular member 17 which is open at both of its ends and the tubular member extends in a direction transverse to the pipe 16 so that one end of the tubular member will open towards the bow and the other end towards the stern of the boat. With this tubular member 17 it will be manifest that water will flow into the inlet pipe 16 of the pump 14 through the tubular member 17 in either direction of movement of the boat.

Within the tubular member 17 is arranged flap valve 18 pivotally mounted as at 19 and this valve is adapted to be moved about its pivot 19 to either position shown in Figure 4 so that when the boat is moving in one direction, incoming water entering the tubular member 17 will operate the valve 18 to prevent the water from flowing straight through the tubular member and to direct the water into the inlet pipe 16.

This valve 18 will automatically adjust itself when the direction of movement of the boat changes.

Connected with the inlet pipe 13 of the centrifugal pump 12 is a reservoir 20 of any

desired size and configuration having an inlet 21 through which some of the water entering the inlet 13, will flow.

This reservoir 20 may be located in any desired or suitable position and the inlet 21 is preferably adjacent the bottom of the reservoir.

At any suitable point preferably adjacent the top of the reservoir is a diaphragm 22 of any suitable material which extends across the reservoir and is held in position in any suitable manner such as by means of a cap ring 23 secured in position by fastening devices 24.

Connected with the diaphragm 22 and suitably insulated therefrom is an arm 25 forming a contact terminal to which a conductor 26 is connected. This conductor 26 is also connected with one terminal 27 of the supplemental pump 14.

Leading from the other terminal 28 of the supplemental pump 14 is a conductor 29 which is connected with one terminal 30 of a battery 31. Leading from this terminal 30 of the battery is a conductor 32 which is grounded on the engine frame, diagrammatically illustrated as at 33.

Leading from the other terminal 34 of the battery are conductors 35 which are connected to the terminals of a double lever throw switch 36.

The switch 36 is adapted to engage a terminal 37 with which a conductor 38 leading preferably from the engine timer 39, is located.

The other arm of the switch 36 is adapted to contact with a terminal 40 mounted upon a suitable support such as the dash board 41.

Co-operating with the contact 40 is an arm 42 of a bell crank lever, which latter is pivotally supported as at 43. The other arm 44 of the lever is provided with a contact terminal 45 which is adapted to engage the arm or contact terminal 25 with which the conductor 26 is connected.

Thus, when the parts are in the position shown in Figure 2, the circuit will be completed through the supplemental or priming motor 14 to operate the latter.

When the diaphragm 22 rises the arm contact 25 will also rise and will swing the bell crank lever about its pivot 43 so as to move the arm 42 carrying the contact 46 out of engagement with the contact terminal 40, thereby interrupting the circuit through the motor 14.

As soon as the diaphragm 22 falls the circuit will be automatically completed through the supplemental or priming motor 14 by reason of the fact that as the arm 25 is lowered the bell crank will swing in the opposite direction about its pivot 43 to cause the arm 42 to move in a direction that its contact 46 will engage the contact 40.

It will also be manifest that at any time in the operation of the device the priming or supplemental motor 14 may be stopped by actuating the switch member 36 to move the arms thereof out of engagement with the contact terminals 30—40.

It is thought the operation of the device will be fully understood from the foregoing, but briefly stated, it is as follows.

Assuming the boat to be advancing in the direction indicated by the arrow in Figure 1, the flap valve 18 will be in the position shown in Figure 4 and water entering the tubular member 17 will be deflected by the valve 18 into the inlet 16 of the supplemental or priming pump.

The diaphragm 22 will be lowered to the position shown in Figure 2 to complete the circuit between the conductor 26, arm 25, bell crank lever 44—42, contact terminal 40, switch member 36, conductor 35, to the priming or supplemental motor, the circuit being completed through the conductor 29 to the battery 31, through the conductor 32, engine frame 33, conductor 38, switch 36, conductors 35, back to the battery.

This will operate the priming or supplemental motor and the parts will remain in this position, with the result that the supplemental or priming motor will force the liquid into the centrifugal circulating pump 12 and a portion of the liquid will enter the reservoir 20 through the inlet 21.

When sufficient liquid has entered the reservoir 20 the air between the liquid and the diaphragm 22 will be compressed and when sufficiently compressed the diaphragm 22 will be raised, thereby raising the contact arm 25 and rocking the bell crank lever 44—42 to move the contact 48 out of engagement with the contact 40, thereby interrupting the circuit through the priming or supplemental motor to stop the latter.

As soon as the pressure in the reservoir 20 falls the diaphragm 22 will fall, thereby permitting the bell crank lever 44—42 to again rock about its pivot 43 in the opposite direction until the contact 46 on the arm 42 engages the contact 40 to complete the circuit through the supplemental or priming motor 14.

Thus it will be seen that with this improved construction there will be provided an hydraulic, pneumatic and electrical control for the priming or supplemental motor.

The priming or supplemental motor 14 may be stopped at any time by shifting the switch 36 so as to move the arms thereof out of contact with the terminals 37—40 to interrupt the circuit.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without

departing from the spirit of this invention.

What is claimed as new is:—

1. In combination, a liquid circulating pump, a supplemental pump for priming the circulating pump, the outlet of the supplemental pump being connected with the inlet of the circulating pump, a closed reservoir having an inlet connected with the communicating passage between the outlet of the supplemental pump and the inlet of the circulating pump, a diaphragm constituting a part of the said reservoir, a motor for operating the said priming pump, a circuit for controlling said motor, and a switch device for controlling the said circuit, said switch device being operable in one direction by the direct action of the diaphragm under the pressure created in the said reservoir by the liquid in the reservoir.

2. In combination, a liquid circulating pump, a supplemental pump for priming the circulating pump, the outlet of the supplemental pump being connected with the inlet of the circulating pump, a closed reservoir having an inlet connected with the communicating passage between the outlet of the supplemental pump and the inlet of the circulating pump, a diaphragm constituting a part of the said reservoir, a motor for operating the said priming pump, a circuit for controlling said motor, a switch device for controlling the said circuit, said switch device being operable in one direction by the direct action of the diaphragm under the pressure created in the said reservoir by the liquid in the reservoir, a submerged inlet for the priming pump arranged in a substantially horizontal position open at both ends whereby liquid will flow thereinto from either end, and a valve within said member for selectively establishing communication between said outlet and either one of the said open ends of the member.

In testimony whereof, I have signed my name to this specification on this 16th day of January, 1929.

EMERY H. FAHRNEY.