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FLUID FLOW INDICATOR

Filed May 25, 1960

2 Sheets-Sheet 1

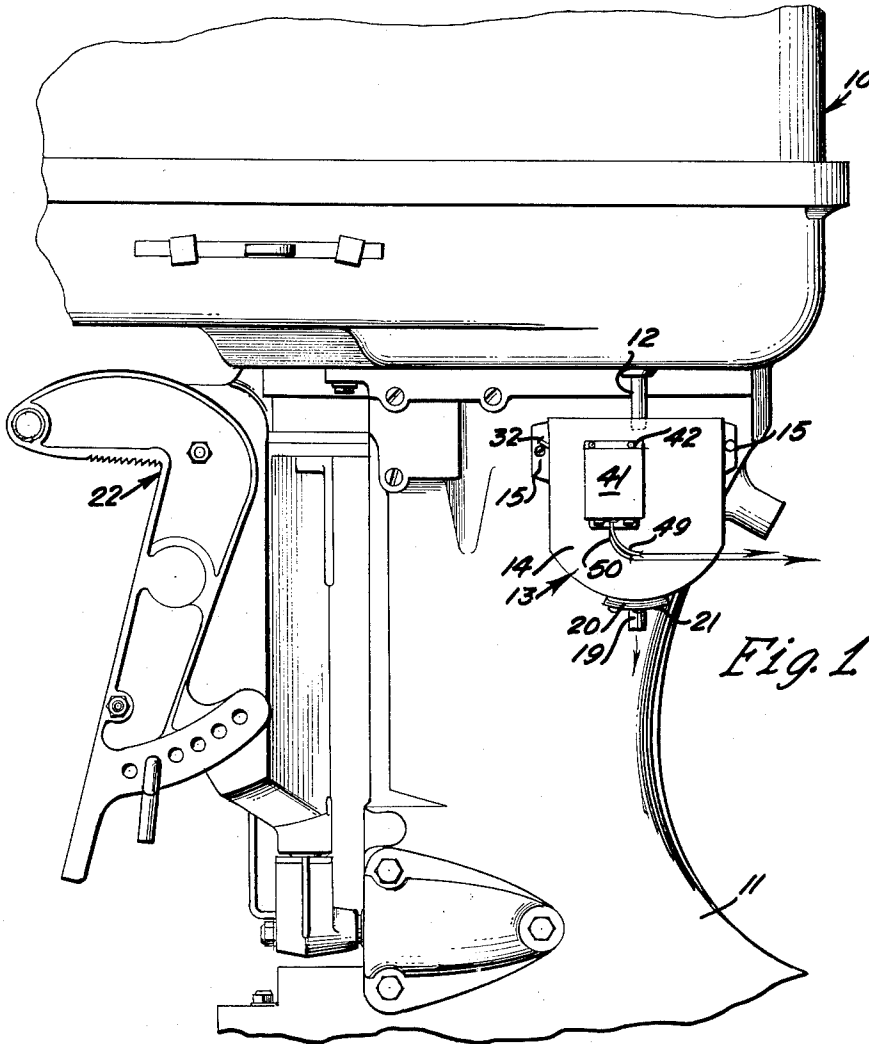


Fig. 1

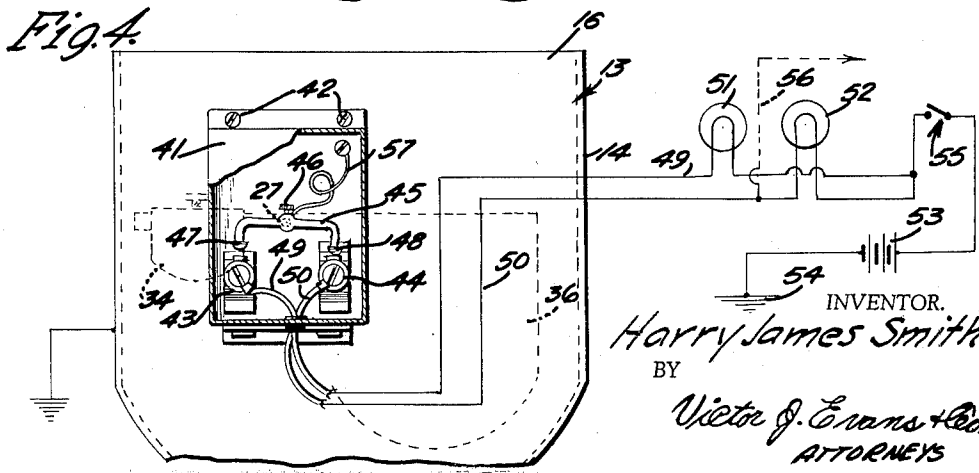


Fig. 4

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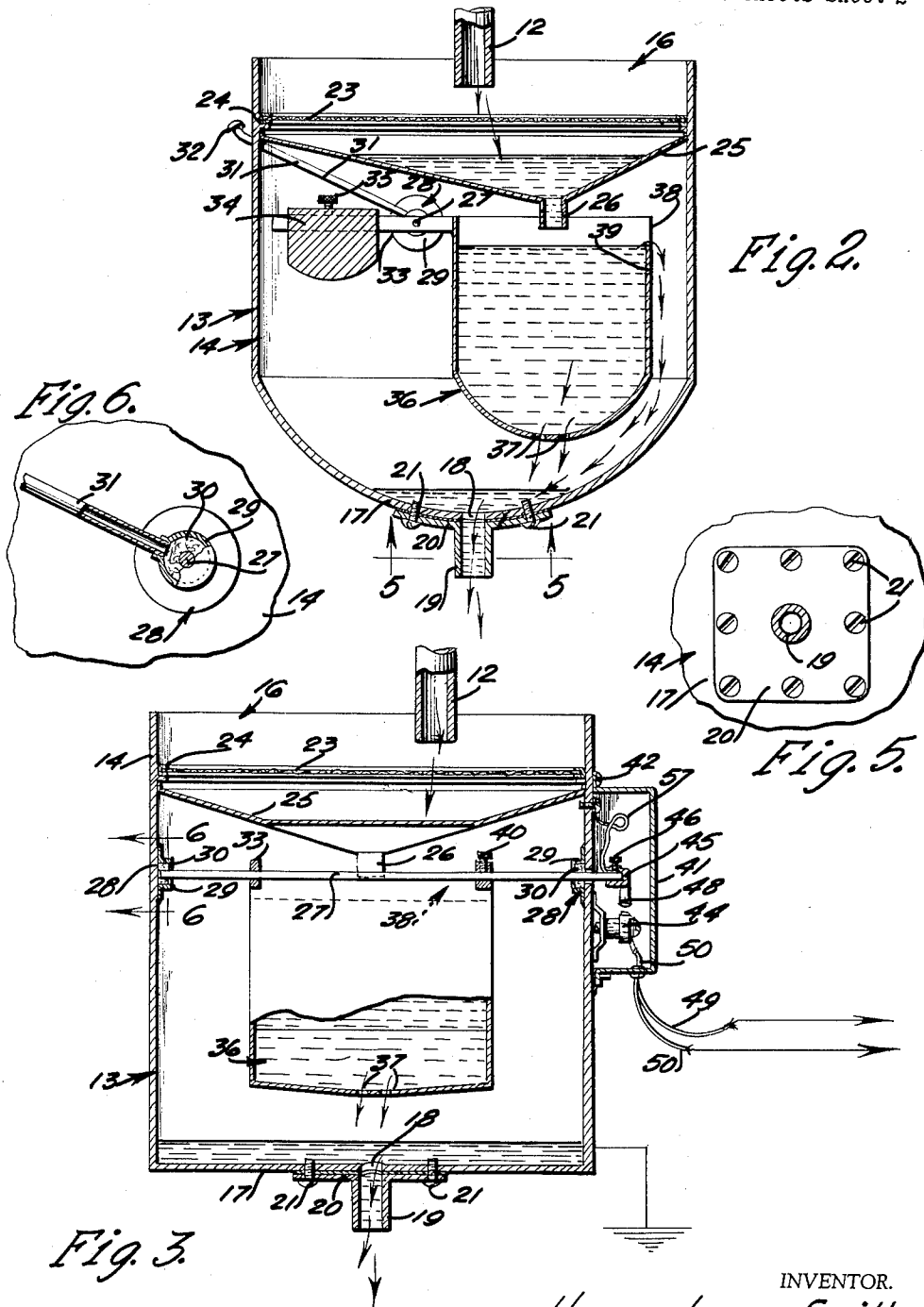
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2 Sheets-Sheet 2



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FLUID FLOW INDICATOR
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 4 Claims. (Cl. 123—41.15)

This invention generally relates to a marine engine such as an outboard motor or engine for use on a boat, and more particularly to an indicator for the cooling water system of such a marine engine.

The primary object of the invention is to provide a novel indicator for a marine engine so that a signal is actuated when the cooling water system is functioning properly and also a warning signal is actuated when the cooling system is not functioning properly so that damage to the engine due to lack of circulation of the proper amount of cooling water will be minimized or prevented.

A further object of the invention is to provide for a marine engine such as an outboard motor, a cooling water system indicator and wherein as long as the proper amount of cooling water is circulating through the engine, a light such as a green light will be on which will indicate to the operator of the boat that the engine cooling system is properly operating or functioning, and wherein when the cooling water fails to circulate for any reason whatsoever, then the green light will go off and a red light will go on so that the operator of the boat will know that the system is not functioning properly whereby the necessary corrective steps can be taken in order to prevent damage such as overheating to the engine, and wherein in such instances the present invention may be used to shut off the engine automatically in the event that the cooling water is not properly circulating.

Other objects of the present invention will reside in its simplicity of construction, ease of attachment, effectiveness for its particular purposes and its relatively inexpensive manufacturing cost.

These together with other objects and advantages which will become subsequently apparent resides in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a fragmentary side elevational view illustrating the cooling water indicator mechanism of the present invention mounted on a marine engine such as an outboard motor.

FIGURE 2 is an enlarged vertical sectional view taken through the indicator.

FIGURE 3 is a sectional view taken at right angles to the view shown in FIGURE 2.

FIGURE 4 is a fragmentary sectional view illustrating schematically the wiring diagram of the present invention.

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 2.

FIGURE 6 is a sectional view taken on the line 6—6 of FIGURE 3.

Referring in detail to the drawings, the numeral 10 indicates a conventional marine engine such as an outboard motor which may be connected to a boat in the usual manner, as for example by means of the clamp mechanism 22. The motor 10 is provided with the usual leg 11 as well as a cooling water outlet 12, FIGURE 1. According to the present invention there is provided an indicator 13 which is constructed or arranged so that the operator of the boat will have a visual warning or signal when the cooling water system is not functioning properly in order to insure that the engine or motor will not be damaged from overheating as for example due to lack of circulation of the cooling water.

As shown in the drawings, the indicator 13 comprises or includes a hollow housing 14 which may be fastened to the upper portion of the leg 11 as for example by means of securing elements 15. The top of the housing 5 is open as indicated by the numeral 16, and the bottom wall 17 of the housing is provided with an opening 18 therein, for a purpose to be later described. The numeral 19 indicates a drain pipe which is mounted below the opening 18, and the drain pipe 19 has a plate portion 10 20 which is affixed to the bottom wall 17 as for example by means of securing elements 21.

Mounted in the upper portion of the housing 14 is a filter member or screen 23 which is adapted to be retained in place by means of support members 24, FIG- 15 URES 2 and 3. The numeral 25 indicates a trough or wall member 25 which is arranged below the filter 23, and a fitting or pipe section 26 depends from the lower portion of the trough 25.

The numeral 27 indicates an axle or rod which is pivotally or rotatably supported as for example by means of bearings 28, and the bearings 28 are shown to comprise retainers 29 which have the material 30 therein for holding a suitable quantity of lubricant such as oil or grease, and inclined conduits 31 are connected to the retainers 29 whereby the lubricant can be introduced into the bearings, and caps 32 are releasably mounted on the upper ends of the conduits 31 so that by moving the caps 32 as for example from the position shown in FIGURE 2, the lubricant can be introduced into the upper ends of the conduits 31 so that this lubricant will flow down through the conduits 31 and into the bearings 28 in order to provide lubrication for the moving rod or axle 27.

The numeral 33 designates each of a pair of arms or bars which are suitably affixed to the rod 27, as for example by means of a set screw 40, FIGURE 3, and a counterweight or a weighted body member 34 is connected to the arms 33, as for example by means of a securing element 35. The numeral 36 indicates a hollow container or receptacle which is also secured to or formed integral with the arms 33, and the container 36 is arranged on the opposite side of the rod 27 from the counterweight 34.

The container 36 is arranged below the outlet pipe 26, and the upper portion of the container 36 is open, while the bottom of the container 36 is closed, and the bottom of the container 36 is shown provided with a plurality of apertures or openings 37. The container 36 includes a wall portion 39 which has its upper end recessed or cut-away as indicated by the numeral 38, so that at times the water can overflow through the cut-away portion 38 as for example as indicated by the arrows in FIGURE 2.

There is further provided an electrically actuated signal means which will provide a signal for the user or operator of the boat when the cooling water is properly circulating, and also the signal means will indicate to the user of the boat when the cooling water is not functioning or circulating properly. The numeral 41 indicates a cover or casing which is suitably affixed to the housing 14, as for example by means of securing elements 42, FIGURE 4. Arranged inside of the casing 41 is a pair of spaced apart terminals 43 and 44, and the numeral 45 indicates a movable bracket which is affixed to an end of the rod 27 as for example by means of a securing element or set screw 46. The bracket 45 is provided with a pair of spaced apart contacts 47 and 48 which are mounted for movement into and out of electrical engagement with the terminals 43 and 44. There is further provided an electrical circuit which includes conductors or wires 49 and 50 that are connected to the terminals 43 and 44, and the electrical also includes signal lights such as the green light 51 and the red light 52, and these lights may be arranged in

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a convenient location such as on the dash board of the boat or the like. The numeral 53 indicates a source of electrical energy such as the battery which is grounded as at 54, and the electrical circuit also includes a switch 55. As shown in FIGURE 4 a wire or conductor 56 is adapted to be connected to the magneto of the marine engine so that when the cooling water fails to circulate properly, the green light 51 will be turned off, automatically, and at the same time the red light 52 will be turned on automatically and due to the provision of the conductor 56, the conventional magneto of the outboard engine or motor will be grounded so as to automatically stop the engine whereby not only will a visual signal be provided to indicate that the cooling water is not circulating, but in addition the engine will be automatically stopped so as to insure that there will be no damage to the engine from overheating due to proper circulation of cooling water. The numeral 57 indicates a ground wire for the member 45.

From the foregoing, it is apparent that there has been provided a signal or indicating mechanism which is especially suitable for use in indicating the absence or circulation of fluid such as cooling water through an engine such as the outboard marine engine or motor 10. In use, with the parts arranged as shown in the drawings, it will be seen that with the engine 10 clamped onto a boat such as by means of the clamp 22, the usual pump will cause the cooling water to be circulated through the cooling passages in the engine as for example through the cooling passages which surround the cylinder walls and head, and after removing the heat, the water flows down the motor leg where it may mix with the exhaust gases and pass out the usual exhaust outlet. A small amount of the cooling water is permitted to run through the small hole or pipe 12 and various factors may cause the motor to run hot such as insufficient oil in the fuel, weeds over the inlet holes, or improper carburetor adjustments.

With the indicator 13 arranged as shown in FIGURE 1 for example, it will be seen that the housing 14 may be secured in place as for example by means of the securing elements 15 so that the water from the fitting or pipe 12 will discharge into the top of the housing 14 and this water will pass downwardly through the screen or filter 23 into the trough 25 and the water will then leave or discharge through the fitting 26 into the container 36. The container 36 is secured to or formed integral with the arms 33, and the arms 33 are fastened to the pivotally mounted rod or axle 27, and the counterweight 34 is also suitably affixed to the arms 33. The water in the container 36 is transferred to the housing 14 as later described in this application, and this fluid or water will then pass downwardly through the opening 18 and then out through the drain pipe 19 so that this water can be returned to the river, lake or other body of water in which the boat is operating.

It is to be noted with the parts arranged as shown in FIGURE 4, the engine is being provided with the proper amount of cooling water so that the weight of the water in the container 36 overcomes the weight of the member 34 and this condition means that the rod 27 and its associated parts will be urged in a clockwise direction, FIGURES 2 and 4, whereby the contact 48 will be in engagement with the terminal 44, and at the same time, the contact 47 will be out of engagement with the terminal 43. Thus, the electrical circuit to the green light 51 will be completed, but the electrical circuit to the red light 52 and the electrical circuit through the conductor 56 to the magneto will be disconnected. Thus, the operator of the boat will be able to observe the green light and know that the cooling system is functioning properly.

In the event that the cooling water stops circulating in the proper quantity for any reason whatsoever, the weight of the member 34 will overcome the weight of the container 36 so that the weight 34 will cause the rod to rock or pivot in a counter-clockwise direction, FIGURES 2

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and 4, so that the contact 48 will move out of engagement with the terminal 44, and at the same time the contact 47 will move into engagement with the terminal 43. This will cause the electrical circuit to the green light to be opened, and at the same time the electrical circuit to the red light 52 will be closed and thus the red warning light will provide an indication to the user of the boat that there is trouble in the cooling system so that the necessary corrective action can be taken in order to prevent damage to the engine due to overheating or lack of cooling water.

In certain instances the conductor or wire 56 can be utilized to automatically stop operation of the engine when the red light 52 is on so that not only will there be a visual indication of improper cooling water circulation, but also there is an automatic means for grounding the magneto in order to stop operation of the engine so that damage thereto will be prevented.

The bearings 28 which support the moving rod 27 are properly lubricated so that the rod 27 is free to turn and articulate the signal as previously described.

The parts can be made of any suitable material and in various forms, shapes or sizes.

The warning signal of the present invention has a simple and rugged construction which does not use any springs or floats and wherein there is only a minimum number of moving parts. The present invention is especially suitable as a marine engine water pump warning signal. The principles of the present invention are applicable to other types of fluid circulating systems. Primarily, the purpose of the present invention is to warn the operator of motor boats that the water is being pumped through the cooling system of the engine. The water in marine engines must be pumped from the water that the boat is moving in, and most marine engines have rubber water pumps which cool the engines going fast or slow, and as the rubber blades give in motion, they will pump sand, gravel, and vegetation that is in most bodies of water. The present invention captures the water after it has passed through the engine and if the water pump is working alright, the green light 51 remains on. If at any time the screen on the engine is stopped up or if the blades on the water pump are broken, then the water will stop going through the indicator 13, the cup or container 36 will drain, and the green light 51 will go off. Since the weight 34 is heavier than the container 36 when the container 36 is empty, the weight 34 will tip the bars 33 and container 36 and a red light 52 will come on which is only a few seconds after the pump stops so that the engine will never overheat and this is important since without water the engine could be damaged or even ruined.

The lights such as the lights 51 and 52 are adapted to be arranged in a convenient location such as on the dash-board and these lights are small candle power lights so that there will be no chance of the breaker points sticking closed or burning out, and they are on the ground side of the current and require very little amperage from the battery such as the battery 53. The screen 23 on the signal covers the entire top, and any foreign matter such as sand or the like which goes through the water pump will go through the signal device 13 since the openings or apertures 37 in the bottom of the cup or container 36 are larger than the openings in the screen mesh 23, and there is no chance of the openings stopping up. The drain holes or apertures 37 are smaller than the outlet water opening 12 on the motor so that the container 36 cannot drain as fast as the water falls into it. The container 36 fills and overflows through the cutaway portion 38 so as to bring the container 36 down which makes the green light points 48 and 44 engage or contact, and when the pump is not working or the motor is stopped, the water drains from the cup or container 36 and makes the weight 34 tip down so that the red light contact points 47 and 43 will be in engagement.

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with each other whereby the red light 52 will come on and warn the driver or operator of the boat.

On magneto ignition motors, the red light wire 50 is adapted to be electrically connected to the engine magneto by means of the wire 56 so that the magneto will be automatically grounded and wherein the motor will be stopped when the pump is not working. By providing the switch 55 in the electrical circuit and turning the switch 55 on after the motor is started and the water is going through the signal, the aforementioned operation can take place. The signal 13 can be mounted on a suitable location as for example it can be mounted on the engine 10 as shown in FIGURE 1 or else it can be arranged in different positions and since the signal has a minimum number of moving parts and since the signal is provided with the oil wick bearings 28, trouble free operation is assured.

The parts can be made economically from a suitable material such as sheet metal, aluminum, plastic or the like, and suitable types of holding clamps or brackets can be used for fastening the indicator to the marine engine or motor.

The position of the contacts 47 and 48 as well as the terminals 43 and 44 serve a dual purpose since they not only provide a means for opening and closing the electrical circuit to the lights, but they also act as stops to limit movement of the various elements or parts.

Thus, it will be seen that there has been provided a marine engine water pump warning signal which will warn the boat driver when the water pump is working properly or when the water pump is not working properly and the present invention is applicable to inboard as well as outboard marine engines or motors. The red and green lights may be arranged on the dashboard of the boat on electric models. When being used with manually operated engines having a magneto, the motor will be shut off when there is insufficient water circulating through the system. Thus, damage to motors will be prevented and also overheating or the like will be eliminated or prevented. The indicator can be mounted on the engine, in back of the boat, in the motor well on outboard boats or in any other suitable place. If desired suitable supply and drain lines or conduits can be extended from the motor to the indicator and by utilizing lights of small candle power, there will be little likelihood that the points will stick or burn out. The openings 37 are larger than the openings in the screen 23 so that sand, small gravel and the like that passes through the screen will pass through the openings 37 and out of the unit. Also, the size of the pipe or discharge fitting 12 is larger than the size of the plurality of openings 37 so that the water fills the container 36 which tips the bracket 45 to turn on the green light so that the driver will know that the motor is being provided with cooling water. This water will flow over the upper front portion 38 of the container 36 and into the housing 14 and then out through the discharge pipe 19. The lever or bracket 45 and the points or contacts 47 and 48 only travel a short distance. The sealed bearings are constructed so that water is prevented from entering the interior thereof and this is because the bucket overflow when the motor is stopped, the container 36 empties and the red light stays on until the switch 55 is turned off. When the motor is off, or when there is a bad pump, or when there is a stuffed hole from the motor, the red warning light comes on. The points also act as stops which make positive contact of the points so that the red and green lights will not flicker after they change. Suitable insulation such as insulation for the contacts can be used wherever desired or required. The plate 20 can be used as an inspection plate. The switch 55 may be arranged on the dash of the boat. The wire 57 is a small ground wire from the axle or rod 27 to the housing 14.

Minor changes in shape, size and rearrangement of

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details coming within the field of invention claimed may be resorted to in actual practice, if desired.

What is claimed is:

1. In a device of the character described, a marine engine of the type including a magneto, said engine having a cooling water fluid outlet, a housing for receiving water from said outlet, a filter embodying a reticulated screen in said housing, a trough positioned below said screen and said trough having a depending outlet fitting, a pivotally mounted rod having arms affixed thereto, a container connected to said arms and arranged on one side of the rod, a counterweight connected to said arms and arranged on the other side of the rod from said container, said container having apertures in its lower end, said housing having a drain pipe in the bottom thereof, electric signal means actuated by said rod, and conductor means for connection to the magneto actuated by said rod, there being a cutaway portion in the upper end of said container for the overflow of water, said cutaway portion being arranged below the rod so that bearings engaging the rod will not be contacted by the cooling water, the reticulated screen of the filter unit being of a mesh so that the openings in the screen are smaller than the size of the apertures in the bottom of the container, and wherein the apertures in the bottom of the container are smaller in size than the fluid outlet from the engine.

2. In a device of the character described, a marine engine including a motor provided with a leg, a cooling water outlet on said motor, an indicator including a hollow housing affixed to said leg, said housing having its upper end open and said housing adapted to receive water from said outlet, said housing including a bottom wall provided with an opening therein, a drain pipe mounted below said opening, a filter unit embodying a screen positioned in the upper portion of said housing, a trough arranged below said filter unit and said trough including a depending fitting for the passage therethrough of water, a horizontally disposed movable rod mounted in said housing, a pair of spaced apart arms connected to said rod, a weighted body member connected to the arms, a hollow container affixed to said arms, said container being positioned below the outlet fitting of said trough, there being a plurality of spaced apart apertures in the bottom of said container, there being a cutaway overflow portion in the upper end of said container, and electrically operated indicator means actuated by said rods.

3. In a device of the character described, a marine engine including a motor provided with a leg, a cooling water outlet on said motor, an indicator including a hollow housing affixed to said leg, said housing having its upper end open and said housing adapted to receive water from said outlet, said housing including a bottom wall provided with an opening therein, a drain pipe mounted below said opening, a filter unit embodying a screen positioned in the upper portion of said housing, a trough arranged below said filter unit and said trough including a depending fitting for the passage therethrough of water, a horizontally disposed movable rod mounted in said housing, a pair of spaced apart arms connected to said rod, a weighted body member connected to the arms, a hollow container affixed to said arms, said container being positioned below the outlet fitting of said trough, there being a plurality of spaced apart apertures in the bottom of said container, there being a cutaway overflow portion in the upper end of said container, and electrically operated indicator means actuated by said rods, said last named means comprising a casing affixed to said housing, an electrical circuit including a pair of spaced apart terminals arranged in said casing, a bracket connected to said rod and having a pair of contacts mounted for moving into and out of engagement with said terminals, signal lights of different colors electrically connected to said terminals, and said electrical circuit further including a source of electrical energy and a switch.

4. In a device of the character described, a marine engine including a motor provided with a leg, a cooling water outlet on said motor, an indicator including a hollow housing affixed to said leg, said housing having its upper end open and said housing adapted to receive water from said outlet, said housing including a bottom wall provided with an opening therein, a drain pipe mounted below said opening, a filter unit embodying a screen positioned in the upper portion of said housing, a trough arranged below said filter unit and said trough including a depending fitting for the passage therethrough of water, a horizontally disposed movable rod mounted in said housing, a pair of spaced apart arms connected to said rod, a weighted body member connected to the arms, a hollow container affixed to said arms, said container being positioned below the outlet fitting of said trough, there being a plurality of spaced apart apertures in the bottom

of said container, there being a cutaway overflow portion in the upper end of said container, and electrically operated indicator means actuated by said rods, said last named means comprising a casing affixed to said housing, an electrical circuit including a pair of spaced apart terminals arranged in said casing, a bracket connected to said rod and having a pair of contacts mounted for moving into and out of engagement with said terminals, signal lights of different colors electrically connected to said terminals, and said electrical circuit further including a source of electrical energy and a switch, and a conductor electrically connected to said circuit for connection to the magneto of the engine.

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