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FLOAT-TYPE MERCURY SWITCH WITH STABILIZING MEANS

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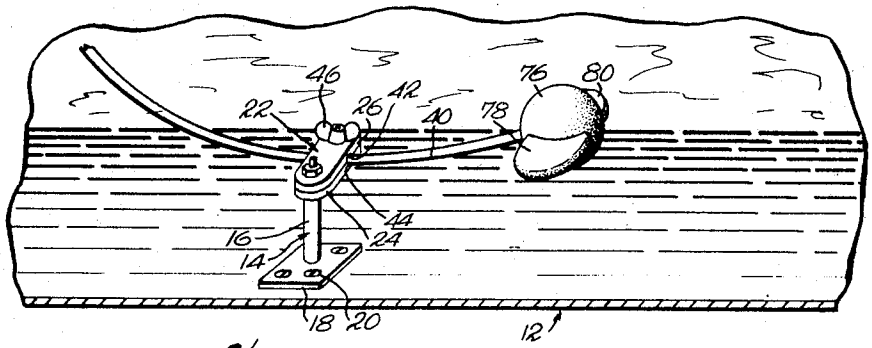


Fig. 1

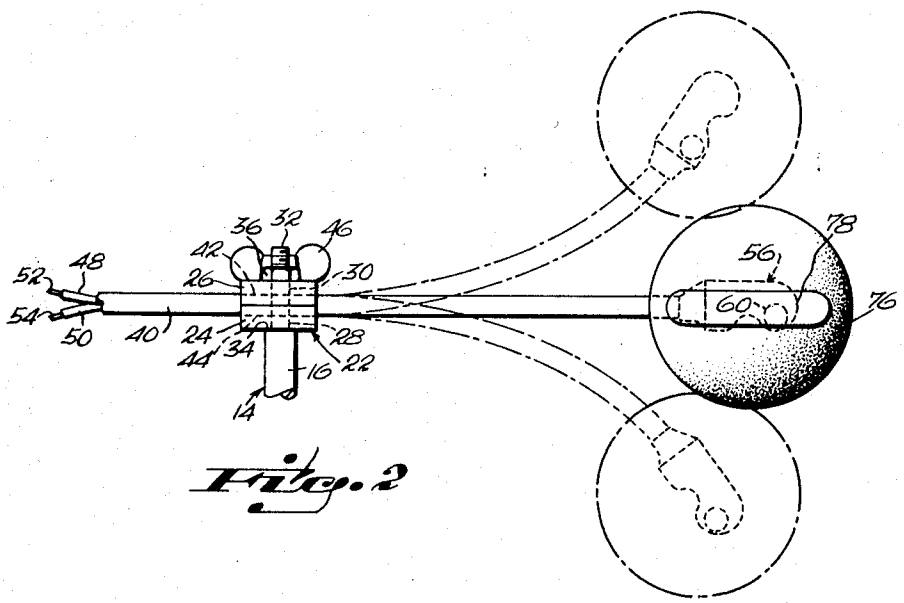


Fig. 2

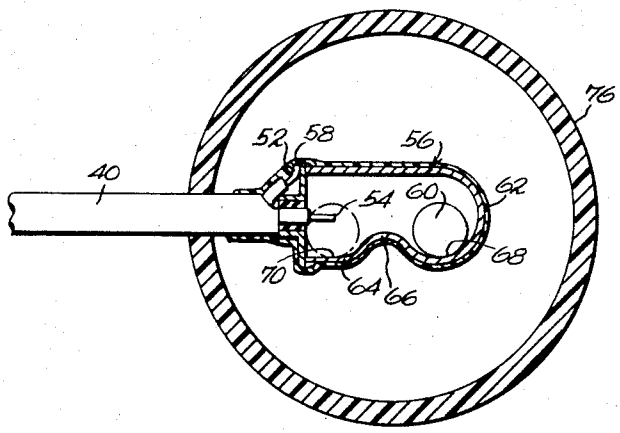


Fig. 3

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FLOAT-TYPE MERCURY SWITCH WITH STABILIZING MEANS

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ABSTRACT OF THE DISCLOSURE

A floatable mercury switch particularly adapted for use in a ship's bilge, or the like, adjustably suspended from a support by a flexible cable; the switch being enclosed in a spherical float including opposed, antipodal stabilizing wings to maintain the switch stable despite wave movement.

This invention relates to an automatic float type switch and, more particularly, to a mercury type switch carried by a float at the distal end of a length of a flexible cable supported intermediate its length on a standard which is adapted to interrupt or permit passage of current flow to a pump or the like depending upon the position of the switch.

As is perhaps well known, it is quite often required to have a switch which will automatically control the operation of a pump such as in the hull of a ship. The present invention relates to such a switch. It is an obect of this invention to provide an automatic float type switch which includes a flexible conductor including a first and a second separated conductive path closely adacent one another which are supported on a standard which is adjustable axially of the conductors and with a float type switch arranged on the distal end of the conductors with the switch being adapted as is described hereinafter to alternatively permit current flow in the conductors or to interrupt the current flow.

It is another object of this invention to provide an automatic float type switch including a standard, a length of flexible twin wire cable having a mercury switch at the distal end of the cable connected to the wires to either prohibit or permit current flow through the cable depending upon the attitude of the mercury switch and a float on the mercury switch to move the same and change the attitude of the switch in response to upward or downward movement of the float as by a variable water level in a bilge of a ship to thereby regulate the operation of a bilge pump.

It is another object of this invention to provide an automatic float type switch which includes a twin wire suspension adjustably arranged with respect to a standard which is simple in construction, includes no parts which are easily corroded and which is inexpensive and can be easily replaced when worn.

In accordance with these and other objects which will become apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings illustrating a preferred embodiment thereof.

In the drawings:

FIGURE 1 is a partial perspective view to illustrate the arrangement of the standard, flexible conductor and float type switch of the instant invention;

FIGURE 2 is a side elevation view of the instant invention and illustrating the details thereof; and

FIGURE 3 is a side elevation view substantially in cross section taken along the vertical medial plane of the float portion of FIGURE 2.

Referring to the drawings, wherein like reference characters designate like or corresponding parts throughout the different views, and referring particularly to FIGURE

1, the numeral 12 generally designates the hull of a ship on which there rests a standard 14 which in the embodiment shown includes an upright member 16 with a lower footed portion 18 which is adapted as by the screws 20 to be mounted to the hull or base or other support 12. To the upper end of the upright member 16 a clamp 22 is provided which, as is seen in FIGURES 1 and 2, includes a first and a second member 24 and 26, each of which are provided with aligned through bores 28 and 30 to accommodate a terminal portion of the upright member of reduced diameter 32 defining a support shoulder 34 for the member 24 and adapted to accommodate a nut 36 in threaded engagement with the terminal end of the upright member for purposes of applying forces to hold the members in close clamping engagement with a flexible cable 40 supported in two semicircular recesses 42 and 44 with one of the recesses being in each of the members. A wing nut 46 may also be provided to engage a stud to assist in the clamping action.

The cable 40, as will be seen in FIGURE 2, includes a first and a second insulated conductor 48 and 50 in which there is a conductor wire 52 and 54. One of the conductor wires 54, it will be seen on reference to FIGURE 3, extends into a switch body 56 in a generally axial fashion. The other of the conductor wires 52 extends into electrical engagement as at 58 with the switch body 56. It is noted that the end of the conductor 54 is held in insulated relation with respect to the switch body. Captivated within the switch body there is a movable mercury sphere 60 and it will be seen on reference to FIGURE 3 that the switch body 56 is provided with an insulating jacket 62 and that the lower face 64 of the generally bullet-shaped switch body 58 which is hollow is provided with a raised portion 66 to define an outer and an inner mercury nests 68 and 70. The mercury sphere is sized such that when in the inner nest 70 and the body is in the attitude shown in FIGURE 3, the terminal end of the wire 54 is spaced from the housing body such that the wire 54 is in electrical engagement with the switch body. It is thus seen that by reason of this arrangement, current flow in the wire 54 will, when the switch is in the attitude shown in FIGURE 3, be permitted to flow through the mercury, which is in effect the switch arm, through the switch body which is of conductive material and thence through the wire 52 to complete a circuit and signal a pump to turn on. On the other hand, when the mercury is in the forward nest designated by the numeral 68, current will not be permitted to flow between the wires 52 and 54 and, consequently, power will be interrupted to a current responsive member which is electrically connected to the said wires. In surrounding relation of the switch and the end of the cable 40 a float 76 is provided which may be provided with stabilizing fins 78 and 80, each projecting in diametrical relation from antipodal points outwardly to stabilize the float body 76 and to maintain the lower face 64 such that the nests are generally in the relation shown in FIGURE 3 in contrast with the two alternative dotted line positions shown in FIGURE 2. Preferably, the float is of polystyrene material which is non-corrosive and which is light, yet highly buoyant.

The operation of the instant device will be apparent upon reference to FIGURE 2. When the float is in relatively deep water the float will raise the switch body up and permit the mercury to move into the inside nest and close the circuit to permit current flow to a pump and, thereafter, as the pump operates and, consequently, the water level drops, the float will descend into the attitude shown in the lower dotted line position of FIGURE 2, at which time the mercury sphere will move into the outer nest position 68 shutting off the power or current flow to the pump. It will be apparent, further, that the

length of cable or the throw of the switch between the float and the standard may be adjusted by unloosening the wing nut **46** and drawing additional cable through the clamp. It will thus be apparent that the instant invention provides an inexpensive and simple on-off switch for use such as by marine pumps which is relatively fool-proof in operation for a single pole switch and the throw of the switch may be adjusted merely by adjustment of the clamp portion of the standard along the cable. The stabilizing wings which preferably encapsulate the switch maintain the switch body in the correct orientation at all times and by the application of an indicia to the exterior north pole of the float, assuming it is generally spherical, the arrangement of the switch and the correct installation thereof will be relatively simple and informs a user of the location of the indent which separates the nests. Further, it will be apparent that the mechanical linkages of prior art devices, such as pins, hinges and the like, are eliminated and are not included in this invention and the device is unaffected by factors tending to cause corrosion, and inasmuch as adjustment is required, the same can be readily achieved by relative movement of the cable with respect to the clamp of the standard.

While the instant invention has been shown and described herein in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is therefore not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent apparatus and articles.

What is claimed is:

1. An automatic float type switch including: a standard, a length of flexible twin wire cable with the wires in insulated relation with respect to one another, a mercury switch at the distal end of the cable and connected between said wires to close or open to permit or prohibit current flow through the wires of the cable depending upon the attitude of the switch, and a float on the mercury switch so that the mercury switch is adapted to move and change the attitude of the switch in response to upward or downward movement of the float, and means to connect the cable to the standard, said mercury switch including an exteriorly insulated conductive body having a mercury glob therein and a first and a second spaced nest captivated therein, said first nest being adjacent the connection to one of the wires of said cable at an exposed point thereof, and said second nest being outwardly of said connection, and one of said wires extending into said first nest with a portion of the extension of the wire being substantially closer to the said body such that the distance between the exposed part of the wire and the said body is less than the span of the glob when in the first nest so that current will be permitted to flow between the wire and the body, and the other wire being electrically in contact with the body, said nests being separated by a raised portion such that the glob will be traveled from nest to nest depending upon the attitude of the body, said float being spherical and including stabilizer means comprising antipodal wings on said spherical float, said wings being in a common plane which is perpendicular to a medial plane through both the nests.

2. A device as set forth in claim **1** wherein said standard includes a foot adapted to be mounted to a surface and a clamp to hold the cable intermediate its length.

3. A device as set forth in claim **2** wherein adjusting means are provided to adjust the grip of the clamp and to vary the portion of said length between the standard and the float.

4. A device as set forth in claim **1** wherein said float is of polystyrene material.

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