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FLOAT-ACTUATED ELECTRIC SWITCHES

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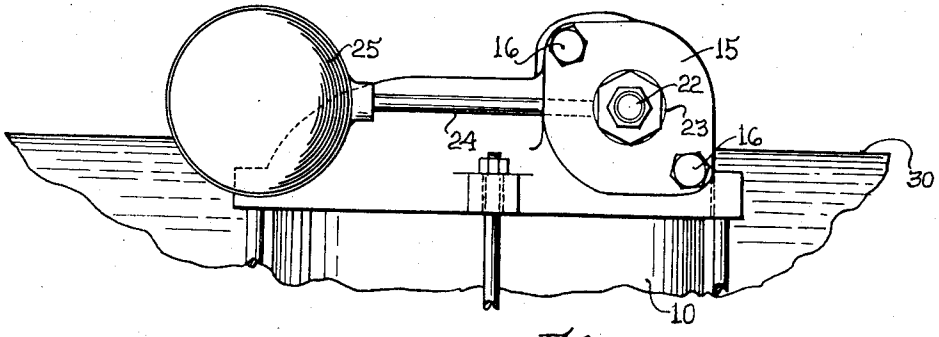


Fig. 1.

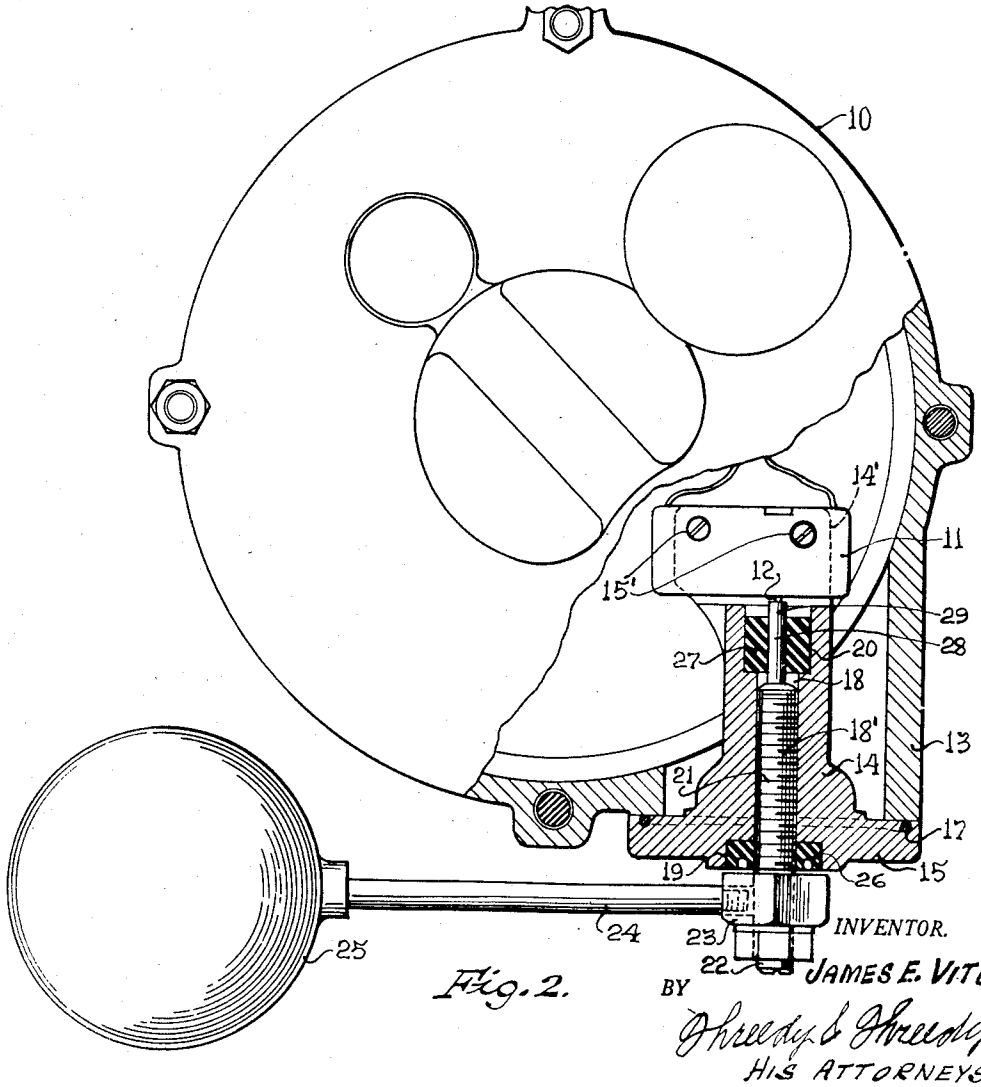


Fig. 2.

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FLOAT-ACTUATED ELECTRIC SWITCHES

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This invention relates to float-actuated electric switches and has for its principal object the provision of an improved construction of the character hereinafter described which will be highly efficient in use and economical in manufacture.

An equally important object of the invention is to provide an actuator member for the switch, which member is rotatable and longitudinally movable by the movement of a float, the latter moved upon the rise and fall of the liquid level within a vessel or container or the like.

Still another object is the provision for effectively sealing the switch-actuating member within a housing by a flexible material, resulting in a permanent seal, thereby to prevent any liquid passing into the housing containing the switch contacts and which sealing will not interfere with the dual movement of the switch-actuating member.

Another and equally important object of the invention is found in the simplicity of arrangement of the parts; the provision of mechanism for actuating an electric switch which by reason of its simplicity may be manufactured at an economical cost.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

Fig. 1 is a side elevational view of a submerged pump or other like mechanism, showing my invention associated therewith;

Fig. 2 is a top plan view of the same with the parts thereof shown partly in section.

While my improved float-actuated electric switch may be adaptable for many different applications, I have shown the same associated with a sump pump **10**, the electrical mechanism of which includes a power circuit in which the switch **11** is associated. The switch **11** is of a well-known type and construction wherein by the slightest movement of the plunger **12** of the switch, the switch will be effective to make or break the main circuit to the pump.

Associated with the housing **13** of the pump **10**, I provide a shaft housing **14** which in turn is provided with a flange **15** secured in any suitable manner, as by means of bolts **16**, to the housing **13** and sealed therewith by means of a suitable sealing ring **17** of compressible material. The shaft housing **14** has a mounting plate **14'** at its inner end portion. Mounted on this plate **14'** and secured thereto by means of screws **15'** is the switch **11**.

The shaft housing **14** has formed therein a longitudinal bore **18**, the outer end of which terminates into a counterbore **19**, and the inner end of which terminates into an enlarged counterbore **20**.

The shaft **18'** has a threaded body portion **21**, the threads of which operatively engage in the threaded portion of the bore **18**. The exterior end portion **22** of the shaft **18'** has secured thereto a connector **23** to which a rod **24** is connected. The rod **24** carries a float or other buoyant device **25**. Within the counterbore **19** is firmly pressed a sealing ring **26** of suitable material which will provide an effective seal between the shaft housing **14** and the shaft **18'** at its outer end portion.

Within the counterbore **20** is mounted a similar sealing ring or sleeve **27**. The shaft **18'** at its inner end portion has an integral reduced stud **28** which projects through the sleeve **27** with its end portion **29** in engagement with the plunger **12** of the switch **11**.

As the liquid level **30** rises within the tank or other vessel within which the sump pump **10** is located, the buoyant action of the float **25** will rotate the shaft **18'** in a clockwise direction as viewed in Fig. 1. Inasmuch as the shaft **18'** has threaded engagement with the thread-bearing portion of the shaft housing **14**, the shaft **18'** by reason of being rotated, will be moved longitudinally with respect to the shaft housing **14**, to bear the stud **28** against the plunger **12** to actuate the switch **11**. The shaft **18'** will move in an opposite longitudinal direction when the surface **30** of the liquid within the vessel or other container lowers, at which time the shaft **18'** will be rotated in a direction to move the stud shaft **28** from bearing engagement with the plunger **12** to actuate the switch **11** in an opposite direction.

It is desirable that the sleeve **27** and ring **26** be formed of a flexible material such that while an effective seal is provided, it will permit the shaft **18'** to be rotated and moved longitudinally with respect to the shaft housing **14**, without in any way breaking the sealing engagement or contact with the shaft **18'**.

The connector **23** and rod **24** may be related to each other in any manner such that the rod **24** can be extended at an angle with respect to the connector **23** to accommodate mounting the float-actuating mechanism within a vessel or container which is cylindrical in cross section.

From the foregoing description, it is apparent that I have provided a float-actuated switch which is relatively simple in structure and which because of the novel relationship of the elements accomplishes its intended result with a high degree of efficiency, in that the shaft **18'** need only be moved longitudinally of the shaft housing **14** to effect opening and closing of the switch **11**.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patents is:

1. A float-actuated mechanism for actuating a switch in which the switch is provided with a plunger, a housing having a longitudinal bore formed therein, means for mounting the switch at one end of the housing with the plunger thereof in alignment with the long axis of the bore, a shaft mounted for rotation and longitudinal movement within the bore, a float arm, means for connecting one end portion of the float arm to the shaft, and a buoyant member at the opposite end of said float arm responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger.

2. A float-actuated mechanism for actuating a switch in which the switch is provided with a plunger, a shaft housing having a longitudinal bore formed therein and having at one end portion a mounting for the switch with the plunger of the switch in alignment with the long

axis of the bore, a shaft rotatably and longitudinally mounted in said bore in engagement with said plunger, said shaft having an end portion extending exteriorly of the housing, a connector on the outer end portion of the shaft, a float arm carried by said connector, and a buoyant member at the outer end portion of the shaft responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger.

3. A float-actuated mechanism for actuating a switch in which the switch is provided with a plunger, a housing having a longitudinal bore formed therein, means for mounting the switch at one end of the housing with the plunger thereof in alignment with the long axis of the bore, a shaft mounted for rotation and longitudinal movement within the bore, a float arm, means for connecting one end portion of the float arm to the shaft, and a buoyant member at the opposite end of said float arm, said bore at its opposite end portions terminating into counterbores, and flexible sealing members mounted in said counterbores in embracing relation with respect to said shaft responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger.

4. A float-actuating mechanism for actuating a switch in which the switch is provided with a plunger, a shaft housing having a longitudinal bore formed therein and having at one end portion a mounting for the switch with the plunger of the switch in alignment with the long axis of the bore, a shaft rotatably and longitudinally mounted in said bore in engagement with said plunger, said shaft having an end portion extending exteriorly of the housing, a connector on the outer end portion of the shaft, a float arm carried by said connector, a buoyant member at the outer end portion of the shaft responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger, said bore at its opposite end portions terminating into counterbores, and flexible sealing members mounted in said counterbores in embracing relation with respect to said shaft.

5. A float-actuated mechanism for actuating a switch in which the switch is provided with a plunger, a housing having a longitudinal bore formed therein, means for mounting the switch at one end of the housing with the plunger thereof in alignment with the long axis of the bore, a shaft mounted for rotation and longitudinal movement within the bore, a float arm, means for connecting one end portion of the float arm to the shaft, a buoyant member at the opposite end of said float arm responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger, said shaft having at its inner end portion a stud shaft, the end of which has bearing engagement with the plunger of said switch.

6. A float-actuated mechanism for actuating a switch in which the switch is provided with a plunger, a shaft housing having a longitudinal bore formed therein and having at one end portion a mounting for the switch with the plunger of the switch in alignment with the long axis of the bore, a shaft rotatably and longitudinally mounted in said bore in engagement with said plunger, said shaft having an end portion extending exteriorly of the housing, a connector on the outer end portion of the shaft, a float arm carried by said connector, a buoyant member at the outer end portion of the shaft responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger, said shaft having at its inner end portion a stud shaft, the end of which has bearing engagement with the plunger of said switch.

7. A float-actuated mechanism for actuating a switch in which the switch is provided with a plunger, a housing having a longitudinal bore formed therein, means for mounting the switch at one end of the housing with the plunger thereof in alignment with the long axis of the bore, a shaft mounted for rotation and longitudinal movement within the bore, a float arm, means for connecting one end portion of the float arm to the shaft, a buoyant member at the opposite end of said float arm responsive to a fluid level so as to move through a circular arm causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger, said bore at its opposite end portions terminating into counterbores, flexible sealing members mounted in said counterbores in embracing relation with respect to said shaft, said shaft having at its inner end portion a stud shaft, the end of which has bearing engagement with the plunger of said switch.

8. A float-actuating mechanism for actuating a switch in which the switch is provided with a plunger, a shaft housing having a longitudinal bore formed therein and having at one end portion a mounting for the switch with the plunger of the switch in alignment with the long axis of the bore, a shaft rotatably and longitudinally mounted in said bore in engagement with said plunger, said shaft having an end portion extending exteriorly of the housing, a connector on the outer end portion of the shaft, a float arm carried by said connector, a buoyant member at the outer end portion of the shaft responsive to a fluid level so as to move through a circular arc causing said shaft to be rotated and threadably moved longitudinally of said bore to actuate said switch plunger, said bore at its opposite end portions terminating into counterbores, and flexible sealing members mounted in said counterbores in embracing relation with respect to said shaft.

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