

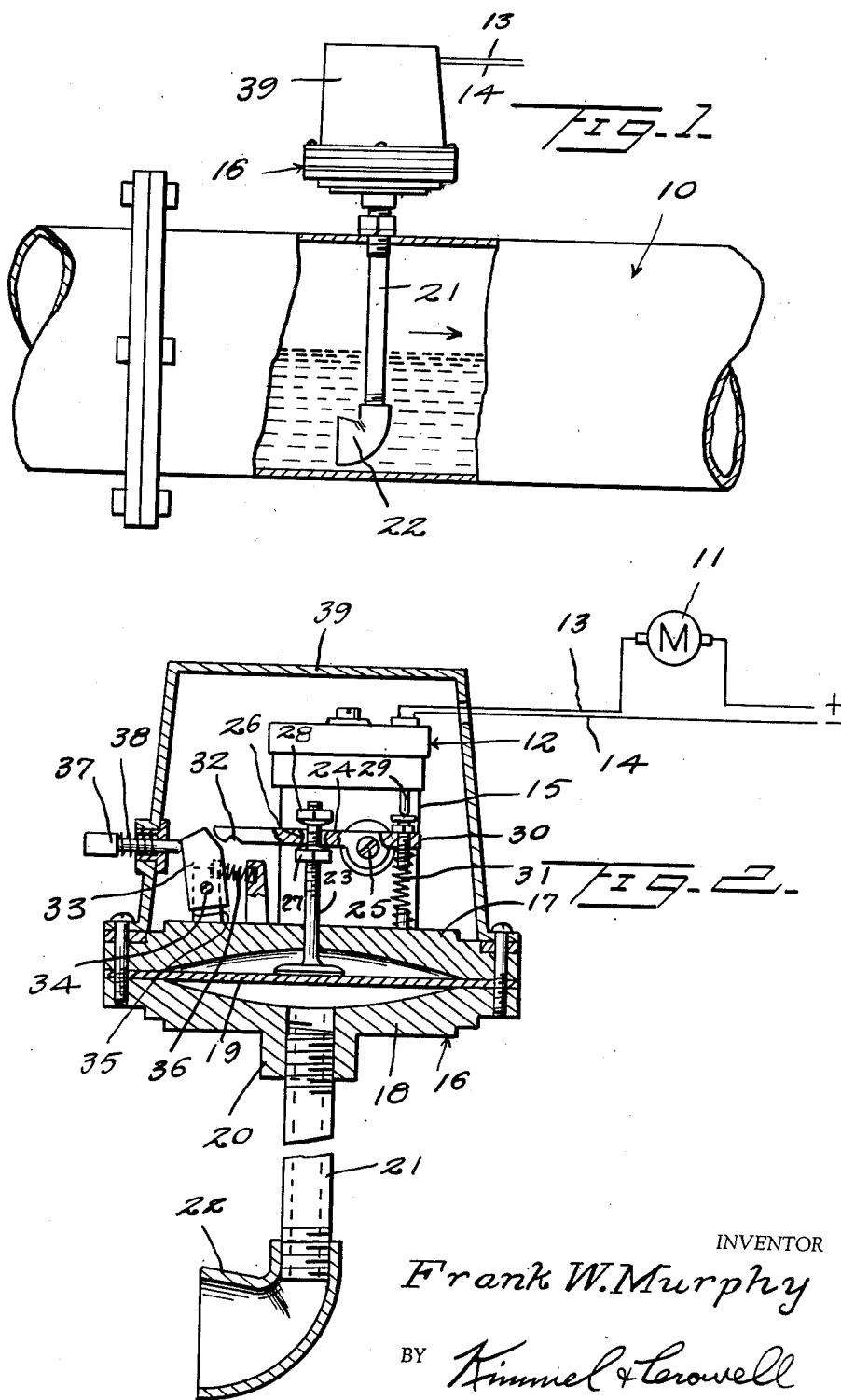
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SAFETY SWITCH

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SAFETY SWITCH

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1 Claim. (Cl. 200—83)

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This invention relates to a safety switch for use in controlling the operator for a pump.

In a well pump, such as a pump for irrigation systems or the like, where a substantial drop occurs in the water supply which results in the pump running without drawing any water, considerable damage may result in the pumping apparatus before the pump is shut down. It is, therefore, an object of this invention to provide an electrical switch connected to the pump operator which under normal pumping conditions will be in circuit closing condition. The switch embodied in this invention is such that if the volume of water being pumped should drop below a safe margin, the operator will be stopped so that no damage will result to the equipment.

Another object of this invention is to provide a safety switch structure which can be initially set so as to start the pump operator in operation, and after the pump has been in normal operation the manual setting will be released so that continued operation of the pump will be under automatic safety conditions.

With the above and other objects in view, my invention consists in the arrangement, combination and details of construction disclosed in the drawings and specification, and then more particularly pointed out in the appended claim.

In the drawings:

Figure 1 is a detailed side elevation of a safety switch constructed according to an embodiment of this invention mounted on a water pipe or duct for controlling the pump operator connected with the duct.

Figure 2 is a vertical section of the switch or regulator for the operator.

Referring to the drawings, the numeral 10 designates generally a pipe or duct which is connected between a pump and a well or water supply wherein the pump is operated by means of an operator 11 which may be an electric motor, or other operator.

In order to provide a means whereby the operator 11 will be stopped when the water in the pipe or duct 10 drops either below a predetermined level or becomes dry, I have provided a spring-pressed switch 12 which is interposed in the conductors 13 and 14 connected with the operator 11.

The switch 12 is spring-pressed to a normal circuit closing position so that the operator 11 may operate the pump for drawing water through the pipe or duct 10. The switch 12 is carried by a support 15 which extends upwardly from a diaphragm housing generally designated as 16.

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The diaphragm housing 16 includes upper and lower housing members 17 and 18, with a flexible diaphragm 19 secured between the housing members 17 and 18. The lower housing member 18 is formed with a boss 20, and the upper end of a pipe 21 is secured in the boss 20.

A scoop 22 is threaded onto the lower end of the pipe 21 and the scoop 22 is mounted in opposed relation to the direction of movement of the water in the pipe 10 so that as the water moves to the right, as viewed in Figure 1, the water will enter the scoop 22 and rise upwardly in the pipe 21 so as to thereby place the trapped air in pipe 21 and in the space below the diaphragm 19 under sufficient pressure so as to flex diaphragm 19 upwardly.

A lever operating rod 23 is secured at its lower end to the diaphragm 19 and slidably engages through the upper housing member 17. A switch operating lever 24 is rockably mounted on a pivot 25 and is formed with an opening 26, through which the rod or bolt 23 loosely engages.

A pair of nuts 27 and 28 are threaded onto the bolt or rod 23 on the lower and upper sides of the lever 24 so that the lever 24 may be regulated as to its movement according to the movement of diaphragm 19 and bolt 23. Switch 12 includes a downwardly projecting switch button 29 disposed in the path of the rocking movement of the short lever arm 30 of lever 24.

A spring 31 is interposed between the lever arm 30 and the upper housing member 17 so as to constantly urge arm 30 upwardly to circuit breaking position, with arm 30 pushing button 29 upwardly. The outer end of lever 24 is formed with a keeper notch 32, within which a manually adjustable latch member 33 is adapted to initially engage.

The latch member 33 is mounted on a pivot 34 extending between a pair of upstanding ears 35 carried by the upper housing member 17, and a spring 36 constantly urges the latch member 33 outwardly to released position. A latch operating pin 37, which is spring-pressed outwardly by means of a spring 38, is carried by a hood or cover 39 and is adapted to be manually pushed inwardly for rocking latch member 33 inwardly to engagement with the keeper 32.

When latch member 33 is engaged with keeper 32, lever 24 will be rocked upwardly on its long end and short lever arm 30 will be rocked downwardly so that the switch button 29 may move downwardly to circuit closing position. At this time, pump operator 11 may be operated in the normal manner, and after a flow of water has

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been established in pipe 10 so that pressure in pipe 21 will flex diaphragm 19 upwardly, lever 24 will be raised upwardly by flexing of diaphragm 19 and latch member 33 will be released from keeper 32 so that continued operation of operator 11 will be under safety conditions.

In the event, after initial starting of operator 11, the flow of water in pipe 10 should be stopped, diaphragm 19 will be released from air pressure on the lower side thereof and will flex downwardly and, in addition, spring 31 will swing short lever arm 30 upwardly to engage switch button 29 and move switch 12 to a circuit breaking position.

With a safety switch as hereinbefore described the switch may be mounted at any point in the water duct, such as an irrigation canal or the like, and if the water should be exhausted in the canal or duct, the pump which is connected with the canal will be promptly stopped so that the pump will not be damaged by dry operation.

I do not mean to confine myself to the exact details of construction herein disclosed, but claim all variations falling within the purview of the appended claim.

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A safety switch for a pump operator which includes a liquid duct, a vertical pipe projecting into said duct, and a scoop at the lower end of said pipe; said switch comprising a diaphragm housing at the upper end of said pipe, a flexible diaphragm in said housing, a normally closed switch carried by said housing, a spring-pressed lever rockably carried by said housing and constantly urging said switch to circuit breaking position, releasable latch means for holding said lever disengaged from said switch, and means connected with said diaphragm and engageable with said lever to effect release of said latch means by presence of a predetermined liquid level in said duct.

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