

UNITED STATES PATENT OFFICE.

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FLUID-CONTROLLING DEVICE.

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To all whom it may concern:

Be it known I, EDWARD J. DE VILLE, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Fluid-Controlling Devices, of which the following is a specification.

My invention relates to improvements in a mechanism for controlling a pumping system of the character in which an electric switch is employed for making and breaking a circuit to an electric motor which operates the pump, with provision for opening and closing the switch by the pressure of the fluid in the system. My invention relates more particularly to an improved valve which permits the fluid to flow to or from a chamber containing a diaphragm which is operatively connected with the switch mechanism.

Heretofore, in mechanism of this character, it has been usual to employ a nozzle with a small aperture which is in communication with the fluid of the pumping system and through which the fluid flows to the chamber containing the diaphragm. Difficulty has been experienced with such a nozzle due to the fact, first, that it is apt to become clogged, thereby preventing the operation of the switch devices, and, second, because of the fact that the fluid which flows through it is subject to the pulsations of the fluid in the system due to the pumping action, which imparts like pulsations to the diaphragm and to the switch operating devices, causing considerable wear upon the parts.

The object of my invention is to provide a form of inlet for the fluid into the diaphragm chamber which obviates all danger of clogging and also which permits the fluid to flow into the chamber in a uniform manner and thereby eliminates any tendency of the diaphragm to vibrate under the action of the fluid.

In the accompanying drawings:—

Fig. 1 is a vertical section of an electrical switch and the devices for operating the same from the fluid pressure.

Fig. 2 is a plan view of my improved fluid inlet.

Fig. 3 is a similar view of the same showing a slight modification.

Fig. 4 is a top plan view of an inlet showing a further modification.

Fig. 5 is a side view of the same.

Referring to the drawings, 1 represents a base plate upon which the operating parts for the switch are supported, a casing 2 being preferably provided to enclose the parts. Secured to the under side of the base-plate 1 is the annular flange 3' of a threaded nipple 3, which nipple may be threaded at any suitable point into one of the pipes of the pumping system. Clamped between the base 1 and the flange 3' is a flexible diaphragm 4 of any suitable material, preferably leather or rubber, and above and below this diaphragm the base and nipple are dished out to form a chamber 6 with which the opening 7 through the nipple communicates. A stem 8, provided with an annular flange 9 located in an opening in the base plate for guiding purposes, has at its lower end an annular plate 10 which bears against the diaphragm. A spring 11, interposed between a bridge piece 12, through which the upper end of the stem loosely extends, and a collar 13 secured to the lower end of the stem, normally forces the stem and the plate 10 downwardly against the diaphragm. A bell-crank lever is pivoted on the base at 14, with a short arm 15 pivotally connected to the stem and a long arm 16 pivotally connected to the short arm 17 of a second bell crank lever, which is pivotally supported in the upper end of the casing. The long arm 18 of this second bell crank lever is linked to a lever 19 with a coil spring 20 interposed in the link connection. The lever 19 carries an arm 21 having a contact 22 at its lower end which co-operates with a second contact 23 secured to the supporting post 24: these contacts being in the circuit of the electric motor which operates the pump.

The pressure of the fluid in the chamber 6 forces the stem 8 upwardly so as to rock the parts to the position shown in Fig. 1 and thereby open the switch, and the spring 11, when the fluid pressure drops, forces the stem downwardly so as to cause the connections described to close the switch. This mechanism is well known and it is thought needs no further description.

My improvement consists in the form of inlet valve which admits the fluid to the

chamber 6 through the nipple 3. It consists of a disk 25 held against a shoulder in the nipple by a bushing 26 which may be pressed in with a tight fit. As shown in 5 Fig. 2 this disk is provided with cross cuts meeting at the center of the disk so as to provide a series of four imperforated V-shaped tongues 27 whose apexes will be the center of the disk. A small aperture 28 may 10 be formed at the center of the disk as shown in Fig. 3, and also if desired two or more disks may be laid upon each other with the cross cuts out of registry as indicated in Figs. 4 and 5.

15 The disk is of resilient material, preferably thin sheet metal, and the spaces between the tongues formed by the cross-cuts are ordinarily sufficient to permit the fluid to pass into and out of the chamber. In 20 the event, however, that these cuts should become clogged the pressure of the fluid will spring the tongues sufficiently to open up larger spaces between the adjacent edges and thereby permit the passage of the fluid 25 into the chamber, thus obviating all danger of the switch mechanism failing to operate to open the switch when the pressure in the system has reached its normal maximum point. This form of inlet also causes the 30 fluid to flow into the chamber under pressure in a uniform, steady manner so that the fluid in the chamber will not be sub-

jected to the pulsations of the fluid in the system due to the pumping action, thereby causing the diaphragm to exert a uniform, 35 steady pressure upon the operating parts of the switch, eliminating undue wear upon the parts. By reason of the imperforated character of the tongues the tendency of the pulsating fluid pressure thereon is to cause 40 slight vibrations of the tongues, thus tending to render them self-clearing by dislodging any dirt which accumulates in the space between the same.

Having thus described my invention, I 45 claim:—

In a device of the character described, the combination with a fluid chamber, a diaphragm in said chamber, actuating devices connected to said diaphragm, an inlet 50 to said chamber whereby the fluid will operate said diaphragm and actuating devices, a valve controlling said inlet consisting of an insertable disk having a plurality of imperforated spring tongues free 55 to be vibrated by the abnormal pressure of the fluid.

In testimony whereof, I have hereunto set my hand this 26th day of August, 1920.

EDWARD J. DE VILLE.

Witnesses:

T. M. DE WITT,
E. H. BESCHER.