

UNITED STATES PATENT OFFICE.

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PUMP-CONTROLLER.

SPECIFICATION forming part of Letters Patent No. 764,852, dated July 12, 1904.

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To all whom it may concern:

Be it known that I, WILLIAM F. IRISH, a citizen of the United States, residing at East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Pump-Controllers, of which the following specification and accompanying drawings illustrate one form of the invention which I now regard as the best out of the various forms in which the invention may be embodied.

My invention relates to pump-controllers; and it consists of apparatus whereby the control of the circulation accomplished by the pump is suitably effected.

In the drawings, Figure 1 is an elevation, partly in section, of a system embodying one form of the invention. Fig. 2 is a vertical section of a part of the apparatus. Fig. 3 is a side elevation of the adjacent part in Fig. 2, and Fig. 4 is an interior view of the adjacent part in Fig. 3.

The general operation of the illustrated apparatus is as follows: The parts are shown as having moved to such relative positions that the electric motor M is ready to operate the pump P to draw the fluid from the source through the pipe S and force it through the pipe I into the storage-receptacle R. In this situation the pressure in the pipe S will force the fluid up through the branch pipe N, valve V, and pipe N' and into the cylinder T and raise the piston O far enough up to close the motor-switch W, then the motor M will operate to drive the pump P and force the fluid up through the pipe I; but even with the valve V in the position shown the motor-switch W cannot close the motor-circuit unless there is pressure in the pipe S. The raising of the piston O also operates to cut the resistances r successively out of the circuit of the motor-armature as the motor speeds up. It will be understood that S represents a pipe in which there is a maintained pressure that is not affected by the suction of the pump. For instance, it is especially intended to represent a house-pipe leading from a street water-main, wherein the pressure is maintained, but is not of sufficient power to lift the water to the tank or to maintain an adequate or constant pres-

sure at the tank-level. This is a common situation in cities where the buildings are high or the pressure on the water-mains too low or inconstant to give the desired pressure at the level of the tank. By my system the water-supply of the building is rendered independent of the pressure on the mains, and it has been practically used with this result. When there has been enough fluid pumped to raise the level in the receptacle R to a predetermined degree, the float C operates an electric switch in the box B. This energizes the electromagnet G, which thereupon pulls up the valve V, stopping the flow of fluid from the source of supply through the pipe N toward cylinder T. The raising of the valve V also brings the cut-away portion V' up opposite the opening in the pipe N' and permits the fluid in the cylinder T to flow out into the waste-pipe Y. The piston O will then descend by gravity, assisted by the weights Z, and open the motor-circuit. When for any reason the level of the fluid in the receptacle R is lowered to a predetermined degree, the float C operates the electric contacts in the box B to energize the electromagnet G', which thereupon serves to draw down the valve V to permit the fluid to flow from the pipe S through the pipes N N' to the cylinder T, as aforesaid.

The generic invention may be embodied in other forms than the one illustrated herein.

The specific construction and arrangement of the parts shown in the drawings are as follows:

The electric motor M is shunt-wound. A hand-switch 1 may be employed to connect the system with the mains L L'. The main L is connected directly to a terminal at the motor. The main L' is connected, through the switch W, to the field of the motor at F and is connected, through the switches W and Q, to the motor-armature at A. The switch-piece Q is connected to the rod of the piston O, so that when the latter is raised by the fluid to close the motor-switch W the resistances r will be successively cut out of the armature-circuit. The stationary contacts for the resistances r may be supported in any suitable manner. The stationary contacts 24 for the switch W

are shown as supported from the cylinder T, but they may be mounted in any desired manner. The cylinder T is provided with suitable stuffing-boxes 23.

5 The pump P may be of any desired construction and may be connected to the motor M in any suitable manner, as by the gears 2 and 3 and the connecting-rod 4.

10 A valve D may be employed to shut off the source of fluid-supply.

The magnets G G' are alternately energized by the movement of the float C in the receptacle R. The upper end of the arm of the float C loosely surrounds the rock-shaft E, 15 Figs. 1 and 3. Two collars U U' are adjustably screw-set on the shaft E. These collars are provided with lugs K K', arranged to be respectively engaged by lugs J J' on the end of the float-arm. Thus the shaft E will be 20 rocked in one direction or the other by the movement of the float C when the fluid in the receptacle reaches a predetermined high or low level. The adjustment of collars U U' allows the required play of the float up and 25 down, the lugs J J' vibrating between lugs K K'.

The switch-box B, Figs. 1, 2, and 3, is provided with the outside cover H and an interposed gasket 5, which keeps moisture from 30 the interior parts. The rock-shaft E extends into the cover H through a stuffing-box 7. A cam device 6 is fixed to the shaft E under the cover H. The wings of the cam 6 bear upon the leaf-springs 10, which are secured to the 35 inside cover 9 of the box. The springs 10 provide bearing-surfaces, so that the wings of the cam device may readily push to the left, Fig. 2, the switch-buttons 8, which reciprocate through holes in the inside cover 9 of the 40 box B.

The electric switch in the box B may be of any desired construction, but is illustrated as a well-known form of snap-switch arranged with three binding-posts, one at the pivot- 45 piece 13^a of the metal part 13 and the other two forming parts of the stationary switch-contacts 15. The metal part 13 is in electrical contact with the switch-arm 14.

The wire L² and the magnet-wires g g', 50 Fig. 1, are led through the pipe 25 into the junction-box 11 after it has been put in place, as hereinafter described, Figs. 2 and 4, where they are attached to the connection-plate 12, made of insulating material and provided with 55 the cover 12^a. The junction-box is provided with a suitable cover 18. From the plate 12 corresponding leads are taken into the box B, the lead L² being connected to the binding-post 13^a and the leads g g' to the binding- 60 posts forming parts of the switch-contact 15. Thus when the cam 6 pushes in one or the other of the buttons 8 the corresponding magnet G or G' is energized.

65 The pipe 25 is threaded and screwed into the boss 28 of the box B. The box B is se-

cured to the interior of the receptacle R by bolts extending through the lugs 28. The nut 16 is screwed on the part of the pipe 25 which projects outside the receptacle R, so as 70 to firmly clamp the wall of the receptacle between the nut and the box B. Finally, the junction-box 11 is screwed on the outer end of the pipe 25 against the nut 16 to firmly secure the parts in place. After the insulated 75 wires L² g g' are inserted in the pipe 25 the pipe may be filled with a suitable insulating material, if desired.

The piston-valve V, Fig. 1, is reciprocated in the box 19 by the magnets G G'. The box 19 is provided with suitable stuffing-boxes 20. 80 The part 21 of the valve V produces communication between the pipes N N'. The part 22 closes the pipe N when the valve V is raised.

The valve V and its associated parts and 85 the piston O and its associated parts may be greatly varied without exceeding the scope of the invention as may the relative arrangement of the two sets of parts and their manner of 90 cooperating.

One special purpose of this device is to insure the stoppage of the motor when the main supply is shut off by the valve D, as well as 95 when the high level in tank or receptacle B is reached.

In previous arrangements the closing of valve D would allow the float C to start the motor when the low level was reached, but would not permit the pump to again fill the 100 tank, and so stop the motor by a restoration of the water-level in the tank. The motor would then continue to run and operate the dry pump. If the supply should be cut off for a considerable time, this would cause 105 waste and damage.

In my present device the starting of the motor depends on the presence of pressure in the pipe N. If the valve D is closed, it will also shut off the pressure in pipe N and the motor will not be started. When the valve 110 D is again opened, the parts will be restored to their normal condition and the motor will start and pump, as before.

What I claim as new, and desire to secure by Letters Patent, is— 115

1. The combination with a motor, of a pump operated thereby, a receptacle supplied by the pump, a controller for the motor operated by the fluid-supply for the pump, and a gov- 120 ernor, operated by variations in the level of the fluid in said receptacle, for controlling the operation of the motor-controller.

2. The combination with a motor, of a pump operated thereby, a receptacle supplied by the pump, and a controller for the motor, gov- 125 erned both by the fluid-supply to the pump and by the fluid in the receptacle.

3. The combination with a motor, of a pump operated thereby, and a controller for the motor, governed by the fluid-supply to the pump. 130

4. The combination with a receptacle, of a pump for supplying fluid thereto, means controlled by fluid from the source, for controlling said pump, and a valve operated by the fluid in said receptacle.

5. The combination with an electric motor, of a pump operated thereby, a receptacle supplied with fluid by the pump, a switch for the motor, and operating means for said switch, dependent upon the conditions of the fluid-supply to the pump and of the fluid in the receptacle.

6. The combination with a pump of a motor, a controller therefor, and a piston operated by the fluid-supply for the pump, connected to said controller.

7. The combination with a motor, of a pump operated thereby, a receptacle supplied with fluid by the pump, a device operated by the fluid-supply to the pump for controlling said motor, a valve constructed and arranged to shut off the fluid from said device and to permit the escape of waste fluid therefrom and means controlled by the fluid in the receptacle, for operating said valve.

8. The combination with an electric motor, of a pump operated thereby, a receptacle supplied with fluid by said pump, a piston operated by the fluid-supply to the pump, an electromagnet connected in shunt to the motor, a switch controlled by the fluid in the receptacle, and a motor-switch controlled by both the piston and the switch.

9. The combination with a fluid-receptacle, of a switch-box, a shaft extending inside the switch-box, a float in the receptacle, an arm for the float, loosely mounted on said shaft and provided with an engaging lug and adjustable stops on said shaft arranged to be engaged by the lug on the float-arm.

10. The combination with a fluid-receptacle, of a switch-box and a junction-box located respectively inside and outside said receptacle, means for securing said boxes together on opposite sides of a wall of the receptacle, an electric switch in said switch-box, a float in the receptacle, and means whereby said float operates said switch.

11. The combination with a fluid-receptacle, of a switch-box mounted therein, an electric switch in said box, a cover secured to the box, a shaft mounted in said box, means attached to said shaft to operate said switch, and a float in the receptacle arranged to rock the said shaft.

12. The combination with a fluid-receptacle, of a switch-box therein, a cover secured to the

box, a gasket interposed between said box and cover, a stuffing-box, a shaft extending through said stuffing-box, and a float in the receptacle mounted on said shaft outside the switch-box.

13. The combination with a motor, of a pump operated thereby, a receptacle supplied with fluid by said pump, a controller for said motor, two electromagnets for governing said controller, a double pole-switch for controlling said magnets, and a float in the receptacle for operating said switch.

14. The combination with a fluid-receptacle, of a switch-box therein, an outside cover for the box, a shaft journaled in said box, a float arranged to rock said shaft, a switch in said box, a perforated inside cover inclosing the switch, switch-buttons extending through the perforations in said cover, and means on the shaft for reciprocating said buttons.

15. The combination with a fluid-receptacle, of a switch-box therein, a push-button switch in said box, a shaft, a float to rock the shaft, and a cam on the shaft to operate the buttons of the switch.

16. The combination with a fluid-receptacle, of a switch-box therein, a push-button electric switch in the box, a rock-shaft, a float to rock the shaft, a cam on the shaft to operate the buttons of the switch, and springs interposed between the cam and the push-buttons.

17. The combination with a receptacle, of a switch-box provided with lugs whereby it may be secured therein, a pipe secured to said box and projecting out through the wall of the receptacle, and a junction-box secured to the projecting end of said pipe.

18. The combination with a receptacle, of a switch-box and junction-box located respectively inside and outside said receptacle, and a pipe extending through the wall of the receptacle and communicating with the interior of the two boxes.

19. The combination with a receptacle, of a switch-box and junction-box located respectively inside and outside said receptacle, a threaded pipe having its ends screwed into said boxes, and a nut on said pipe between the junction-box and the wall of the receptacle.

In witness whereof I have hereunto set my hand, before two subscribing witnesses, this 23d day of April, 1903.

WILLIAM F. IRISH.

Witnesses:

L. T. SHAW,

G. W. HOPKINS.