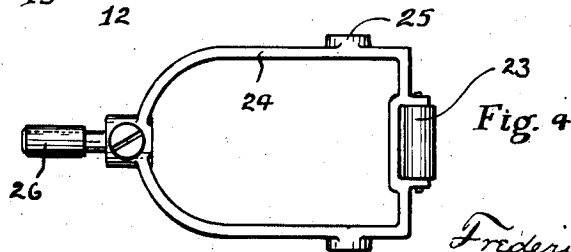
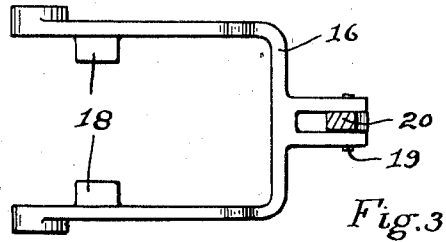
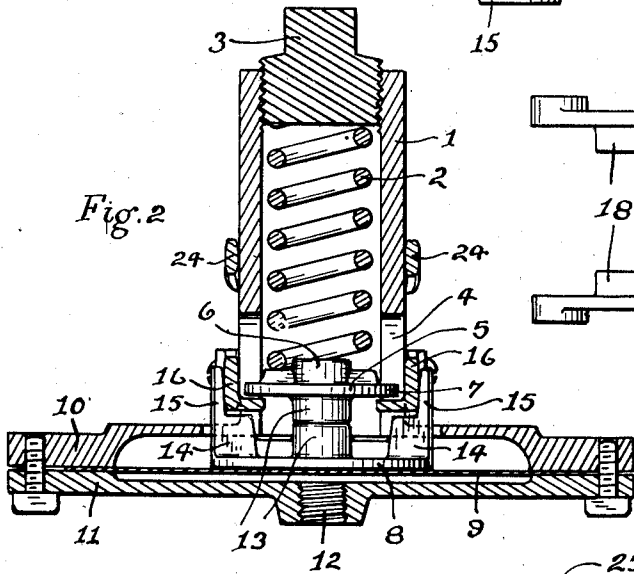
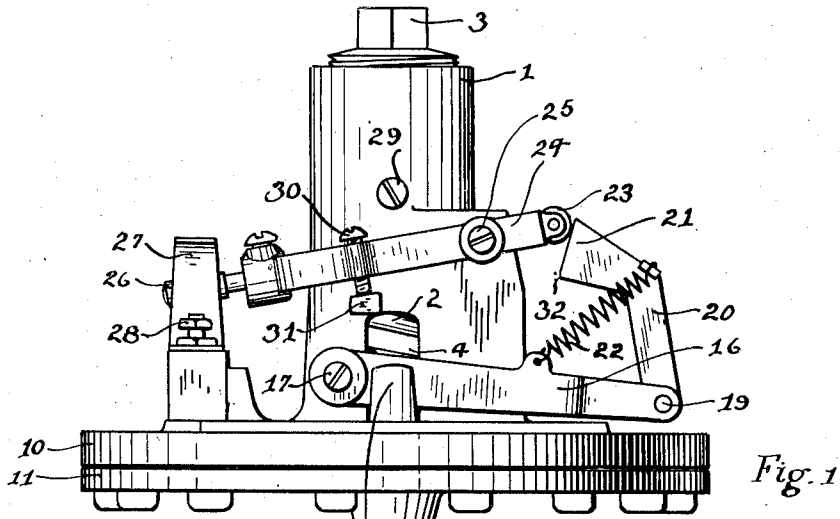


F. A. LITTER.  
 AUTOMATIC PRESSURE REGULATOR.  
 APPLICATION FILED NOV. 8, 1916. RENEWED SEPT. 15, 1919.

1,320,879.

Patented Nov. 4, 1919.



Witness  
*R. M. McCormick*  
*A. L. Phelps*

By

Inventor  
*Frederick A. Litter*

*C. C. Shepherd*  
 Attorney

# UNITED STATES PATENT OFFICE.

FREDRICK A. LITTER, OF COLUMBUS, OHIO.

## AUTOMATIC PRESSURE-REGULATOR.

1,320,879.

Specification of Letters Patent.

Patented Nov. 4, 1919.

Application filed November 8, 1916, Serial No. 130,263. Renewed September 15, 1919. Serial No. 323,958.

*To all whom it may concern:*

Be it known that I, FREDRICK A. LITTER, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Automatic Pressure-Regulators, of which the following is a specification.

10 This invention relates to automatic pressure regulators designed particularly for use in connection with waterworks systems of private houses. My structure is designed to act in conjunction with a pressure tank and is so constructed that when the pressure falls below a given point, the regulator automatically sets the pump in operation. When this pressure has reached a predetermined point, the regulator automatically discontinues the operation of the pump.

The main object of my invention resides in the structure whereby the proper movement is given the switch structure by means of the movements of a diaphragm forming a portion of the regulator. Specifically, I employ a lever element operatively disposed between spring and diaphragm bearing members in such manner that the lever is permitted free play between them or is not clamped between them.

Another object of this invention resides in the structure for directly operating and controlling the switch bar by means of which a circuit is opened or closed to govern the operation of the pump.

The preferred embodiment of my invention is shown in the accompanying sheet of drawings, in which similar characters of reference designate corresponding parts, and in which:

Figure 1 shows my regulator detached and in side elevation,

Fig. 2 is a transverse vertical section of the structure shown in Fig. 1,

Fig. 3 is a plan view of a lever member used by me, and,

Fig. 4 is a plan view of a switch bar used by me.

50 In these several views, the regulator is shown as comprising a spring supporting body or housing 1, within which the spring 2 is confined. The pressure of this spring may be regulated by the cap closure shown at 3, against which the spring bears at one end. This housing member is open at its

lower end and its opposite sides are also slotted at diametrically opposite points, as shown at 4, in which the spring bearing member 5 operates. This spring bearing member is provided with a central upwardly extending boss 6 which centers the spring and laterally projecting flanges 7, which operate in the slotted or cut-out portions 4. Beneath this spring bearing member there is located a diaphragm bearing member 8 which rests directly upon the diaphragm 9 located between the two plates 10 and 11, this latter being threaded centrally as shown at 12 into which the water pipe is designed to be screwed. Both members are provided with cooperating boss portions 13 of such size that the upstanding shoulders 14 on opposite sides of the diaphragm bearing member are spaced slightly from the flanges 7 of the spring bearing member in the manner shown. Both shoulders are also provided with upstanding lips 15 between which the operating lever 16 is designed to fit. This operating lever is pivoted at one end to the spring casing as shown at 17 and is provided with laterally disposed flanges 18, which flanges are of a size slightly smaller in width than the distance between the shoulders 14 and flanges 7, as shown. By this arrangement, the lever is not securely clamped between the two bearing members, but is loosely mounted therebetween to permit a free movement of the lever as it moves about its pivot 17. To the outer end of this lever, there is pivotally attached, as shown at 19, the actuating member 20 carrying a cam formation 21 at its upper end. This actuating member is normally urged toward the left of Fig. 1 by means of the coiled springs 22 and by means of these springs, the cam portion 21 is held in cooperative relation with the roller 23 suitably journaled in the right hand side of the switch bar 24. This switch bar is pivoted intermediate its ends to the spring casing, as shown at 25, and at its left hand end it removably carries a roller contact member 26, which contact member is designed to operate between a pair of spring contact plates 27. It is to the binding posts 28 which lead to these spring plates 27 that the electric wires are attached, it being understood that, although not shown, the spring plates 27 are slightly spaced from each other and electric communication established between them by means of the roller 26. The spring casing

is also provided with a stop 29 which limits the upward movement of the left hand end of the switch bar, as will be apparent and this switch bar is also limited in its lower movement by means of the screw 30 adjust-  
5 ably carried by the switch bar and arranged to coöperate with the outwardly projecting flange 31 carried by the casing.

In use, the threaded aperture 12 is connected to a water pipe leading to the storage reservoir. The pressure in this tank operates directly upon the diaphragm and when this pressure has dropped below the minimum, the parts will be in the position  
10 shown in Figs. 1 and 2. At this time, the switch is closed and the pump structure normally set in operation. As the pressure increases, the diaphragm is elevated slightly and because of the contacting engagement  
15 between the bosses 13 on the spring bearing member 5 and the diaphragm bearing member 8, the laterally projecting flanges 18 of the lever 16 are not securely clamped between them. Therefore, as these bearing  
20 members are elevated, the lever member 16 is also elevated without any attendant frictional resistance between it and the two bearing members, but against the resistance of the spring controlled actuator member  
25 20 until the corner 32 of the cam passes beyond the center of the roller 23. Because of this, the actuating member 20 is allowed a quick action after the corner 32 of the cam portion 21 has passed beyond the center

of the roller 23. When this occurs, the  
35 switch bar is withdrawn from the position shown in Fig. 1, to thereby interrupt the electrical communication between the switch plates 27.

What I claim, is:

A pressure regulator comprising a spring supporting body, a spring confined within said body, a spring bearing member movable within said body and against which one end of said spring rests, a diaphragm structure,  
40 a diaphragm bearing member interposed between said structure and said spring bearing member, an outwardly projecting flange on said spring bearing member, a lever piv-  
45 50 otated at one end and operatively disposed between the shoulder and flange on said bearing members, a boss structure carried by said bearing members for holding them apart to allow said lever to operate freely  
55 between them, an actuating member pivoted to the free end of said lever, a cam on the free end of said actuating member, a switch bar pivoted to said body intermediate its  
60 ends in connection with one end of which said cam operates, and a contact structure with which said switch lever operates.

In testimony whereof I affix my signature in presence of two witnesses.

FREDRICK A. LITTER.

Witnesses:

WALTER E. L. BOCK,  
A. L. PHELPS.