Sept. 11, 1945. A. P. RUTH 2,384,770

AUTOMATIC AIR VOLUME CONTROL

Filed Nov. 11, 1944

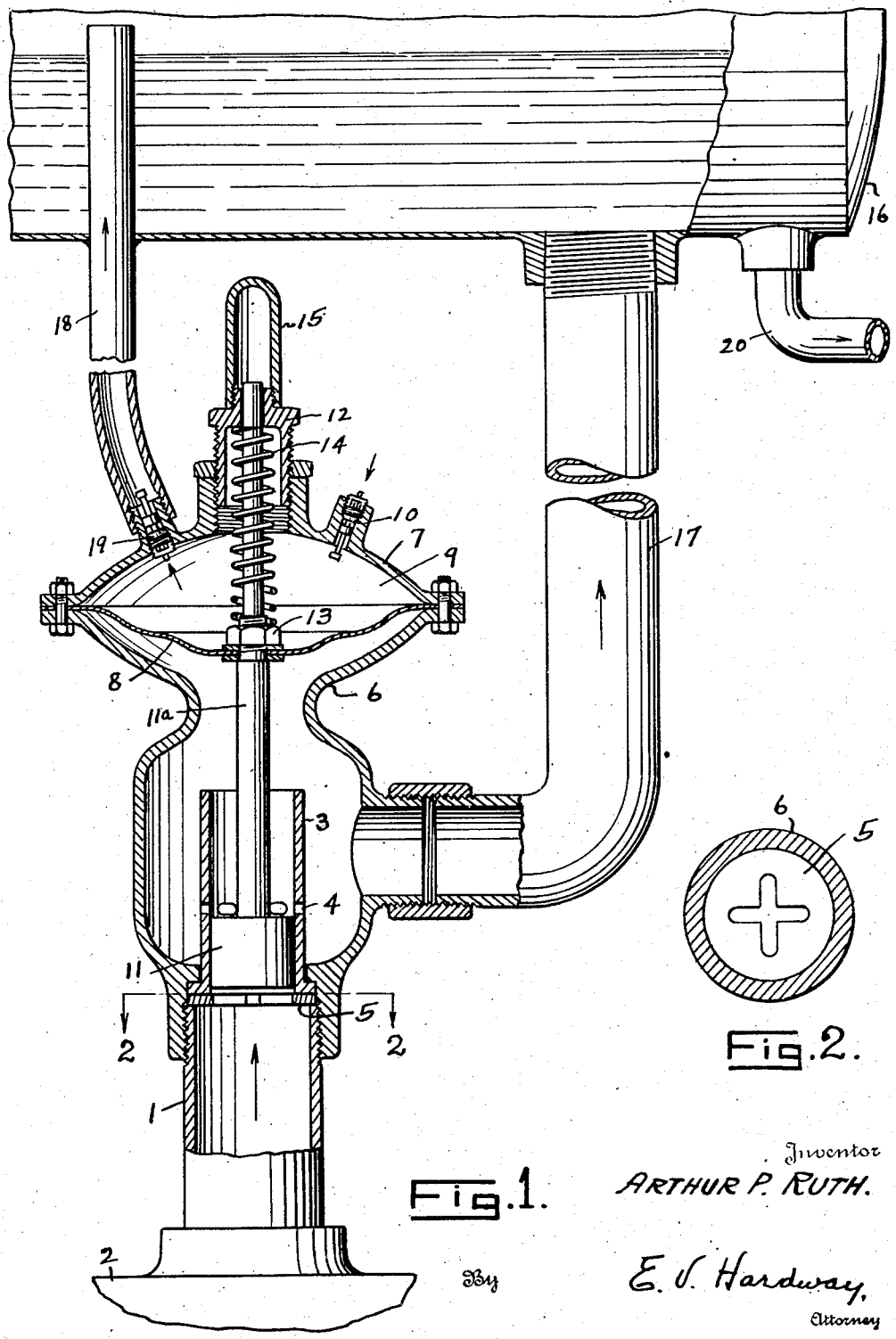


Fig. 1.

Fig. 2.

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Patented Sept. 11, 1945 2,384,770

UNITED STATES PATENT OFFICE

2,384,770

AUTOMATIC AIR VOLUME CONTROL

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Application November 11, 1944, Serial No. 563,067

2 Claims. (Cl. 230—50)

This invention relates to an automatic air volume control.

The invention embodies certain improvements over that type of control means described in the United States Patent No. 2,362,586 issued to applicant.

An object of the invention is to provide novel means for maintaining the required air pressure in the water tank of a water supply system.

Another object of the invention is to provide apparatus of the character described which will not only charge the tank with the required air pressure but which is of such construction that the air cannot reach the pump of the system with means for manually adjusting the controlling apparatus so that a predetermined water pressure will be maintained in the water pump and the pump will not lose its prime irrespective of variations of pressure in the well.

The improvements herein disclosed may be applied either to the pump supply line leading into the tank or to the service line leading from the tank to the point of utilization just as is the case with the construction shown in the patent above referred to.

With the above and other objects in view the invention has particular relation to certain novel features of construction, operation and arrangement of parts, an example of which is given in this specification and illustrated in the accompanying drawing, wherein—

Figure 1 shows a sectional view of the controlling device as connected to the pump and to the water tank; and

Figure 2 shows a cross sectional view taken on the line 2—2 of Figure 1.

Referring now more particularly to the drawing, wherein like numerals of reference designate similar parts in each of the figures, the numeral 1 designates the discharge line from a water pump 2 and attached, in any preferred manner, to the outer end of said line there is a cylinder 3 having the discharge ports 4 and clamped between the outer end of said cylinder and the opposing end of the discharge line there is a disc shaped seat 5 which is suitably perforated for the free flow of water therethrough.

Screwed onto the outer end of the line 1 there is a surrounding housing 6 and bolted to the free end of this housing there is a dome like cap 7. A flexible diaphragm 8 has its margin clamped between the housing 6 and the cap 7 thus forming a pressure chamber 9 which is equipped with the inwarly opening inlet valve 10.

Fitted into the cylinder 3 there is a piston 11 which is fastened to one end of the piston rod 11a. This rod extends axially through the cylinder 3 and also extends through the diaphragm 8 to which it is fastened, as shown in Figure 1.

Threaded into the cap 7 there is a gland 12 whose outer end has a bearing through which the corresponding end of the piston rod works. The piston rod is clamped to the diaphragm by means of a clamp nut 13 and surrounding the outer end of the rod and interposed between the nut 13 and the gland there is a strong coil spring 14.

The outer end of the piston rod may be enclosed and protected by a cap 15 which is screwed onto the outer end of the gland 12.

Leading from the housing 6 into the conventional pressure tank 16, of the system, there is a supply line 17 through which water is delivered into the tank and leading from the chamber 9 and terminating in the tank above the normal water level there is an air pipe 18 which is equipped with a back pressure valve 19.

It is to be understood that the pump will be driven by an electric motor and the switch for controlling the motor will be operated by the pressure in the tank in the well known manner so that when the pressure is low in the tank the switch will be closed so as to start the motor to operate the pump to deliver additional water to the tank and when a predetermined pressure in the tank has been attained the switch will be automatically opened and the pump stopped.

With the type of charger herein described the required amount of air will be maintained in the tank so that the tank will not become water logged, that is, so that there will be a sufficient volume of air maintained at all times in the tank to maintain pressure on the water for a suitable length of time, when once placed under pressure, so that the motor will not be so frequently started.

When the pump begins operation, the piston 11 will be forced outwardly in the cylinder until it uncovers the ports 4 whereupon the water will be delivered on through said ports, and the line 17, into the tank. At the same time the diaphragm will be operated to reduce the volume of the chamber 9 and the air therein will be forced through the pipe 18 into the tank and trapped therein by the back pressure valve 19. When a predetermined pressure has been attained the motor and pump will be automatically stopped and the spring 14 will force the piston 11 in the opposite direction until it is stopped by the seat 5.

The capacity of the chamber 9 will be in-

creased as the piston moves to its original, or starting position, and an additional charge of air will be drawn in through the valve 10.

Excessive pressures in the tank 16 will be prevented since said tank is equipped with a conventional relief valve provided for the purpose.

As the pump pressure varies in accordance with the variations of pressure of the liquid in the well the compression on the spring 14 must be correspondingly adjusted and for that reason the gland 12 is provided with the required range of adjustment so that by adjusting the gland the compression on the spring 14 may be correspondingly varied. The gland and spring are, therefore, so mounted as to be accessible and adjustable to accomplish the purposes stated. For example, when water is being pumped into the tank 16 the ports 4 will be open. Should water be drawn from the tank 16 so as to lower the pressure in the tank the pressure in the discharge pipe 1 will be correspondingly lowered but the spring 14 should be so adjusted that it will move the plunger into position to close the ports 4, so as to maintain the pressure in the discharge line and pump at the required pressure necessary for the pump to efficiently operate.

The air charger may be, if desired, connected into the service line 20 of the tank by arranging it so that the out flowing water will operate against the piston 11. In this arrangement the supply pipe 17 would be connected directly to the discharge line of the pump.

What I claim is:

1. An air pump comprising, a cylinder connected into a pressure line, a piston in the cylinder exposed to the pressure in said line, an air chamber having an air discharge line, a piston rod connected to the piston and extended through said cylinder and chamber, an adjustable gland connected to one wall of the chamber through which the outer end of the rod extends, means connected to the piston rod for varying the capacity of the chamber, a coil spring interposed between said means and said gland and whose compression may be varied by the adjustment of said gland.

2. An air pump comprising, a cylinder adapted to be connected into a pressure line and having a discharge port, a piston in the cylinder exposed to the pressure in the line and movable to one position to close said port and to another position to open said port, an air chamber having an air discharge line and having a movable wall for varying the volume of said chamber, a valve controlled inlet into the chamber, a piston rod connected to the piston and extended through said cylinder and chamber and connected to said movable wall, an adjustable gland connected to another wall of the chamber through which the outer end of the rod extends, a coil spring between said gland and said movable wall and whose compression may be varied by the adjustment of the gland.

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