W. L. HAMILTON.

PUMP.

APPLICATION FILED MAY 6, 1911.

1,008,816.

Patented Nov. 14, 1911.

2 SHEETS—SHEET 1.

Fig. 2

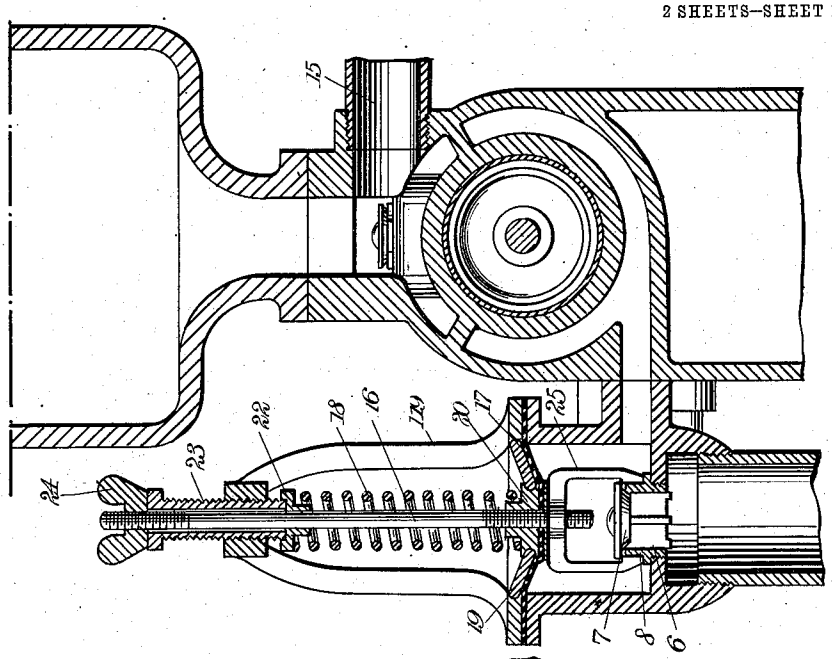
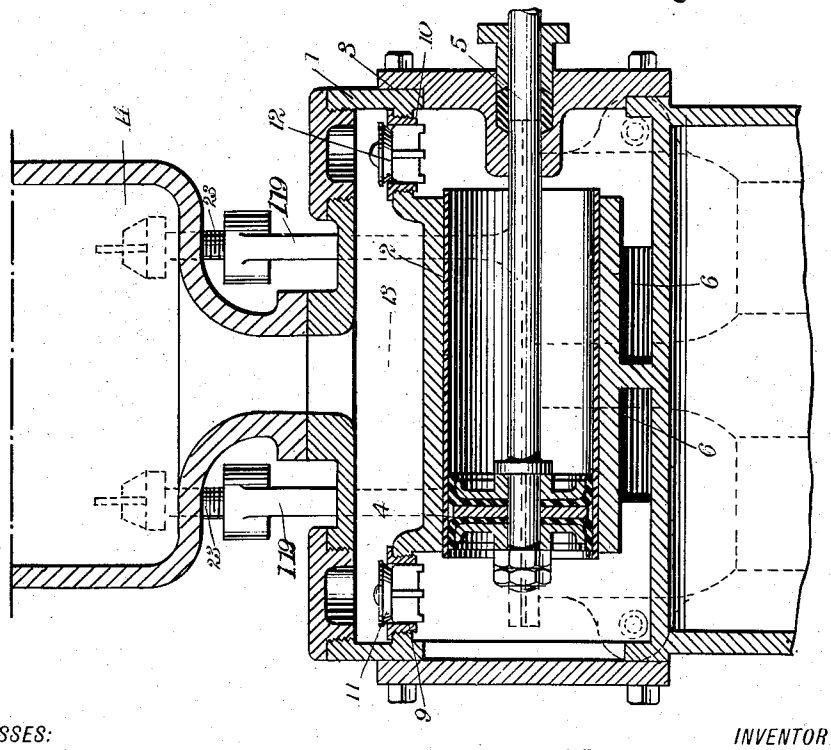


Fig. 1



WITNESSES:

John A. Bergstrom

H. Whiting.

INVENTOR

William L. Hamilton

BY Munn & Co

ATTORNEYS

W. L. HAMILTON.

PUMP.

APPLICATION FILED MAY 6, 1911.

1,008,816.

Patented Nov. 14, 1911.

2 SHEETS—SHEET 2.

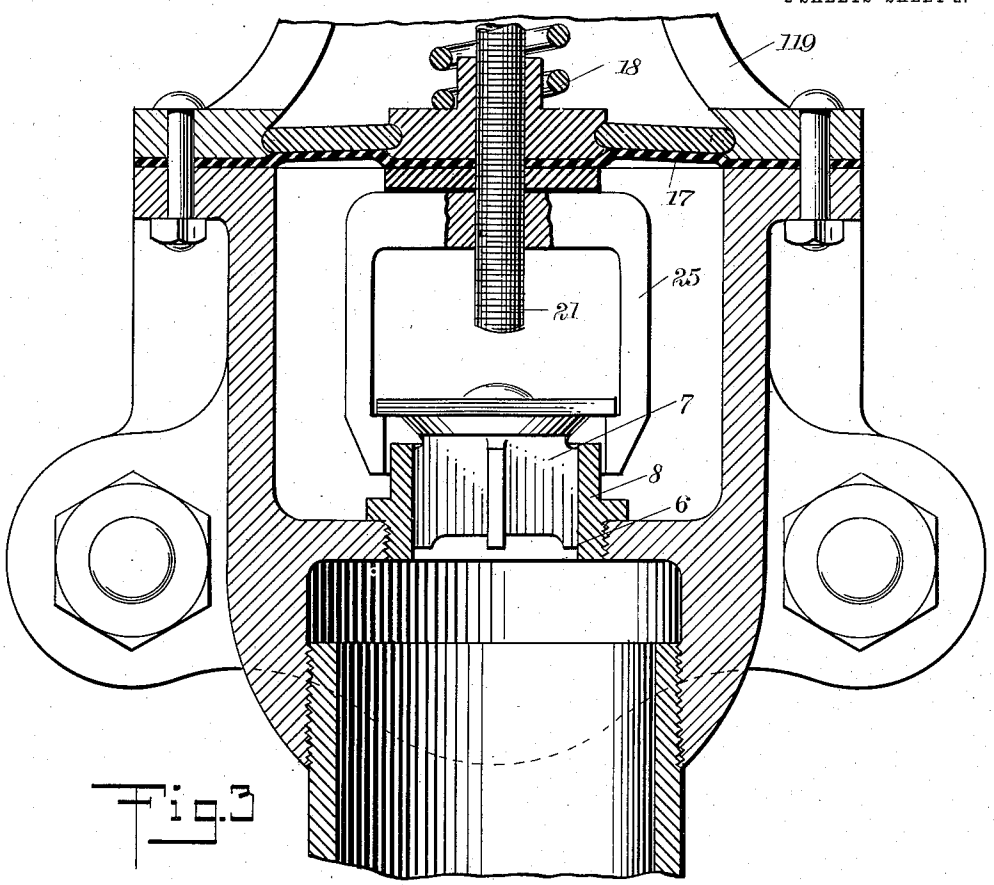


Fig. 3

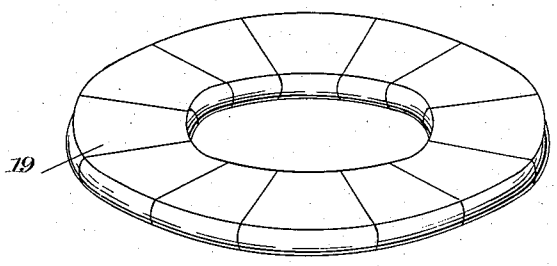


Fig. 4

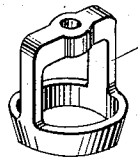


Fig. 5

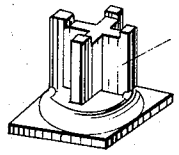


Fig. 6

WITNESSES:

John A. Bergstrom

H. Whiting.

INVENTOR

William L. Hamilton

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM L. HAMILTON, OF BANGOR, MICHIGAN.

PUMP.

1,008,816. Specification of Letters Patent. Patented Nov. 14, 1911.

Application filed May 6, 1911. Serial No. 625,459.

To all whom it may concern:

Be it known that I, WILLIAM L. HAMILTON, a citizen of the United States, and a resident of Bangor, in the county of Van Buren and State of Michigan, have invented a new and Improved Pump, of which the following is a full, clear, and exact description.

This invention relates to a new and improved pump of a type adapted to force any fluid, such as water or air, and further, of a type which will automatically regulate its own pressure without the need of extraneous relief valves.

It has been found in actual practice that while some types of relief valves are quite efficient and will relieve excess pressure, with greater or less regularity, the majority of relief valves cannot be depended upon to act at a definite predetermined pressure, but will vary in their action, coming in play sometimes at one pressure and sometimes at another pressure. It has also been found that the relief valves sometimes will not seat until the pressure has gone considerably below that which is desired. In addition to these deficiencies, the relief valves wear out rapidly, especially in spraying pumps, so that they have to be repeatedly reground in order to be tight.

It is therefore an object of this invention to provide an attachment for a pump, which will be actuated to automatically control the fluid pumped in accordance with any predetermined pressure desired.

A further object of this invention is to provide automatic means for controlling the pressure of the fluid supplied by a pump, which will be simple in construction, inexpensive to manufacture, strong, durable, positive in its action, and easily controlled.

A still further object of this invention is to provide means governed by the pressure of the fluid pumped by the pump for controlling the action of one of the valves of the pump, whereby the pressure of the fluid pumped can be controlled.

These and further objects, together with the construction and combination of parts, will be more fully described hereinafter and particularly set forth in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views, and in which—

Figure 1 is a vertical section through the pump; Fig. 2 is a partial section taken at right-angles to the section taken in Fig. 1, through one of the suction checks; Fig. 3 is an enlarged fragmentary section of the regulator shown in Fig. 2; Fig. 4 is a perspective view of the reinforcing gasket for the movable diaphragm; Fig. 5 is a perspective view of the control for one of the valves, which in this instance is shown as the suction check valve; and Fig. 6 is an inverted perspective view of the check valve.

Referring more particularly to the separate parts of this invention as embodied in the form shown in the drawings, 1 indicates a pump, which may be of any suitable character, and is shown as being provided with a cylinder 2 located in a casing 3, and spaced apart from the heads thereof so as to form pressure chambers. Slidingly mounted in the cylinder 2 in any suitable manner, so as to afford a fluid-tight fit, there is provided a piston 4, which is adapted to be reciprocated by a piston rod 5, which extends through one of the heads of the pump, and may be driven in any suitable manner from any suitable source of power. The suction inlets for the pump, of which there are two, shown at 6, one for each end of the cylinder, are controlled by automatically-acting check-valves 7, the particular form of which may be seen by reference to Fig. 6. While any suitable form may be used, this form of valve gives a positive action, and is well guided in the seats of the valves, indicated at 8, each having an opening therein forming the suction inlets 6. Outlets for the active portion of the pump are indicated at 9 and 10, and are controlled by gravity check-valves or any other suitable type 11 and 12. The check-valves 11 and 12 separate the active or pumping compartments of the pump from a common storing chamber 13, which communicates with a storing member 14, which may be of any suitable character, such as a dome or stand-pipe. This arrangement is merely to keep a constant head on the outlet of the pump, indicated at 15, irrespective of the back-and-forth intermittent action of the piston proper.

In many types of pumps, it is common to

provide a relief valve for taking care of any excess pressure above that desired. In this case, I have done away with this by rendering the pump more or less ineffective, by preventing one or more of the valves thereof from properly seating. While any of the valves might be regulated in this manner, I prefer to regulate the check valves 7, controlling the suction inlets. For this purpose, I provide in each instance a regulator 16, which is provided with a diaphragm 17, preferably flexible in its nature and of any suitable material, such as rubber. The diaphragm 17 is exposed to the pressure of the fluid in the pump, and is normally held in a position such that it can be moved by an excess pressure in the pump, by means of a spring 18. In the case of high-pressure pumps, it may be necessary to reinforce this diaphragm to prevent it from blowing out. In such cases, I provide a sectional gasket 19, the form of which may be seen by reference to Fig. 4, which may be of any suitable material, having sufficient strength to withstand the pressure of the pump. The gasket is adapted to engage a peripheral groove in the frame 119, and a similar groove on a washer 20, on its inner side. The washer 20 may be adjustably mounted on a rod 21, in any suitable manner, as by means of a screw-threaded connection therewith. The spring 18 rests at one end on the washer 20, and at its opposite end on a collar 22, which bears on an adjuster 23, in the form of a screw-threaded sleeve, which engages a screw-threaded opening in the frame 119, whereby the tension of the spring 18 can be varied, and thus the pressure at which the diaphragm will operate will also vary. A thumb screw 24 engages the upper screw-threaded end of the rod 21, the latter projecting through the sleeve adjuster 23, and said thumb-screw or nut 24 may thus lock the parts together, so that new diaphragms can be put in without danger of the segments of the washer falling out and causing trouble.

Adjustably secured to the lower end of each of the rods 21, as by means of a screw-threaded engagement, and thus operatively connected to the diaphragm 17, there is provided a controller 25, which forms the connecting link between the rest of the mechanism of the regulator and each of the valves 7. These controllers have arms which engage under the rims of the valves 7, and will serve to lift the valves if they are already seated, or prevent them from seating when the diaphragms are raised by an excessive pressure in the pump, thus in a way, forming a lift or a stop, according to conditions, generally the latter.

The operation of the device will be readily understood when taken in connection with the above description. Under normal conditions, the piston 4 reciprocates back and forth, piling up a pressure in the storing chamber 14, which may be simultaneously utilized through the outlet 15. In case this pressure and the pressure in the pump proper exceeds a certain predetermined limit, one or the other of the diaphragms 17, which are normally in their innermost or lowermost position, will be forced outwardly and upwardly against the tension of the spring 18, thereby lifting the controller 25, which will prevent one of the check-valves 7 from properly seating, so that the pump, instead of forcing the fluid into the storing member 14, will merely force it back into the suction or supply pipe of the pump through the suction inlet 8. It will thus be seen that the piston will merely churn the water, and not add to the pressure in the storing chamber 14. Under such circumstances, if the fluid being pumped is being used through the outlet 15, the pressure will gradually diminish until it reaches a point where the force of one of the springs 18 will be greater than the pressure in the pump, thus permitting the raised diaphragm to lower, and thus permitting the valve 7 to seat itself, whereupon the pressure will immediately climb up to any predetermined amount, depending on the initial tension of the springs 18, which can be regulated by the adjusters 23.

While I have shown one embodiment of my invention, I do not wish to be limited to the specific details thereof, but desire to be protected in various changes, alterations and modifications which may come within the scope of the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. The combination with a pump, of a check valve for said pump, a diaphragm exposed to the fluid pressure of said pump, a screw-threaded rod extending through said diaphragm, a washer having a screw-threaded adjustable connection with said rod and contacting with said diaphragm so that the movement of said diaphragm will be transmitted to said rod, a control adjustably connected to said rod and engaging said valve so that the movement of said rod and said diaphragm will be transmitted to said valve, said control being in the form of an annular ring having a bracket extending upwardly therefrom and engaging said rod, said annular ring being located subjacent a portion of said valve, a spring contacting with said washer, so as to oppose the movement of said diaphragm, and means for adjusting the tension on said spring so as to vary the pressure at which said diaphragm will move.

2. The combination with a pump, of a check valve for said pump normally sensitive to the suction and compression action

of the pump and having a rim, a control for rendering said valve unresponsive to the pump action comprising a bracket having a portion engaging the valve subjacent its rim, a rod having connection with said bracket, a flexible diaphragm exposed to the fluid pressure of the pump and arranged above the bracket, a washer adjustable on said rod and engaging said diaphragm to clamp the same against said bracket, and a spring bearing against said washer to oppose the pressure-wise movement of the diaphragm.

3. The combination with a pump, of a check valve for the pump, normally sensitive to the suction and compression action of the pump, and having a rim, a control for rendering said valve unresponsive to the pump action comprising a bracket having a portion engaging the valve subjacent its rim, and provided with a threaded opening, a flexible diaphragm exposed to the fluid pressure of the pump, a rod extending through said diaphragm and having a threaded end for adjustable engagement in said bracket opening, a washer threaded upon said rod to bear upon said diaphragm and clamp the same against the bracket, a spring bearing against the washer to oppose the pressure-wise movement of the diaphragm, and means to adjust the tension of said spring.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM L. HAMILTON.

Witnesses:
LLEWELLYN J. LEWIS,
DANIEL M. ALLEN.