No. 615,812. Patented Dec. 13, 1898.

W. P. DALLETT.

AUTOMATIC RELIEF VALVE FOR PUMPS.

(Application filed Dec. 11, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

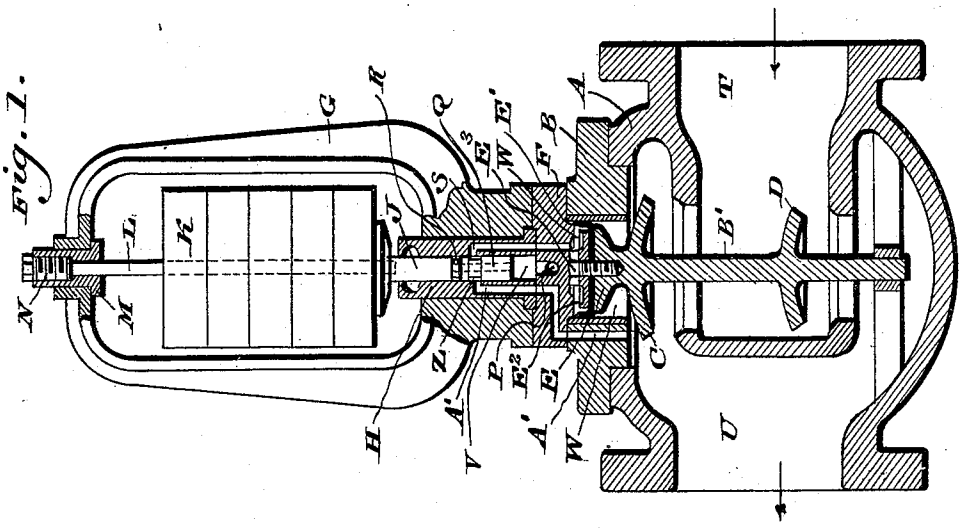
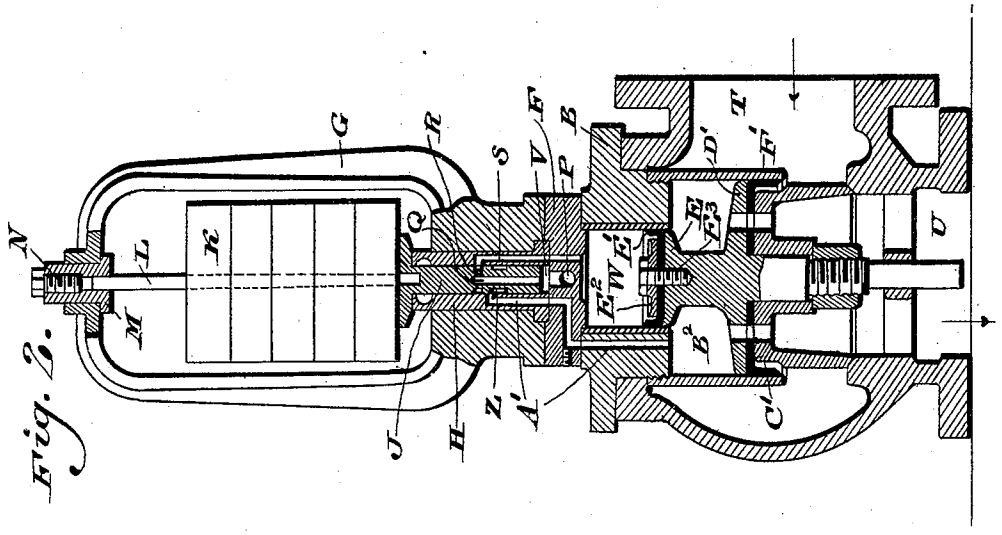


Fig. 2.



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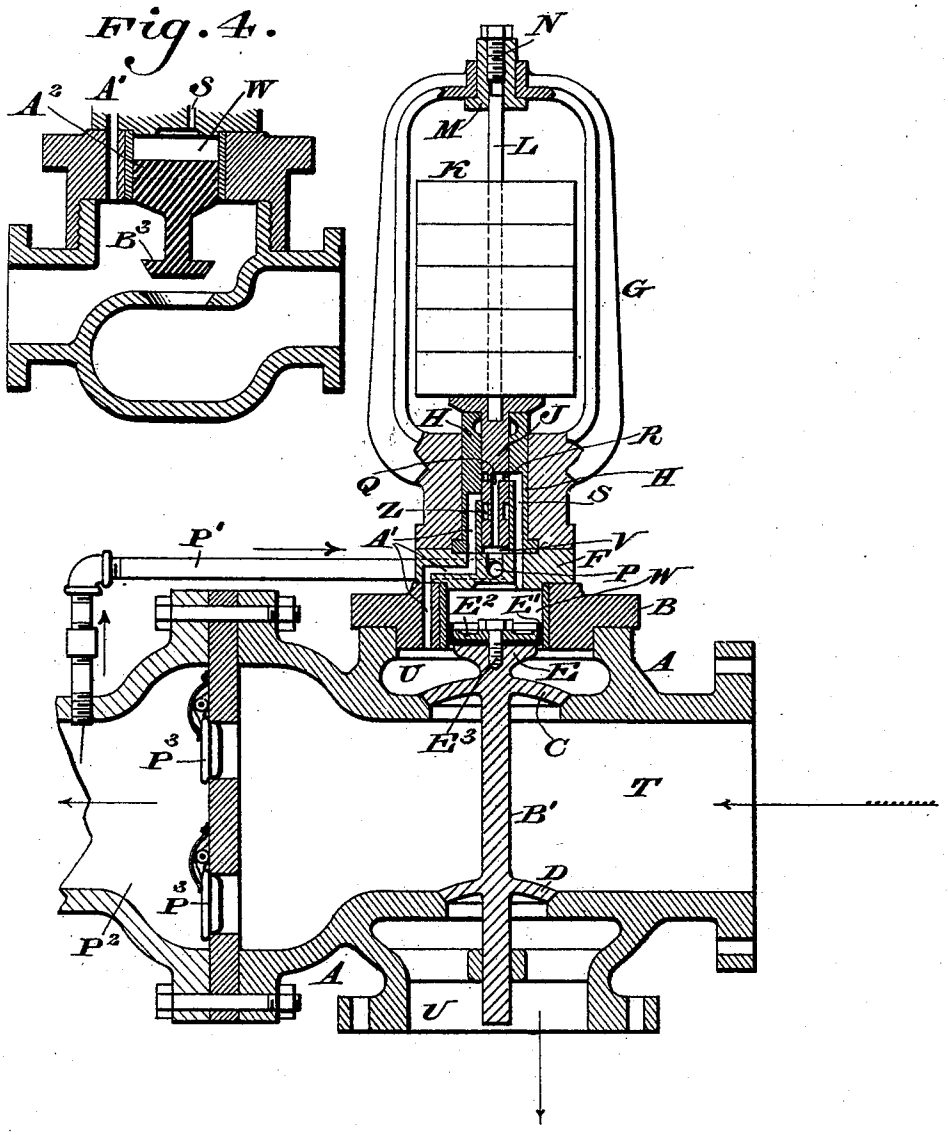
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Fig. 3.

Fig. 4.



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AUTOMATIC RELIEF-VALVE FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 615,812, dated December 13, 1898.

Application filed December 11, 1897. Serial No. 661,510. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. DALLETT, a citizen of the United States, residing at Media, in the county of Delaware, State of Pennsylvania, have invented a new and useful Improvement in Automatic Relief-Valves, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of an improved construction of automatic relief-valve, which is adapted to be attached to the discharge of a pump and to open automatically when the pressure in the tank, reservoir, stand-pipe, pumping main, or other receptacle into which the pump is discharging through a check-valve shall attain a required or certain predetermined pressure, said valve remaining open until the pressure in said tank or other receptacle shall have dropped, when the valve will automatically close, the action of said valve being such that when it is opened it relieves the discharge of nearly all the pressure, discharging all the water through this valve either back into the suction, suction-well, or into the relief-pipe or overflow, the pressure being held in the tank or other receptacle by a check-valve placed in the discharge-pipe at a point beyond where my novel automatic valve is attached.

It further consists of novel details of construction, all as will be hereinafter fully set forth, and particularly pointed out in the claims.

Figure 1 represents a sectional view of an automatic relief-valve embodying my invention, the valve and its adjuncts being shown in an open position. Fig. 2 represents a vertical sectional view of an automatic relief-valve, showing a slightly-modified construction of main valve, the latter being in closed position, the mechanism for operating the auxiliary valve which is thrown into operation by variation of pressure being, however, the same. Fig. 3 represents a sectional view of the relief-valve seen in Fig. 1, the main valve being shown in closed position and having a valved chamber attached thereto, said chamber having a connection leading to auxiliary valve. Fig. 4 represents a sectional view of a modification.

Similar letters of reference indicate corresponding parts in the figures.

Referring to the drawings, A designates the body or casing of the relief-valve, the same being provided with the bonnet B and the differential double-beat puppet or main valve B′, the same having the valves proper or disks C and D attached thereto and provided with suitable seats, said disks D being of less diameter than the disk C.

E designates the auxiliary piston, the same being of any suitable construction, but consisting in the present instance of a head, preferably made integral with the main valve and adapted to act in unison therewith, having the packing E′, which is held in place thereon by the plate E^2, the parts being held in juxtaposition by means of the screw or other fastening device E^3, and said piston reciprocating in the cylinder W within the bonnet B.

F designates a port-plate located above said bonnet, upon which plate is supported the frame or cage G.

H designates an auxiliary-valve cylinder in which reciprocates the auxiliary valve J.

K designates weights which are carried by a guide-rod L, the lower extremity of which is seated in a table formed upon the upper extremity of the auxiliary valve J, thus providing a suitable support for the said weights, and the upper extremity of said guide-rod is movable in the guide-block M, the extent of movement of said guide-rod being limited by means of the stop-screw N, which engages said guide-block, the latter being retained in the upper portion of the frame G by any suitable means.

It will of course be understood that in place of the weights, guide-rod, and their adjuncts any combination of springs, levers, or devices capable of placing the desired or predetermined weight on the valve J and of regulating and limiting its motion may be employed without departing from the spirit of my invention.

P designates a port located in the port-plate F, said port being connected by the pipe P′ with the discharge-main, tank, or other receptacle P^2 at a point beyond the check valve or valves P^3. The pressure from the receptacle P^2 is conveyed through the pipe P′ to the port P, thence to the chamber V below the valve J, thence through the passage Q and the port R to the downwardly-extending passage

S, when the auxiliary valve is in the position seen in Figs. 2 and 3 upon the auxiliary piston E, thereby forcing the latter downwardly, and with it the main valve B′, thereby closing the latter and preventing any of the water from being discharged from the inlet T to the outlet U of the valve, and consequently all the discharge from the pump is under these conditions forced through the check-valves P^3 into the reservoir or receptacle P^2. When a certain amount of pressure has been attained in the receptacle P^2, the same is transmitted through the pipe P′ and the port P to the space V, the pressure in said space V overcoming the counterbalancing pressure of the weights K or their equivalents, and the parts assume the position seen in Fig. 1, in which case the cylinder W, through the port S, the reduced neck Z of the auxiliary valve J, and the port A′, is in communication with the low-pressure or relief side U of the main valve, as indicated in Fig. 1.

The pressure in the inlet T now acts on the differential area between the disks or portions C and D of the main valve B′, whereupon the latter is opened, as seen in Fig. 1, and allows all the discharge to flow from T to U until the pressure in the reservoir or tank P^2 and pipe P′ and chamber V falls, and consequently the weights K or other equivalents force the auxiliary valve J into the position seen in Figs. 2 and 3, when the pressure again is admitted, through the ports Q, R, and S, into the cylinder W, thereby permitting pressure to be exerted on the piston E, which in turn overbalances the differential pressure between the parts C and D of the main valve B′, thereby closing the valve, as before, it being understood that Figs. 2 and 3 show the valve in the position its parts will assume when the pressure is below the desired pressure in the tank or other receptacle P^2, while Fig. 1 shows the valve in the position the parts assume when the pressure in said tank is above the desired point.

It will be evident that, although I have shown a slightly-different form of main valve in Fig. 2, the same falls within the scope of my invention, the automatically-operated auxiliary valve being the same in each instance.

In Fig. 2 a differential-piston puppet-valve D′ is employed, the latter having the ports C′ therethrough and reciprocating in the cylinder F′.

Communication is established from the port A′ to the discharge or relief side of the valve by means of the ports C′ and the chamber B^2, as is evident.

It will be seen from the foregoing that the above valve is automatic under all conditions and that after having been once installed in position will require no further attention.

It will be evident that the piping, check-valves, tanks, or other connections can be arranged or assembled in different positions according to requirements.

It will of course be understood that the piston E may be made solid, if desired, as indicated at A^2 in Fig. 4, wherein I have shown a valve consisting of but a single disk B^3 and a seat proper therefor, it being noted that the area of the valve B^3 is less than that of the piston A, whereby I attain the desired result, the construction of the auxiliary valve and its adjuncts being the same as already described, as is evident.

It will be evident that changes may be made by those skilled in the art which will come within the scope of my invention, and I therefore do not desire to be limited in every instance to the exact construction I have herein shown and described.

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

1. In an automatic relief-valve, a main valve, an auxiliary piston, an auxiliary valve, means for directing fluid-pressure upon one end of said auxiliary valve and counterbalancing devices for the latter, said auxiliary valve having ports therein whereby said fluid-pressure is communicated to said auxiliary piston, or the latter is relieved from said fluid-pressure through said valve.

2. In an automatic relief-valve, a differential main valve, an auxiliary piston attached thereto and movable in unison therewith, an auxiliary valve, means for conducting pressure to said auxiliary piston, and means for directing pressure upon either end of said auxiliary valve, and means for relieving the pressure on said piston through said valve.

3. In an automatic relief-valve, a valve-casing having a bonnet supported thereon, a cylinder in said bonnet, a main valve, an auxiliary piston attached to said valve and reciprocating in said cylinder, and means for conducting pressure upon said auxiliary piston either from the discharge or relief side of the main valve or from a point exterior to the latter.

4. In an automatic relief-valve, a casing, a bonnet supported thereon, a port-plate, an auxiliary piston movable in a cylinder adjacent said port-plate, a main valve to which said auxiliary piston is attached, an auxiliary valve, a cylinder therefor, and means for applying pressure to either end of said auxiliary valve, and to the top of said auxiliary piston, the pressure upon the top of the latter being relieved through said valve.

5. The combination of a valve-casing, a bonnet supported thereon, a port-plate supported on said bonnet, an auxiliary-valve cylinder, an auxiliary valve in said cylinder, said valve being provided with a longitudinal and laterally-extending passage therein, a neck in said valve, passages in said valve-cylinder, port-plate and bonnet adapted to be in communication with the openings in said valve, an auxiliary piston located in said bonnet and a differential or main valve attached to said auxiliary piston.

6. In an automatic relief-valve, a valve-casing, a differential or main valve therein, an auxiliary piston attached to said valve, an auxiliary valve, a cylinder therefor, ports in said cylinder controlled by said auxiliary valve, and leading to the discharge or relief side of the valve and other ports in said cylinder, also controlled by said valve and leading to the top of said auxiliary piston.

7. In an automatic relief-valve, a differential main valve, an auxiliary piston attached thereto, a cylinder for said piston, an auxiliary valve having a port therein for controlling the movement of said piston, a guide-rod extending upwardly from said valve, a frame supported above the latter, a block mounted in said frame and having the upper end of said rod freely movable therein, and weights or their equivalents for depressing said valve.

8. In an automatic relief-valve, a valve-casing, a main valve therein, an auxiliary piston attached to said main valve, the latter having differential areas, a bonnet supported on said casing, a port-plate located above said bonnet, a frame supported upon said port-plate, an auxiliary cylinder supported adjacent to said port-plate, an auxiliary valve in said cylinder, weights for said valve, means for applying pressure to the under side of said auxiliary valve, and the top of said piston, and means controlled by said auxiliary valve for enabling pressure to escape from the top of said piston to the discharge or relief side of said main valve.

9. In an automatic relief-valve, a main valve, an auxiliary piston, an auxiliary valve, a port for directing fluid-pressure upon one end of said auxiliary valve, a receptacle provided with check-valves and communicating with the discharge of said main valve, a pipe leading from said receptacle to said port, and counterbalancing devices for said auxiliary valve, the latter having ports therein, whereby said fluid-pressure is communicated to said auxiliary piston, or the latter is relieved from said fluid-pressure through said valve.

10. In an automatic relief-valve, a main valve, an auxiliary piston, an auxiliary valve, a reservoir or tank, means for directing fluid-pressure from said reservoir or tank upon one end of said auxiliary valve, and counterbalancing devices for the latter, said auxiliary valve having ports therein, whereby said fluid-pressure is communicated to said auxiliary piston, or the latter is relieved from said fluid-pressure through said valve.

11. In an automatic relief-valve, a differential main valve, an auxiliary piston therefor adapted to act in unison therewith, an auxiliary valve in alinement with said auxiliary piston, a reservoir or tank, means for conducting pressure therefrom to said auxiliary piston, and means for directing pressure upon either end of said auxiliary valve.

12. In an automatic relief-valve, a casing, a bonnet supported thereon, a port-plate, an auxiliary piston movable in a cylinder adjacent said port-plate, a main valve to which said auxiliary piston is attached, an auxiliary valve, supported above said auxiliary piston, a cylinder therefor, a reservoir or tank, and means for applying pressure therefrom to either end of said auxiliary valve and to the top of said auxiliary piston.

13. In an automatic relief-valve, a differential main valve, an auxiliary piston attached thereto, a cylinder for said piston, a valve-controlled reservoir or tank, an auxiliary valve, means connecting the said reservoir and valve, whereby the movement of said piston is controlled, a guide-rod extending upwardly from said valve, a frame supported above the latter, a block mounted in said frame and having the upper end of said rod freely movable therein, and weights or their equivalents for depressing said auxiliary valve, the latter having ports therein, whereby fluid-pressure is communicated to said auxiliary piston, or the latter is relieved from said fluid-pressure through said auxiliary valve.

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