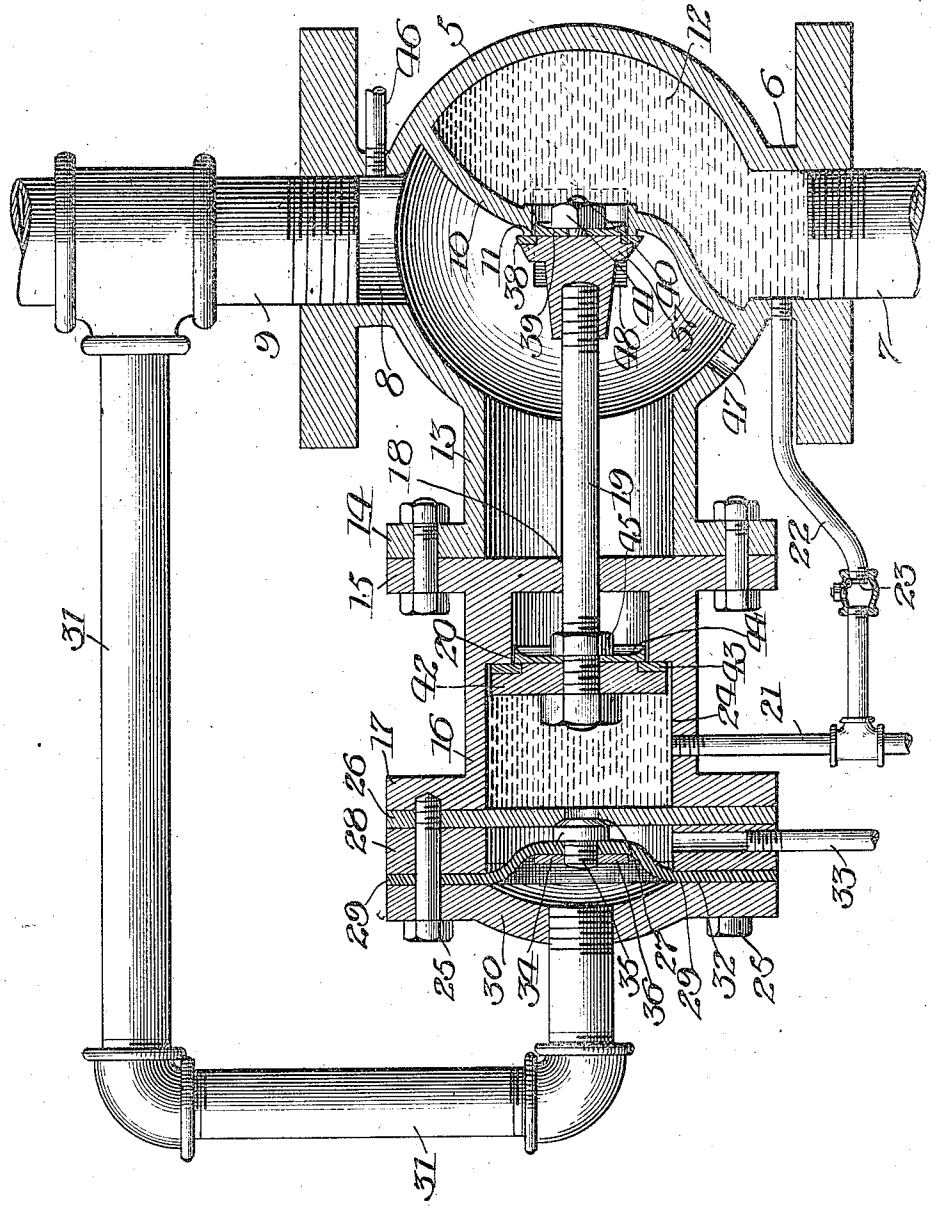
W. E. DIXON.

AUTOMATIC VALVE.

APPLICATION FILED DEC. 10, 1908.

953,260. Patented Mar. 29, 1910.



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AUTOMATIC VALVE.

953,260. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed December 19, 1908. Serial No. 468,764.

To all whom it may concern:

Be it known that I, WILLIAM E. DIXON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Valves, of which the following is a specification.

This invention relates to improvements in automatic valves, and while it is more especially intended for use in connection with automatic sprinkling apparatuses or fire extinguishers, such as are set in operation by the action of heat on fusible plugs or thermostats, yet it is applicable for and may be used in connection with other kinds of apparatuses or machinery; and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is to provide an automatic valve which shall be simple and inexpensive in construction, strong, durable and efficient in operation, and so made that the valves thereof will be normally held in their closed positions by fluid pressure, yet will be adapted to be opened through an inequality set up in the liquid pressure operating at opposite ends of the valves.

Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In order to enable others skilled in the art to which my invention pertains, to make and use the same, I will now proceed to describe it, referring to the accompanying drawing, in which the figure represents a view partly in elevation and partly in vertical central longitudinal section of a valve embodying the invention, showing the parts in their closed positions.

The reference numeral 5 designates the main body or valve-casing which may be made of any suitable size, form and material, but preferably spherical in shape, and has in its lower portion an opening 6 in which is fitted one end of a pipe 7 which may communicate with a supply of water under pressure (not shown), and has in its upper portion an opening 8 in which an outlet pipe 9 leading to the sprinkling pipe, when used in connection with an automatic sprinkling apparatus, or to another point or receptacle when not so used, is fitted at one of its ends. As shown, the valve-casing or body 5 is provided with a transverse partition 10 which is disposed between the openings 6 and 8 of the valve-casing and preferably in an inclined position therebetween. This partition is provided at about its middle with an apertured valve-seat 11 which will permit the liquid or water 12 to pass therethrough from the opening 6 and out through the opening 8 into the pipe 9 for distribution. Communicating with the cavity of the body or valve-casing 5 is a hollow extension 13 which has on its free end an annular flange 14 to which is secured the head 15 on one end of a cylinder 16 which has at its other end an annular flange 17 for the purpose to be presently explained. The head 15 of the cylinder 16 is provided with a central opening 18 for the reception and operation of the duplex valve-stem 19 which is adapted to be reciprocated therethrough by means of the inequality of the water pressure operating on the valves at opposite ends thereof. The cylinder 16 is provided with an apertured valve-seat 20 intermediate of its ends, and the cavity of said cylinder has communication through pipes 21 and 22 with the opening 6 of the valve-casing or body 5, or, if preferred, with the liquid supply pipe 7.

Located in the pipe 22 is a check-valve 23 of the ordinary or any preferred construction, the parts of which are so arranged that the water or liquid will be free to flow from the source of water or liquid supply therethrough and through the pipe 21 and into the chamber or cavity 24 of the water cylinder.

Secured to the outer surface of the annular flange 17 of the water cylinder 16 by means of screw-bolts 25 or otherwise is a disk or plate 26 which has a centrally located and apertured valve-seat 27 which communicates with the chamber or cavity 24 of the water cylinder. Located on the outer surface of the disk or plate 26 and secured thereto by means of the bolts 25 or otherwise is a ring 28 on the outer surface of which is located a diaphragm 29 of any suitable flexible material, which is held in position by means of a head 30 and the bolts 25 which secure said head to the water cyl-

inder, as is apparent. Communicating at one of its ends through an opening in the head 30 with the cavity of the ring 28 is a pipe 31, which is herein shown as being in communication at its other end with the outlet pipe 9 leading from the body or valve-casing 5 to the sprinkling system or pipes, but which pipe may have communication with air or fluid under pressure, yet adapted to be released automatically. As shown in the drawing, the ring 28 is provided at its lower portion with a channel 32 in which is located a pipe 33, which may lead to any suitable point of discharge. The diaphragm 29 carries at its center a valve 34 which is adapted to rest on the valve-seat 27, and has on its outer portion a screw-threaded extension 35 on which is screwed a nut 36 used for holding the valve 34 in position on the diaphragm. Movably located in the opening 18 of the head 15 of the water cylinder 16 is the valve-stem 19 which preferably has each of its ends screw-threaded. On one end of the stem 19 is secured a valve 37 which is provided on its face with a rubber or other suitable ring or gasket 38 to rest against the seat 11 for said valve. This valve may also be provided on its face with an annular guide 39 adapted to fit snugly in the opening of the valve-seat 11 and held in position on the valve 37 by means of a screw 40 and nut 41 thereon. On the opposite end of the valve-stem 19 is adjustably secured a valve 42 which is provided on its seating surface or face with a gasket or washer 43 of rubber or other suitable material to rest against the seat 20 formed in the water cylinder. The valve 42 is also preferably provided with a guide 44 which fits snugly in the opening of the seat 20, and is held in position against the valve by means of a nut 45 located on the valve-stem 19, as is clearly shown in the drawing. The valve-casing 5 may be provided in its upper portion with a pipe 46 leading to an alarm, and in its lower portion with an opening 47 in which may be located a pipe having an automatic waste valve.

From the foregoing and by reference to the drawing it will be clearly seen and readily understood that by reason of the fluid pressure in the pipe 31 and in the parts with which it communicates the diaphragm 29 will be forced inwardly, thus causing the valve 34 to close the port or valve-seat 27 in the disk 26 which port communicates with the chamber 24 of the water cylinder, thus confining the water in said chamber which has been supplied thereto through the pipes 21 and 22 from the supply-pipe 7, which latter pipe also furnishes water or liquid to the valve-casing 5 on one side of the partition 10 thereof. When the parts are in the positions shown in the drawing it is apparent that the valves 37 and 42 will be held in their closed positions, thus preventing the water or liquid passing through the openings in the valve-seats 11 and 27, but as soon as the air or fluid pressure is sufficiently reduced in or through the pipe 31 the diaphragm 29 carrying the valve 34 will be retracted, thus opening the port or valve-seat 27 and permitting the water or liquid to escape through the channel 32 and pipe 33, in which operation it is apparent that the valves on the stem 19 will be moved away from their seats, thus permitting the water or liquid to flow through the outlet pipe 9 and from thence to the sprinkling pipes or other parts. As soon as sufficient pressure is again produced in the pipe 31 or through the same it is apparent that the diaphragm 29 will be caused to assume the position shown in the drawing so that its valve 34 will close the port or seat 27, when the valves 37 and 42 will be held in their seated positions by means of the inequality of the pressure of the water or liquid operating thereagainst. The valve-casing 5 is provided with a hand-hold opening 48 through which access to the interior of said casing may be had for adjusting the valve 37 or for other purposes.

It will be understood that the discharge channel 33 is larger than the supply pipe 21 and that the valve 42 is larger than the valve 37, so that when the valve 34 is opened the water in the chamber 24 will be discharged therefrom more rapidly than it is supplied thereto, and when the valve 34 is closed the pressure on the valve 42, by reason of the fact that it is larger in area than the valve 37, will afford a greater surface for the pressure of the water, and will hold the two valves on the stem 19 in their closed positions.

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

In an automatic valve, the combination with the valve-casing having a transverse partition provided with an apertured valve-seat, of a cylinder secured on the valve-casing and having a valve-seat between its ends and provided with an opening in its end adjacent to the valve-casing, a valve stem located in said opening for reciprocation therein, a valve on each end of said stem to engage said valve-seats, the valve on the end of the stem within the casing being smaller than the valve on the end of the stem within the cylinder, a disk or plate secured on the outer end of the cylinder and having an apertured valve-seat, a ring secured on the outer surface of said plate or disk and having an outlet channel, a flexible diaphragm secured on the outer surface of said ring, a valve on the diaphragm to engage

the valve-seat of the plate or disk, a head secured on the outer surface of the diaphragm, a pipe extended at one of its ends through said head and having communication at its other end with a supply of fluid under pressure, a pipe communicating at one of its ends with a supply of liquid, and at its other end with the cavity of the cylinder, the inlet to the cylinder of said pipe being smaller than the outlet channel of the aforesaid ring.

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