F. NICOLA.

PRESSURE REDUCING VALVE.

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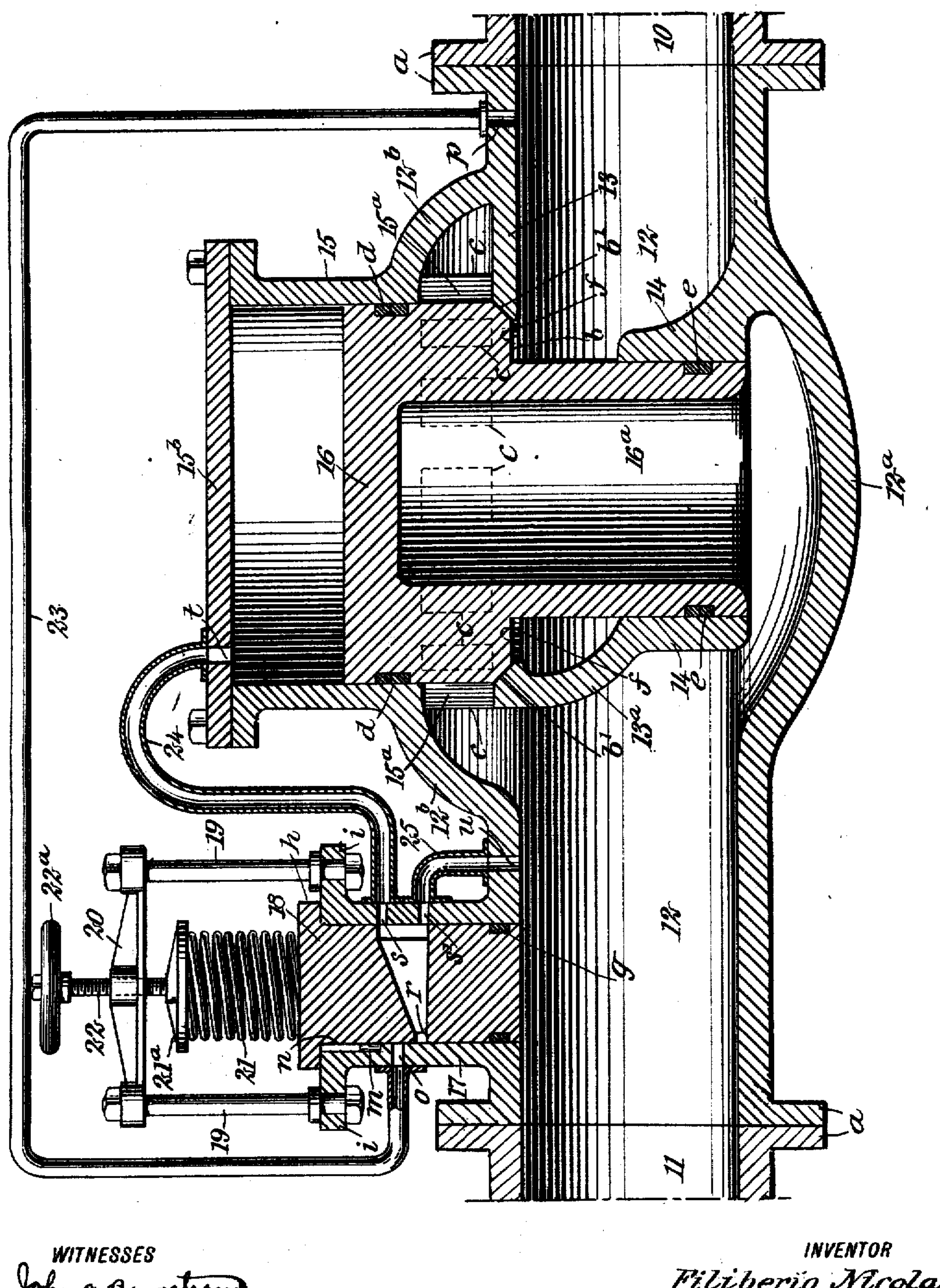
923,568. Patented June 1, 1909.



WITNESSES

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INVENTOR

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FILIBERTO NICOLA, OF NEW YORK, N. Y.

PRESSURE-REDUCING VALVE.

No. 923,568. Specification of Letters Patent. Patented June 1, 1909.

Application filed April 12, 1909. Serial No. 489,396.

To all whom it may concern:

Be it known that I, FILIBERTO NICOLA, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Pressure-Reducing Valve, of which the following is a full, clear, and exact description.

This invention relates to valves adapted for reducing the pressure of a motive agent as it is utilized for useful effect, and more particularly to reduce the pressure of water flowing from high pressure service conduits, to hose or the like for extinguishing fires or for other purposes that require a controlled uniform pressure of fluid or liquid where used.

The object of my invention is to provide novel, simple details of construction for a pressure reducing valve, that afford a practical, inexpensive device of the character indicated, which is generally applicable for use in controlling the pressure of water, steam or gas as it is distributed to a point for use from a source of high pressure supply.

The invention consists in the novel construction and combination of parts, as is hereinafter described and defined in the appended claims.

Reference is to be had to the accompanying drawing and to the characters of reference thereon, the single figure shown representing a longitudinal sectional view of the improved valve.

The device is shown as introduced between a high pressure water conduit 10, that appears at the right in the drawing, and a reduced pressure service main 11, that is shown at the left in said view. The valve shell 12, that is a detail of the invention, may be joined with the conduit 10 and service main 11 by flanges *a*, or other preferred means, and consists of the following details; A concavo-convex wall 12^a forms the lower side of the shell 12, and directly above the wall 12^a, a circular opening *b* is produced in a diaphragm 13, from which depends a transverse partition 13^a, that is integral with a cylindrical guide wall 14, which is joined with the concavo-convex wall 12^a at its side that is nearest to the high pressure conduit 10. The upper edge *b'* of the diaphragm 13 is beveled and affords a valve seat, and concentric with said vavle seat and equally spaced therefrom, a dome-like top wall 12^b, is formed integrally with the diaphragm 13 and other portions of the shell 12.

From the dome top 12^b, a cylindrical wall or valve case 15 is upwardly extended, which is an integral portion of the guide wall 14 and is axially coincident therewith. The wall 15 is extended down and connects with the diaphragm 13, as is indicated at 15^a, and openings *c* are formed therein at intervals, as shown by dotted lines. A cylindrical valve is provided, which comprises two integral portions 16, 16^a, that are concentric or have a common axis. The upper portion 16 of the valve is of a diameter that adapts it to slide freely but liquid-tight in the valve case 15, and to insure against leakage, a packing ring *d* is fitted into a peripheral groove in said portion 16 of the valve and contacts with the true inner surface of the valve case 15. The lower portion 16^a of the valve body is slidably fitted in the ring-like guide wall 14 and a packing ring *e* that is embedded in the valve has water-tight contact with the valve body and case, thus adapting the lower portion 16^a of the valve body to form a closure between the high pressure or receiving end of the valve shell and the opposite end thereof. There is a radial shoulder *f* formed between the upper portion 16 and the lower portion 16^a of the valve body and the outer corner of this shoulder is beveled, thus adapting it to have liquid-tight engagement with the beveled valve seat *b'*.

The valve body is centrally chambered from its lower end toward the upper end thereof to lighten it, and the height of the upper portion 16 from the valve seat when imposed thereon, is such that a space is afforded above the valve in the case 15 which is closed by a cover plate 15^b.

Upon the portion of the valve shell 12, that is attached to the service main 11 at the left in the drawing, an upright valve case 17 is formed, having a true cylindrical bore therein, and in said bore a controller valve 18 is fitted, that is rendered water tight by a packing joint ring *g* that is embedded in a groove in the periphery of the valve body. A radial flange *h* is formed on the upper end of the controller valve 18, which when seated on a similar flange *i* formed on the valve case 17, limits the downward movement of said valve.

Erected on the radial flange *i* are two diametrically opposite posts 19, of an equal height, whereon a yoke bar 20 is mounted and secured. A coiled spring 21 is centrally

seated on the upper end of the controller valve 18, and upon said spring a pressure plate 21^a is mounted, which at its center receives the lower end of an adjusting screw 22, that has a threaded engagement with a central threaded perforation in the yoke bar 20, said screw being controlled by a hand wheel 22^a that is secured on the upper end thereof.

The controller valve 18 is prevented from turning on its axis, by a spline *m* that projects therefrom into loose engagement within a vertical groove *n* formed in the side wall of the valve case 17. In the cylindrical body of the valve case 17, as shown at the left in the drawing, a narrow port *o* is formed at a suitable distance from the top of the valve, and in the upper side of the shell 12, near the high pressure conduit 10, a similar port *p* is formed, these ports *o* and *p* being connected by a by-pass pipe 23.

A transverse passage *r* is formed in the body of the controller valve 18, which at the left side of said valve, is normally positioned below and near the port *o*. The lower wall of the transverse passage *r* is nearly horizontal, but the upper wall thereof is sloped upward, so as to give proper vertical width to said passage at its right hand end.

In the side wall of the valve case 17, opposite the widest end of the transverse passage *r*, two spaced narrow ports *s*, *s'* are formed in the same vertical plane. A bent pipe 24 is secured by its lower end over the upper port *s* in the side wall of the valve case 17, and thence extends upward and laterally, so as to locate the other end thereof in engagement with the cover 15^b on the valve case 15 over an opening *t* therein. Over the lower port *s'* in the valve case 17, one end of a bent pipe 25 is seated and secured, and the lower end of said pipe that seats upon the upper side of the valve shell 12 over an opening *u* therein, is secured thereto by any suitable means.

As shown, the relative positions of the ports *s*, *s'*, and port *o*, and the vertical dimensions of the passage *r* at the right hand end thereof, are such that when the controller valve 18 is seated upon the flange *i* at the upper end of the case 17, the ports *s*, *s'*, will be put into communication with each other by a disposal of the wider end of the passage *r* opposite said ports. This will afford a direct passage for liquid through the bent pipes 25 and 24, from the left end of the valve chamber 12 into the chamber above the main valve 16. At this time the narrow end of the passage *r* is disposed below and near the port *o*, so that the left hand end of the by-pass pipe 23 is sealed.

Assuming that the parts of the device are adjusted as shown, the operation is as follows: The controller valve 18 is by an adjustment of the screw 22 and spring 21, loaded to afford a desired pressure for liquid passing into the pipe 11 at the left end of the reducing valve. The initial pressure of the liquid fed from the conduit 10 into the valve chamber 12, will lift the valve 16, and water or the liquid passing into the reducing valve will pass through the openings *c* into the left hand end of the valve chamber 12. As the initial pressure of the liquid thus introduced below the controller valve 18, is greater than the load on said valve, it will rise in the casing 17 and close the lower port *s'*, said elevation of the valve 18 disposing the narrow end of the passage *r* therein in registry with the left hand end of the by-pass pipe 23. As the upper port *s* in the case 17, is still in open communication with the widest end of the transverse passage *r*, it will be seen that the initial pressure of the liquid from the conduit 10 will be transferred to the chamber above the main valve 16. The area of the upper end of the valve 16 being greater than that of the annular shoulder *f* and the beveled face on said valve, this imposed pressure on the valve 16 will correspondingly depress it and reduce the volume of liquid passing through the ports *c*.

It will be understood that the reduction in pressure had by the liquid passing into the left end portion of the valve chamber 12, will correspond with the load on the controller valve 18.

Obviously any variation in the initial pressure of the liquid passed into the reducing valve from the conduit 10, will be automatically reduced to a continuous pressure that is exactly regulated by the spring pressure on the controller valve.

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

1. A pressure reducing valve, embodying a main valve and a controlling valve, both slidable in casings that are branch extensions from the shell of the reducing valve, a spring-pressed device engaging the upper end of the controlling valve, ports in the main valve casing for transferring fluid under initial pressure into the shell below the controlling valve, so as to lift the controlling valve, and means controlled by the lifting of the controlling valve for transferring fluid under initial pressure through the controlling valve and into engagement with the upper surface of the main valve, so as to press said valve for the control of fluid passing below it in accord with the spring pressure on the controlling valve.

2. The combination with a high pressure fluid conduit and a reduced pressure pipe, of a pressure reducing valve, embodying a shell, a main valve slidable in an upright extension from the shell, a controlling valve slidable in a branch casing extended from the shell at the side of the other valve, a

pressure regulating spring seated on the controlling valve, said valve having a transverse passage therein wider at one end than at the other end, the casing for the controlling valve having a port therein that may register with the narrow end of the passage, this casing also having two spaced ports formed opposite the single port therein, two bent pipes that respectively connect the upper port with a chamber in the main valve casing above the main valve, and the lower port with the reducing valve shell near the controller valve, and a by-pass pipe connecting the single port that registers with the narrow end of the transverse passage with an opening in the reducing valve shell near the high pressure conduit.

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

FILIBERTO NICOLA.

Witnesses:

GIACOMO PROVERE,

GIACOMO ZURDITI.