

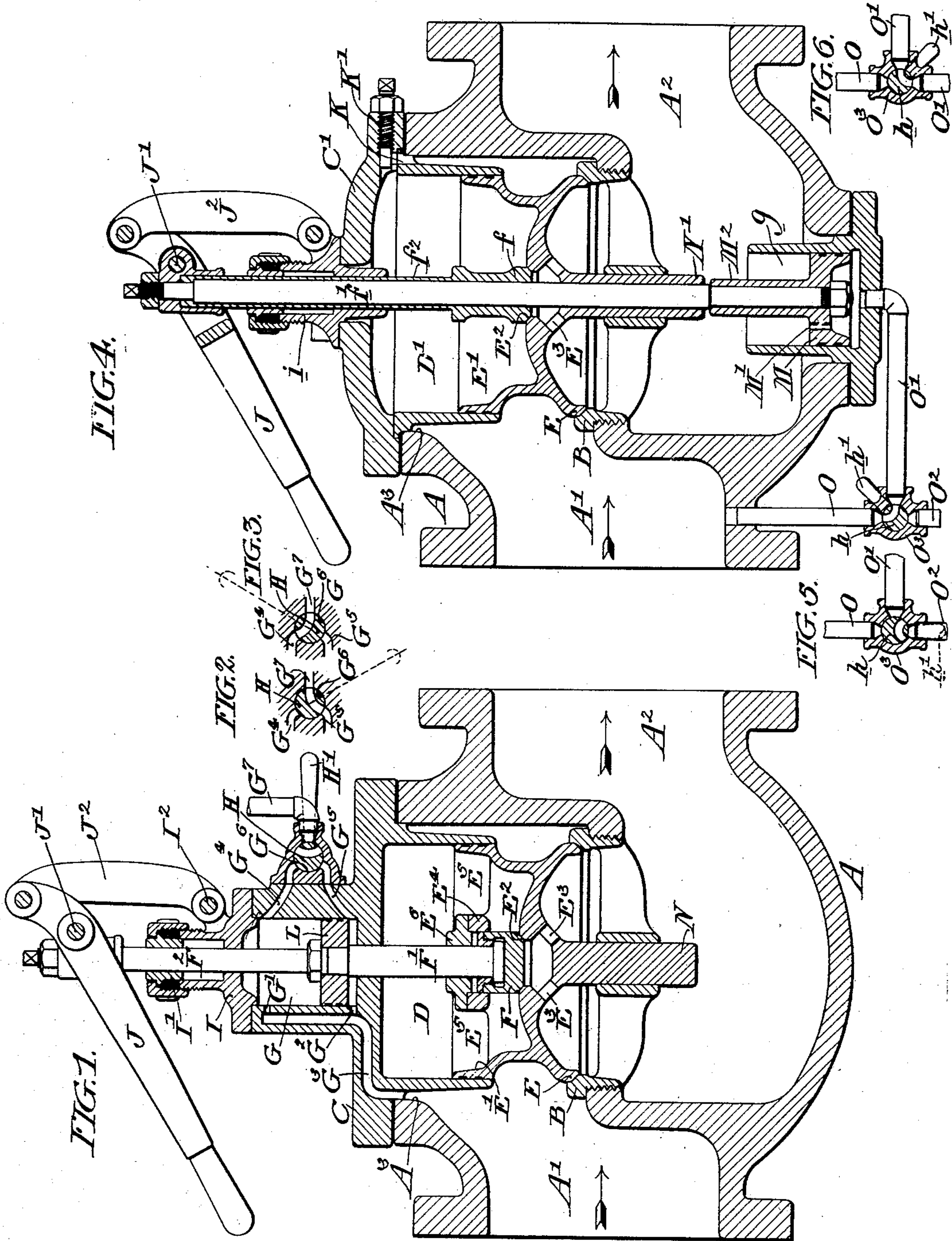
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VALVE.

APPLICATION FILED JULY 7, 1904.

931,228.

Patented Aug. 17, 1909.



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# UNITED STATES PATENT OFFICE.

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## VALVE.

No. 931,228.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed July 7, 1904. Serial No. 215,638.

*To all whom it may concern:*

Be it known that I, LOUIS SCHUTTE, a citizen of the United States, residing in the city and county of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Valves, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction of valves and has for its object to provide a valve and valve actuating mechanism whereby the valve can open and close at will and irrespective of pressure tending to keep it closed.

The nature of my improvements will be best understood as described in connection with the drawings in which—

Figure 1, is a sectional elevation of a valve provided with my improvements. Figs. 2 and 3, sectional views of the regulating cock by which the valve is actuated. Fig. 4 a sectional elevation of a modified form of my valve, and Figs. 5 and 6, sectional elevations of the regulating cock used in actuating this modified valve.

A, is the valve casing, having admission and exit chambers A', and A<sup>2</sup>, connected through a valve seated passage indicated at B, A<sup>3</sup>, indicating an opening in the top of the casing which is, in Fig. 1, closed by a cover C, and in Fig. 4, by a cover C'.

Referring first to the construction shown in Fig. 1, D, is an open ended cylinder arranged directly above the valve seat B, and E, is the main valve, having formed with or attached to it a piston E', which makes a loose fit with the cylinder D. In the center of the valve E, is formed the valve seated port E<sup>2</sup>, E<sup>3</sup>, through which the cylinder D, communicates with the outlet chamber A<sup>2</sup>, of the casing, and as shown the piston has attached to it by arms E<sup>5</sup>, a cylindrical guide ring E<sup>4</sup>, over the top of which is secured the perforated guide plate E<sup>6</sup>.

F, is a pilot valve adapted to seat itself on the portion E<sup>2</sup>, of the port and having its upper end alined and guided in the ring E<sup>4</sup>. To the top of this pilot valve is secured the valve spindle F' which passes through the cover C, and has attached to it a piston L, the valve spindle being continued, as indicated at F<sup>2</sup>, through a stuffing box at the top of the cylinder G, in which the piston L, works and which is covered by the perfo-

rated cover I, having the stuffing box I', at its top. G', and G<sup>2</sup>, are ports leading into the top and bottom respectively of the cylinder G, and both communicating with a port or conduit G<sup>3</sup>, which leads into the admission side of the casing as shown. G<sup>4</sup>, and G<sup>5</sup>, are outlet or exhaust passages leading from the ends of the cylinder G, and merging into a cock seat indicated at G<sup>6</sup>, from which leads the exhaust conduit G<sup>7</sup>.

H, is a two way cock working in the seat G<sup>6</sup>, and actuated by a handle H'.

J, is an actuating lever pivotally connected at J', to the top of the spindle F<sup>2</sup>, and also pivotally connected with the link J<sup>2</sup>, which is pivoted on the cover I, at I<sup>2</sup>.

N, indicates a depending guide rod forming part of the valve E, and guided in the spider extending inward from the valve seat B.

The operation of the valve is readily followed. In the position of the parts shown in Fig. 1, the valve and pilot valve are closed, the pressure in the cylinder D, entering through the clearance between the piston E', and the cylinder, is equal to that in the chamber A', of the casing, and the valves are held to their seats by this full pressure, the chamber A<sup>2</sup>, being practically without pressure. The cock H, being in the position shown in Fig. 1, both ends of the cylinder G, are closed to the exit passage, and the fluid pressure of the chamber A', is freely admitted to both sides of the piston L, with of course no tendency whatever to move said piston. If now it is desired to open the valve the cock H, is turned to the position indicated in Fig. 3, which permits the pressure fluid to exhaust freely through the top of the cylinder G, while the entrance of such fluid through the port G', is restricted owing to the small size of this port, consequently the superior pressure beneath the piston L causes the latter to move upward raising the pilot valve F, from its seat and permitting the escape into the chamber A<sup>2</sup>, of the pressure fluid in the cylinder D, so that when the pilot valve comes in contact with the plate E<sup>6</sup>, which it does a short time after leaving its seat, the pressure on the valve E, and piston E', is practically balanced, and the valve E, can be and is lifted from its seat by the piston L with little or no resistance, and as long as the cock H, remains in the position shown in Fig. 3, both



valves will be held in their raised or open positions. When it is desired to close the valves the cock H, is turned to the position shown in Fig. 2, permitting the exhaust of fluid from the lower end of the cylinder G, while the pressure accumulates in the top of the cylinder and forces the piston L, downward with the effect of forcing both valves to their seats and of course it will be understood that as soon as the pilot valve F, is seated pressure accumulates in the cylinder D, to hold the valves to their seats with the full admission pressure of the casing. The main and pilot valves can be opened and closed by lifting or depressing the lever J, as well as by the action of the piston L.

In the modified construction shown in Fig. 4, D', indicates the open ended cylinder above the valve seat B, the valve E' and its attached piston being practically the same as in F Fig. 1. The pilot valve, indicated at f, is shown as attached to a sleeve f<sup>2</sup>, and through this sleeve is connected with the valve spindle indicated at f', which spindle extends down through the guide rod of the main valve, indicated at N', and differing from the guide rod N, of Fig. 1, in that it is perforated for the passage of the spindle. The lower end of the spindle passes through an upwardly extending sleeve M<sup>2</sup> of a piston M, to which the spindle is securely attached, said piston being formed with a restricted aperture M', leading through it and working in an open ended cylinder situated in the bottom of the chamber A<sup>2</sup>, of the casing and communicating through conduits O, and O', with the admission chamber A', of the casing, and with an exhaust conduit O<sup>2</sup>, the said conduits O', and O<sup>2</sup>, opening into a cock seat O<sup>3</sup>, in which works a two way cock h, actuated by a hand lever h'. The sleeve f<sup>2</sup>, is shown as working through a stuffing box i. In addition to its communication with the chamber A', alongside of the loose fitting piston E', the cylinder D', communicates with the admission side of the casing through a port K, the aperture of which is regulated by an adjusting screw K'. In other features the device is practically identical with that of Fig. 1.

The operation of the modified construction is much the same as in the first described construction; the valves being closed and it being desired to open them, the cock h, is moved to position shown in Fig. 4, whereupon pressure fluid from the chamber A' is admitted to the bottom of the cylinder g, and the passage M', being restricted, practically the full pressure is exerted on the piston M, to raise it and through it and the spindle f', to lift the pilot valve f, from its seat, permitting the pressure fluid in the cylinder D', to escape. After opening the pilot valve the end of the sleeve M<sup>2</sup>, comes in contact with the end of the perforated guide rod

N', and through it raises the valve E, from its seat permitting the flow of pressure fluid through the seat B to the chamber A<sup>2</sup>. When it is desired to close the valves the cock h, is shifted to the position shown in Fig. 6, cutting off pressure fluid from the chamber A', and permitting the fluid beneath the piston M, to exhaust, whereupon the pressure fluid now in the chamber A<sup>2</sup>, of the casing acting on the piston M, presses it downward in the cylinder g, closing first the pilot valve and then drawing the main valve E, to its seat.

In Fig. 5, I have shown the pilot valve h, in position to close both the admission and exhaust ports leading to the bottom of the cylinder g and connected with the top of the spindle. I have shown the same hand lever for actuating the valves which is shown in Fig. 1.

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

1. A valve casing having its inlet and outlet chambers connected through a valve seated port and having a cylinder arranged in line with said port and connected to receive fluid from the entrance chamber of the casing through restricted apertures, in combination with a valve adapted to open and close the port aforesaid, a piston connected to the valve and moving in the cylinder of the casing, a port formed through the valve connecting the closed end of the cylinder with the outlet chamber of the casing, a pilot valve arranged to close said port, a valve spindle attached to the pilot valve and arranged to engage and lift the main valve after the pilot valve is moved from its seat, a second cylinder, a piston secured to the valve spindle and working in said second cylinder, means for admitting and freely exhausting pressure fluid from both ends of the second cylinder and valve mechanism for regulating the pressure in the ends of the cylinder.

2. A valve casing having its inlet and outlet chambers connected through a valve seated port and having a cylinder arranged in line with said port and connected to receive fluid from the entrance chamber of the casing through restricted apertures, in combination with a valve adapted to close and open the port aforesaid, a piston connected to the valve and moving in the cylinder of the casing, a port formed through the valve connecting the closed end of the cylinder with the outlet chamber of the casing, a pilot valve arranged to close said port, a valve spindle attached to the pilot valve and arranged to engage and lift the main valve after the pilot valve is moved from its seat, a second cylinder, a piston secured to the valve spindle and working in said second cylinder, means for admitting pressure fluid from the casing to both sides of the second



cylinder, means for freely exhausting pressure fluid from either side of said cylinder, and valve mechanism for regulating the pressure in the ends of the cylinder.

5 3. A valve casing having its inlet and outlet chambers connected through a valve seated port and having a cylinder arranged in line with said port and connected to receive fluid from the entrance chamber of the casing through restricted apertures, in combination with a valve adapted to close and open the port aforesaid, a piston connected to the valve and moving in the cylinder of the casing, a port formed through the valve connecting the closed end of the cylinder with the outlet chamber of the casing, a pilot valve arranged to close said port, a valve spindle attached to the pilot valve and arranged to engage and lift the main valve after the pilot valve is moved from its seat, a second cylinder, a piston secured to the valve spindle and working in said second cylinder, a conduit leading from the admission side of the casing to the end of the second cylinder where pressure fluid acts to open the valves, a cock whereby the said end of the said cylinder can be connected to exhaust and means for introducing pressure fluid to the other end of the cylinder to close the valves.

4. A valve casing having its inlet and outlet chambers connected through a valve seated port and having a cylinder arranged in line with said port and connected to receive fluid from the entrance chamber of the casing through restricted apertures, in combination with a valve adapted to close and open the port aforesaid, a piston connected to the valve and moving in the cylinder of the casing, a port formed through the valve connecting the closed end of the cylinder

with the outlet chamber of the casing, a pilot valve arranged to close said port, a valve spindle attached to the pilot valve and arranged to engage and lift the main valve after the pilot valve is moved from its seat, a second cylinder, a piston secured to the valve spindle and working in said second cylinder, ports leading to both ends of the second cylinder from the admission side of the casing, ports leading also from both ends of the said cylinder to exhaust and means whereby either end of the cylinder can be opened to exhaust at will.

5. A valve casing having its inlet and outlet chambers connected through a valve seated port and having a cylinder arranged in line with said port and connected to receive fluid from the entrance chamber of the casing through restricted apertures, in combination with a valve adapted to close and open the port aforesaid, a piston connected to the valve and moving in the cylinder of the casing, a port formed through the valve connecting the closed end of the cylinder with the outlet chamber of the casing, a pilot valve arranged to close said port, a valve spindle attached to the pilot valve and arranged to engage and lift the main valve after the pilot valve is moved from its seat, a second cylinder, a piston secured to the valve spindle and working in said second cylinder, ports leading to both ends of the second cylinder from the admission side of the casing, ports leading also from both ends of the said cylinder to a common exhaust, and a cock whereby either exhaust port can be opened at will.

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