

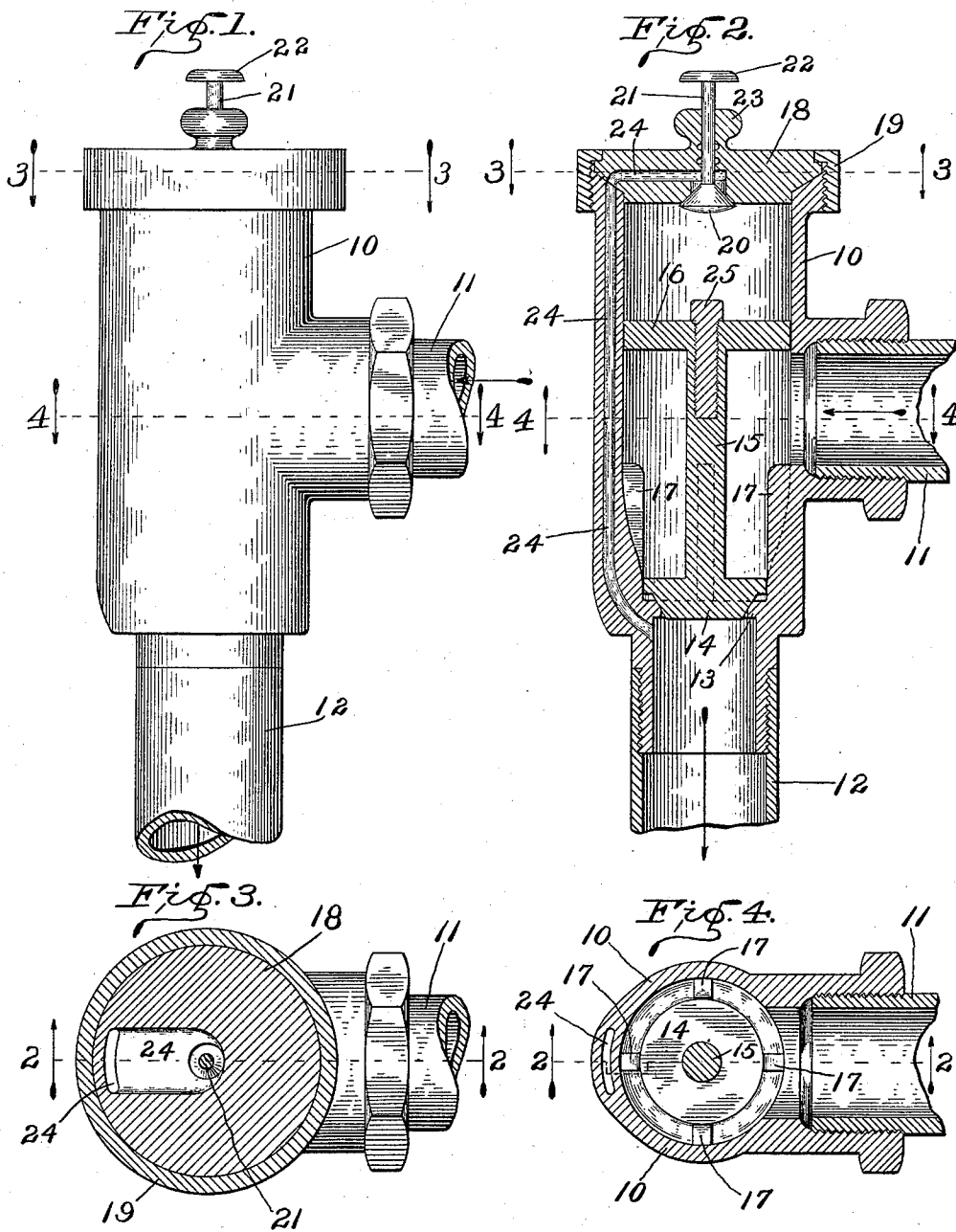
No. 685,930.

Patented Nov. 5, 1901.

J. W. NETHERY.
VALVE.

(Application filed May 31, 1901.)

(No Model.)



WITNESSES:
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VALVE.

SPECIFICATION forming part of Letters Patent No. 685,930, dated November 5, 1901.

Application filed May 31, 1901. Serial No. 62,595. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH W. NETHERY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Valves, of which the following is a specification.

My present invention relates to that class or variety of valves wherein the main valve opens automatically upon the opening of a small auxiliary valve and closes automatically in a certain period after the closing of said auxiliary valve and wherein the small auxiliary valve is closed by the opening of the main valve, the valve thus being self-controlling in its operation after the auxiliary valve is once opened.

Said invention consists in an improved means whereby the above-stated results are accomplished.

Referring to the accompanying drawings, which are made a part hereof and on which similar reference characters indicate similar parts, Figure 1 is a side elevation of a valve of the kind mentioned with fragments of the inlet and outlet pipes thereto; Fig. 2, a central vertical sectional view of the same as seen when looking upwardly from the dotted line 2 2 in Figs. 3 and 4; and Figs. 3 and 4 horizontal sectional views as seen when looking downwardly from the dotted lines 3 3 and 4 4, respectively, in Figs. 1 and 2.

In the valve of my present invention the fluid enters the main chamber in the valve-body 10 through the ingress-pipe 11 and is discharged through the egress-pipe 12. The ingress-pipe 11 is shown as connected to the side of the valve-body instead of, as is usual, to its end, while the egress-pipe 12 is at the end in the place usually occupied by the ingress-pipe. The main chamber within the body 10 is cylindrical in form for the greater portion of its length, as shown, but at its lower end is constricted and terminates in the valve-seat 13, upon which the main valve 14 rests when the valve is closed, as shown in Fig. 2. The valve-stem 15 continues up to a point in the chamber above the ingress-opening and has a piston-head 16 thereon which

is substantially the full size of said cylindrical chamber, but fits somewhat loosely therein, for the purpose which will be presently stated. The valve proper, 14, which is of smaller diameter than this piston, is guided in its movements by wings 17, which extend from just above the valve-seat up a distance at least equal to the travel of the valve in operation. As will be observed, the sides of the chamber between these wings taper outward gradually until the full size of the chamber is reached, so that the effective opening for the flow of fluid as the main valve is opened in operation gradually enlarges until the largest size is reached instead of opening suddenly to its full capacity. The upper end of the cylinder is closed by means of a suitable head 18, which is shown as held in place by the flanged coupling 19. In the under side of the head 18 is the valve-seat for the small auxiliary valve 20, whose stem 21 extends up through said head to the outside, where it terminates in a push-button 22. A stuffing-box may or may not be provided in the knob 23; but in my present construction, for reasons which will be presently given, this is in most cases unnecessary.

Extending from the auxiliary-valve seat around to below the main-valve seat is the by-pass 24. As best shown in Figs. 3 and 4, this by-pass is of larger cross-sectional area than the opening which the auxiliary valve 20 is designed to close, and consequently when the valve 20 is opened the fluid which thereupon passes out of the main chamber flows easily and under no pressure as soon as it reaches said by-pass, and therefore a stuffing-box for the valve-stem 21 is unnecessary, as the fluid has no tendency to press out of the inclosure up around said stem.

In operation my improved valve works in the following manner: The operator presses upon the button 22, forcing the valve 20 off its seat. The fluid in the upper portion of the main chamber, above the piston-head 16, being thereupon released from confinement, the pressure coming in from the ingress-pipe 11, acting on the under side of said piston-head 16, (which is of greater area than the

upper side of the main valve 14,) will raise said piston and said main valve, the fluid above the piston-head flowing out into the by-pass 20, and thence discharging into the main egress-opening leading from the main valve, as will be readily understood. As the piston-head rises it soon comes in contact with and pushes up the auxiliary valve 20, which is thus presently seated. As before stated, the piston-head 16 fits somewhat loosely in the cylindrical portion of the main chamber, so that a small quantity of the fluid under the pressure which exists will find its way to above said piston-head, so that presently there comes to be an equal pressure upon both sides of said head. Thereupon the main-valve structure, including the piston-head, begins to descend both by reason of gravity and because of the pressure on the upper side of the main valve 14. This descent, however, is gradual, as it can take place no faster than is permitted by the slow passage of fluid to above the piston-head through the small opening provided.

The piston-head may come directly against the auxiliary valve, if desired; but I prefer to provide an adjustable strike 25, which may be in the form of a screw inserted in a screw-threaded perforation which extends down through the piston-head 16 and into the valve 15, as shown in Fig. 2, and which is thus adjustable. By adjusting this strike, as will be readily seen, I am able to close the auxiliary valve 20 at any predetermined point in the ascent of the main-valve structure.

One noticeable advantage incident to the construction employed in the valve embodying my present invention is that no packing of any kind is necessary at any point. Neither are there any springs or small and intricate parts to get out of order. The valve structures are wholly of metal and are of a solid and substantial construction, are of great simplicity, and therefore inexpensive, although very durable and efficient.

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

1. A valve comprising a cylindrical body the lower end of which converges to a valve-seat of smaller diameter, and which is provided with a head containing a valve-seat for a small auxiliary valve, a valve structure comprising a valve-stem having the main valve upon one end thereof and of a larger diameter than said stem, and a piston-head of larger diameter than said main valve adapted to operate within the cylindrical chamber upon the other end, an ingress-opening leading to within said cylindrical chamber below the piston-head and above the main valve, an egress-opening leading off from below the main valve, a by-pass leading from the small auxiliary-valve seat to and discharging into said egress-opening, and an auxiliary

valve adapted to be pushed away from its seat by means of its stem from the outside and to be engaged and pushed toward and against its seat from the inside by the main-valve structure as it rises, substantially as set forth.

2. The combination, in a valve, of the body 10 having an ingress-opening at one side and an egress-opening at one end leading to and from a substantially cylindrical chamber within said body, said chamber however converging at one end toward the main-valve seat and provided with guide-wings extending above said seat for guiding the main valve in its movement, said main valve having a stem which extends to a point above the ingress-opening where a piston-head of substantially the diameter of the main chamber is provided, a by-pass leading from below the main valve up around the same into the head of the cylinder and terminating in a valve-seat, and a small auxiliary valve mounted in said head and adapted when closed to rest against said valve-seat, substantially as set forth.

3. The combination of a valve-body containing a single large cylindrical chamber provided with a main-valve seat at one end and a small valve-seat at the other end, a combined main-valve-and-piston structure presenting differential pressure areas to the fluid situated within said chamber, the piston being arranged on one side of the fluid-inlet and the valve on the other side, a by-pass leading from the small valve-seat around to below the main-valve seat, and a starting-valve at said small valve-seat, adapted to be closed by contact with the main-valve-and-piston structure as it opens.

4. The combination, in an automatic valve, of the valve-body comprising a cylindrical chamber with a small valve-seat at one end and a main-valve seat at the other end and a fluid-inlet between them and a fluid-outlet below said main-valve seat, a combined valve-and-piston structure mounted therein the piston above and the valve below the fluid-inlet, the piston being formed to permit the passage of fluid from one side to the other thereof in said chamber and of a larger area than the pressure-surface of the valve, a by-pass leading from the small valve-seat to below the main-valve seat, an auxiliary valve mounted to operate on said small valve-seat, and a strike on said valve-and-piston structure for closing said auxiliary valve, substantially as set forth.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 27th day of May, A. D. 1901.

JOSEPH W. NETHERY. [L. S.]

Witnesses:

CHESTER BRADFORD,
L. H. COLVIN.