No. 679,364. Patented July 30, 1901.

S. L. CLUETT.

VALVE GATE OR COVERING.

(Application filed Feb. 6, 1901.)

(No Model.)

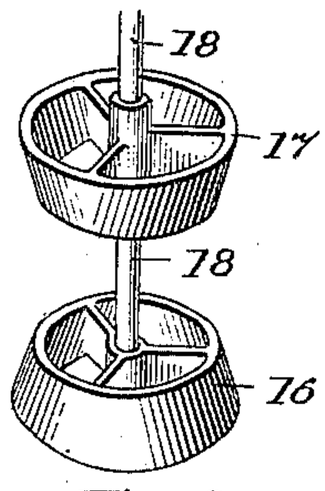
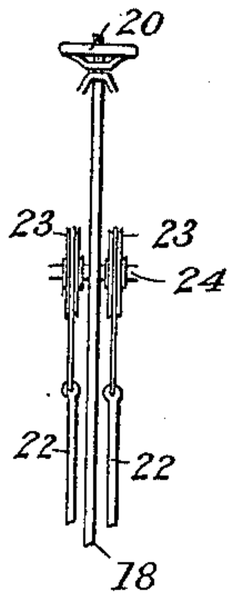
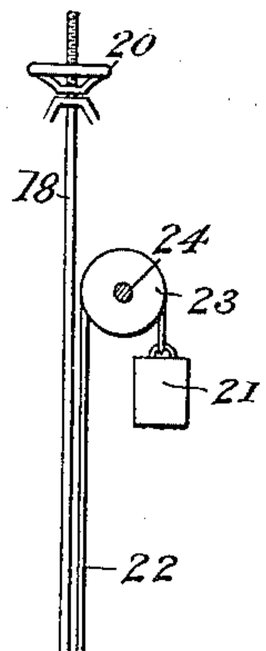


Fig. 3.





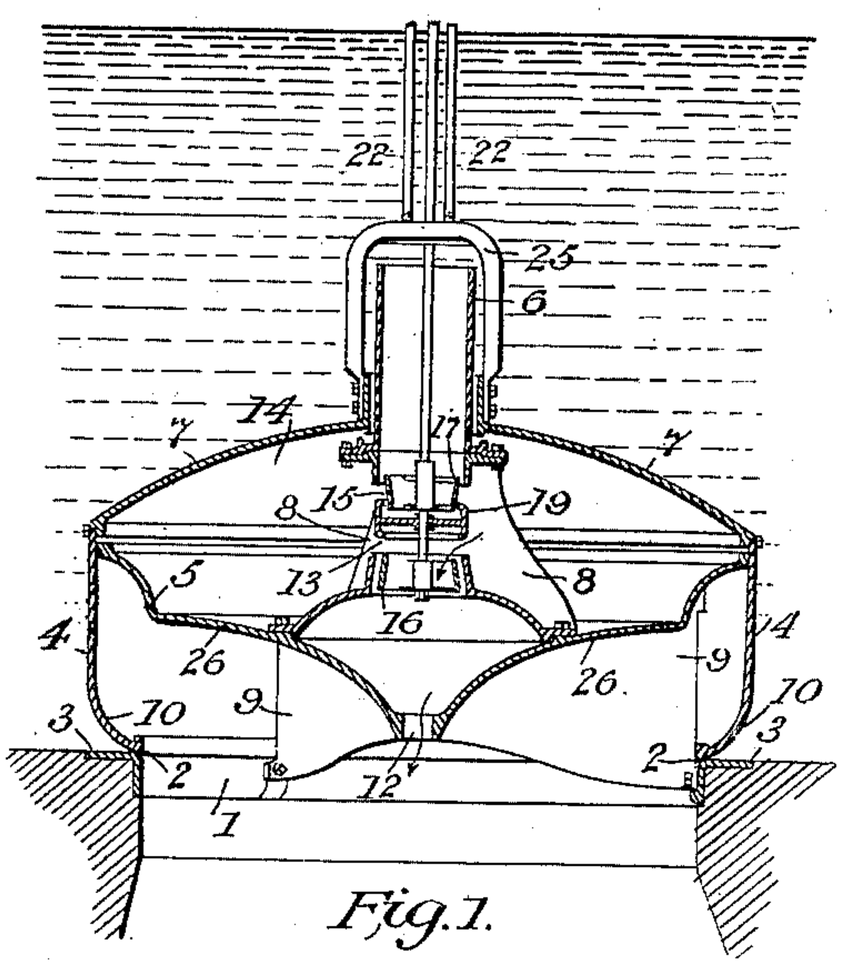


Fig. 1.

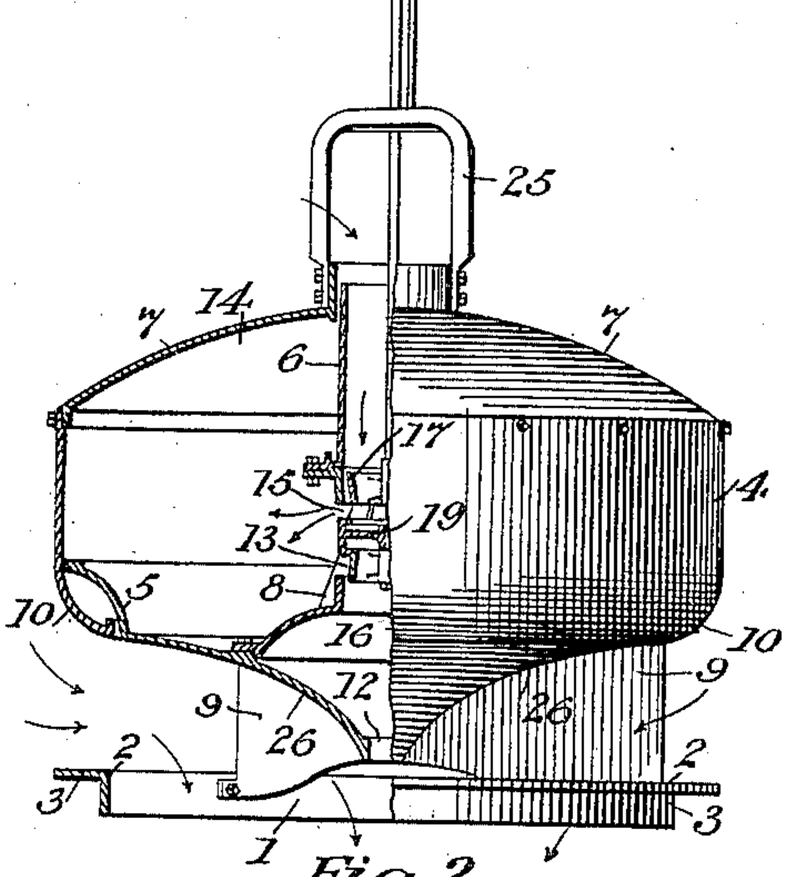


Fig. 2.

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UNITED STATES PATENT OFFICE.

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VALVE GATE OR COVERING.

SPECIFICATION forming part of Letters Patent No. 679,364, dated July 30, 1901.

Application filed February 6, 1901. Serial No. 46,195. (No model.)

To all whom it may concern:

Be it known that I, SANFORD L. CLUETT, a citizen of the United States, residing at Hoosick Falls, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Valves, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

Figure 1 of the drawings is a view in central vertical section of my improved valve seated. Fig. 2 is a view, partly in elevation and partly in central vertical section, of the same in an open position. Fig. 3 is a view in perspective of the double valve gate and stem for controlling the fluid-supply to the chamber in the hollow main valve-gate.

The principal objects of my invention are to utilize the fluid-pressure in a supply-reservoir for operating a valve controlling an outlet from such reservoir, to secure stability of construction, and to facilitate the flow of fluid through the outlet when the valve is opened.

My invention is applicable to valves for controlling various fluids, but is more particularly adapted for hydraulic valves.

I have shown in the drawings the invention in its application to a valve adapted to control the outlet from a hydraulic reservoir.

1 represents an outlet-passage surrounded by a valve-seat 2, formed upon a supporting structure 3, which may be part of the bottom of a supply-reservoir, such as a lock-chamber. The outlet-passage 1 is adapted to be closed by a hollow valve 4, movable within said reservoir toward and from the seat 2. This hollow gate is guided in its movements toward and from its seat by the diaphragm 5, extending transversely of and fitting the hollow interior of the gate, and by the stand-pipe 6, which projects through a contracted aperture in the outer end wall 7 of the gate. The inner end of this hollow gate is open, as shown at 9, said opening being surrounded by an introverted convexed seating-flange 10, forming the inner termination of the side walls of the gate. The stand-pipe 6 is rigidly connected with the diaphragm 5 by the web mechanism 8, and said diaphragm is rigidly connected by the webs 9 with the supporting structure 3, said webs extending directly through the open end 9 of the gate. The several webs, diaphragm, and stand-pipe are all thus rigidly secured together and in fixed relation to the valve-seat 2 and serve as supports and guides for the hollow gate. The diaphragm 5 is provided with a central outlet 12, communicating with the outlet-passage 1 through the open end of the gate, said outlet 12 communicating through the port 13 with the chamber 14, formed between said diaphragm and the end wall 7 of the gate. The stand-pipe 6 opens at its outer end to the main supply-reservoir and at its inner end through the port 15 to the chamber 14, forming a means of communication between said chamber and reservoir. The ports 13 and 15 are adapted to be closed, respectively, by the valve-gates 16 and 17, fixed upon a common valve-stem 18, which passes through the transverse diaphragm 19, mounted on the web structure 8 in position to separate from each other the seats for the respective gates 16 and 17. These gates are so mounted upon the valve-stem 18 that an upward movement of said stem will open the port 15 and close the port 13, while a downward movement will close the port 15 and open the port 13. By suitably operating this valve-stem the chamber 14 can thus be placed in communication either with the main supply-reservoir or with the outlet-passage 1 therefrom. This valve-stem may be operated in any known manner, as by a hand-wheel 20. The valve-seats surrounding the ports 13 and 15 preferably face or taper in opposite directions, and the gates 16 and 17 in like manner are tapered in opposite directions relatively to each other and each similarly to its respective valve-seat, whereby provision is made for compensation for wear and securing at all times an accurate fitting of each valve to its seat.

The operation of the valve is as follows, it being understood that the hollow gate is seated in the position shown in Fig. 1 at the bot-

tom of the main supply-reservoir and exposed externally to and held to its seat by the fluid-pressure of such supply, the port 15 being closed and the port 13 being open: The hand-wheel 20 being operated to raise the valve-stem 18, the port 13 will be closed by the gate 16 and the port 15 will be opened, permitting the fluid-supply from the main reservoir to pass through the stand-pipe and port 15 into the chamber 14. The internal and external areas of the end wall 7 of the hollow gate are approximately the same, and when the water has filled the chamber 14 the downward pressure on the outer surface of the end wall 7 will be practically the same as the upward pressure exerted thereon by the fluid in the chamber 14, the weight of the body of water contained in said chamber being sustained by the supporting structure 3 through the webs 9 and diaphragm 5. The internal and external pressures upon the end wall 7 of the gate thus practically balance each other. The introverted flange 10 on the seating end of the gate forms a considerable area of external gate-surface exposed to the upward pressure of the fluid-supply in the main reservoir without any counterbalancing internal pressure. When this unbalanced pressure is greater than the weight of the hollow gate, the latter will be thereby forced upwardly to the position shown in Fig. 2, and the water can then flow freely from the supply-reservoir through the outlet-passage 1. Should the upward pressure upon the flange 10 be less than the weight of the gate, it can be supplemented by a counterweight 21, connected with one end of the cable or cables 22, passing over a pulley or pulleys 23, rotary upon a fixed support 24, the other end of said cable or cables being connected with a yoke 25, fixed upon said gate. The valve being open in the position shown in Fig. 2 can be closed in either of two ways. If the supply of water is exhausted, all pressures upon the gate being balanced, it drops to its seat by reason of its own weight, the fluid contained in the chamber 14 escaping therefrom back through the port 15 and stand-pipe as the gate descends. If the supply of water continues, the valve may be closed by operating the hand-wheel 20 to cause a downward movement of the valve-stem 18 to close the port 15 and open the port 13, thus cutting off communication between the chamber 14 and the main fluid-supply and opening said chamber 14 through the port 13 and outlet 12 to the outlet-passage 1. The internal pressure upon the end wall 7 of the gate is thus destroyed, whereupon the downward external pressure upon said end wall 7 exceeds and overcomes the upward pressure upon the flange 10 and forces the gate to its seat, the downward movement of the gate being assisted by gravity.

The valve-gates 16 and 17 can be so operated as to vary the size of the port-openings 13 and 15, and thus accelerate or retard the movements of the main gate, which can thus be maintained under the control of a person operating the hand-wheel 20.

The diaphragm 5 is provided on its lower side with a concaved deflecting-surface 26, which converges toward the outlet-passage 1 and which is so located that when the valve is fully opened the convexed flange 10 on the lower end of the gate will terminate in line with said concaved deflecting-surface 26. I am thus able to provide when said valve is open an approximately-continuous reversely-curved deflecting-surface adjacent to the valve-seat and outlet-passage 1, whereby the fluid entering said passage is deflected and its direction gradually changed without materially retarding the flow or causing loss of head.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a valve or the like, the combination with a fluid-supply reservoir provided with an outlet surrounded by a valve-seat; of a gate movable toward and from said seat and provided with oppositely-disposed surfaces wholly contained within said supply-chamber; and means for regulating the application of the fluid in said supply-chamber to one of said oppositely-disposed gate-surfaces, whereby said fluid-supply can be utilized to either open or close said gate, substantially as described.

2. In a valve or the like, the combination with a fluid-supply reservoir provided with an outlet surrounded by a valve-seat; of a hollow gate movable toward and from said seat, and having oppositely-disposed interior and exterior surfaces exposed to the fluid-supply in said reservoir, and means for regulating the application of said fluid-supply to one of said surfaces.

3. In a valve or the like, the combination with a fluid-supply reservoir provided with an outlet surrounded by a valve-seat; of a hollow gate movable toward and from said seat within said supply-chamber and exposed exteriorly to the fluid-supply therein; a diaphragm supported in fixed relation to said seat and extending transversely of, and fitting, the interior of said gate; and means for regulating the admission of fluid under pressure from said supply-chamber to, and its escape from, the interior of the hollow gate between its outer end and said diaphragm.

4. In a valve or the like, the combination with a liquid-supply reservoir provided with a bottom outlet surrounded by a valve-seat located in a horizontal plane; of a hollow gate movable toward and from said seat; a diaphragm supported above, and in fixed relation to, said seat, and extending horizontally across, and fitting, the interior of said hollow gate; and means for regulating the supply of liquid under pressure from said supply-chamber to the interior of the gate between its outer end and said diaphragm.

5. In a valve or the like, the combination with a fluid-supply reservoir provided with an outlet surrounded by a valve-seat; of a hol-

low gate movable toward and from said seat; a diaphragm extending transversely of, and fitting, the interior of said gate, and supported in fixed relation to said seat; an inlet leading from said supply-chamber to the gate-chamber formed between the outer end of the gate and said diaphragm; an outlet leading from said gate-chamber past said diaphragm through an opening in the inner end of the gate to the outlet-passage of the fluid-supply chamber; valve mechanisms for controlling said inlet and outlet passages communicating with the gate-chamber; and means for operating said valve mechanisms to simultaneously open one and close the other of said gate-chamber passages.

6. In a valve or the like, the combination with a fluid-supply reservoir provided with an outlet surrounded by a valve-seat; of a hollow gate movable in said reservoir toward and from said seat, said gate having a closed outer end, and closed sides introverted and convexed to form a contracted seating-surface; a diaphragm supported in fixed relation to said seat and extending transversely of, and fitting, the interior of the hollow gate, said diaphragm being of greater area than the space inclosed by the seating-surface on said gate; and means for supplying fluid under pressure to the interior of the gate between its outer end and said diaphragm.

7. In a valve or the like, the combination with a valve-seat surrounding a fluid-passage; and a deflector supported in fixed relation to said seat and provided with a fluid-deflecting surface inclined toward said fluid-passage; of a gate movable toward and from said seat and provided near its seat-engaging end with an inclined fluid-deflecting surface, adapted when said gate is open to terminate in line with the inclined surface on said deflector; and means for operating said gate.

8. In a valve or the like, the combination with a valve-seat surrounding a fluid-passage; a hollow gate movable toward and from said seat and provided on its seat-engaging end with a convexed surface; of a diaphragm supported within said gate at a distance from said seat sufficient to permit the desired quantity of fluid to pass between said seat and diaphragm, said diaphragm being provided with a deflecting-surface concaved toward said passage; and means for operating said gate to bring its convexed end, when closed, into engagement with said valve-seat, and, when open, into line with the concaved deflecting-surface of the diaphragm to form an approximately continuous, reversely-curved, deflecting-surface adjacent to said seat and passage.

9. In a valve or the like, the combination with a valve-seat; and a hollow gate movable toward and from said seat and having an end wall provided with a contracted aperture; of a diaphragm supported in fixed relation to said seat and extending transversely of, and fitting, the interior of the gate-body; a stand-pipe supported in, and fitting, said contracted end aperture in the gate and in fixed relation to said diaphragm, said pipe opening at its outer end exteriorly of the gate and at its inner end interiorly thereof between the end wall thereof and said diaphragm.

10. In a valve or the like, the combination with a supporting structure provided with a valve-seat; and a hollow gate provided at its inner end with a seating-surface surrounding an opening therein, and having its outer end provided with a contracted aperture; of a diaphragm extending transversely of, and fitting, the interior of the gate; a stand-pipe rigidly connected with said diaphragm and projecting through and fitting said contracted aperture in the outer end of the gate; and rigid supporting connections between said rigidly-connected stand-pipe and diaphragm and said supporting structure, extending through said opening in the inner end of the gate.

11. In a valve, the combination with a tubular case having oppositely-tapered, interior seats located on opposite sides of a transverse diaphragm, and provided with outlets extending laterally through said seats; of a pair of oppositely-tapered, tubular gates adapted to singly engage the respective seats; and a valve-stem common to said gates and passing through said diaphragm, substantially as described.

12. A self-operating valve, gate or covering consisting essentially of but three parts, namely; a fixed-base diaphragm and stand-pipe fixed firmly together; a movable part, the valve proper; and an operating mechanism.

13. In a valve or the like, the combination with a fluid-supply reservoir provided with an outlet surrounded by a valve-seat; of a hollow gate movable toward and from said seat, and having oppositely-disposed interior and exterior surfaces exposed to the fluid-supply in said reservoir, means for regulating the application of said fluid-supply to one of said surfaces, and a counterweight connected with said hollow gate.

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

SANFORD L. CLUETT.

Witnesses:
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ALBERT M. CAMPBELL.