2 Sheets--Sheet 1.

J. GURNEY.

Construction of Taps or Valves.

No. 151,969. Patented June 16, 1874.

Fig: 1.

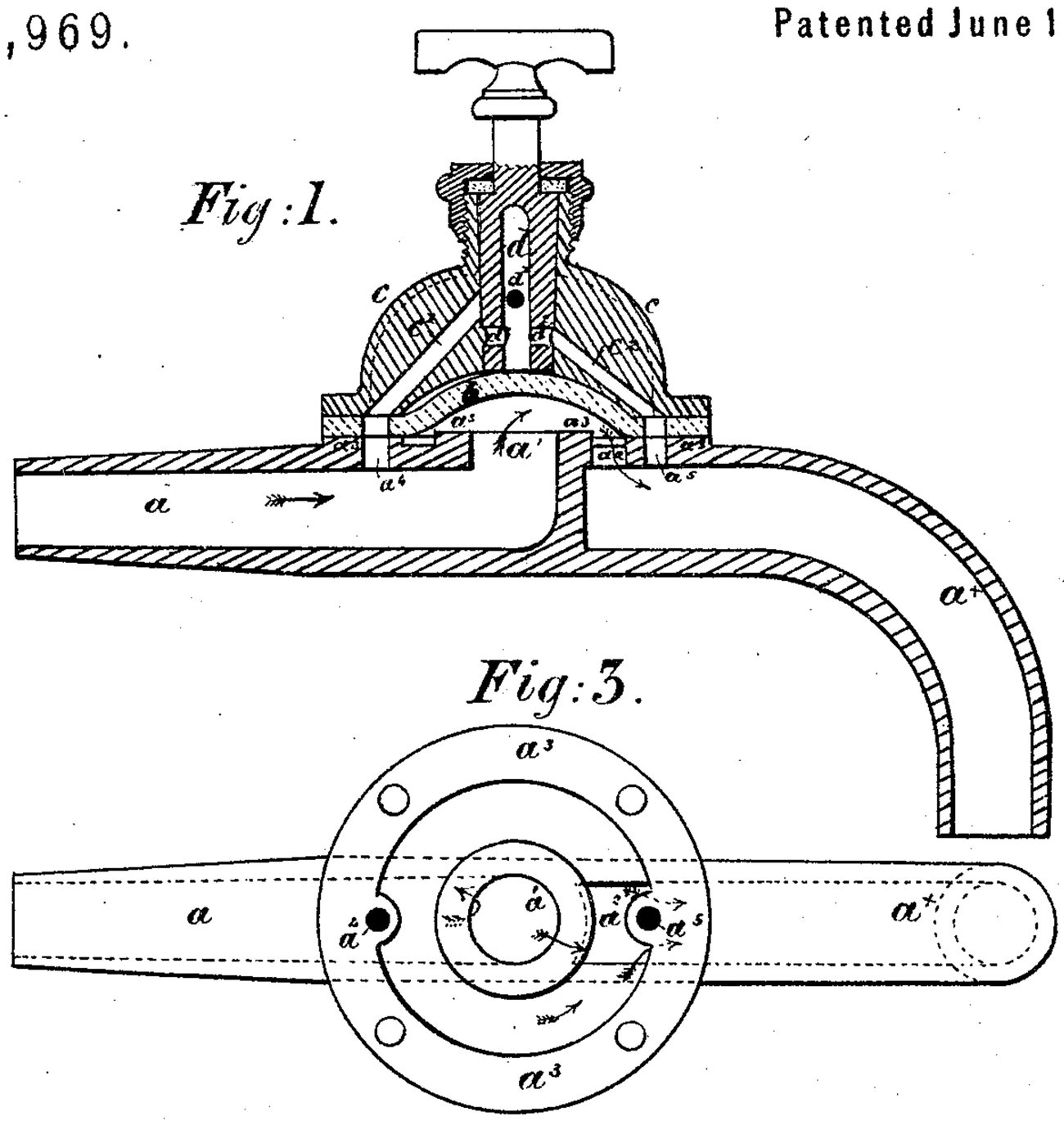
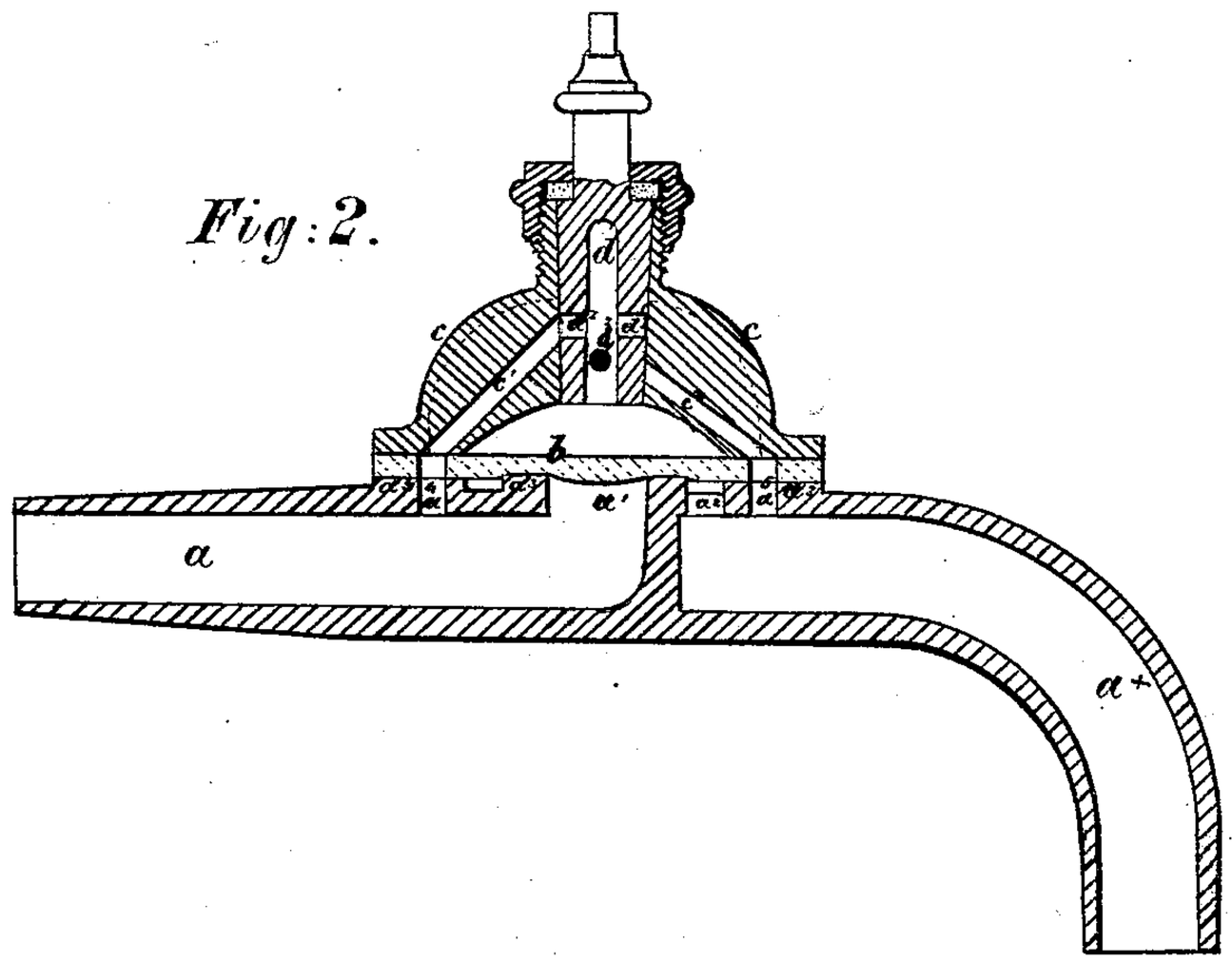


Fig: 3.

Fig: 2.



WITNESSES.

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INVENTOR.

John Gurney

by Knight Bros

2 Sheets--Sheet 2.

J. GURNEY.

Construction of Taps or Valves.

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Fig: 4.

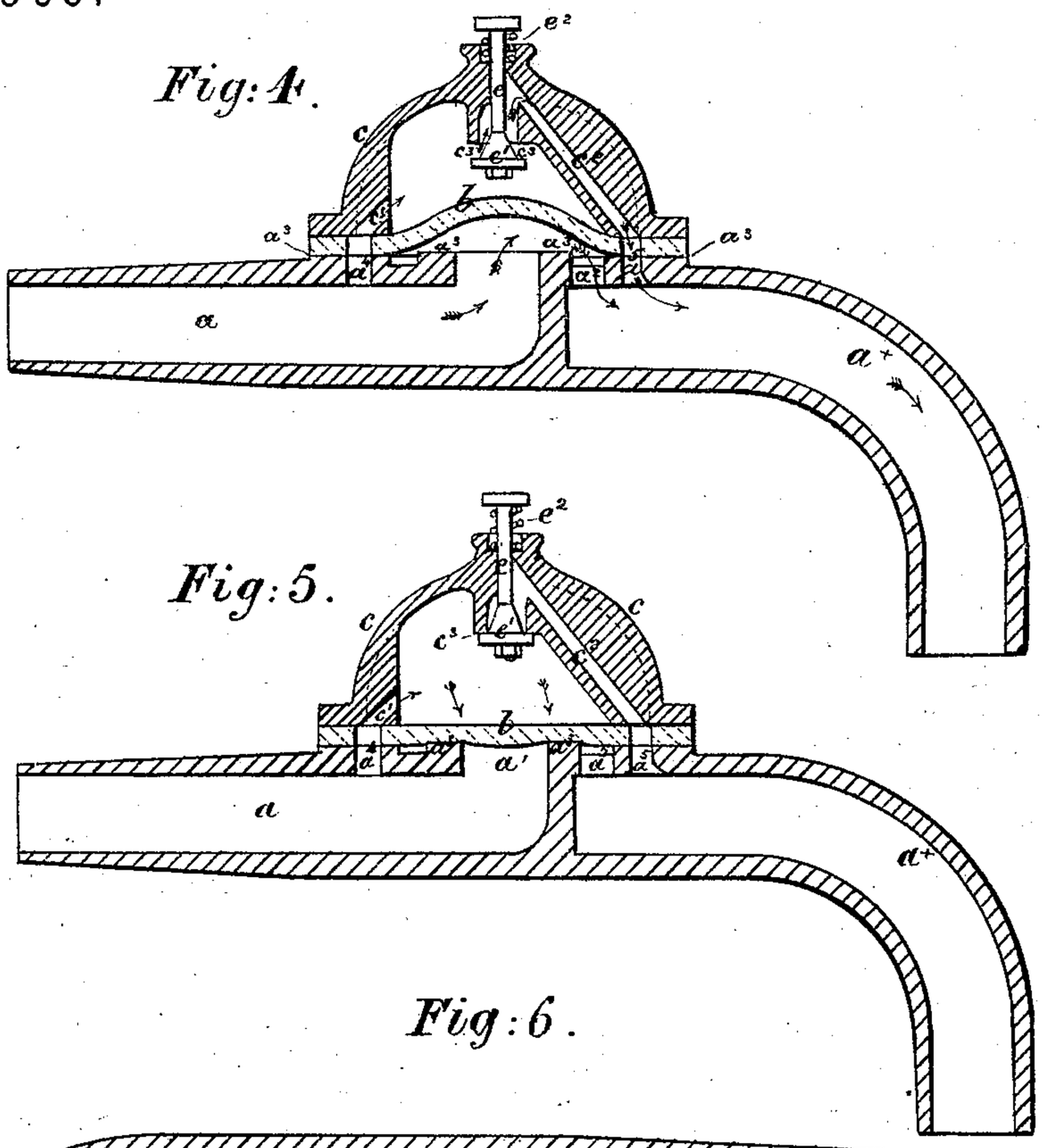


Fig: 5.

Fig: 6.

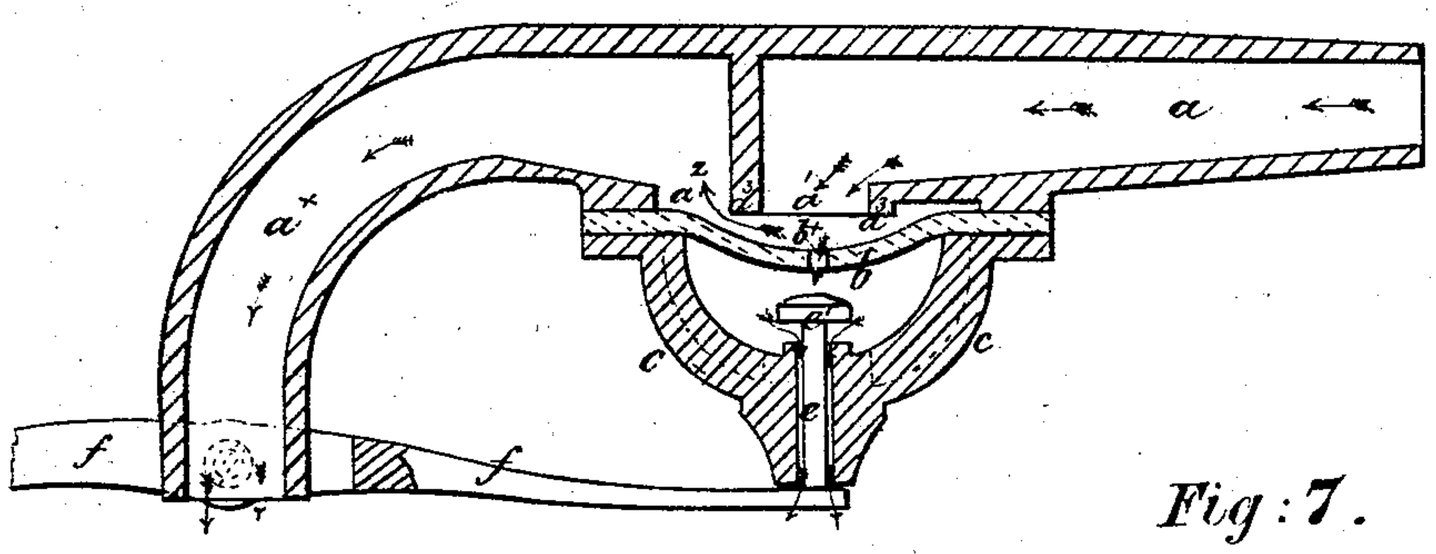
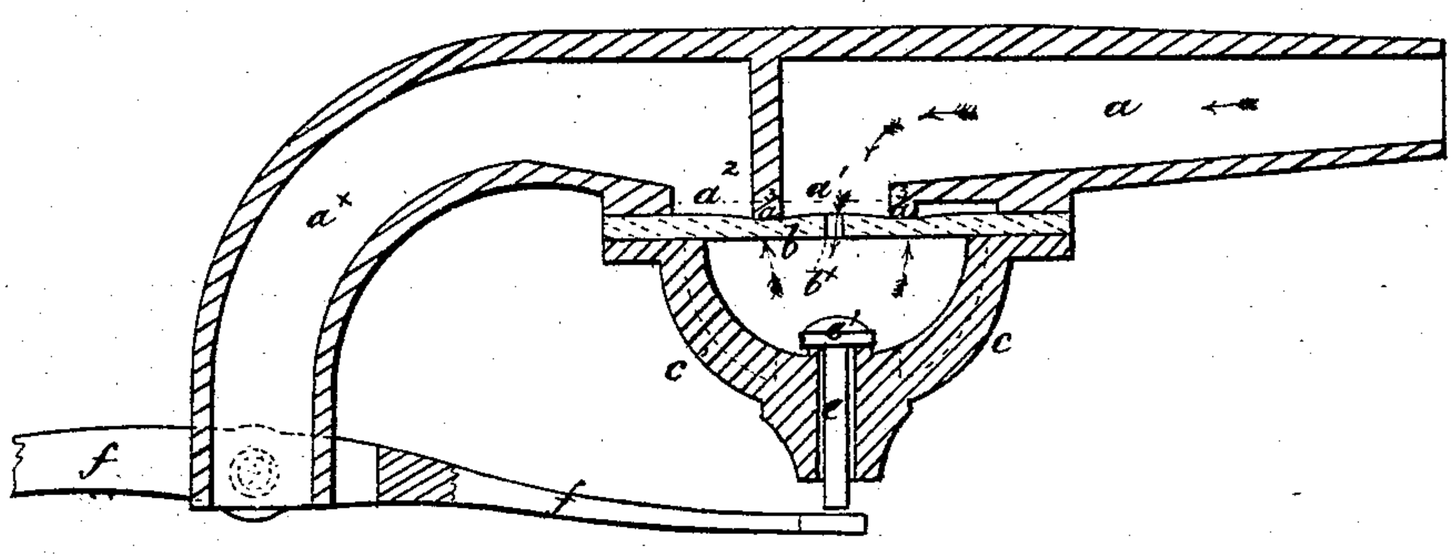


Fig: 7.



WITNESSES.

Jas. L. Lewis

Walter Allen

INVENTOR.

John Gurney

by Knight Bros

UNITED STATES PATENT OFFICE.

JOHN GURNEY, OF BRADFORD, ENGLAND.

IMPROVEMENT IN THE CONSTRUCTION OF TAPS OR VALVES.

Specification forming part of Letters Patent No. **151,969**, dated June 16, 1874; application filed April 22, 1874.

To all whom it may concern:

Be it known that I, JOHN GURNEY, of Bradford, in the county of York, England, merchant, have invented certain Improvements in the Construction of Taps or Valves, of which the following is a specification:

The invention has for its object improvements in the construction of that class of taps or valves in which an india-rubber or other flexible diaphragm is used, and relates to the employment of means whereby they are rendered more secure in their action and more durable than heretofore. For this purpose I dispense with any mechanical means for acting directly upon the diaphragm, thereby enabling the diaphragm to be made solid or without any hole in the moving portion thereof, while the pressure of the liquid or fluid is caused to open or close the passage through the tap or valve by acting upon one or the other side of the said diaphragm. I construct the tap or valve with a cover, between which and the body of the tap or valve the diaphragm is placed, and securely held by means of screws connecting the cover to the body of the tap or valve, as is well understood. The diaphragm, when the passage through the tap or valve is closed, rests upon a seat, as heretofore, to close the passages through the tap or valve, and the mode in which I cause the diaphragm to operate to open and close the outlet-orifice is as follows:

Between the diaphragm and the cover a space or chamber is formed, and in the cover I form two passages, which communicate with holes or openings formed in the body of the tap or valve and through the diaphragm. One of these passages is open to the supply and the other is open to the outlet, and I employ a small tap or valve to place one or other of these passages in communication with the chamber between the cover and the diaphragm, and to close the other. Thus, when the passage communicating with the supply is placed in communication with the interior of the chamber by acting upon the small tap or valve, the liquid from the supply is admitted into the chamber, and the pressure thereof acts to keep the diaphragm to its seat, and thereby stop the flow of liquid or fluid through the tap or valve; but when the passage communicating with the outlet is opened, the pressure within the chamber will be reduced, so that the pressure from the supply will be enabled to raise the diaphragm from its seat, and permit the passage of liquid or fluid through the tap or valve.

As modifications of the above, the space above the diaphragm may be always open to the supply; and instead of making the holes at the edges of the diaphragm, a single small hole may be made through the center thereof.

And in order that my said invention may be more clearly understood and readily carried into effect, I will proceed, aided by the accompanying drawings, more fully to describe the same.

Figures 1 and 2 are longitudinal sections of a valve or tap constructed according to my invention, and Fig. 3 is a plan of the same with the upper part or cover removed. In this arrangement of tap or valve, an ordinary handle is employed to operate it, and it is preferably arranged as shown in the drawings, so that when it is standing in a line with the barrel of the tap or valve the latter is open for the passage of water therethrough, and when standing in a direction across the barrel the tap or valve is closed. Figs. 4 and 5 are longitudinal sections of another valve or tap constructed according to my invention, but arranged as a push-tap; and Figs. 6 and 7 are longitudinal sections of another valve or tap arranged as a ball-tap, and showing a modification of my invention.

Similar parts are marked with similar letters of reference in all the figures.

At Figs. 1, 4, and 6, the taps or valves are shown as they would appear when water is passing through them, and at Figs. 2, 5, and 7 they are shown closed. *a a** is the barrel of the tap or valve, which is provided with passages a^1 and a^2 leading from the inlet *a* to the outlet *a** of the barrel. The barrel of the tap or valve is also provided with a circular seat or flange, a^3, to receive a disk or diaphragm of vulcanized india-rubber, *b*, which is secured in position by the cap or cover *c*, which is secured to the flange a^3 by screws passing through the flexible disk *b*. The flexible disk or diaphragm *b*, it will be seen, is secured in position at its edges, and in the arrangements shown at Figs.

1, 2, 3, 4, and 5 is not perforated at its center, as is the case with ordinary diaphragm taps or valves. The flange or seat a^3 has formed therein two holes, a^4 a^5. The hole a^4 communicates with a passage, c^1, formed in the cap or cover c with the inlet portion of the barrel a, while the hole a^5 communicates with a passage, c^2, formed in the cap or cover c, and with the outlet portion of the barrel a.

In the arrangement shown in Figs. 1, 2, and 3, I operate the tap or valve by means of a hollow conical plug, d, having holes d^1 d^2 formed therein. The holes d^1 are in a position to communicate with the passages c^1 a^4, and the holes d^2 are in a position to communicate with the passages c^2 a^5. Thus when the plug d is in the position shown at Fig. 1, the inlet of water through the hole a^4, passage c^1, and hole d^1 is cut off from the space in the cap or cover c above the flexible diaphragm b, while such space is placed in free communication with the outlet portion of the barrel a by a hole, d^2, passage c^2, and hole a^5, when the pressure of water, being cut off from the upper side of the diaphragm b, and allowed to act only on the under side thereof, the water will flow freely through the tap or valve in the direction shown by the arrows; but when the plug d is in the position shown at Fig. 2, free communication is formed by the hole a^4, passage c^1, and the hole d^1 with the space above the flexible diaphragm b, in which position the pressure of water is caused to act on the upper side of the diaphragm b to keep it close to its seat, and thereby prevent the passage of water through the tap or valve.

In the arrangement shown at Figs. 4 and 5, the mode of operating the tap or valve is somewhat modified. In this latter case the conical plug d is replaced by a spindle, e, having a valve, e^1, formed or fixed on the lower end thereof, to act against a seat, c^3, formed in the cap or cover c; and the passage c^2 is put in communication with the space or chamber above the diaphragm b, when desired, by depressing the spindle e, when, by the pressure above the diaphragm b being reduced, the water coming from the inlet a will lift the diaphragm b, and pass out through the outlet a^*. A spring, c^2, is employed to assist in closing the valve e^1 against the seat c^3. In this arrangement it will be seen that the passage c^1 is always in communication with the space above the diaphragm b, and, if desired, such may be the case with the other arrangement shown at Figs. 1, 2, and 3, in which case, instead of forming the plug d with holes d^1 to act in connection with the passage c^1, such holes d^1 may be dispensed with, and the passage c^1 may be opened direct into the space above the diaphragm b.

It is evident that other arrangements of means for putting the space above the diaphragm b into communication with the outlet a^*, and thereby dimishing the pressure in such space, may be employed without departing from the nature of my said invention; and, if desired, my improved tap or valve may be arranged to act as a ball-tap.

It will be observed that, according to my invention, the diaphragm b is not directly connected to any mechanical means; and that in the arrangements shown at Figs. 1, 2, 3, 4, and 5 the moving part thereof is without any perforation, and is, therefore, not so liable to injury as when connected to means directly operating it; and this part of my invention is also applicable to valves or taps in which a plunger is caused to press the diaphragm to its seat.

In the modification shown at Figs. 6 and 7, which represent a ball-tap, the parts are reversed in position; and instead of forming the diaphragm b with holes a^4 a^5 therethrough at the edge, as in the previous figures, it is provided with a hole, b^*, in the center thereof, through which hole the space between the diaphragm b and the cover c is continually open to the supply. The end of a ball-lever, f, acts upon the valve-spindle e to raise it from its seat, and thereby release the pressure from the interior of the chamber or space between the diaphragm b and cover c, the water in which is free to pass out thereof around the spindle e.

I would here remark that I am aware that a diaphragm has been previously operated in a somewhat similar manner to that herein shown and described; but in such case the diaphragm has not been arranged to act directly upon a valve-seat, and so open or close the passage through the valve or tap; but it has been connected to a smaller valve, and has been the means by which such smaller valve was operated.

Having thus described the nature of my said invention, and the mode in which I propose to carry the same into effect, I would have it understood that what I claim is—

In a tap or valve, the combination of a diaphragm to close the water-way, operated by the pressure of water, and a supplemental tap or valve to control said pressure.

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