

G. MILNE & W. H. GANTS.
Valve for Water Closets.

No. 231,967.

Patented Sept. 7, 1880.

Fig. 1.

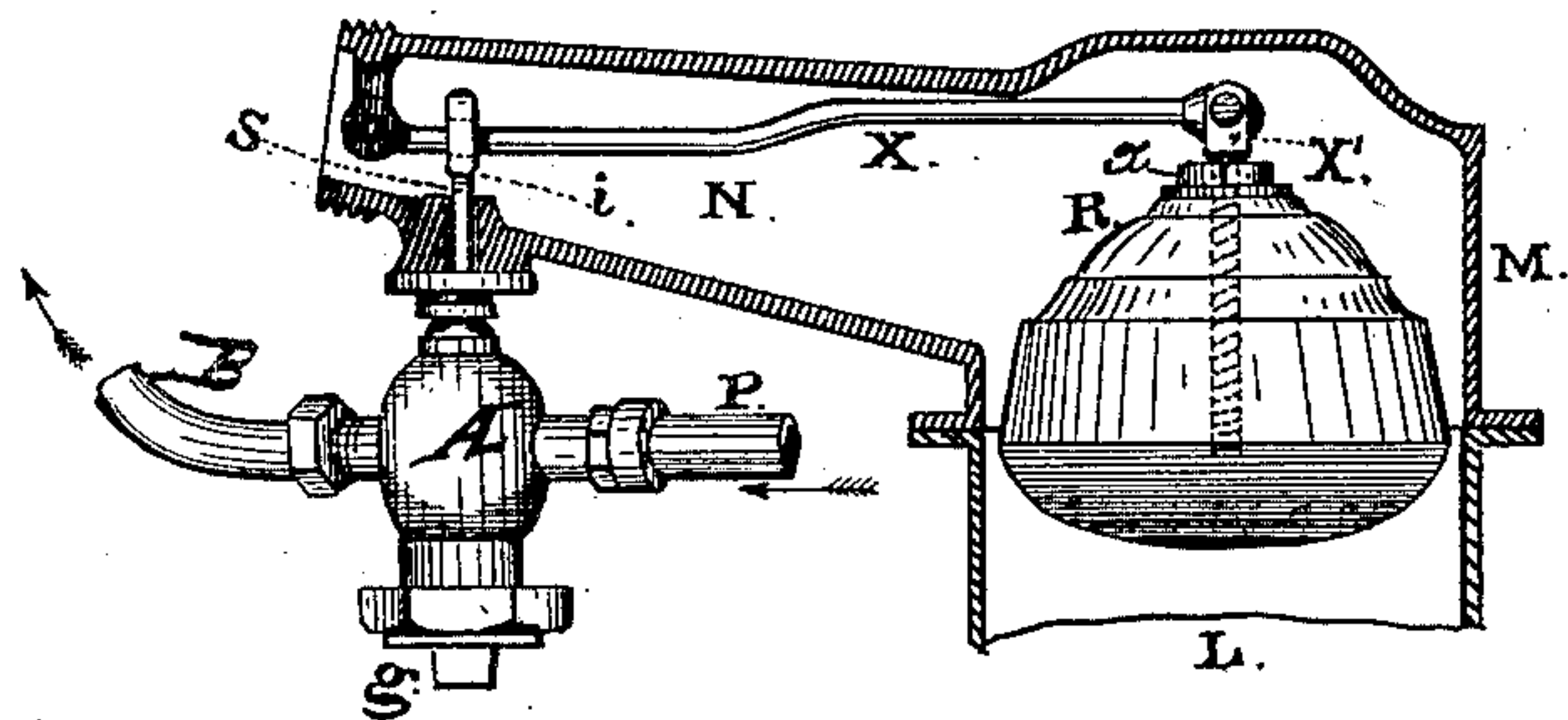


Fig. 2.

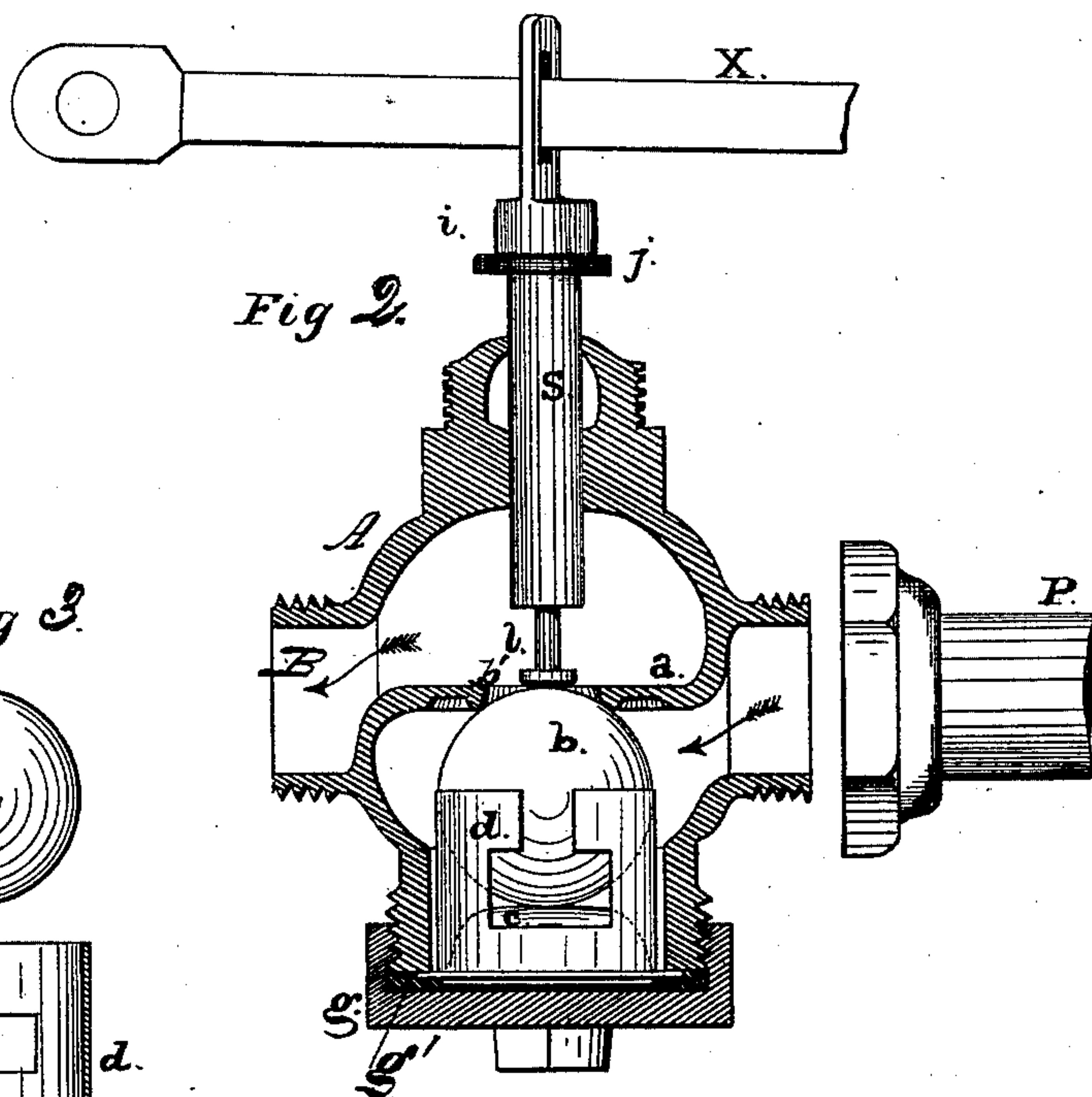
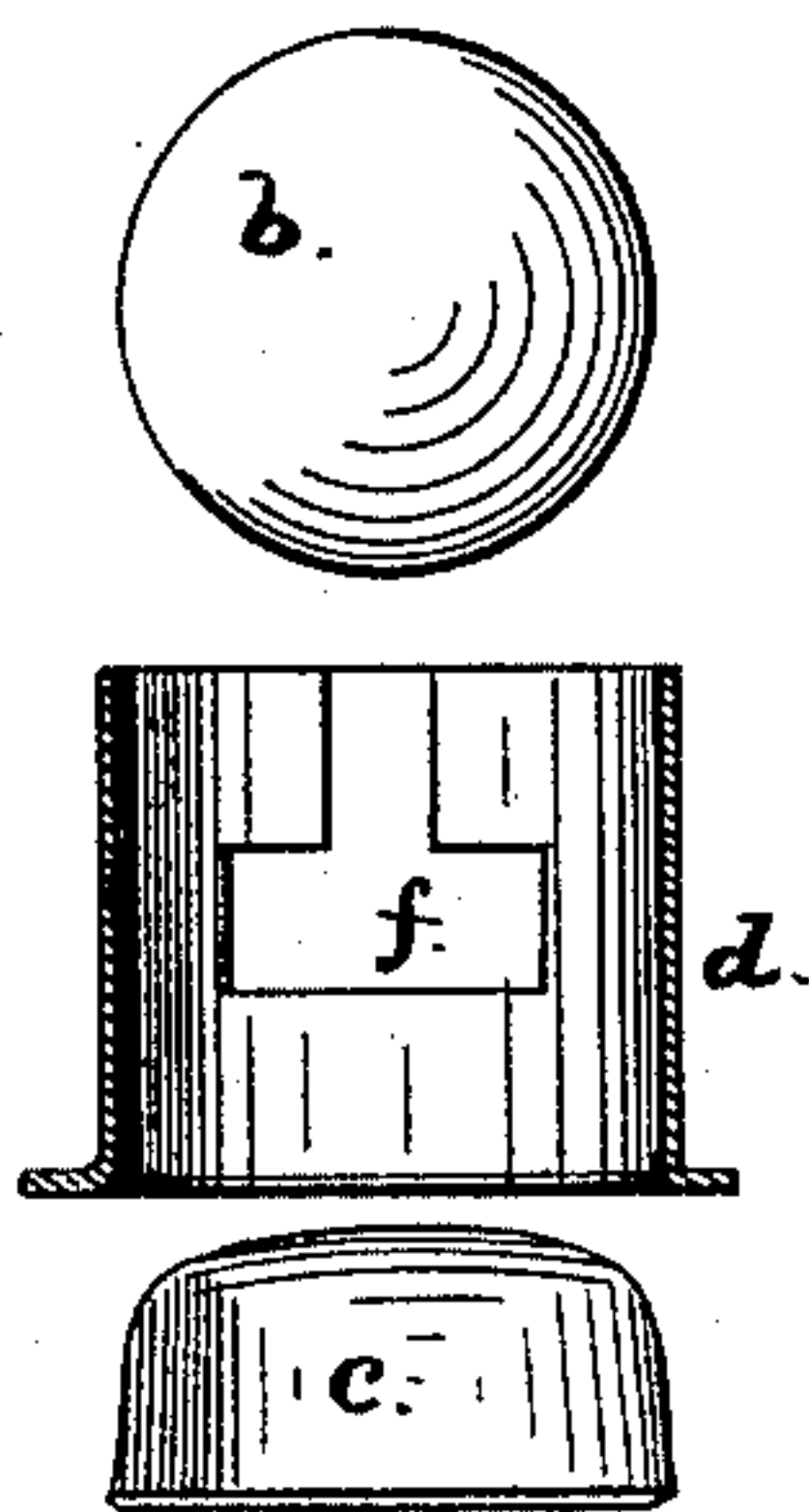


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

GEORGE MILNE AND WILLIAM H. GANTS, OF SAN FRANCISCO, CALIFORNIA.

VALVE FOR WATER-CLOSETS.

SPECIFICATION forming part of Letters Patent No. 231,967, dated September 7, 1880.

Application filed December 31, 1879.

To all whom it may concern:

Be it known that we, GEORGE MILNE and WILLIAM H. GANTS, both of the city and county of San Francisco, in the State of California, have made and invented a new and useful Improvement in Supply-Valves for Water-Closets; and we do hereby declare that the following is a full, clear, and exact description of our said invention, reference being had to the accompanying drawings.

Our invention relates to an automatic valve and its operating mechanism, which admit a certain quantity of water to the closet to supply the bowl as often as it is emptied of its contents.

It relates, first, to an improved construction of valve which is operated by means of a pressure stem or plunger, and the combination of said valve and plunger with the water-chamber of an actuating-float and float-lever, by which we prevent any leakage of water around the stem or plunger to the outside; second, to a means for adjusting the float so that it shall act to hold down the plunger a greater or less length of time to admit more or less water through the valve, as may be required to supply the bowl; third, to a means for aiding the pressure of water to raise and close the valve as the pressure is removed from the plunger whenever, from any cause, there is a variation in the water-pressure or the force and head of water is not sufficient to throw up the valve to its seat.

By this construction and arrangement of parts we are enabled to dispense with the usual water-tank, and to take the supply of water for the closet directly from the main or service pipe. We are also able to work the valve automatically with a short lever and a float of light weight, thereby rendering the parts smaller and more compact in form, all which will be more fully set forth hereinafter.

Referring to the said drawings, Figure 1 is a view showing the application of our valve to the float of our water-closet, described in a former application for patent. Fig. 2 is a sectional elevation of our valve, and Fig. 3 is a detailed view of the same.

The valve-chamber A has a partition, *a*, extending across it, with a water passage or inlet, *b'*, which is closed by the valve *b*. The pipe P conducts the water from the main or

service pipe, and supplies it to the chamber A below the valve-opening *b'*, while the pipe B connects with the chamber above the partition.

The valve employed by us consists of a hard-rubber or other ball, *b*, placed below the seat, and held up to it by the pressure of the water when the valve is closed, and pressed and held back therefrom by the stem or plunger *l* when the water is to be admitted. This ball is seated upon an elastic cushion or spring, *c*, placed in the lower part of the valve-chamber, and is termed by us a "cushion ball-valve." This cushion *c* acts to raise the ball *b* up to its seat in the partition when a small head or pressure of water is on that is not sufficient of itself to properly throw up the valve, and the full force of the water is brought underneath the valve by this means, and the water promptly shut off. In many cases a light head or pressure would be sufficient to hold the ball against its seat and close the valve, and yet would not of itself be able to promptly lift the ball from its place in the lower part of the valve-chamber.

When the full pressure of water is acting against the under side of the ball and holding the valve closed, it is also reacting against the cushion or spring *c*, and depressing it more or less, so that at such time the cushion is not pressing against the ball. There is, therefore, no fixed pressure beneath the ball to be overcome by the stem or plunger, so that we can work the plunger with a short lever and a light bouyant float. This lever and float, which is shown in Fig. 1 of the drawings, we place in a water-tight chamber, M, to the under side of which we secure the valve-chamber A in such manner that the stem or plunger that opens the valve *b* shall project and work up into the water-space of the float-chamber, where it is connected with the lever X. A slot is made in the head of the stem *s*, through which the lever passes, and the end of the lever is then fulcrumed in the chamber at the point. The opposite end of the lever is attached to a screw-threaded spindle, X', that works through a screw-thread cut in the top of the float, and this spindle serves as the adjusting medium for regulating the position of the float R with regard to the lever X.

A binding-nut, *x*, is provided for locking the float at any point upon the spindle, so that the

distance between the end of the lever and the float can be regulated as required.

The greater the distance between the float and its point of suspension at the end of the lever, the sooner the water rising in the float-chamber will act upon and lift the float and its lever X, the more quickly then will the valve be caused to close and shut off the water. A greater or less quantity of water can be thus admitted through the valve to supply the bowl by simply adjusting the float upon its spindle. This is a great advantage over other methods of operating such valves by floats, where the quantity of water to be kept standing in the bowl cannot be varied after the closet is set up.

The float-chamber M is to be connected with the water-space of the bowl and discharge-pipe, so that there shall be proper communication between the two, and the water passing into the bowl through the inlet-pipe B of the valve-chamber A shall also rise into the float-chamber M and stand at the same level. The water, therefore, acts upon the float and raises the lever as it rises in the bowl and the float-chamber. The moment when the stem or plunger is lifted from the ball determines, therefore, the water-level, and this level is regulated by the position of the float upon its screw-spindle.

The lower end of the valve-chamber is closed by a screw-cap, *g*, with a flexible washer or packing, *g'*, and the ball *b* is inserted through this opening before the cap is put on.

For convenience in placing and holding the ball and its elastic cushion in proper working position with each other, we use a short guiding-cylinder, *d*, in the lower end of which we fit the cushion *c*, while the upper end receives the ball *b*. Suitable apertures are made in the side of this cylinder to admit the water underneath the ball, so that the full pressure can be brought under it. By the use of this cylinder, also, the ball is directed properly to and against its seat, and a large free water-space can be left in the lower part of the valve-chamber below the valve. This is of importance in getting a prompt action of the ball to shut off the flow through the opening as quickly as the stem or plunger is relieved of the weight of the float.

When the stem is depressed and the water is flowing through the valve to supply the bowl the collar or washer *j* upon the stem is brought down against the seat surrounding the stem where it enters the float-chamber M, so that a close joint is made at this point. The lower end of the stem S is also reduced in diameter by cutting or forming a deep groove around it in order not to fill up the inlet and water-space above the valve.

We thus provide a simple and effective valve and operating mechanism for supplying a regular quantity of water to a closet, which can be graduated at pleasure, and is operated automatically at each discharge of the contents from the closet. It is particularly adapted for

those closets in which a body of water is kept standing in the bowl and discharge-pipe to seal the outlet and prevent the escape of gases from the sewer-pipe into the apartment, and it is of such construction that the water can be supplied to the valve-chamber directly from the street-main or service-pipe, or else from a tank, it working equally well under extremes of pressure, as well as in cases where the supply is subject to variations in pressure. There is also no chance of any leakage or escape of water from any of its parts.

When the float-chamber is connected with the bowl the overflow is caused to take place through the float-chamber, and for this purpose we provide the waste-outlet, which is connected with the discharge-pipe of the closet, so that the water-level in the bowl and the float-chamber cannot rise higher than this overflow-outlet.

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The valve-chamber A, attached to the under side of the extension of the float-chamber M of a water-closet, with its ball-valve *b*, in combination with the lever X, fulcrumed at one end, its float R, and the stem or plunger S, substantially as and for the purpose described.

2. The float-chamber M, having the valve-chamber A attached thereto, the actuating stem or plunger S of which works through a water-tight aperture in the float-chamber, in combination with the float R, suspended from the end of the hinged lever X, said float being arranged to operate the valve-stem or plunger, substantially as specified.

3. In combination with the stem or pressure-plunger of a water-valve, the lever X and the float R, adjustably suspended from the end of said lever in such manner that the distance between the end of the lever and the top of the float can be made longer or shorter, as required, when said lever and float are suspended within a water-chamber, substantially as and for the purpose specified.

4. The improved water-closet valve consisting of the valve-chamber A, with its horizontal perforated partition *a*, and having the inlet-pipe P connected with it below the partition, and the outlet-pipe B connected above the partition, in combination with the ball-valve *b* and its elastic cushion *c*, placed below the said partition, substantially as and for the purpose specified.

5. In combination with the valve-chamber A and its ball-valve *b* and elastic cushion *c*, the cylinder *d*, with its apertures *f'*, substantially as and for the purpose specified.

In witness whereof we have hereunto set our hands and seals.

GEO. MILNE. [L. S.]
WILLIAM H. GANTS. [L. S.]

Witnesses:

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ROLLIN P. LANE.