No. 623,706. Patented Apr. 25, 1899.

T. DILLON.

BALL COCK.

(Application filed July 25, 1898.)

(No Model.) 2 Sheets—Sheet 1.

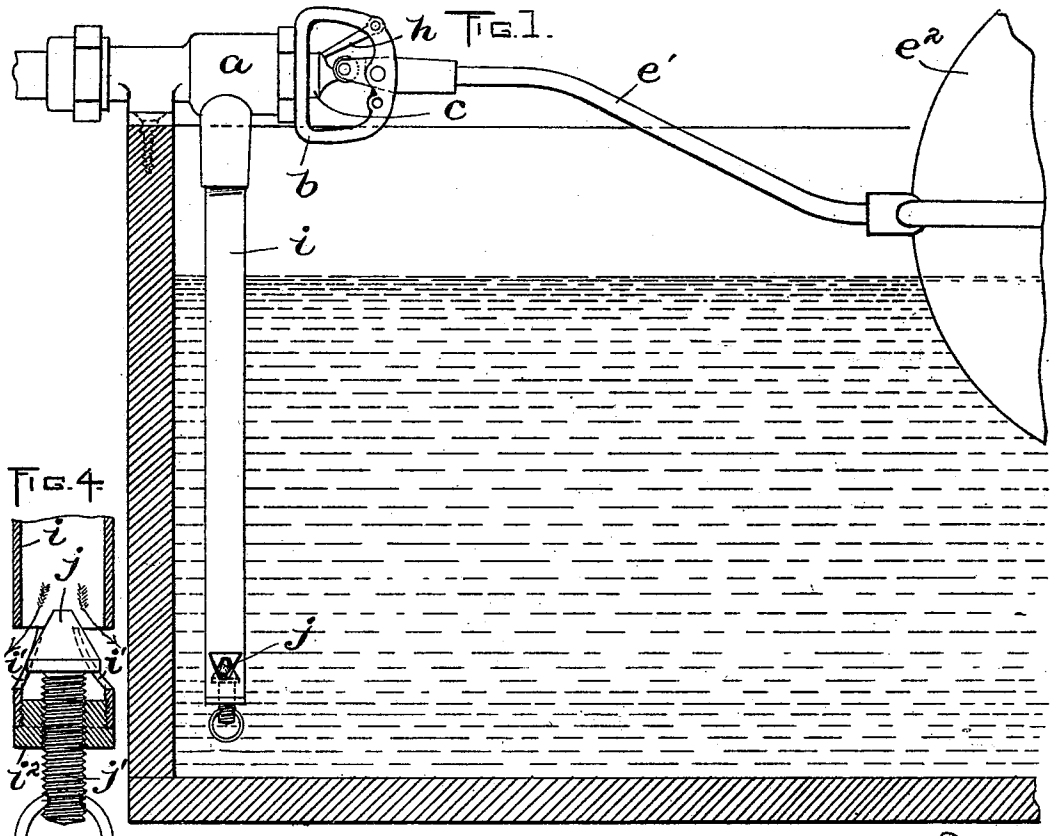

Fig. 1.

Fig. 4.

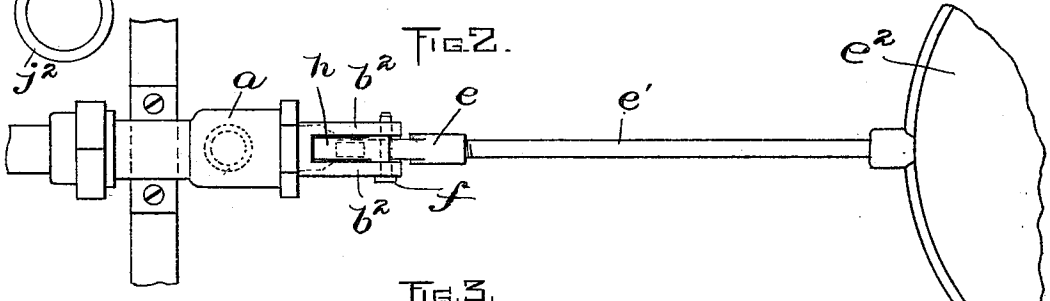

Fig. 2.

Fig. 3.

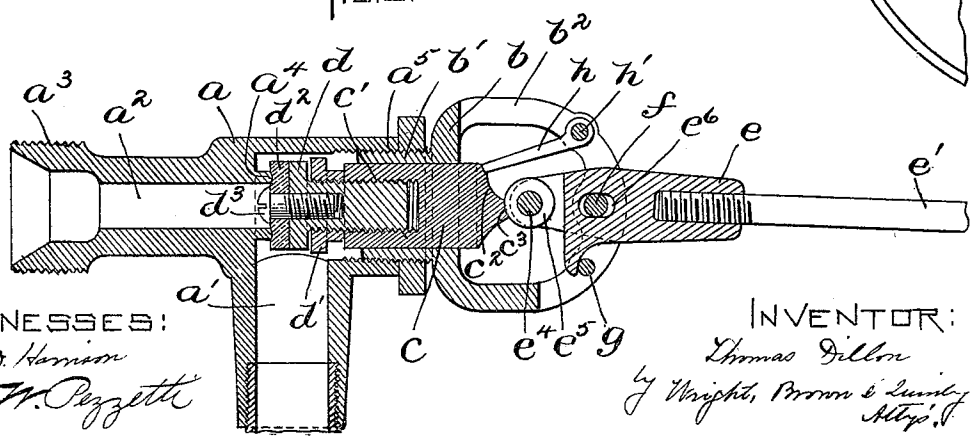

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FIG. 5.

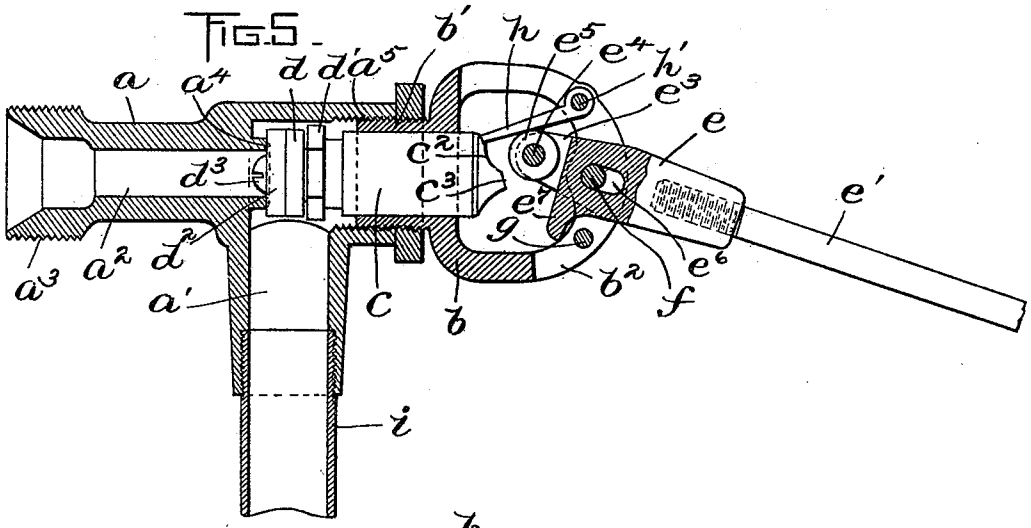


FIG. 6.

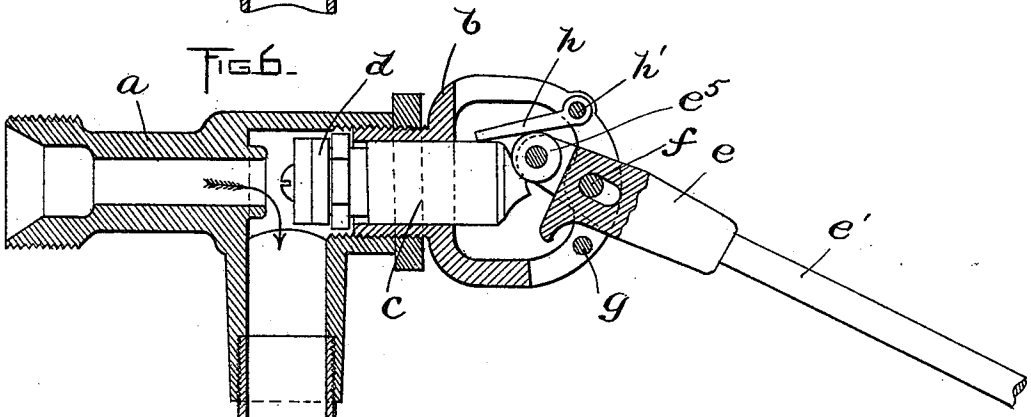


FIG. 7.

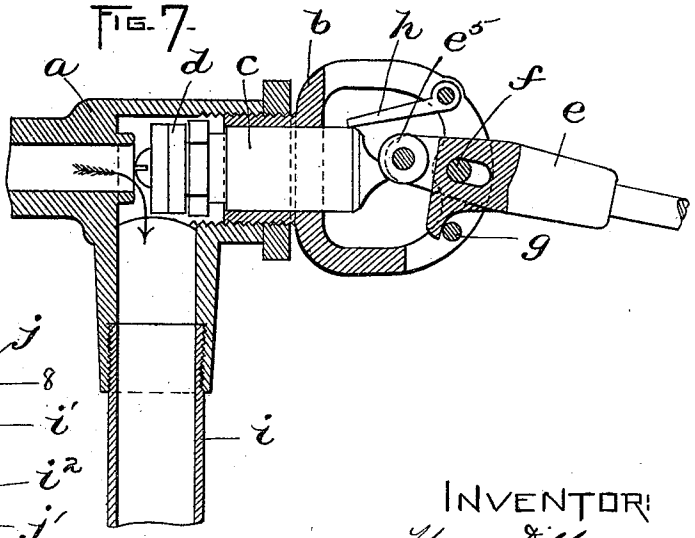
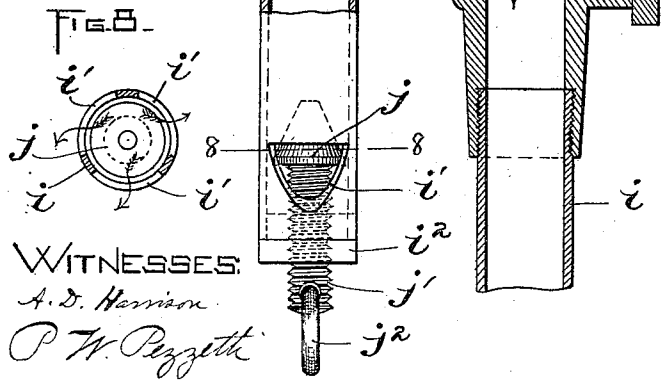


FIG. 8.



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UNITED STATES PATENT OFFICE.

THOMAS DILLON, OF WAKEFIELD, MASSACHUSETTS.

BALL-COCK.

SPECIFICATION forming part of Letters Patent No. 623,706, dated April 25, 1899.

Application filed July 25, 1898. Serial No. 686,775. (No model.)

To all whom it may concern:

Be it known that I, THOMAS DILLON, of Wakefield, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Ball-Cocks, of which the following is a specification.

This invention has relation to ball-cocks, and has for its object to provide certain improvements in the same whereby the valve may be opened and closed with rapidity, so as to prevent the disagreeable hissing noise which is noticeable when ball-cocks are employed in which the valve is moved slowly to its seat, the hissing being occasioned by the discharge of the water through the small orifice left by a partly-closed valve.

With this object in view the invention consists in certain features of novelty in construction and arrangement, which I shall now proceed to describe and claim.

Reference is to be had to the drawings accompanying this specification, in which like reference characters indicate like parts in the several figures.

Figure 1 represents a view of a closet-tank provided with my improved ball-cock, the tank being shown in section and other parts in side elevation. Fig. 2 represents a top plan view of the ball-cock. Fig. 3 represents a median vertical section therethrough. Fig. 4 represents a vertical sectional view of the lower part of the delivery-pipe. Fig. 5 represents a sectional view similar to Fig. 3, showing the parts in another position. Fig. 6 represents a similar view with the parts in still another position and showing also the lower end of the delivery-pipe in side elevation. Fig. 7 represents a sectional view of the ball-cock with the parts in still another position. Fig. 8 represents a section on line 8 8 of Fig. 6.

Referring to the drawings, a indicates the valve-casing, having a laterally-extending inlet a^2 and a downwardly-extending outlet a', connected with a central valve-chamber. At its inlet end the valve-casing is externally threaded, as at a^3, adapting it to be coupled to the end of a supply-pipe, and at the inner end of the inlet-duct a^2 is formed a valve-seat a^4. At a^5 the casing is internally threaded to receive the threaded tubular portion b' of a yoke b. In the tubular portion b' is placed a slide c, internally threaded, as at c', to receive the externally-threaded valve d, held in any desired adjustment relatively to the slide c by a nut d', screwed upon the valve and having its end abutting against the slide c. Upon the face of the valve is placed a packing-disk d^2, secured thereon by a screw d^3. By moving the slide longitudinally through the tubular portion of the yoke the valve is moved toward or from the valve-seat a^4. Between the two arms or ears b^2 b^2 of the yoke is placed the hub or socket-piece e for the rod e', on the end of which the ball or float e^2 is secured. The end of the hub or socket-piece adjacent to the slide is bifurcated or provided with two ears e^3 to receive a stud e^4, on which is journaled a roller e^5, adapted to bear against the slide c. The socket-piece e is provided with a longitudinal slot e^6, extending from side to side, and through said slot projects a stud f, secured in the arms of the yoke and intersecting substantially the longitudinal line of the valve. Below the stud f is another stud g, on which as a fulcrum a laterally-extending arm e^7 of the hub e may rest and the socket-piece and rod e' may swing. The end of the slide c is provided with a curved cam-surface c^2, against which the roller e^5 may roll when the float e^2, rod e', and hub e swing about the pivot-stud f during a rising movement of the float, and said slide is provided with a curved surface c^3, against which the roller e^5 may operate when the said parts swing about the fulcrum-stud g during the continued motion of the float, and the end of the socket-piece moves substantially longitudinally of the valve.

h is a dog or detent pivoted on a stud h' and adapted by the action of gravity to fall into place in front of the slide c when the valve is pushed clear in against its seat, said detent then holding the valve against its seat until displaced. On the downward movement of the float e^2 when said float is well depressed in the tank the upper side of the roller e^5 on the hub e comes in contact with the under side of the detent h, and a continued swinging of the hub displaces said detent and dis-

engages it from the slide *c*, permitting the pressure of the water behind the valve to unseat said valve.

The position of the parts when the tank is full is shown in Figs. 1 and 3, the roller e^5 having operated on the valve to seat the same and the dog or detent *h* acting to hold the said valve against its seat. When the water begins to flow out of the tank, the float is depressed and the hub *e* swings so as to carry its roller e^5 away from the end of the slide *c* and against the detent *h*, as shown in Fig. 5. A further depression of the float causes the roller e^5 to disengage the detent *h* from the slide *c*, and the latter then moves suddenly outward until stopped by abutting against the roller, as shown in Fig. 6. Thus a sudden opening of the valve to its full extent is effected and the water flows through the outlet *a'* in full volume. When the flow of water out of the tank is stopped and the tank begins to fill again by the delivery from the valve, the float e^2 is carried upward, causing the hub *e* to swing about the fulcrum *f*, so that the shorter end of the hub swings on a relatively short radius, practically transversely of the longitudinal lines of the valve, so that the valve is forced inwardly slowly by the roller e^5 bearing against the cam-surface c^2 of the slide *c*. When at last the arm e^7 strikes against the stud *g*, the water, continuing to rise, causes the hub *e* to swing about the stud *g*, this being permitted by the slot e^6, and the roller e^5 is moved practically longitudinally of the slide or valve on a longer radius, whereby the final seating movement of the valve is made rapidly from the position shown in Fig. 7 to the position shown in Fig. 3. Thus by changing the fulcrum-point for the float-rod and hub the valve is first moved toward its seat slowly and then very rapidly, and "hammering" and disagreeable noise heard when valves of other kinds are employed are avoided. The detent *h*, as previously stated, slips into place in front of the slide *c* as the valve reaches is seat.

In effecting a sudden opening and sudden closing movement of the valve by the means above described a contracted opening at the valve-seat, due to a partly-opened valve, exists only for an instant in both the opening and closing movements and not for a considerable period of time, as in other valves.

i is a delivery-pipe screwed into the casing *a* and forming a continuation of the outlet-passage *a'*. The pipe *i* extends to within a short distance of the bottom of the tank, so as to have its lower end normally submerged, and at the lower end thereof are formed the outlet-ports *i' i'*. The lower end of the pipe is closed by a screwed plug i^2, centrally apertured and screw-threaded to receive the stem *j'* of a conical plug *j*. The stem is provided with a ring j^2 at its lower end, whereby said stem *j'* may be screwed up and down through the plug i^2. The conical plug *j* is in such position with respect to the passage in the pipe *i* and the ports *i' i'* therein that its up-and-down movement changes the size of the delivery-outlet through the ports. By screwing the plug *j* up into the pipe, as shown in Fig. 6, the outlet may be contracted, so as to secure a small delivery through the ports, and by screwing said plug down, as shown in Figs. 1 and 4, a larger opening and an increased delivery may be obtained. The object of this construction is to adapt the ball-cock for use with different water-pressures.

Having thus explained the nature of my invention and described a way of constructing and using the same, although without having attempted to set forth all the forms in which it may be made or all the modes of its use, I declare that what I claim is—

1. A ball-cock comprising a casing having a valve-seat, a valve, a float-actuated device operating said valve, and means for causing the operating part of said device to have two successive movements, one transverse of the longitudinal lines of the valve, and the other substantially longitudinal thereof, whereby two successive movements are imparted to the valve.

2. A ball-cock comprising a casing having a valve-seat, a valve having a stem, and a float-actuated device operating on said stem, one of the last said parts being cam-formed, whereby a transverse movement of the float-actuated device produces a longitudinal movement of the valve-stem, and means for changing the movement of the valve-operating part of said device during its swing, from a direction substantially transverse to a direction substantially longitudinal of the valve-stem.

3. A ball-cock comprising a casing having a valve-seat, a valve, a float-actuated lever having its end bearing against the valve and having a transversely-extending arm, and two fulcrum-studs for the lever, one intersecting substantially the central longitudinal line of the valve, and the other below said line and parallel to the first-mentioned stud.

4. A ball-cock comprising a casing having a valve-seat, a valve arranged to be opened by the pressure of the water, a valve-stem, a retaining-detent adapted to engage said stem to hold said valve closed against its seat, and a float-arm disconnected from said stem and having provisions for tripping said detent to release the stem and allow the pressure of the water to suddenly force the valve from its seat.

5. A ball-cock comprising a casing having a valve-seat, a valve, a retaining-detent adapted to hold the valve closed against its seat, and a float-actuated device adapted to close said valve during its movement in one direction and to trip the detent so as to release the valve and effect a sudden opening thereof during its movement in an opposite direction.

6. A ball-cock comprising a casing having

a valve-seat, a valve, a float-actuated device operating said valve, means for causing said device to impart two successive movements to the valve in closing the same, the first movement being relatively slow and the last relatively rapid, and a detent adapted to engage the valve and hold the same closed against its seat, said detent being tripped by the float-actuated device so as to release the valve and effect a sudden opening thereof when the said device moves in a direction opposite to that of its valve-closing movement.

In testimony whereof I have affixed my signature in presence of two witnesses.

THOMAS DILLON.

Witnesses:

HORACE BROWN,

P. W. PEZZETTI.