

No. 690,011.

Patented Dec. 31, 1901.

G. A. BLAKE.
FAUCET.

(Application filed Mar. 8, 1901.)

(No Model.)

Fig. 1.

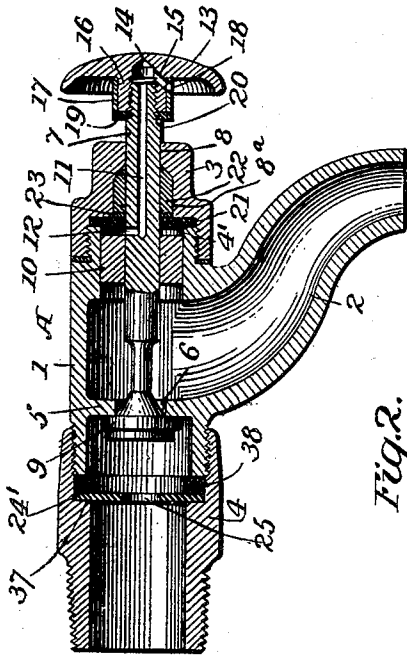


Fig. 2.

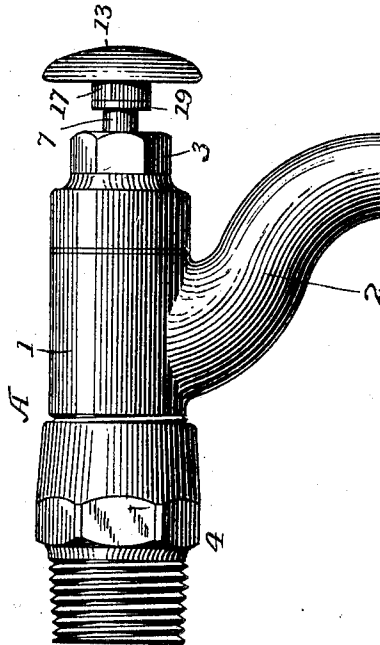


Fig. 3.

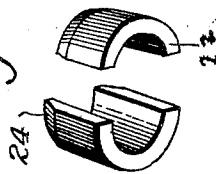


Fig. 4.

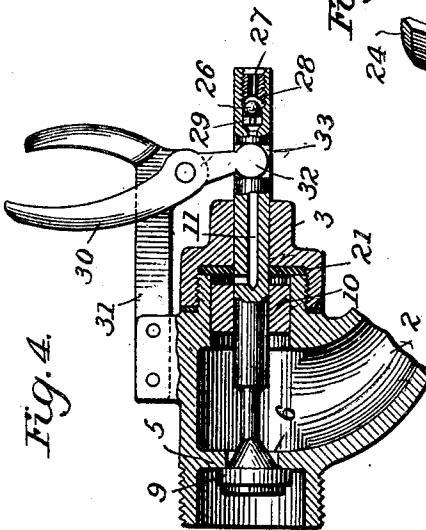
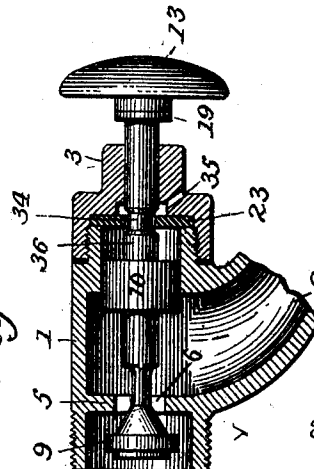


Fig. 5.



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FAUCET.

SPECIFICATION forming part of Letters Patent No. 690,011, dated December 31, 1901.

Application filed March 8, 1901. Serial No. 50,370. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. BLAKE, a citizen of the United States, residing at New Bedford, in the county of Bristol, State of Massachusetts, have invented certain new and useful Improvements in Faucets, of which the following is a specification.

My invention comprises certain improvements in faucets of the kind wherein the valve is normally held closed by the pressure of the liquid; and it includes means for regulating the pressure of the liquid against the valve and for cushioning the valve when it is closing in order to prevent the concussion which accompanies a sudden stoppage of the flow of liquid under pressure.

In the accompanying drawings, Figure 1 is a horizontal section through a faucet, showing my improvements. Fig. 2 is a side view of the faucet shown in Fig. 1. Fig. 3 is a detailed view of the friction-bushing forming part of the construction shown in Fig. 1, and Figs. 4 and 5 are sectional views through different forms of faucets embodying my improvements.

Referring to Figs. 1, 2, and 3 of the drawings, A indicates the casing of the faucet, comprising a tubular body portion 1, having a laterally-projecting outlet-pipe 2, a cap 3, threaded onto its outer end, and a tubular fitting 4, threaded onto its inner end. The outer end of the body portion is bored out to form a cylindrical air-chamber 4', and at the opposite side of the outlet-pipe is arranged a valve-seat 5, surrounding a central outlet-opening 6. The valve-stem 7 extends through a central opening 8 in the cap and inwardly through the cylindrical air-chamber and the opening in the valve-seat, and to this valve-stem is attached the valve 9, which is normally held closed against the inner side of the valve-seat by the pressure of the liquid within the pipes, and a piston 10, which fits closely within the cylinder 4'. The valve-stem, beyond the piston, is tubular, and the central bore 11, which extends to the outer end of the stem, communicates with the air-chamber 4' through an opening 12, extending radially inward from the side of the stem. A knob or handle 13 is threaded onto the outer end of the stem, as shown, and is formed with a central cavity 14, projecting beyond the stem.

From this cavity a small passage-way 15 leads outward to the side of the shank 16, and a split collar 17, having an opening 18, arranged to register with the outer end of the said passage-way, is fitted upon the shank, so that the size of the outlet may be regulated. This collar is frictionally held against rotation, and it is held against longitudinal movement by a washer 19, made of leather or other suitable flexible material, said washer fitting around the valve-stem and being firmly held between the shank 16 and a shoulder 20 upon the valve-stem. This washer prevents unnecessary noise when the handle is pushed down against the casing. Between the cap 3 and the body portion 1 of the casing is arranged a flexible washer 21, fitting closely about the valve-stem. The cap is formed with a cylindrical cavity 8", extending outwardly from the washer 21, said cavity being concentric with the opening 8 and tapering inwardly to said opening at its outer end, as shown. Within this cavity and surrounding the valve-stem is arranged a split friction-bushing 22, (shown in detail in Fig. 3,) and between said bushing and the flexible washer 21 is arranged a metal washer 23. The outer end 24 of the bushing tapers, as shown, and the arrangement is such that when the leather washer is moved outward the tapering end of the bushing will be forced against the tapering end of the cavity and the former will, in consequence, grip the valve-stem. The metal washer 23 prevents any portion of the flexible washer from getting between the two parts of the bushing.

In operation when the valve-stem is pushed inward the valve is forced off of its seat against the pressure of the liquid, and the latter is permitted to escape through the opening 6 and the outlet-pipe 2. The piston 10 being connected rigidly to the stem is also forced inwardly and air is drawn into the air-chamber 4 through the tubular valve-stem and the opening 18 in the band 17, which is arranged to register with the passage-way 15. When the handle is released, the pressure of the liquid forces the valve to its seat, the movement of the valve being retarded on account of the compression of the air within the chamber 4' by the piston and the friction of the bushing against the valve-stem. The valve is allowed to come gradually to its seat

by the escape of air from the air-chamber, and the time allowed for the escape of air is regulated by the adjustment of the air-regulating valve or collar 17. When the air is compressed within the chamber, it will be noted that the portion of the flexible washer 21 adjacent to the valve-stem will move outwardly, thereby forcing the friction-bushing outward and causing it to clamp the valve-stem, so that the movement of the valve will be retarded directly by the cushioning of the air and indirectly by the friction of the bushing around the valve-stem, and the greater and compression of the air the stronger will be the friction of the bushing. On the contrary, when the valve is being opened the bushing will not bind upon the stem.

In order to regulate the pressure of the liquid upon the valve, I provide between the body portion 1 of the casing and the fitting 4 a removable washer 24', having an opening 25 through which the fluid must pass. This washer, as shown, is held at its outer edge between the end of the body portion of the casing and a shoulder 37 within the fitting 4, a yielding packing-ring 38 being interposed between the washer and the body portion to prevent leakage. By unscrewing the fitting the washer may readily be removed and replaced with another having a larger or a smaller opening. It will be seen that when the valve is open and the liquid flowing the pressure against the valve with any given pressure in the pipes leading to the faucet will be governed by the size of the orifice in the washer, and with a pressure-regulating feature of this kind and means for regulating the escape of air from the air-chamber the valve may be controlled so as to close easily and without causing shock or pounding in the pipes.

In Fig. 4 I have shown an arrangement in which the features of the valve-casing, valve, piston, and the air-chamber are substantially the same as those shown in Fig. 1. In Fig. 4, however, the escape of air from the air-chamber is controlled by a ball-valve arranged within the outer end of the tubular valve-stem, and I have shown in this figure a lever for opening the valve instead of the knob shown in the other figures of the drawings. In said figure the tubular portion of the stem is enlarged at the end, and within this enlarged portion is placed a ball 26. A tubular screw 27, fitting into the outer end of the stem, prevents the ball from being thrown out, and the inner end of said screw is rounded out so as to form a seat 28 for the ball. The ball is free to play longitudinally in the cavity thus formed, but does not fit air-tight against either the outer or inner seats 28 and 29, being adapted to restrict but not to entirely prevent the escape of air. It will be seen that when the air within the chamber is compressed by the closure of the valve the ball will be forced outward against the end of the screw, thus preventing

the rapid escape of air. The leakage of air past the ball will permit the valve to close gradually, and when the valve has closed the ball will drop away from the opening in the screw. Any suitable means may be employed for operating the valve-stem, such as the knob shown in the other figures of the drawings, or a lever 30, pivoted to the support 31, secured to the casing and having a forked end, the bifurcated arm 32 of the lever fitting within notches 33, formed in the sides of the valve.

In Fig. 5 I have shown another form of valve in which the air from the air-chamber does not escape through the valve-stem. In this figure the valve-stem is formed with an annular groove or recess 34, somewhat longer than the thickness of the washer 23, which is clamped between the cap and the body of the casing. An opening 35 in the cap forms a vent for the air-chamber. The recess in the valve-stem is located so that when the valve is forced off of its seat said recess will be within the opening in the washer and the air-chamber between the washer and the piston will be in communication with the outer atmosphere through the passage-way 35 and the space between the washer and the valve-stem. When the valve is closing, however, the part 36 of the valve-stem fills the opening in the washer at the commencement of movement, and thus forms a practically closed air-chamber within which the piston cushions. The leakage of air between the washer and the valve-stem permits the valve to come gradually to its seat. In opening the valve, when the valve reaches the position shown in the drawings the air may rush freely into the air-chamber, and thus fill the chamber with air to form a cushion upon the return movement of the valve. A regulating-screw may be placed within the passage-way 35, if desired. It will be understood that the pressure-regulating washer may be applied to all of the forms of valve shown, although I have only deemed it necessary to illustrate it in connection with Fig. 1.

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

1. In a faucet, the combination with a casing having an air-chamber provided with a vent, and a valve-seat having an opening therethrough, of a valve adapted to be held against the seat by the pressure of the fluid, a valve-stem extending through the casing to which said valve is attached, and a piston connected with said stem and arranged to cushion against the air within the air-chamber when the valve is closing.

2. In a faucet, the combination with a casing having an outlet-opening, a valve-seat at one side of said opening, and an air-chamber at the opposite side, said air-chamber having a vent, of a valve adapted to be held against the seat by the pressure of the fluid, a valve-stem extending through the casing to which said valve is attached, and a piston connected

with said stem and arranged to fit into said air-chamber and cushion against the air when the valve is closing.

3. In a faucet, the combination with a casing having an air-chamber, and a valve-seat having an opening therethrough, of a valve arranged to be held against the seat by the pressure of the fluid, a piston fitting within said air-chamber, and a valve-stem to which said valve and piston are secured, said stem having a tubular portion extending through the casing and forming a vent for the air-chamber.

4. In a faucet, the combination with a casing having an air-chamber, and a valve-seat having an opening therethrough, of a valve arranged to be held against the seat by the pressure of the fluid, a piston fitting within said air-chamber, a valve-stem to which said valve and piston are secured, said stem having a tubular portion extending through the casing and forming a vent for the air-chamber, and a valve arranged to control said vent.

5. In a faucet, the combination with a casing having an outlet-opening, a valve-stem at one side of said opening, and an air-chamber provided with a vent at the opposite side, of a valve arranged to be held against the seat by the pressure of the fluid, a piston fitting within said air-chamber, a valve-stem extending through the casing and to which said piston and valve are attached, a tapering adjustable bushing arranged within a tapering socket surrounding said stem, and means for forcing said bushing outward to compress it against the stem when the air in the chamber is compressed.

6. In a faucet, the combination with a cas-

ing having an outlet-opening, a valve-seat at one side of said opening, and an air-chamber provided with a vent at the opposite side, of a valve arranged to be held against the seat by the pressure of the fluid, a piston fitting within said air-chamber, a valve-stem extending through the casing to which said piston and valve are attached, a tapering split bushing arranged within a tapering socket surrounding said stem, and a flexible diaphragm or washer forming the outer wall of the air-chamber and adapted to compress the bushing within the socket and force it against the stem when the air within the air-chamber is compressed.

7. In a faucet, the combination with a casing having an outlet-opening, a valve-seat at one side of said opening, and an air-chamber at the opposite side, of a valve arranged to be held against the seat by the pressure of the liquid, a piston fitting within said air-chamber, a valve-stem to which said valve and piston are secured, said stem having a tubular portion extending through the casing, the interior of said stem being in communication with the air-chamber, a knob or handle upon the outer end of said stem and having a passage-way communicating with the interior of the valve-stem, and a collar surrounding the shank of said handle and having an opening adapted to register with said passage-way.

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

GEORGE A. BLAKE.

Witnesses:

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A. G. BOARDMAN.