July 4, 1939. J. PODOLSKY 2,164,622

SIPHON-BREAKING DEVICE

Filed Nov. 10, 1936

Fig. 1.

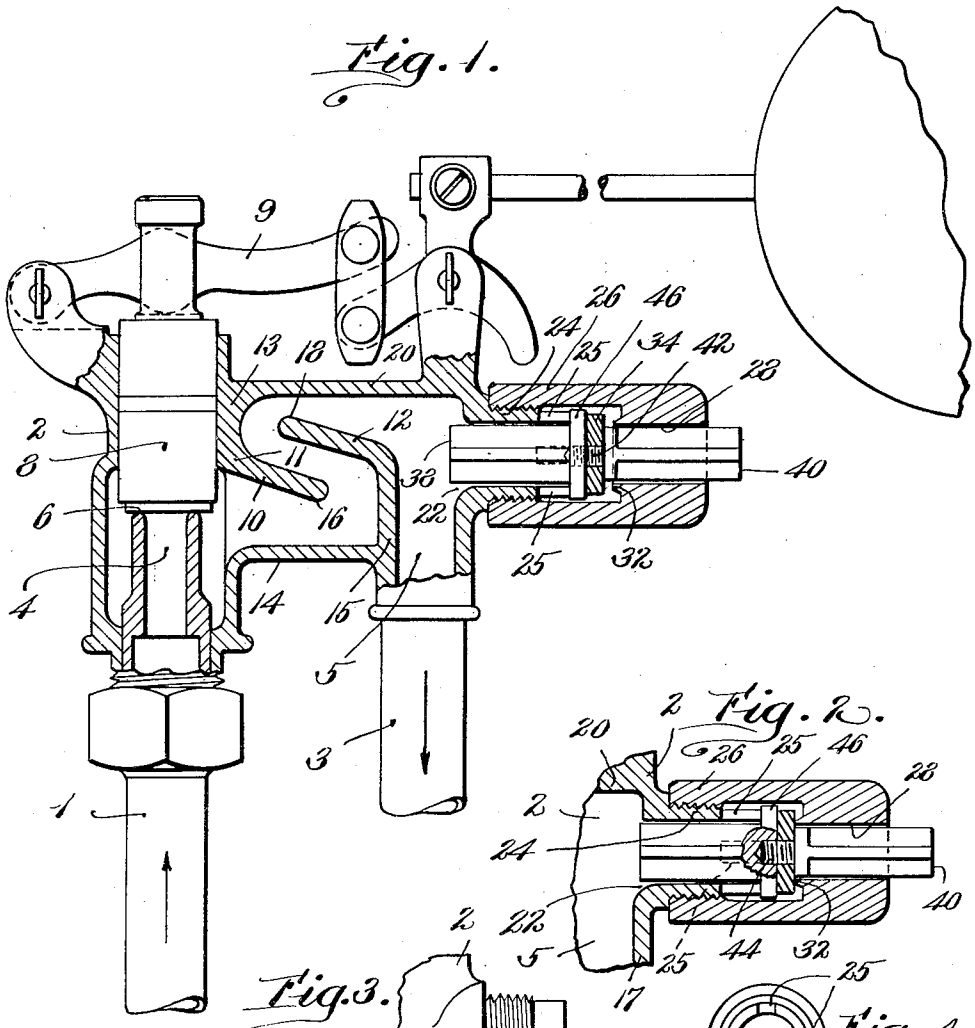


Fig. 2.

Fig. 3.

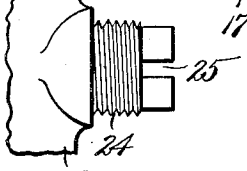


Fig. 4.

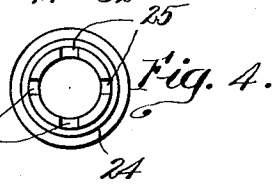


Fig. 6.

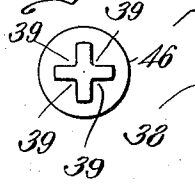


Fig. 5.

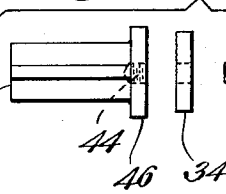
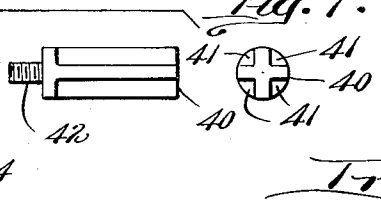


Fig. 7.



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SIPHON-BREAKING DEVICE

Jacob Podolsky, Dorchester, Mass.

Application November 10, 1936, Serial No. 110,062

9 Claims. (Cl. 137—104)

The present invention relates to siphon-breaking devices for ball cocks and its object is to provide a new and improved siphon-breaking device that shall be simple in construction and effective in operation.

The invention will now be described in connection with the accompanying drawing, in which Fig. 1 is an elevation, partly in section, illustrating an improved embodiment of the invention, the valve being shown open; Fig. 2 is a section of a portion of the same, with the valve closed; Fig. 3 is a fragmentary elevation of a detail; Fig. 4 is a corresponding end view; Fig. 5 is an exploded view of parts of the mechanism shown in Figs. 1 and 2; Fig. 6 is an end elevation of the same, looking from the left; and Fig. 7 is a corresponding end elevation of the same, looking from the right.

A valve casing 2 is shown provided with an inlet 4, where it is joined to an inlet pipe 1, and an outlet 5, where it is joined to an outlet pipe 3, the inlet being provided with a valve seat 6 that is adapted to be closed by the head of a valve stem 8, operated by a float-controlled, valve-stem lever 9. The inlet 4 may extend into the casing 2 from below, as in Fig. 1, or from above, as described in a copending application, Serial No. 683,324, filed August 2, 1933, now Patent No. 2,129,958, granted Sept. 13, 1938, the outlet being shown, in both cases, at the lower side of the casing.

The invention may be used in connection with any ball cock, whether or not provided with a means for eliminating the hereinafter-mentioned noises. For convenience, however, the invention is illustrated as applied to the ball cock of the said application, having two overlapping deflecting walls 10 and 12 in the casing 2, the former terminating at one end 11 in a casing wall 13 and extending from near the inlet 4 toward the outlet 5, and the latter terminating at one end 15 in or near another casing wall 17 and extending from near the outlet 5 toward the inlet 4. The water is thus restricted to travel along a zig-zag path from the inlet 4, towards the outlet 5 between the wall 10 and a wall 14 of the casing, then around the free end 16 of the deflecting wall 10, back toward the inlet 4 between the deflecting walls 10 and 12, then around the free end 18 of the deflecting wall 12, and finally toward the outlet 5 again, between the deflecting wall 12 and a wall 20 of the casing 2.

Being forced to travel along this zig-zag path in the casing 2, the water can not flow too fast, with the result that the water substantially fills the casing 2 during its flow from the inlet to the outlet. The high-pitched noises that are usually heard just before the valve stem 8 is forced against the valve seat 6 to shut off the flow of the water become thus completely eliminated.

According to the present invention, a wall of the casing 2, as the wall 17, is provided with an opening 22, and the casing is integrally provided with an exteriorly threaded pipe 24 projecting out beyond the opening 22, upon which is tightly threaded a cylindrical housing 26 having an opening 28 alined with the opening 22. The casing 2 is thus sealed, notwithstanding the opening 22, to the atmosphere, except that it is open to the atmosphere through the opening 28. When the water flows from the inlet 4 to the outlet 5 along the above-described zig-zag path, however, it enters the housing 26 through the opening 22 and forces a freely slidably mounted disc-shaped valve 34 in the housing 26 to its extreme position to the right, against the opening 28 to close it. When the valve 34 is thus closed, obviously, the ball cock operates the same as though there were no openings 22 and 28. The valve 34 may be in the form of a washer carried upon, and to the right of, a backing disc 46.

At times, however, there is a tendency for stale water in the toilet bowl (not shown) to back up the outlet pipe 3 and through the casing 2, into the inlet pipe 1, and the water-supply system connected therewith, thereby contaminating the water-supply system with disease germs. This is caused, of course, by a condition of partial vacuum in the casing 2.

According to the present invention, as soon as such vacuum conditions obtain in the casing 2, the atmospheric pressure will cause the valve 34 to slide over to its extreme position to the left, as illustrated in Fig. 1, but without closing the opening 22; thus, by permitting air to enter the casing 2 through the openings 28 and 22, preventing the back-up of stale water. Any desired expedient may be adopted for preventing the closing of the opening 22 at such time. As shown, the disc 46 upon which the member 34 is mounted, may be caused to engage against the free unthreaded end of the pipe 24, openings or slots 25 being provided in the wall of the pipe between the said free end and the threads of the pipe through which air may enter the casing from the atmosphere. In this manner, though the disc 46 engages the free end of the pipe 24, it does not prevent the entry of air from the atmosphere, through the openings 28, 25 and 22, into the casing 2.

As soon as water starts to flow through the casing 2 from the inlet 4 to the outlet 5, once more, the pressure of the water, being in excess of atmospheric pressure, will force the valve over to the right again, as illustrated in Fig. 2, thus again to close the opening 28.

The housing 26 may be of any desired form, but it is preferred to have it cylindrical, and to provide the opening 28 therein with a seal 32 against which the valve 34 may become seated. The disc 46 and the valve 34 carried thereby may be guided during their sliding movement in the housing 26 by guide members 38 and 40 mounted in the respective openings 22 and 28, thus to ensure proper seating and preventing binding of the member 34. For constructional purposes, the guide member 38 may be integral with the disc 46 and the guide member 40 may be integral with a threaded member 42 that is threaded into an internally threaded socket 44 of the guide member 38, thus to hold the valve 34 in place against the disc 46. The valve 34 and the related parts may, however, be in one piece, if desired.

The guide member 38 may be provided with longitudinally disposed grooves 39 communicating with the slots 25, and the guide member 40 with similar grooves 41, both for facilitating the flow of air from the atmosphere, through the openings 23 and 25, into the casing 2, under the conditions above described. Though the valve 34 and the parts by which it is carried may be free to rotate in the housing 26, this will not interfere with the flow of air from the atmosphere: first, between the walls of the opening 28 and the guide member 40, along the grooves 41; then into the housing 26, to the left of the opening 28; then through the slots 25, and by way of the grooves 39, into the casing 2. This takes place when the valve 34 occupies a position to the left of the position illustrated in Fig. 2, as shown, for example, in Fig. 1. In the closed position, illustrated in Fig. 2, air can not travel either into or out of the casing through the opening 28.

Modifications will occur to persons skilled in the art, and all such are considered to fall within the spirit and scope of the invention, as defined in the appended claims.

What is claimed is:

1. A siphon-breaking device for a ball cock having a casing provided with an inlet and an outlet and a valve for the inlet, a wall of the casing having an opening in the path of flow of the water from the inlet to the outlet, a housing mounted on the casing and having an opening alined with the casing opening, and a member freely slidably mounted in the casing opening and provided with means for closing the housing opening in one of its extreme positions of slidable movement.

2. A flush valve having a valve casing provided with an inlet and an outlet, a valve in the casing for preventing the flow of water into the casing through the inlet when the valve is closed and for permitting the flow of water from the inlet through the casing to the outlet when the valve is open, the wall of the casing having an opening in the path of flow of the water from the inlet to the outlet, a housing mounted upon the casing having an opening alined with the casing opening, and a member slidably mounted in the housing and having oppositely extending guides in the respective openings for guiding its slidable movement in the housing, the member having means for closing the housing opening in one of its extreme positions of slidable movement.

3. A flush valve having a valve casing provided with an inlet and an outlet, a valve in the casing for preventing the flow of water into the casing through the inlet when the valve is closed and for permitting the flow of water from the inlet through the casing to the outlet when the valve is open, the wall of the casing having an opening in the path of flow of the water from the inlet to the outlet, a housing mounted opon the casing having an opening alined with the casing opening, and means slidably mounted in the housing having oppositely extending guides in the respective openings and slidably movable in one direction by the flow of water from the inlet to the outlet to close the opening in the housing and slidably movable in the opposite direction by atmospheric pressure to open the opening in the housing.

4. A ball cock having a valve casing provided with an inlet and an outlet, the inlet being provided with a valve seat, a valve stem having a head adapted to be closed against the valve seat for preventing the flow of water into the casing through the inlet, and a float-controlled lever for controlling the valve stem, the casing having walls for sharply deflecting the passage of the liquid into the casing through the inlet in a direction toward the outlet, for then sharply deflecting the passage of the liquid back toward the outlet, for then sharply deflecting the passage of the liquid back toward the inlet and for finally sharply deflecting the passage of the liquid toward the outlet once more, whereby when the said head of the valve stem is not closed against the valve seat, the flow of the water in the casing from the inlet to the outlet is restricted along a sharply zig-zag path, the walls being disposed and spaced from each other to force the water to flow slowly enough along the zig-zag path to cause the water substantially to fill the casing during its flow from the inlet to the outlet and consequently to eliminate noise during the closing of the said head of the valve stem against the valve seat by the float-controlled lever, a wall of the casing having an opening in the path of flow of the water from the inlet to the outlet, a housing mounted on the casing and having an opening alined with the casing opening, and a member freely slidably mounted in the casing opening and provided with means for closing the housing opening in one of its extreme positions of slidable movement.

5. A siphon-breaking device for a ball cock having a casing provided with an inlet and an outlet and a valve for the inlet, a wall of the casing having an opening in the path of flow of the water from the inlet to the outlet and a pipe projecting out beyond the opening, the wall of the pipe being provided with openings, a housing mounted on the casing and having an opening alined with the casing opening, and a member freely slidably mounted in the casing opening and provided with means for closing the housing opening in one of its extreme positions of slidable movement.

6. A flush valve having a valve casing provided with an inlet and an outlet, a valve in the casing for preventing the flow of water into the casing through the inlet when the valve is closed and for permitting the flow of water from the inlet through the casing to the outlet when the valve is open, the wall of the casing having an opening in the path of flow of the water from the inlet to the outlet and a pipe projecting out beyond the opening, the wall of the pipe being provided with openings, a housing mounted upon the casing and

having an opening alined with the casing opening, and a member slidably moutned in the housing and having oppositely extending guides in the respective openings for guiding its slidable movement in the housing, the member having means for closing the housing opening in one of its extreme positions of slidable movement and the guide in the first-named opening being provided with longitudinally disposed grooves communicating with the openings in the wall of the pipe.

7. A flush valve having a valve casing provided with an inlet and an outlet, a valve in the casing for preventing the flow of water into the casing through the inlet when the valve is closed and for permitting the flow of water from the inlet through the casing to the outlet when the valve is open, the wall of the casing having an opening in the path of flow of the water from the inlet to the outlet and a pipe projecting out beyond the opening, the wall of the pipe being provided with openings, a housing mounted upon the casing and having an opening alined with the casing opening, means in the housing movable in response to the flow of water from the inlet to the outlet to close the opening in the housing and movable in response to atmospheric pressure to open the opening in the housing, and means for guiding the movement of the first-named means and comprising guides in the respective alined openings, the guides being provided with longitudinally disposed grooves.

8. A device of the class described having a casing provided with an inlet and an outlet, water being adapted to flow through the casing from the inlet to the outlet, a wall of the casing having an opening in the path of flow of the water, a housing mounted on the casing and having an opening alined with the casing opening, and a member freely slidably mounted on the casing for closing the housing opening in one of its extreme positions of slidable movement, the member having a guide slidably mounted in the casing opening.

9. A device of the class described having a casing provided with an inlet and an outlet, water being adapted to flow through the casing from the inlet to the outlet, a wall of the casing having an opening in the path of flow of the water, a housing mounted on the casing and having an opening alined with the casing opening, and a member slidably mounted in the housing and having oppositely extending guides in the respective openings for guiding its slidable movement in the housing.

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