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AUTOMATIC VACUUM BREAKING SILL COCK

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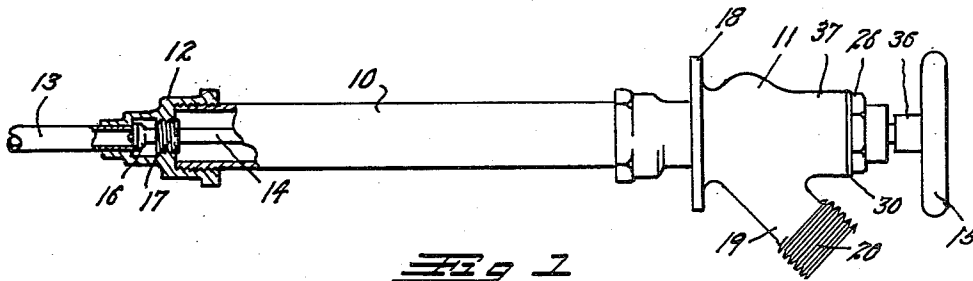


Fig. 1

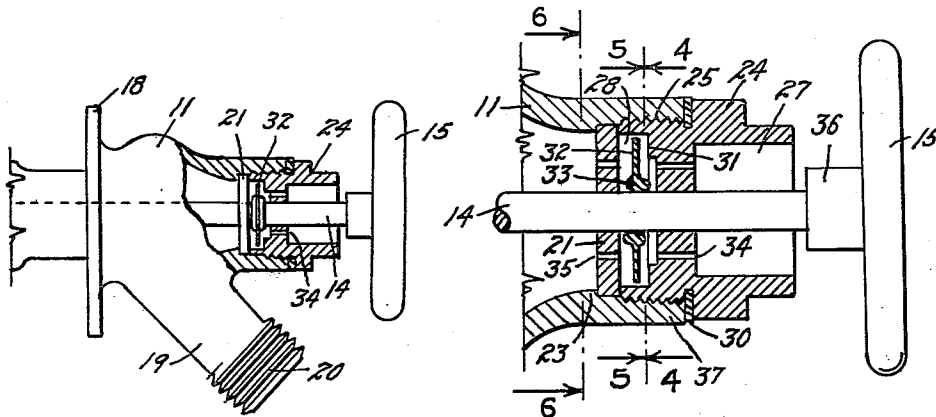


Fig. 2

Fig. 3

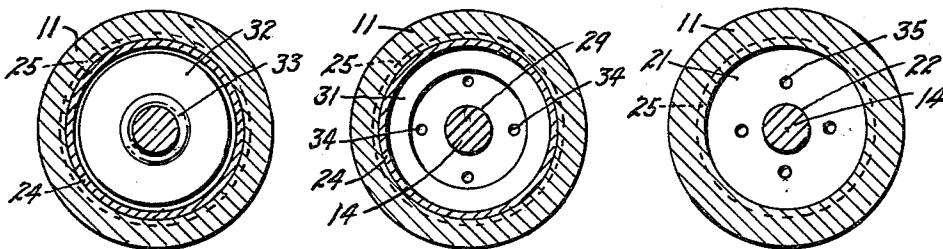


Fig. 4

Fig. 5

Fig. 6

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AUTOMATIC VACUUM BREAKING SILL COCK
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This invention relates to a sill cock and more particularly to an anti-freeze type of sill cock wherein the operating handle is positioned on the exterior of a building and the shutoff valve is positioned on the interior thereof to prevent freezing of the valve. It is intended that, when the valve is closed, the residual water will drain externally, from the cock to prevent freezing in the portion passing through the wall to the exterior. It is necessary, however, that air be enabled to enter the cock to replace the water draining therefrom and if the valve be closed a relatively long hose is connected to the cock, the water in the hose acts to prevent the flow of air so that a partial vacuum will be formed to retain the water in the cock. This residual water is subject to freezing with resulting damage to the cock and the conduit passing through the wall.

The principal object of this invention is to provide automatic means for admitting air to the cock, when the valve is closed, so as to prevent the formation of a vacuum therein so that it will drain freely into a connected hose to eliminate freezing.

Another object of the invention is to provide a vacuum breaking attachment for anti-freeze sill cocks which can be quickly and easily installed in present conventional cocks without requiring any changes in the latter and without the use of special tools or equipment.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is had to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

FIG. 1 is a side elevation of a conventional anti-freeze type sill cock partially broken away to show the interior construction and with the invention in place thereon;

FIG. 2 is an enlarged side elevation of the outer or external extremity of the cock of FIG. 1 partially broken away to show the position of the improved vacuum breaking attachment;

FIG. 3 is a still further fragmentary enlargement of the broken away portion of FIG. 2; and

FIGS. 4, 5 and 6 are cross-sections taken on the lines 4-4, 5-5, and 6-6, FIG. 3, respectively.

For the purposes of illustration and description, elements of a conventional anti-freeze sill cock are illustrated on the drawing and designated by numeral as follows: wall tube 10, arranged to pass through the wall of a building; external cock housing 11, threaded or otherwise mounted on the outer extremity of the tube 10 and adapted to be positioned against the outside face of the wall; valve housing 12, threaded or otherwise mounted on the interior extremity of the wall tube 10 for receiving a water supply pipe 13; and valve stem 14, extending axially through the tube 10 and the cock housing 11 and terminating at its outer extremity in a conventional hand wheel 15 having a wheel hub 36, and at its inner extremity in a shutoff valve 16 and provided with conventional valve actuating threads 17. The housing 11 is usually provided with a wall flange 18 and a hose spout 19. The hose spout 19 is threaded, as shown at 20, to receive a conventional hose coupling. In the conventional cock, a valve stem bushing is threaded into the neck 37.

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This bushing is not used with this invention and is not illustrated.

The above described elements are conventional in anti-freeze sill cocks. When the hand wheel 15 is rotated, clockwise, the shutoff valve 16 is forced to a seat to shut off the supply pipe 13. When the valve is closed, the residual water in the tube 10 and the housing 11 is intended to drain from the hose spout 19. However, if a hose is connected to the spout 19, the water in the hose prevents air from entering the housing 11 and the tube 10 so that a vacuum is formed which acts to retain the water therein with resulting freezing damage.

This invention is designed to automatically admit air to the housing 11 and break the vacuum therein so as to allow the residual water to drain directly into the connected hose.

The invention employs a circular ported disc 21 having a plurality of inner air ports 35, and an axial opening 22, for the passage of the valve stem 14. The disc 21 has an outer diameter sufficient to pass closely within the valve stem neck 37 against an internal shoulder 23 therein, with which such housings are conventionally provided. A body member 24 is threaded into the internal threads of the neck 37 and acts to fixedly clamp the ported disc 21 against its shoulder 23.

The body member 24 is provided with external threads 25, external wrench-receiving faces 26, a hand wheel hub-receiving cavity 27 in its outer face; a circular valve cavity 28 in its inner face; a plurality of air ports 34 and an axial bore 29 for the passage of the valve stem 14. The body member 24 is sealed to the housing neck 37 by means of a suitable sealing gasket 30. The valve cavity 28 is counterbored to a smaller diameter to form an annular shoulder or valve seat 31.

A relatively thin, flat, circular flap valve disc 32 is positioned about the valve stem 14 in the valve cavity 28. The flap valve disc 32 is formed from exceedingly flexible resilient material such as rubber, neoprene, flexible plastic, nylon or the like and is molded with an annular hub 33 having a normal internal diameter slightly less than the external diameter of the valve stem 14 so that when forced over the latter, it will frictionally engage thereabout.

To install the invention in the housing 11, the conventional hand wheel 15 and the conventional valve stem bushing are removed from the housing 11. The ported disc 21 is slipped over the valve stem 14 and pushed in place in the housing neck 37. The hub 33 of the flap valve disc 32 is placed over the valve stem 14 followed by the body member 24, with its gasket 30 in place, and the body member 24 is threaded tightly into the housing 11 against the gasket 30. The hand wheel 15 is now replaced and the cock is ready for use without any changes in its original construction.

If the hand wheel 15 be rotated counter-clockwise, to open the supply valve 16, water will rush under pressure through the tube 10 into the housing 11 and through the inner ports 34 and against the flap valve 32 so as to force the latter against the annular valve seat 31 to prevent the escape of water through the outer air ports 34. It will be noted that when the valve stem 14 moves outwardly to open the shutoff valve 16, the frictional engagement between the valve stem and the hub 33 of the flap valve 32 will move the hub outwardly against the body member 24 so as to seal the latter about the valve stem.

If the hand wheel 15 be now rotated clockwise to close the valve 16, the inward movement of the valve stem will carry the hub of the flap valve 32 toward and against the ported disc 21 and away from the body member 24 so that air may flow freely inward through the outer air ports 35, around the periphery of the flap valve, and through

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the inner ports 34 into the housing 11. Thus, preventing the formation of a vacuum therein should a hose be connected to the hose spout 19, so that the residual water may freely drain away.

While a specific form of the improvement has been described and illustrated herein, it is to be understood that the same may be varied within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. A sill cock comprising: an external housing; an internal supply shutoff valve; a wall tube connecting said housing to said valve; a valve stem extending from said valve outwardly through said housing; a body member threaded into the outer extremity of said housing about said valve stem; an internal annular seat formed on said body member concentric of said valve stem; and a relatively flat, thin, flexible, circular flap valve disc mounted on said valve stem and means maintaining said valve disc in such relation to said seat that it may flex into contact with the latter and close said ports when the pressure in said housing exceeds atmospheric pressure and so that it may flex away from said seat when the pressure in said housing is sub-atmospheric.

2. A sill cock as described in claim 1 having a ported disc fixedly positioned in said housing in spaced relation to said seat, said flap valve disc being positioned between said body member and said ported disc so that said ported disc will limit the movement of said valve disc away

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from said valve seat, the ports in said ported disc allowing free flow to and from said valve disc at all times.

3. A sill cock comprising: a wall tube; a shut off valve on the inner extremity of said wall tube; an external hose cock housing mounted on the outer extremity, of said wall tube; a valve stem extending from said shut off valve through said hose cock housing; a body member mounted in said housing about said stem; an air port extending through said body member in radial spaced relation to said stem and communicating with the interior of said cock housing; a circular valve seat formed on said body member concentric of said stem and of greater radius than the radial spacing of said air port; a flexible valve disc mounted on said stem interiorly of and in spaced relation to said valve seat so that pressure in said cock housing will flex said disc against said valve seat to close said port; and a ported disc fixed in said neck about said stem and spaced interiorly from said disc and positioned to be contacted by the latter to limit the movement of said disc away from said valve seat and to maintain an open flow to said valve disc at all times.

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