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SIPHONPROOF BALL COCK

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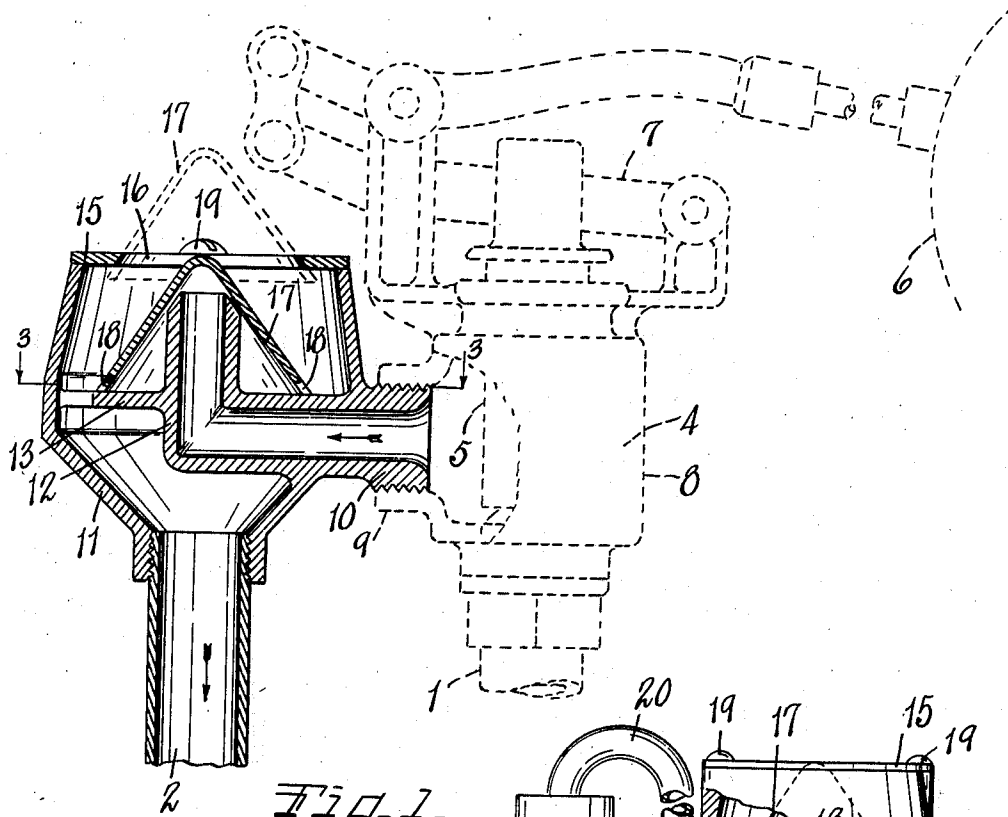


Fig. 1.

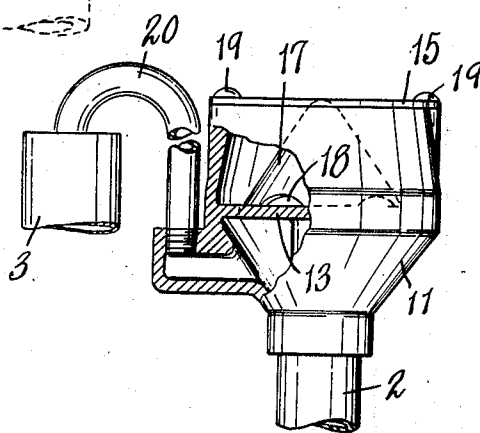


Fig. 2.

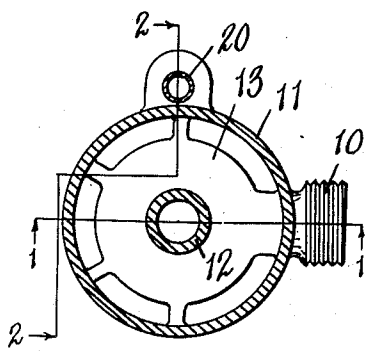


Fig. 3.

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SIPHONPROOF BALL COCK

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8 Claims. (Cl. 137—69)

This invention relates to improvements in siphon-proof ball cocks.

The main objects of this invention are:

First, to provide a vacuum breaking ball cock or flushing valve combination which is highly efficient and is not likely to become inoperative through clogging or getting out of order.

Second, to provide an anti-siphoning device which may be readily embodied in well-known types of flushing valve assemblies with little modification therein.

Third, to provide a device of the type described which is quite economical in the matter of parts and assembly.

Objects relating to details and economies of the invention will appear from the description to follow.

The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a fragmentary view partially in vertical section on line 1—1 of Fig. 3 of a flushing valve assembly embodying my invention, certain of the valve parts being shown by dotted lines.

Fig. 2 is a fragmentary view partially in section on line 2—2 of Fig. 3.

Fig. 3 is a horizontal section on line 3—3 of Fig. 1 with the anti-siphoning device proper removed from the valve body.

The present invention relates to a vacuum breaking device of simple construction which is adapted to seal a hydraulic transmission line when a fluid is flowing therethrough, the force of the fluid itself being utilized to effect this sealing, and to instantaneously open the line to atmospheric pressure when the flow of fluid is discontinued, whereby to break any condition of vacuum which may arise as for instance in the supply end thereof and thereby prevent back siphonage in the line. Such provision is especially useful in connection with the valve assembly of a flushing tank, wherein the breaking of any vacuum arising in the supply line prevents sucking of polluted water up through the discharge pipe and into the system. My device is particularly designed for such an application, however it should be understood that the principle and structure herein described and shown are of much broader application than this and are, in fact, applicable to any case where it is desired to communicate a hydraulic transmission line with the atmosphere upon cessation of flow of fluid therein to break vacuum in the line.

In the embodiment of my invention illustrated, 1 represents the supply pipe which is connected to a suitable source of water supply and which supply is to be guarded or protected by preventing back siphoning. 2 is the discharge pipe delivering to the flushing tank and 3 the overflow pipe of the flushing tank. The flushing tank is not illustrated as its relation to the flushing valve mechanism will be readily understood.

The inlet valve 4 is provided with a plunger or piston type of valve 5 controlled through the float 6 to a suitable lever mechanism designated generally by the numeral 7.

The valve casing 8 has an internally threaded opening 9 at one side into which the nipple 10 of the discharge chamber 11 is threaded. The discharge pipe 2 is threaded into the bottom of this discharge chamber.

The inlet valve delivery nozzle 12 is disposed centrally and directed upwardly within the discharge chamber 11. A spider-like support 13 is provided within the discharge chamber below the tip or discharge port of the nozzle.

The discharge chamber is provided with a removable cover 15 having a central opening 16 therein through which air may be admitted to the discharge chamber or, in other words, the opening 16 opens to the atmosphere and both it and the discharge port of the valve are substantially above the top of the overflow pipe.

A conical baffle 17 is adapted when in a position of rest to rest upon the support 13 in embracing relation to the nozzle but out of contact therein, so that air may pass through the opening 16 through the opening 18 in the lower edge of the baffle and upwardly within the baffle to the delivery nozzle 12 and thence into the valve casing 8 to break any vacuum or suction that may exist or be induced in the supply pipe 1.

When water is discharged from the nozzle, it impinges against the inner side of the baffle member, lifting it to the position shown by dotted lines in Fig. 1, in which position the air opening 16 is closed and water is directed downwardly around the nozzle and downwardly by the baffle through the openings in the spider-like support 13 and is discharged through the discharge pipe 2 into the tank. However, as stated, when water is not being discharged, the baffle member drops to its normal or rest position so that a large capacity connection to the atmosphere is provided for breaking any vacuum or suction that may occur in the supply pipe.

The cover or plate 15 is detachably connected by means of screws 19 to facilitate assembling.

It will be noted that the central portion of the spider-like support 13 is disk-like and impermeate, the purpose of this being to provide a guard member which is disposed centrally above the discharge pipe 2 and in substantially spaced relation therefrom for the nozzle, the guard member being disposed below the tip of the nozzle. In certain conditions of a high vacuum arising in the supply system, and in the event this occurs before the water in the discharge pipe has reached its normal level or in the event that it is quite high in the discharge, there may be some resurging action set up and this guard prevents any water due to this resurgence entering the nozzle. Such situation is not likely to occur under any normal conditions but the guard is desirable and effective under extreme conditions.

The refill tube 20 is connected to the discharge chamber and in practice is operatively associated with the overflow pipe. However, as such an arrangement is well understood, I have not illustrated this association in the accompanying drawing.

While I would contemplate embodying my invention as a complete valve assembly, one of the advantages of the vacuum breaker device proper is that it can be readily applied to various types of flush valves now on the market, the discharge pipe connections commonly employed being removed and my vacuum breaker assembly being substituted. In my device, the line is open to the atmosphere at all times when the baffle member is not subjected to a positive pressure in the supply line. Owing to the unique construction of the parts in the embodiment of my invention illustrated, the baffle member may be pushed down away from the top plate 18 by a positive pressure without any water being discharged through the opening 19 as the water discharged within the conical baffle member is directed downwardly to the discharge pipe 2.

I have illustrated and described my improvements in an embodiment which I consider very practical. I have not attempted to illustrate or describe certain embodiments and adaptations which I contemplate as it is believed that this disclosure will enable those skilled in the art to embody or adapt my improvements as may be desired.

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

1. A vacuum breaker comprising a delivery chamber communicating through an aperture with the atmosphere, said aperture having an outwardly tapered edge, a liquid discharge orifice in said chamber directed toward said aperture, a conical baffle member movably supported in said chamber in line with the discharge of the orifice and operative when actuated by the discharge from the orifice to enter said aperture and sealingly engage said tapered edge, means for supporting said baffle member in spaced relation to said aperture and orifice to permit passage of air through the aperture when liquid is not being discharged from said orifice and around said baffle member to said orifice whereby to break a vacuum in the supply line for the orifice, and discharge means for said chamber, said baffle member when in actuated position deflecting the fluid discharged from the orifice toward said discharge means.

2. A vacuum breaker comprising a delivery chamber communicating through an aperture with the atmosphere, said aperture having an

outwardly tapered edge, a liquid discharge orifice in said chamber directed toward said aperture, a conical baffle member movably supported in said chamber in line with the discharge of the orifice and operative when actuated by the discharge from the orifice to enter said aperture and sealingly engage said tapered edge, and means for supporting said baffle member in spaced relation to said aperture to permit passage of air therethrough when liquid is not being discharged from said orifice and around said baffle member to said orifice whereby to break a vacuum in the supply line for the orifice.

3. A vacuum breaker comprising a hollow body communicating through an aperture with the atmosphere, an upwardly directed liquid discharge orifice within the body, and a conical baffle member movably supported in the body adjacent to and in position to receive the impact of the discharge from said orifice whereby it is actuated to enter said aperture in said hollow body and close said aperture, said baffle member being normally supported in spaced relation to said aperture, permitting when in normal position the passage of air therethrough to said orifice.

4. A vacuum breaker comprising a discharge chamber having a downwardly directed discharge pipe and an opening to the atmosphere above said discharge pipe, a liquid discharge orifice in said chamber, and a conical baffle member movably supported in said chamber in the line of discharge from said orifice and actuated by the discharge from the orifice to enter said aperture and close said aperture, said baffle member being supported in normally spaced relation to said aperture to permit the passage of air therethrough and around the baffle member to said orifice whereby to break a vacuum in the supply line for the orifice.

5. A vacuum breaker comprising a discharge chamber having a downwardly directed discharge pipe and an opening to the atmosphere above said discharge pipe, an upwardly directed liquid nozzle disposed centrally within said chamber, a guard member surrounding said delivery nozzle and disposed centrally within said chamber, and a conical baffle member disposed in said chamber above said guard member and adapted to normally rest thereon, said baffle member when resting upon said guard member being in spaced relation to the tip of the nozzle to permit the passage of air around the baffle member to said nozzle, the guard member acting to guard said nozzle from an upward surge within said chamber.

6. A vacuum breaker comprising a discharge chamber having a downwardly directed discharge pipe and an opening to the atmosphere above said discharge pipe, an upwardly directed liquid delivery port disposed centrally within said chamber, a guard member disposed below said delivery port and centrally within said chamber, and a conical baffle member disposed in said chamber above said guard member to receive the impact of the liquid discharged from said nozzle, said guard member acting to guard said nozzle from an upward surge within said chamber.

7. A vacuum breaker comprising a delivery chamber having a centrally disposed air opening at the top thereof and a downwardly directed discharge pipe positioned centrally thereof, an upwardly directed delivery nozzle disposed centrally in said chamber, a conical baffle floatingly supported above said nozzle to receive the impact of the water from the nozzle centrally thereof, and

a guard member for said nozzle disposed below the tip thereof and centrally of said chamber.

5 8. A vacuum breaker comprising a delivery chamber having an air opening at the top and a downwardly directed discharge pipe, a liquid inlet having an upwardly directed liquid delivery port, a baffle supported above said port in position

to receive the impact of the water discharged from the port thereof, and a guard member for said port disposed within said chamber above and substantially spaced from said discharge pipe and below said port to deflect an upward surge within said chamber from said port. 5

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