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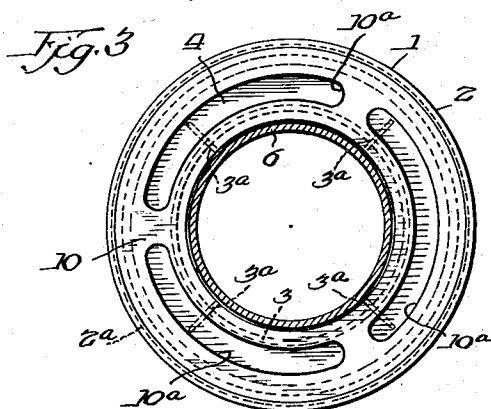
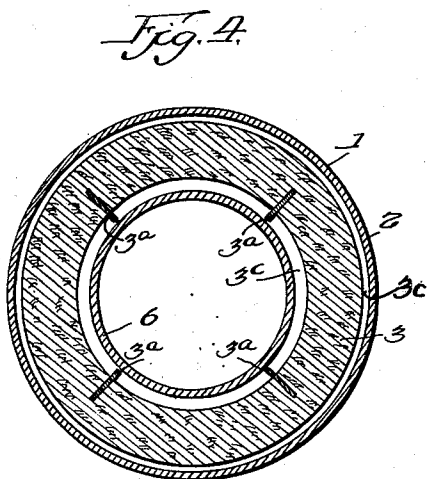
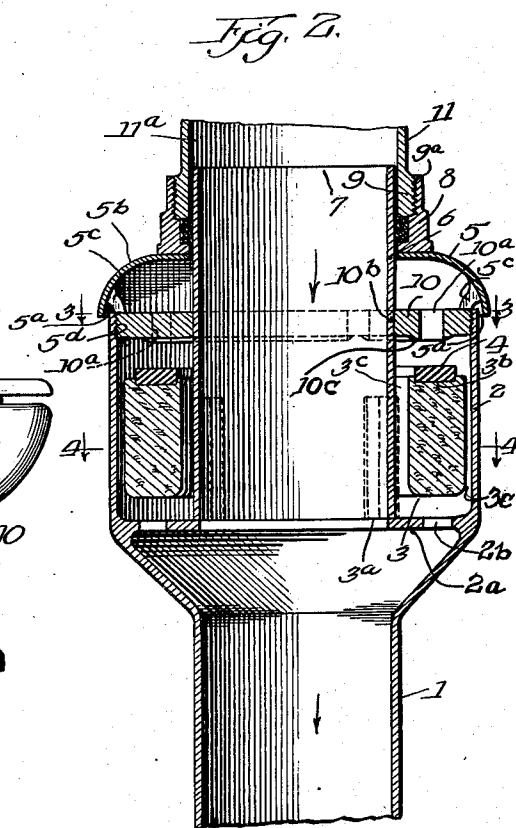
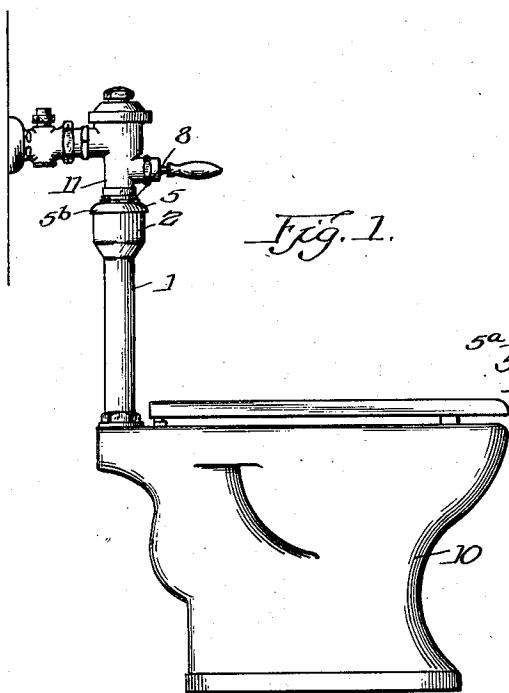
J. G. CEKAL

2,096,844

COMBINATION VALVE AND VENT FOR PLUMBING FIXTURES

Filed Aug. 9, 1934

2 Sheets-Sheet 1



Witness:
A. Davidson

Inventor:
James G. Cekal
By: Joseph O. Lange
Atty

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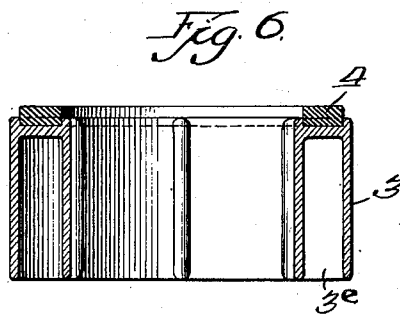
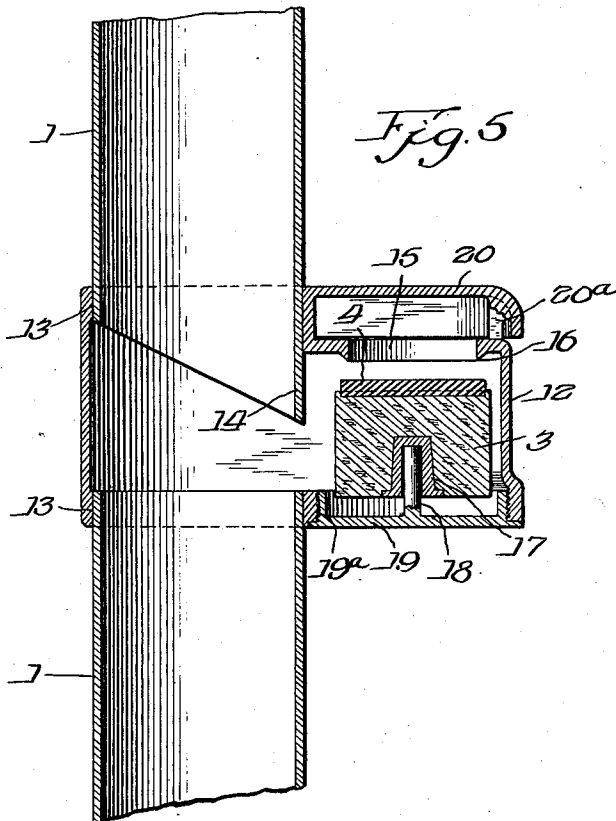
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COMBINATION VALVE AND VENT FOR PLUMBING FIXTURES

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2 Sheets-Sheet 2



Witness:

R B Davison.

Inventor:
James G. Cehal:

By: Joseph O. Lange *Att'y*

UNITED STATES PATENT OFFICE

2,096,844

COMBINATION VALVE AND VENT FOR
PLUMBING FIXTURESJames G. Cekal, Chicago, Ill., assignor to Crane
Co., Chicago, Ill., a corporation of Illinois

Application August 9, 1934, Serial No. 739,093

7 Claims. (Cl. 137-69)

My invention relates to improvements in devices to be used in combination with the flushing of such fixtures as, for example, water closet bowls, urinals, and the like.

5 More particularly it relates to a combined valve and vent for use with a water control device as, for example, a flushing valve in which my invention permits an exceedingly large size air vent to be used to prevent back siphonage. At the same
10 time, it prevents the objectionable "spitting" caused by the quick and sudden flow through said device ordinarily resulting in leakage outwardly into the atmosphere. This latter action is commonly referred to by the trade as "spitting" of
15 the valve, and is very objectionable in being unsanitary.

Another important advantage lies in providing for a device which offers a minimum of resistance to the flow of water to the fixture to be flushed, in that, in no way does my device interfere with the
20 normal flow of water as discharged from the control flushing valve or other control means.

A further advantage is that my device is normally open to the atmosphere; that is, a direct
25 communication exists between the atmosphere and the interior of the device. This is a desirable feature, in that, no part is required to move in order to admit the atmosphere into the device, when a vacuum is created therein.

30 In general, heretofore, the use of small vacuum breakers has been objectionable because of the inadequacy or relatively small capacity of the air vent size used.

In addition, those previously furnished with a
35 generous capacity of air vent have been objectionable in that escape of water to atmosphere occurred when water flowed through the device.

Other objects and advantages of my invention will be apparent upon reading of the description
40 as disclosed in the patent drawings, in which

Fig. 1 shows one of the many conventional installations in which the device of my invention identified by the numeral 2 in the drawings is
45 attached to the downstream or discharge side of the flushing valve 11 or any similar water control means and leading into a discharge pipe 1 for the purpose of flushing the bowl 10.

Fig. 2 is a detailed sectional view showing a preferred embodiment of my invention.

50 Fig. 3 is a view taken on the line 3-3 of Fig. 2 showing a preferred vent port arrangement.

Fig. 4 is a section taken on the line 4-4 of Fig. 2 showing a preferred guide means for the float, and in addition accomplishing adequate venting
55 clearance.

Fig. 5 is a sectional assembly view of another preferred form of my device hereinafter identified as the offset type, in which the valve portion is placed off to one side of the normal line of flow within the vertical tubing and leaving the water
5 to flow unrestricted into the fixture to be flushed.

Fig. 6 is a sectional view of a modification of a vent float or disc suitably designed to permit buoyancy when made from such materials having a relatively higher specific gravity than cork, as
10 for example, certain compositions, rubber, wood, and the like, having a relatively large air space 3e for facilitating greater buoyancy.

Referring again to Fig. 1, the discharge tubing 1 is shown for illustrative purposes only as being
15 flared as at 2 thus forming casing to contain the float 3, preferably made of cork or other light, buoyant materials, the float 3 being preferably loosely guided on either its inner or outer peripheries. The inner guiding is preferably accom-
20 plished by means of the guide ribs 3a, which assure uniform clearances so as to provide proper areas 3c (see Fig. 4) between the outside diameter of the tubing 6 and the inside diameter of float,
25 also between outside diameter of float 3 and inside diameter of casing 2.

Guide ribs 3a also serve to guide float 3 to the seat 10c. The guide ribs 3a are so arranged on float 3 so as to allow sufficient distance between the underside of float 3 and baffle 2a to provide
30 enough area for venting. Such clearances around the float allow sufficient volume so as to permit substantially unrestricted venting completely around the aforesaid float. Therefore, in the normal position as shown in Fig. 2, the float
35 3 being supported by the guide ribs 3a rests upon the baffle 2a so that an annular opening or space is created above the baffle perforations 2b directly around and centrally under the float 3.

For purpose of maintaining a tight seat the float 3 is preferably provided with a facing material 4, which may be made readily renewable of such material so as to be specially adaptable for certain services although the latter provision is not absolutely necessary, but obviously depends
45 upon the nature of the float material used. At the upper end of the flared portion 2 and preferably loosely surrounding the tube 6, a bell-shaped shield 5 with a curved surface 5b venting exteriorly is positioned so as to rest upon a plate 10 by means of equally spaced lugs 5c forming the
50 annular clearance 5a. The plate 10 is preferably threadedly attached to the housing 2 by means of the threads 5d and as shown more clearly in Fig. 3.

The plate 10 is provided with arcuately extending ports 10a of such form and size as to permit the sufficient entrance of the outside atmosphere in the event that a vacuum within the device is created. The tubing 6 is shown sweated or otherwise connected to cap 10 as shown at 10b to provide a leak proof joint. It is obvious that tubing 6 could also be made integral with plate 10. It is preferred that the port 7 of the tubing 6 be of the same internal diameter as the smaller part 7 of the flared housing 2 and which forms the piping as a direct connection to the fixture to be flushed thus tending to induce unbroken flow of the flushing discharge.

The union ring 8 is threadedly attached to the lower enlarged portion 9 of the flush valve 11 by means of the threads 9a, the discharge tubing 6 extending upwardly into the port 11a of the flush valve 11 or similar flush control means.

In describing a typical operation of my device, let it be supposed that the valve 11 is normally flushing. During such operation, the water in large volume flowing downwardly will lift the float 3 to its seat 10c, thus preventing escape of water or "spitting" of the valve.

Should the fluid level within the housing 2 drop by a reason of back siphonage occurring or the normal downward flow ceases, obviously the buoyant float 3 will again fall back to its normal position resting upon the baffle 2a, thus again opening the ports 10a and permitting the entry of air from the outside atmosphere through the respective clearances 3c and past the underside of the float 3 entering the perforations 2b to destroy the vacuum. It will thus be apparent that my device is a sensitively operating arrangement, responsive to the slightest changes in conditions of flow.

Referring to Fig. 5, applying to a structural modification, the casing 12 is preferably attached as at 13 by sweated connections to the divided tubing 1. The latter tubing at its upper portion is preferably made with a lower extending biased portion 14 tending to direct the flow of water uninterruptedly downward rather than to impinge against the side of the valve casing 12, and induce the buoyancy to occur immediately under the float 3, rather than around it. The latter casing is provided with an opening 15, which is preferably sufficiently large in its size to allow for the area of 1" pipe or more. On its inner edge the opening 15 is provided with a seat 16 adapted for complementary engagement with the facing 4 of the float, which is preferably of cylindrical shape in its structure, and being of a comparatively soft material is preferably made with an insert guide member 17 adapted for a loose guiding fit on the vertical extending pin 18 of the cap 19. The latter is preferably threadedly attached to the casing 12 by means of the threads 19a, although the attachment may be by any suitable means.

From the detailed description above given, it is evident that my invention is capable of numerous modifications and any desired proportion of parts may be used. I, therefore, desire to be limited only to the extent of the appended claims.

I claim:

1. In an atmospheric vent for the supply to plumbing fixtures having an inlet and an outlet in substantial axial alignment, comprising in combination a centrally positioned discharge tubing providing unrestricted passage to said outlet, a housing surrounding a portion of the exterior of said discharge tubing, a ported cap in communication with the atmosphere transversely

positioned in leak-proof relation between the said tubing and the interior of the said housing, a float within said housing adapted for leak-proof engagement with the said cap, a baffle peripherally arranged within the said housing, the said float being normally positioned intermediate the said baffle and the said cap and annularly surrounding the said tubing, whereby during normal flow, the said outlet is in free access to the atmosphere.

2. In an atmospheric vent for the supply to plumbing fixtures having an inlet and an outlet in substantial axial alignment, comprising in combination a centrally positioned discharge tubing providing for unidirectional flow to said outlet, a housing surrounding a portion of the exterior of said discharge tubing, a ported cap in communication with the atmosphere transversely positioned in leak-proof relation between the said tubing and the interior of the said housing, a float within said housing adapted for leak-proof engagement with the ports of the said cap, a baffle peripherally arranged within a lower portion of said housing, the said float annularly contacting with the said tubing and being normally positioned intermediate the said baffle and the said cap, the said float being supported by the said baffle.

3. In an atmospheric vent for the supply to plumbing fixtures having an inlet and an outlet in substantial axial alignment, comprising in combination a centrally positioned discharge tubing providing for unidirectional flow to said outlet, a housing surrounding a portion of the exterior of said discharge tubing, a ported cap transversely positioned in leak-proof relation between said discharge tubing and the interior of said housing, a shield superposed over said cap, a float within said housing adapted for leak-proof engagement with the said cap, a baffle peripherally arranged within a lower portion of said housing, the said float being normally positioned intermediate the said baffle and the said cap, whereby upon occurrence of back flow the said float will close off said ports.

4. In an atmospheric vent for the supply to plumbing fixtures having an inlet and an outlet in substantial axial alignment, comprising in combination a centrally positioned discharge tubing between said inlet and outlet, a housing surrounding a portion of the exterior of said discharge tubing, a shielded cap transversely positioned in leak-proof relation between said discharge tubing and the interior of said housing and provided with openings in communication with the atmosphere, a float within said housing adapted for leak-proof engagement with the said cap, a baffle annularly positioned within said housing, the said float being normally supported by the said baffle intermediate the latter and the said cap and annularly guided by the said tubing.

5. In an atmospheric vent for a supply to plumbing fixtures having an inlet and an outlet in axial alignment, a centrally positioned discharge tubing providing unrestricted passage from said inlet to said outlet, a housing surrounding a portion of the said discharge tubing, the interior of the latter being in communication with a ported vent having access to atmosphere, a float within said housing adapted for leak-proof engagement with the said vent upon upward vertical movement thereof occasioned by the occurrence of back flow or the creation of a vacuum therewithin, the said float being so positioned within the said housing as to permit simultaneous venting to atmosphere of both the said inlet and outlet.

6. In an atmospheric vent for a supply to plumbing fixtures having an inlet and an outlet in axial alignment, a centrally positioned discharge tubing providing unrestricted passage from said inlet to said outlet, a housing surrounding a portion of the said discharge tubing, the interior of the latter being in communication with a ported vent having access to atmosphere, a float within said housing adapted for leak-proof engagement with the said vent upon upward vertical movement thereof occasioned by the occurrence of back flow or the creation of a vacuum therewithin, the said float being so positioned within the said housing as to permit simultaneous venting to atmosphere of both the said inlet and outlet, central guide means for the said float and supporting the latter so as to render it readily buoyant.

7. In an atmospheric vent for a supply to

plumbing fixtures having an inlet and an outlet in axial alignment, a centrally positioned discharge tubing providing unrestricted passage from said inlet to said outlet, a housing surrounding a portion of the said discharge tubing, the interior of the latter being in communication with a ported vent having access to atmosphere, a float within said housing adapted for leak-proof engagement with the said vent upon upward vertical movement thereof occasioned by the occurrence of back flow or the creation of a vacuum therewithin, the said float being so positioned within the said housing as to permit simultaneous venting to atmosphere of both the said inlet and outlet, annular guide means for the said float providing for an annular space beneath the lower face of the latter so as to render it readily buoyant upon back flow or the accumulation of liquids therewithin.

JAMES G. CEKAL.