Nov. 10, 1953 J. AUE 2,658,203

CLOSET

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Fig. 1

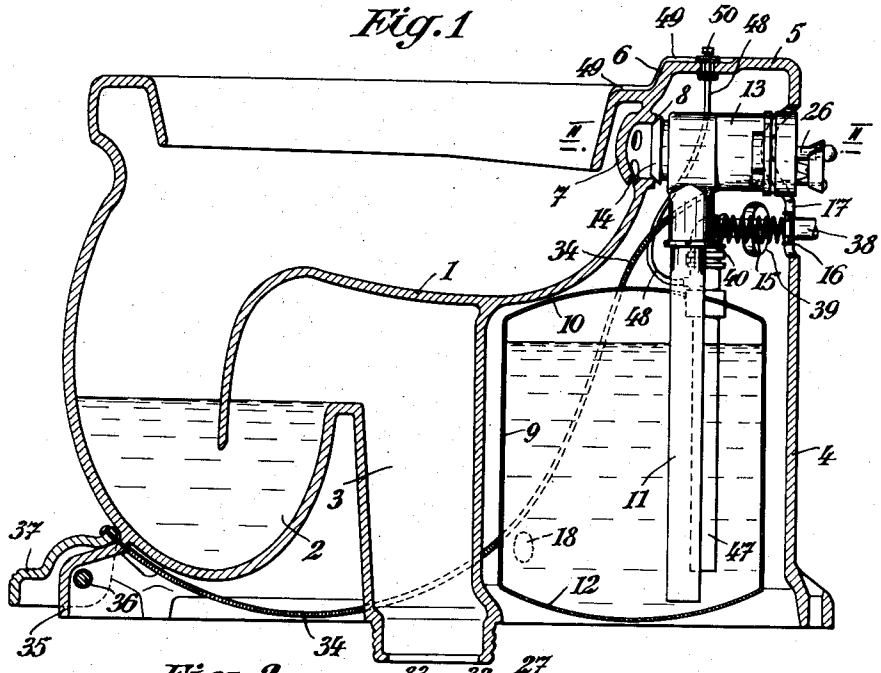


Fig. 2

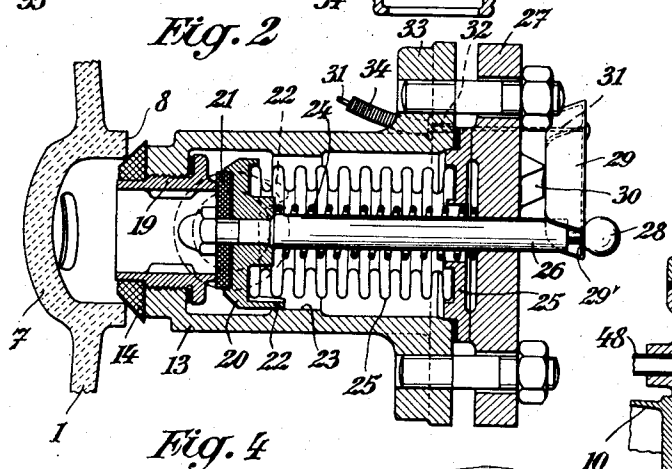


Fig. 3

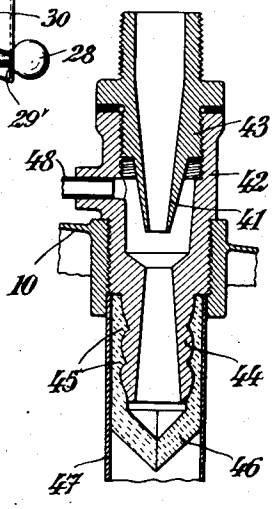
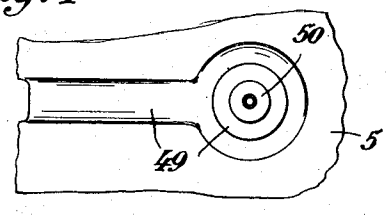


Fig. 4



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5 Claims. (Cl. 4—26)

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This invention relates to an improved water closet construction.

A closet has been suggested which comprises a pressure vessel forming an air receiver and being connected to the water supply pipe. This pressure vessel is fitted behind the bowl into a downwardly open chamber and is connected through a riser pipe, which contains a flushing valve, to the catch basin of the closet bowl. In that closet the riser pipe passes through the top wall of the chamber and extends by means of a bend, containing a hand-controlled valve, through the top wall of the chamber back into the flushing passage of the closet bowl. This construction is rather complicated and requires the tight connections between to the pressure vessel and the flushing pipe; to operate the flushing means, the user must bend forwardly over the closet bowl, which is comparatively long owing to the arrangement of the air receiver behind the bowl. Other closets are known in which flushing is effected by means of a pedal, the control gear from the pedal to the flushing means being freely accessible and, therefore, easily deranged.

The object of the present invention is the provision of a water closet which avoids the said drawbacks of conventional constructions in a simple manner.

In the water closet according to the invention the preferably cylindrical chamber accommodating the pressure vessel extends approximately by half its diameter below the catch basin, and the flushing valve, which is provided at the top end of the riser pipe and is controllable transversely to the axis of said pipe, is mounted with an intervening packing ring loosely on the open end of the flushing spout, which end is provided within the chamber, the sealing pressure required being provided by the force of a spring, which bears on the one hand against the rear wall of the chamber behind the outlet of the riser pipe and on the other hand against the riser pipe and which at the same time secures the pressure vessel in its position. In this manner the pressure vessel can be fitted most simply into the chamber because when the vesel has been inserted in the chamber and the spring has been mounted the tight connection with the flushing or catch basin is provided without special screw means and the position of the pressure vessel in the chamber is determined. In this construction there are at the top wall of the chamber no pipes or handles which would disturb the outside appearance of the closet and tend to cause damage to the bowl. In the closet according to the invention the valve

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cone of the flushing valve—this cone is pressure-relieved in the conventional manner, e. g., by a bellows diaphragm—is connected to a Bowden pull through a two-armed lever attached to the free end of the valve spindle. This Bowden pull extends through the chamber and is within the base of the closet bowl and connected to a pedal hinged to the front part of the base, the pedal preferably consisting of stoneware. Thus the flushing can be effected by the user in a standing or sitting position. Owing to its pivoted arrangement at the base of the closet bowl and its manufacture from stoneware the pedal is hardly visible at all and is protected against damage. The invention further relates to constructional improvements in the closet bowl to ensure perfect functioning.

In the accompanying drawing an embodiment of the invention is illustrated by way of example.

Fig. 1 is a longitudinal sectional view of the closet,

Fig. 2 an enlarged section taken along the line II—II of Fig. 1, and

Figs. 3 and 4 show details.

The closet bowl comprises the usual catch basin 1, the trap 2, the discharge pipe 3, provided approximately in the center below the catch basin, and a downwardly open chamber 4, which is arranged behind the catch basin and the lower part of which is of cylindrical cross section and extends to the discharge pipe 3 so that the chamber lies approximately by half its diameter below the catch basin 1. The upper part of the chamber 4 is limited in front by the back wall of the catch basin and is, therefore, restricted in its cross section. The top wall 5 of the chamber, forming a small, slanting step 6, rises somewhat beyond the top rim of the catch basin and is flush with the seat (not shown in the drawing). In the back wall of the catch basin a flushing spout 7 is provided, the open end 8 of which forms a plane annular surface. The chamber 4 has fitted into it a cylindrical pressure vessel 9, which serves as an air receiver and into the top wall 10 of which a riser pipe 11 is tightly fitted. This riser pipe extends close to the bottom 12 and at its top carries the casing 13 of a flushing valve, which at its end facing the annular surface 8 carries a conical packing ring 14. One end of a coil spring 15 bears against the casing 13, the other end bears against a supporting plate 16 adjoining the wall of the chamber 4 and extending across a cut-out 17 provided to facilitate the insertion of said plate. By the action of the spring 15, the packing ring 14 is urged against the inner rim

of the annular surface 8 (Fig. 2) and at the same time the pressure vessel 9 is urged against two inwardly projecting bosses 18 of the chamber 4, to be secured in position. To prevent sweating of the outside surface of the vesel, a heat-lagging lining made of fiber material may be provided between the pressure vessel and the chamber.

Inside the valve casing 13 (Fig. 2) there is arranged above the riser pipe 11 a valve seat 19, the central axis of which is arranged at a right angle to the axis of the tube 11. The valve cone 20 lies with a rubber plate 21 on the annular surface of the valve seat 19, and is guided on the cylindrical surface 23 of the casing 13 by means of three lugs 22 evenly distributed over its periphery. The valve cone 20 is pressed against its seat by a spring 24 and is tightly connected to a bellows diaphragm 25, the rear end of which is tightly fitted into a ring 25' provided at the end of the valve casing 13. The spindle 26 fitted into the valve cone 20 extends through a bore in a flange 27 pressing the ring 25' against the casing 13. At is set-off free end the spindle 26 carries a ball 28. A lever 29 consisting of a metal strip bent in the shape of a U is passed by means of a marginal slot 29' on the set-off end of the spindle 26. At its center the lever rests rockingly on a saddle 30 of the flange 27. At its other end the two-armed lever 29 has attached to it the end of the pulling wire 31 of a Bowden pull, which extends through the bore 32 of a flange 33 of the casing 13, and against which bears the sleeve 34 of the Bowden pull, and which sleeve consists of a closely wound coil spring. The Bowden pull extends through the chamber 4 and the base 35 of the closet bowl and is connected to a pedal pivoted at 36 to the base and preferably consisting of stoneware. This pedal is adapted to the curvature of the front part of the base. When the pedal 37 is depressed, the wire 31 of the Bowden pull is pulled so that the two-armed lever 29 operates the valve spindle 26 and the valve cone 20 is lifted from its seat to initiate the flushing. The supply of water from the water supply pipe to the pressure vessel 9 is effected through the pipe 38 (Fig. 1), which extends through an opening 39 of the chamber 4 and is connected by means of a bend 40 to a nozzle 41 (Fig. 3), which is connected through a threaded extension 43 to a casing 42 tightly screwed into the top wall 10. The casing 42 has a nozzle extension 44, which is provided with annular grooves 45 and over which a cylindrical portion of a lip valve made of rubber and functioning as a non-return valve is slipped. An immersion pipe 47, which is somewhat shorter than the riser pipe, is slipped on the cylindrical portion of the lip valve 46. It can be seen from the drawings that no special means for connecting the parts 42, 46, and 47 are required, because the pipe 47 is held by friction to the lip valve 46 and is at the same time prevented from expanding and being pressed off from the hose connection 44 by the pressure of the water flowing therein. The water flows almost noiselessly into the vessel 9. Together with the casing 42 and the nozzle extension 44 the nozzle 41 forms an injector for the supply of additional air into the pressure vessel 9. This air flows through an inlet conduit 48, the end of which protrudes through the top wall 5 of the chamber 4 and terminates in a groove 49 provided in the top wall and extending to the catch basin. A non-return valve 50 (Figs. 1 and 4) is provided in the end of conduit 48 terminating in groove 49, which valve prevents the escape of water. Should the non-return valve 50 leak, the escaping water will visibly flow to the bowl without doing any harm, so that the defect can be removed quickly.

The invention is not restricted to the embodiment described and various modifications in construction are possible within its scope. For instance, instead of the flushing valve described a self-closing valve may be provided, which can be set for a certain flushing period.

What I claim is:

1. A closet which comprises a closet bowl having a catch basin and a downwardly open chamber disposed behind said basin, an air receiver consisting of a pressure vessel provided in said chamber, means connecting said pressure vessel to a water supply line, a flushing spout having an open end in said chamber, a riser pipe in said pressure vessel, said riser pipe having an outlet adjacent to and in register with said open end of the flushing spout, a packing ring betweeen said outlet of the riser pipe and said open end of the flushing spout, a spring bearing on the one hand against the rear wall of said chamber behind the outlet of the riser pipe and on the other hand against said riser pipe to urge said outlet of the riser pipe into sealing engagement with said packing ring and to urge the latter into sealing engagement with said open end of said spout, a flushing valve at the top of said riser pipe, and means movable at right angles to the axis of said riser pipe to control said flushing valve.

2. A closet which comprises a closet bowl having a catch basin and a downwardly open chamber behind said basin, said chamber being of substantially cylindrical shape and extending by approximately half its diameter below said basin, an air receiver consisting of a pressure vessel provided in said chamber, means connecting said pressure vessel to a water supply line, a flushing spout having an open end in said chamber, a riser pipe in said pressure vessel, said riser pipe having an outlet adjacent to and in register with said open end of the flushing spout, a packing ring between said outlet of the riser pipe and said open end of the flushing spout, a spring bearing on the one hand against the rear wall of said chamber behind the outlet of said riser pipe and on the other hand against said riser pipe to urge said outlet of the riser pipe into sealing engagement with said packing ring and to urge the latter into sealing engagement with said open end of said spout, and to hold said pressure vessel in position, a flushing valve at the top of said riser pipe, and means movable at right angles to the axis of said riser pipe to control said flushing valve.

3. A closet which comprises a closet bowl having a catch basin and a downwardly open chamber disposed behind said basin, said bowl having a base comprising a front part, an air receiver consisting of a pressure vessel provided in said chamber, means connecting said pressure vessel to a water supply line, a flushing spout having an open end in said chamber, a riser pipe in said pressure vessel, said riser pipe having an outlet adjacent to and in register with said open end of the flushing spout, a packing ring between said outlet of the riser pipe and said open end of the flushing spout, a spring bearing on the one hand against the rear wall of said chamber behind the outlet of the riser pipe and on the other against said riser pipe to urge said outlet of the riser pipe into sealing engagement with said packing ring and to urge the latter into sealing engagement with said open end of said spout, said flushing

valve comprising a valve cone, means for pressure-relieving said valve cone, a valve spindle connected with said valve cone and axially movable at right angles to the axis of said riser pipe to move said cone, said spindle having a free end, and means for moving said valve spindle, said last mentioned means comprising a two armed lever attached to the free end of said valve spindle, a pedal hinged to said front part of the base of the bowl, and a Bowden pull attached to said two-armed lever and extending through said chamber and said base and being connected to said pedal.

4. A closet as set forth in claim 3, said means connecting said pressure vessel to a water supply line comprising an injector pump having a nozzle extension provided with annular grooves, a lip valve having a substantially cylindrical portion slipped on said nozzle extension, and a tube extending into said pressure vessel and being slipped on the outside surface of said cylindrical portion.

5. A closet according to claim 4, said chamber

having a top wall, a groove provided in said top wall and extending toward said basin, an air inlet conduit having one end connected with said injector pump, the other end of said conduit terminating in said groove, and a non-return valve in the end of said conduit terminating in said groove.

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