July 4, 1939. W. C. GROENIGER 2,164,319

WATER CLOSET OR DEFECATOR

Filed Dec. 31, 1937

Fig. 1.

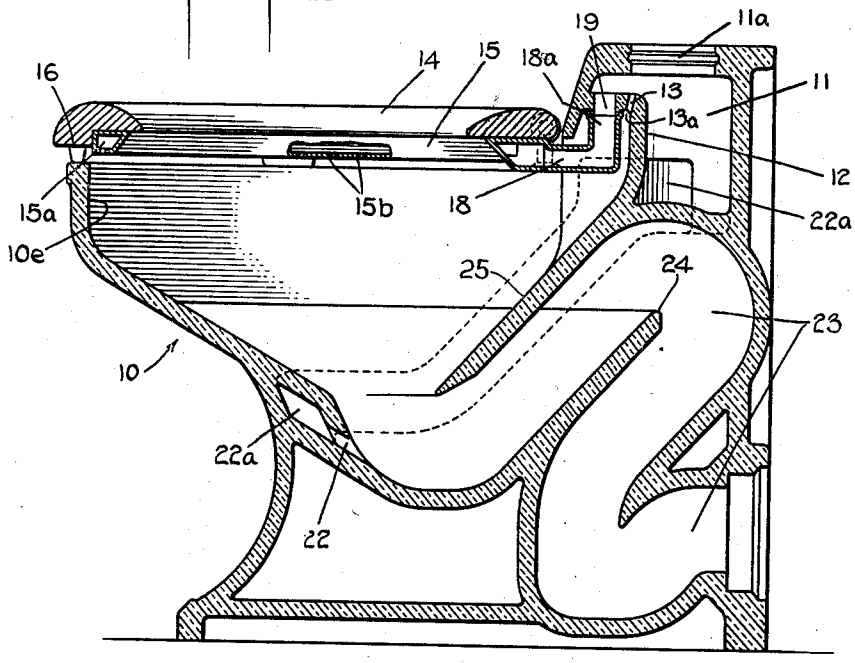



Fig. 2.

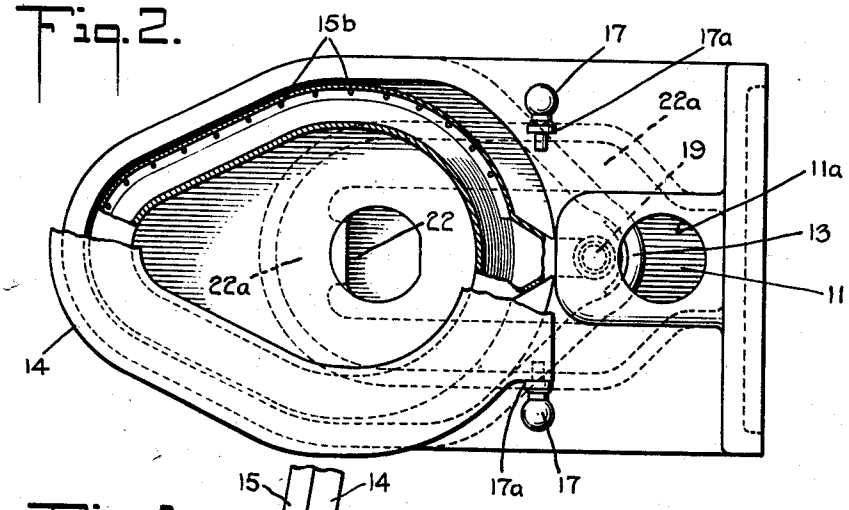
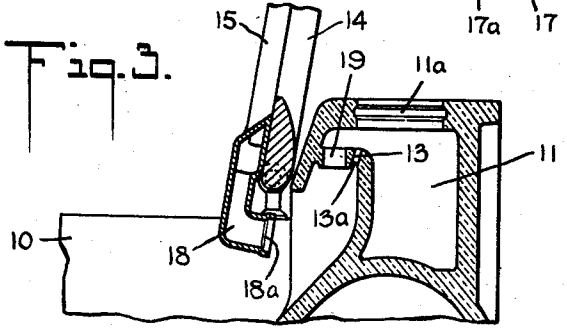



Fig. 3.




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## WATER CLOSET OR DEFECATOR

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13 Claims. (Cl. 4—10)

This invention relates to improved water closets or defecators.

More particularly the invention is directed to closet bowls and therewith combined seat and flush rim means, constructed to positively preclude any syphonage of the contents of the bowl into the water supply system under all possible status of operation including vacuum and/or other abnormal conditions.

The invention is applicable to any desired type of closet bowl structure and to any desired arrangement of water supply and manner of discharge of the contents of the bowl into a soil pipe or equivalent.

Preferred embodiments of the invention, attaining the above and other objectives, comprise a water supply channel mechanically directly associated with the closet bowl per se, as by unitary structure therewith, a wall, serving in common as a portion of the wall of the bowl proper and of the water supply channel, being equipped with an opening leading to the interior of the bowl proper and located at a clearance appreciably above the overflow spill level of the closet bowl, that is to say, at a position vertically appreciably above the highest possible level of the contents of the bowl at which spilling flow over the upper rim takes place. Such opening, accordingly, functions under all possible status of normal or abnormal conditions of operation including vacuum condition, as an air break effective in dissipating such vacuum.

In coordination with such air break means, the flush rim is constructed mechanically independently of the closet bowl structure per se and desirably mechanically directly associated with the seat. Preferably, the flush rim is directly carried by the seat and most preferably the flush rim and seat are mechanically formed as a unit.

Such combined seat-flush rim structure may be pivotally mounted to provide movement of the same to lowered position and to raised position, a range of movement usually over an arc of approximately 100 degrees, in which latter position the flush rim structure inclusive of its rim jet openings are brought into wholly accessible position, affording full inspection and repair if necessary, ready cleansing or sanitary treatment, and other advantages wholly unavailable in the conventional closet bowl having its flush rim of integral structure with the upper rim of the bowl.

Such arrangement of flush rim mechanically separate from the closet bowl per se enables the flush rim structure to be formed of any suitable moldable material such as "Bakelite" and other synthetic or common plastic compositions, affording full scope of any desired type of arrangement of openings and insured final status of jet opening, size and shape.

If desired, the bowl proper may be formed of conventional material, such as porcelain or other baked compositions, cast metal, etc. By reason of the structure of the flush rim being mechanically separate from the structure of the closet bowl per se, the stated rim may be formed of more readily fashioned and controlled material, such as sheet metal.

As above generally set forth, the stated opening located in a wall of the bowl-water supply channel and disposed appreciably above the overflow spill level of the bowl, functions to discharge flushing water into the bowl; preferably, such opening is arranged and constructed to scour the inner faces of the bowl, usually at the rear of the bowl. Such opening, accordingly, is located at a position intermediate the water distribution system supplying the flushing water and the flush rim openings, thus constituting a dual air break arrangement of ample total cross-sectional area for the entry of air, in the event of a vacuum in the water distribution system, in dissipation of such vacuum. Preferably, such opening is located in the wall of the bowl at a level above the level of discharge of the flush rim openings, giving rise to a two-level flush discharge.

The above objectives and additional advantages are attained in preferred embodiments of the present invention by extending upwardly the rear wall structure of the bowl and locating therein the stated air break opening, thus locating the same a marked clearance above the overflow spill level of the bowl. Advantageously, in such preferred embodiments of the present invention, the aperture effecting communication between the water supply channel and the combined seat-flush rim structure is similarly located at an elevation above the upper rim of the bowl proper, thus providing for definite downgrade flow and consequent increased efficiency, of the flushing water in its path of flow to and through the flush rim of the combined seat-flush rim structure.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawing, in which

Fig. 1 is a vertical section of a closet bowl typi-

cal of a general form of closet bowl, provided with cross connection preventing means and equipped with combined seat means and rim flush means pursuant to the invention.

Fig. 2 is a top plan view of Fig. 1, partly broken away through its rim flush means, in horizontal section.

Fig. 3 is a detail vertical section corresponding to a portion of Fig. 1, showing the combined seat and rim flush means moved to raised position.

Referring to the drawing, the closet bowl **10** may be of any desired form of construction and arranged for any desired manner of discharge. By any form of construction I include closet bowls of the conventional syphon wash-down type, syphon jet type, blow-out, i. e., ejector type, combined bowl and tank type, hopper type, or of the momentum jet type, the last named usually including a vortical jet opening.

Mechanically directly associated with such bowl **10**, pursuant to the present invention, is provided a water supply channel **11** having an intake opening **11***a*, suitably arranged for connection with a flush tank, piping equipped with a flushometer valve, etc., as preferred. As illustrated in the drawings, the water supply channel is desirably integral with the structure of the bowl proper **10**.

As shown in the drawing, the wall **12** serving in common as a wall of the water supply channel **11** and an upper wall portion of the bowl proper **10**, is equipped with an opening **13** communicating at its upper end with the interior of the water supply channel **11** and having its lower end **13***a* disposed in proximity of an inner face of the bowl proper, and preferably constructed to direct one or more jets in scouring relation with such inner face of the bowl proper.

A structural and functional feature of the present invention resides in disposing the lower end **13***a* of such opening **13** at a clearance vertically above the overflow spill level of the closet bowl, for the purposes herein set forth.

Pursuant to the invention suitable seat means and therewith mechanically associated flush rim means are provided, and suitably mounted to afford proper support for the same when the flush rim means is in position adjacent the upper rim of the closet bowl proper, under condition of flushing, to effect thorough scouring of the inner walls of the bowl proper.

In the embodiment illustrated in the drawing, the seat means and therewith mechanically associated flush rim means are structurally united. The seat per se **14** may be of any conventional configuration and/or material. Suitably associated with such seat **14**, pursuant to the present invention, is a rim flush member **15** carried by the seat in any suitable manner. Such rim flush member may be formed of any suitable material, advantageously of moldable material such as "Bakelite", or of suitable nature to be formed to have a hollow interior, see **15***a*, of suitable volumetric capacity and contour, and provided with rim openings **15***b* of selected individual volumetric capacity to afford during the stage of flushing, jets suitably directed to scour the inner wall **10***e* of the bowl **10** in compliance with the requirements of sanitary codes.

A feature of the present invention lies in the provision of means for insuring an effective clearance between the rim jet openings **15***b* when the combined seat and flush rim means are in lowered position and at a clearance vertically appreciably above the overflow spill level of the closet bowl. As illustrated in the drawing, such provision of means is had by suitable bumper or other means, **16**, advantageously carried at the under wall face of the combined seat-flush rim means, providing for such clearance above the rim of the bowl when the combined seat-flush rim means are in lowered position.

Suitable communication affording means is provided between the interior of the water supply channel **11** and the member **15** serving as the flush rim channel, during the stage of flushing, when the combined seat-flush rim means is in lower position. Such communication is attained pursuant to the embodiment illustrated in the drawing by a pivotal mounting of the combined seat-flush rim means, as by seat posts **17**, **17**, suitably secured to the structure of the bowl, such as to the indicated wall portion **17***a*, and by a hollow extension **18** suitably communicating with the flush-rim member **15** as by integral wall connection therewith. The walls of the opening **18***a* of such hollow wall extension make effective water-tight communication with the interior of the water supply compartment when the combined seat-flush rim member **15** is in its lowered position. As is shown in the drawing, such communication is had by the provision of an aperture **19** in a wall of the water supply channel.

Accordingly, under the condition of supply of water to the water supply channel **11**, assuming the combined seat-flush rim means **14**, **15**, to be in lowered position, such flushing water is in part directed to the particular jet or jets or equivalent, such as the jet **22** supplied through the channel **22***a* leading from the water supply channel **11**, to effect the desired manner of discharge of the contents of the bowl as through the discharge passage **23**, and in part directed dually through the one or more jet wall scouring openings **13**, and through the aperture **19** and thence through the hollow wall extension **18** and the hollow interior **15***a* of the combined seat-flush rim means, and finally through the rim jet openings **15***b*. Desirably, the terminal wall portion of the opening **18***a* of the extension **18** is suitably contoured as by outwardly divergent flaring to make an effective water seal with the lower end wall formation of the aperture **19**.

Succeeding such flushing stage, assuming the combined seat-flush rim means to be moved to its raised position, any residue of the flushing water remaining in the flush rim **15** drains out under gravity through the now-free opening **18***a*.

The opening or openings **13** are preferably suitably contoured to effect a flat, fanwise pattern of discharge therefrom, such discharge pattern increasing in area of coverage below the rim level of bowl **10**. Such fanwise discharge affords full and complete scouring of the rear upper side walls of the stated bowl, inclusive of the upper portion of rear ledge **25**; accordingly opening **13** supplements rim-jet openings **15***b* in thoroughly washing the upper surface of the bowl interior.

In the event that the combined seat-flush rim means is in partial or full raised position, should the flush tank, flushometer or the like be operated, such flushing water is discharged from the water supply channel **11** partly through the jet-discharging means **22**, or equivalent, partly through the aperture **19**, and jointly through the one or more jet openings **13**, the aforesaid taking place to the exclusion of the supply of water to the interior **15***a* of the combined seat-flush rim means.

In the circumstance of a vacuum or other ab-

normal condition in the water distribution system supplying the flushing water, any syphonage of the contents of the bowl into the water distribution system is positively precluded by the inflow of atmospheric air into chamber 11 through the one or more jet openings 13, the cross-sectional area of which is designed to exceed the cross-sectional area of the piping leading to the flush-tank or the piping equipped with a flushometer valve or equivalent normally supplying the flushing water. Such area of opening permits inflow of air in quantity sufficient to cause an immediate dissipation of the vacuum condition. Should the combined seat-flush rim means be in its lowered position, the aperture 19 functions to add the total cross-sectional areas of the flush rim openings 15b to that of the opening or openings 13, in the assistance of dissipation of such vacuum condition, thus precluding cross-connection.

From the above, it appears that the invention embodies dually operative provision of means for the entry of air under all status of operation of the bowl, in dissipation of any vacuum and/or in the circumstance of other abnormal conditions affecting the bowl and/or the supply of flushing water thereto.

As appears from the preferred embodiment of the invention illustrated in the drawings, the objectives of the invention are attained by extending the wall and other rearward portions of the bowl definitely upwardly above the top rim of the bowl proper, thus locating the air break opening 13 and the flush communication aperture 19, at marked clearance above the overflow spill level of the bowl. Such provision of means affords a definite downgrade path of flow of the flushing water from the water supply channel to and through the flush rim, thus enhancing the efficiency of flushing operation.

In particular, the present invention provides for a multi-level introduction of flushing water to the bowl, effecting under normal operation status of the bowl, the discharge of the flushing water into the interior of the bowl, when the combined seat-flush rim structure is in lowered position. Desirably, such multi-level introduction of flushing water, as appears from the foregoing, provides for the introduction of flushing water into the bowl initially at a point below the normal level of fluid therein, such mass of fluid being known as the trap sealing liquid and established in level by the elevation of the dam or weir 24 of the evacuator 23, and before appreciable discharge through rim-jet orifices 15b or opening or openings 13. As will be obvious, during the stage of cessation of flushing, rim-jet openings 15b and opening or openings 13 will be free of water and hence open to atmospheric air before the completion of flow of water through passage 22a.

As appears also hereinabove, the invention provides for the safe disposal of the flushing water, under all status of position of the combined seat-flush rim structure and for the safety of the parts of the bowl, in the circumstance of shutting off of the water distribution system in the event of freezing temperature.

Whereas this invention has been illustrated and described with respect to a preferred embodiment thereof, it is clearly understood that changes may be made without departing from the spirit of the invention as defined in the following claims.

I claim:

1. The combination with a closet bowl, including a water supply channel unitarily constructed therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a locality in proximity of an inner face of the bowl proper, of seat means and therewith mechanically associated rim flush means, means for displaceably relating said seat means and said rim flush means relative to the upper rim of the closet bowl to afford variant position of said seat means and said rim flush means from supported position relative to the upper rim of the closet bowl to a position remote from such supported position, and means affording communication between said water supply channel and the interior of said rim flush means when said seat means and rim flush means are in rim supported position.

2. The combination with a closet bowl, including a water supply channel unitarily constructed therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a locality in proximity of an inner face of the bowl proper, the point of discharge of said opening being substantially above the overflow level of said bowl, of seat means and associated therewith rim flush means, means for movably mounting said seat means and said rim flush means in common relative to the closet bowl to afford movement of the same from a position remote therefrom, means for limiting the movement of said rim flush means when in position adjacent the upper rim of the closet bowl, and means affording communication between the interior of said rim flush means and said water supply channel when said seat means and rim flush means are in position adjacent the upper rim of the closet bowl.

3. The combination with a closet bowl, including a water supply channel unitarily constructed therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a locality in proximity of an inner face of the bowl proper, of seat means and mechanically associated therewith rim flush means, means for movably mounting said seat means and said rim flush means in common relative to the closet bowl to afford movement of the same from a position remote therefrom, means for limiting the movement of said rim flush means when in position adjacent the upper rim of the closet bowl, and means affording communication between the interior of said rim flush means and said water supply channel when said seat means and rim flush means are in position adjacent the upper rim of the closet bowl, said communication affording means comprising an aperture communicating with said water supply channel.

4. The combination with a closet bowl, including a water supply channel unitarily constructed therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a locality in proximity of an inner face of the bowl proper, of seat means and mechanically associated therewith rim flush means, means for movably mounting said seat means and said rim flush means in common

relative to the closet bowl to afford movement of the same from a position remote therefrom, means for limiting the movement of said rim flush means when in position adjacent the upper rim of the closet bowl, and means affording communication between the interior of said rim flush means and said water supply channel when said seat means and rim flush means are in position adjacent the upper rim of the closet bowl, said communication affording means comprising an aperture communicating with said water supply channel, said aperture disposed forwardly of said first-mentioned water-discharge opening.

5. The combination with a closet bowl, including a water supply channel unitarily constructed therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a locality substantially above the level of overflow of said bowl and in proximity of an inner face of the bowl proper, and providing for fan-shaped discharge against such bowl face, of seat means and associated therewith rim flush means, means for movably mounting said seat means and said rim flush means in common relative to the closet bowl to afford movement of the same from a position remote therefrom, means for limiting the movement of said rim flush means when in position adjacent the upper rim of the closet bowl, and means affording communication between the interior of said rim flush means and said water supply channel when said seat means and rim flush means are in position adjacent the upper rim of the closet bowl, said communication affording means comprising an aperture communicating with said water supply channel.

6. The combination of a closet bowl, including a water supply channel unitarily constructed therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a locality substantially above the level of overflow of said bowl and in proximity of an inner face of the bowl proper, of seat means, said opening having cross section area suitable for the admission of atmospheric air to said water supply channel in quantities sufficient for immediate dissipation of any degree of sub-atmospheric pressure condition within said channel, rim flush means carried by said seat means, means affording common movement of said seat means and said rim flush means from a position adjacent the upper rim of the closet bowl to a position remote therefrom, means for limiting the common movement of said seat means and said rim flush means when in position adjacent the upper rim of the closet bowl, and means affording communication between the interior of said rim flush means and said water supply channel when said seat means and said rim flush means are in position adjacent the upper rim of the closet bowl.

7. A defecator including, in combination, a bowl, a water supply channel communicating therewith, a wall in common with such water supply channel and the bowl proper, said wall provided with a bowl-wall scouring discharge port affording communication between the water supply channel and the interior of the bowl at a locality in proximity of an inner face of the bowl proper and substantially above the maximum overflow level of said bowl, and rim flush means effective to discharge water against the upper interior wall of said bowl from a point above the rim of the said bowl, said first-mentioned discharge port being disposed at a level above said rim flush means.

8. A defecator comprising a bowl normally containing a mass of fluid arranged to receive waste matter for ultimate discharge from said defecator, means for effecting such discharge by the admission of a volume of water thereto, such admission of water effective to restore the normal level of such fluid mass after the discharge of the first mentioned fluid mass; said discharge means including a water supply channel, a water-flow passage extending therefrom and communicating with said bowl at a point below the normal fluid level thereof, a water-flow passage extending from said water supply channel and arranged to discharge water around a portion of the interior side walls of said bowl from a point above the maximum attainable fluid level of said bowl, and a water-flow passage extending from said water supply channel and arranged to discharge against a portion of the interior side walls of said bowl.

9. A defecator comprising a bowl normally containing a mass of fluid arranged to receive waste matter for ultimate discharge from said defecator, means for effecting such discharge by the admission of a volume of water thereto, such admission of water effective to restore the normal level of such fluid mass after the discharge of the first mentioned fluid mass; said discharge means including a water supply channel, a water-flow passage extending therefrom and communicating with said bowl at a level below the normal fluid level thereof, a water-flow passage extending from said water supply channel and arranged to discharge water around a portion of the interior side walls of said bowl from a level above the maximum overflow spill level of said bowl, and a water-flow passage extending from said water supply channel and arranged to discharge against a portion of the interior side walls of said bowl from a level above the level of said second-mentioned discharge means.

10. A defecator comprising a bowl, means for evacuating the contents of said bowl, said means including a water supply channel associated with said bowl and having a water-flow passage communicating therewith at a point below the normal water level in said bowl, and means for washing the upper interior walls of said bowl, said means comprising a plurality of discharge jet orifices, each of limited water flow capacity, directed against the inner wall of said bowl from a point above the level of water overflow from said bowl and cumulatively scouring the greater portion of the periphery of said inner wall and a discharge orifice of substantially greater water flow capacity arranged to discharge water against the rear inner wall of said bowl from a level above that of the said discharge jet orifices.

11. In a defecator, a bowl, a water supply channel communicating therewith and arranged to discharge water thereinto to effect evacuation of the contents of said bowl, rim-jet means disposed adjacent the rim of said bowl and communicating with said water supply channel to effect a washing of the upper sides of said bowl during the evacuation thereof, said rim-jet means disposed above the point of overflow of said bowl, and means communicating with said water supply channel and providing for divergent fanwise discharge of water into said defecator bowl at the

rear thereof, said last-mentioned means disposed at a level above the level of said rim-jet means.

12. A defecator comprising, in combination, a bowl, a water supply channel communicating therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a location substantially above the level of overflow of said bowl, seat means, a rim flush channel arranged to scour the greater portion of the upper interior wall of said bowl, means for movably mounting said rim flush channel relative to the closet bowl to afford movement of the same from a position adjacent the upper rim of the closet bowl to a position remote therefrom, means affording communication between said rim flush channel and said water supply channel, and means for disposing said rim flush channel when in position adjacent the upper rim of the closest bowl at a position above the maximum overflow spill level of said closet bowl.

13. A defecator comprising, in combination, a bowl, a water supply channel communicating therewith, a wall in common with such water supply channel and the bowl proper being provided with an opening affording communication between the water supply channel and the interior of the bowl at a location substantially above the level of overflow of said bowl, means for scouring the greater portion of the upper interior wall of said bowl, said bowl scouring means including a plurality of jets and means for supplying water thereto, means for movably mounting said rim flush means relative to the closet bowl to afford movement of the same from a position adjacent the upper rim of the closet bowl to a position remote therefrom, and means for disposing said rim jet openings at a position above the maximum overflow spill level of the bowl, when said rim flush means are disposed adjacent the upper rim of said bowl.

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