

June 6, 1961

J. R. SCHMITT ET AL

2,986,744

COMBINED WATER CLOSET AND FLUSH TANK

Filed Dec. 3, 1957

2 Sheets-Sheet 1

FIG. 1

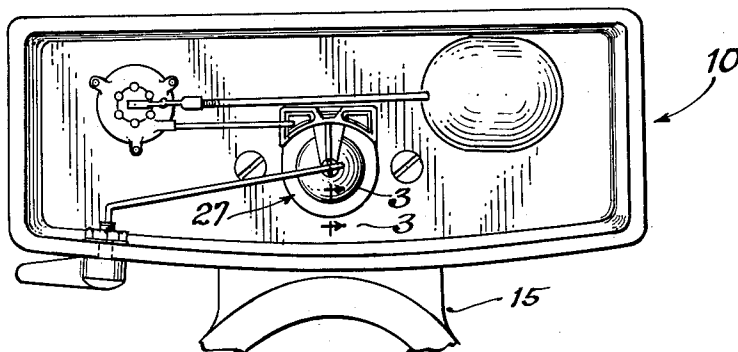


FIG. 2

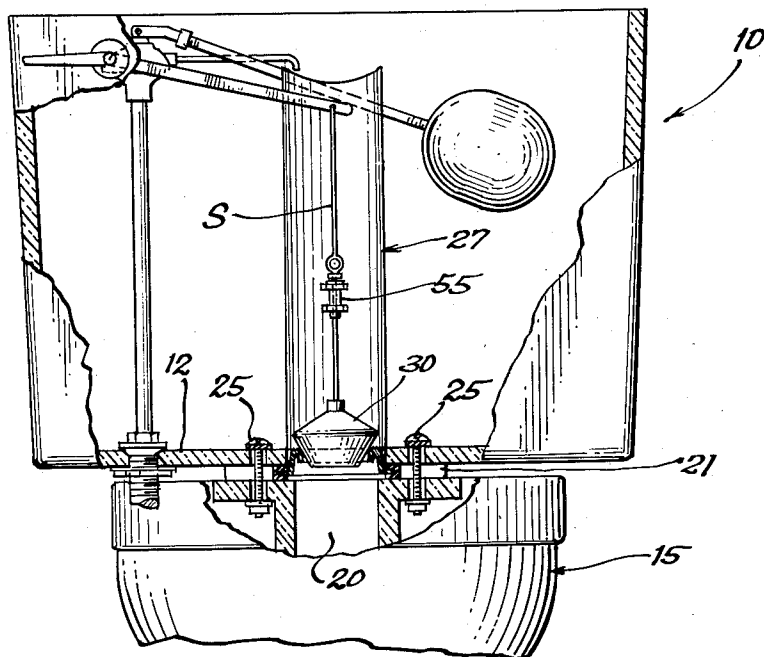
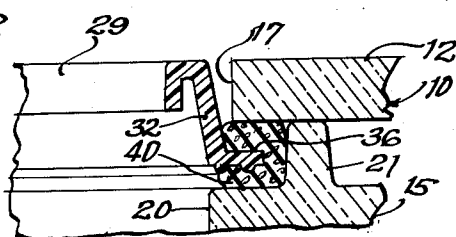


FIG. 3



INVENTORS
Joseph R. Schmitt
Fred C. Alexander
BY Frank H. Marks,
Nathan H. Kraus,
Attorneys

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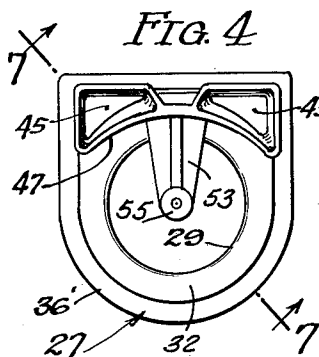
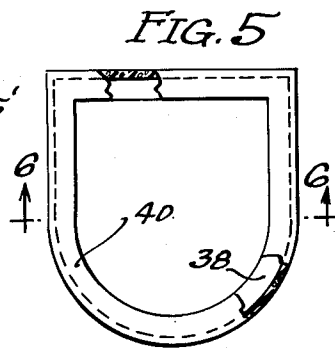
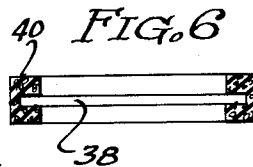
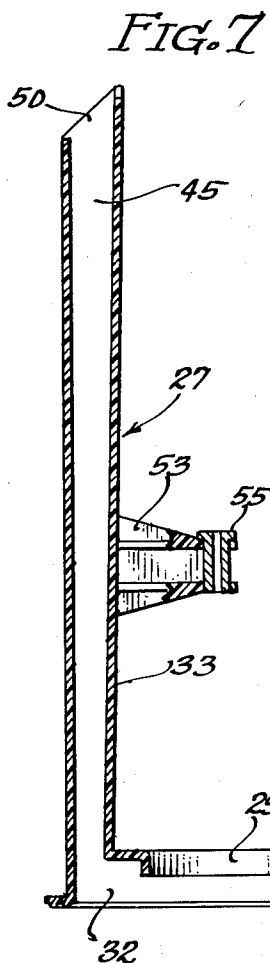
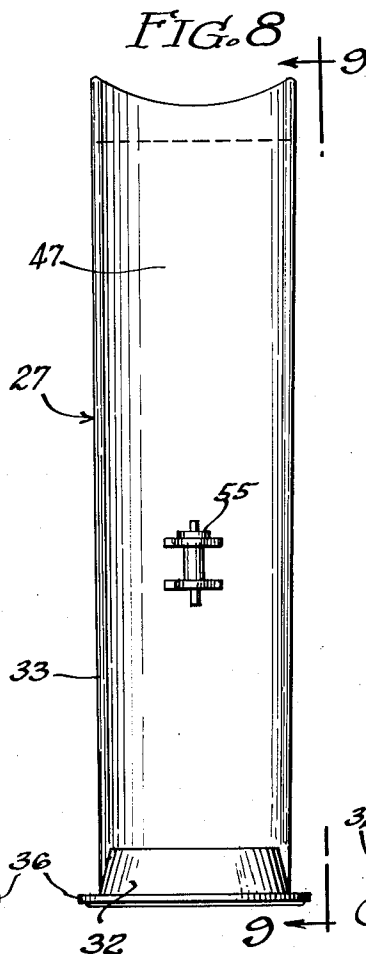
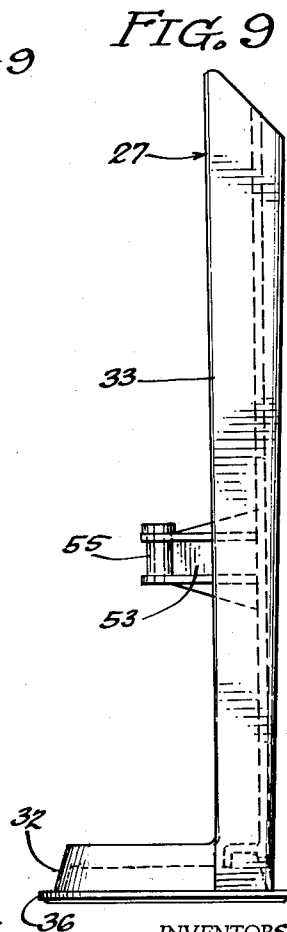
J. R. SCHMITT ET AL

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INVENTORS.
Joseph R. Schmitt
BY Fred C. Alexander
Frank H. Marks
Nathan H. Kraus,
Attorneys

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2,986,744

COMBINED WATER CLOSET AND FLUSH TANK
Joseph R. Schmitt and Fred C. Alexander, New Castle, Pa., assignors to Universal Rundle Corporation, New Castle, Pa., a corporation of Delaware
Filed Dec. 3, 1957, Ser. No. 700,336
12 Claims. (Cl. 4-57)

Our invention relates generally to close connected water closets and flush tanks and has to do more particularly with improvements in combinations thereof with flushing means and associated parts.

We have provided an improved flush valve which has a number of important advantages. Thus, according to one aspect of our invention we provide a unitary element comprising a valve seat for the customary ball valve together with an overflow pipe and guide for the ball valve stem.

Our invention also contemplates that the valve seat be disposed substantially flush with the bottom of the tank, thus utilizing substantially the entire capacity of the tank in flushing the bowl.

Our invention also contemplates that the overflow means be of peculiar contour instead of the ordinary cylindrical tube customarily used for this purpose. In accordance with our invention we provide overflow means in the form of an upstanding element preferably integral with the valve seat and discharging into the valve outlet, said overflow means being a pair of tubes which are generally triangular in cross section. By this means we provide a maximum overflow capacity at a minimum of cost.

In a preferred embodiment of our invention an improved valve seat, overflow means and valve stem guide are molded out of synthetic plastic material, thus making for a highly satisfactory construction from the standpoint of low cost, ease of assembly, ruggedness, etc.

Our invention also contemplates an improved assembly of the flush tank and toilet bowl by means of a relatively simple gasket connection on the valve and overflow outlet disposed directly between the tank and the bowl adjacent the discharge outlet of the tank and with no protruding or inter-connecting parts such as the usual nipple or "spud" usually employed between tank and bowl. This extremely simple construction also is conducive to low cost, ease of assembly, certainty of operation and minimum of upkeep.

Various other objects and advantages will become apparent as the description proceeds.

Referring now to the drawings forming a part of this specification and illustrating a preferred embodiment of our invention:

FIG. 1 is a top plan view of a flush tank and toilet bowl and associated flushing mechanism embodying our invention;

FIG. 2 is a fragmentary vertical section of the same, partly in elevation, with parts broken away;

FIG. 3 is a fragmentary sectional view taken substantially along line 3-3 of FIG. 1;

FIG. 4 is a top plan view of the combined overflow means and valve seat constituting a feature of our invention;

FIG. 5 is a plan view of an improved gasket constituting an element of our invention, with parts broken away for added clarity;

FIG. 6 is a sectional view taken substantially along line 6-6 of FIG. 5;

FIG. 7 is a sectional view taken substantially along line 7-7 of FIG. 4;

FIG. 8 is an elevational view of the part shown in FIGS. 4 and 7, and

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FIG. 9 is another elevational view of the same taken at substantially right angles to the view of FIG. 8.

Referring first to FIGS. 1 and 2, the numeral 10 represents a flush tank and numeral 15 a close connected toilet bowl which may be of standard or other suitable design.

It will be noted that the tank 10 has a simple bottom wall 12 which has a discharge outlet 17 therein roughly of horseshoe shape (see FIG. 3) communicating with a circular inlet opening 20 in the toilet bowl 15. Upstanding bosses 21 are formed on the top of toilet bowl 15, spaced radially outwardly from inlet opening 20, the bottom wall 12 of the flush tank resting on the bosses 21 (FIG. 3).

The tank and bowl are secured together by means of the usual bolts and nuts indicated generally by the numeral 25. Disposed within the tank 10 is a unit indicated generally by numeral 27, preferably molded of a suitable plastic material, such as a phenol-formaldehyde resin or any other suitable synthetic or natural resinous material, although the same may be formed of sheet metal or any other desired material. The unit 27 comprises, preferably in integral form, a circular seat member 29 for the usual ball valve, which may take the form of valve 30 seen in FIG. 2. Formed integrally with valve seat member 29 is a discharge conduit 32 and overflow means 33. The discharge conduit 32 will preferably be of more or less horseshoe shape as seen best in FIG. 4.

Laterally extending from the discharge conduit 32 is a flange 36 which will, of course, have the horseshoe configuration shown in FIG. 4 and will serve to seat in the groove 38 of a resilient gasket 40, seen best in FIGS. 5 and 6. As seen in FIGS. 2, 3, and 7, the cross-sectional conformation of the valve seat 29, flange 36 and connecting portion is more or less S-shaped, constituting a shell-like-formation. The gasket 40 is substantially U-shaped in cross-section and will seat in compression on the upper surface of the toilet bowl 15. The parts will be so proportioned and the weight of tank 10 will be such that the gasket 40 will be tightly pressed against the toilet bowl so as to form a liquid seal when the parts are assembled as in FIGS. 2 and 3.

Communicating with the discharge conduit 32 is overflow means which comprises a pair of conduits 45, 45' leading directly into the outlet passage 32. It will be seen from FIG. 4 that the overflow conduits 45, 45' are of generally triangular cross-section and are formed with a common wall 47 which is arcuate in cross-sectional contour. The inlets 50 of conduits 45, 45' are preferably beveled as seen best in FIG. 7.

Extending laterally from wall 47 and preferably molded integral therewith is an arm 53 supporting a sleeve 55 serving as a guide for the usual valve stem S (FIG. 2).

The valve may be actuated by standard or other suitable manipulating mechanism and float control as seen in FIGS. 1 and 2 and detailed description of the same is considered unnecessary.

It will be seen that we have provided a novel arrangement and combination of parts having numerous important advantages as compared with the prior art. The peculiar construction of the overflow means permits rapid discharge of a maximum amount of water, taking into account economy of space and material utilized in our construction. It is also found extremely economical from the standpoint of production as well as assembly to provide the valve and overflow means as parts of a single unit.

It will also be seen that with our invention the related parts may be of the most economical design. Thus, the tank may be of simple, box-like form being provided with a simple discharge orifice in the bottom wall thereof without the need for any upstanding or depending nipple,

false bottom or anything of the sort such as is common in previously known tank constructions. Furthermore, there is no need for any additional nipple or other special connection between the tank and the toilet bowl, a direct connection being provided by the extremely simple arrangement seen in detail in FIGS. 2 and 3. This makes not only for economy in the production of the tank and associated parts but also most efficient utilization of space and materials and providing a maximum discharge of water for a given outside tank size.

It will be obvious that the parts may be assembled rapidly and easily by an unskilled person by merely placing in position on the bowl the combined overflow and valve seat unit and then attaching the tank in proper position on the bowl and tightening up the bolts and nuts 25, thus providing a fluid-tight assembly requiring a minimum of maintenance. The ball valve and associated parts are then attached in the usual way.

Although our invention contemplates a flush tank which is of special design in certain respects, practically any toilet bowl of more or less standard design may be employed.

Various changes coming within the spirit of our invention may suggest themselves to those skilled in the art. Hence, we do not wish to be limited to the specific embodiment shown and described or uses mentioned, but intend the same to be merely exemplary, the scope of our invention being limited only by the appended claims.

We claim:

1. In combination, a flush tank and toilet bowl disposed in close-coupled relation, said tank having a bottom wall with a discharge opening therein and said bowl having an inlet opening aligned with said discharge opening, a gasket disposed between the bottom wall of the tank and said bowl and encompassing the space between said discharge opening and inlet opening, a valve-seat member of shell-like formation having an annular seat portion approximately level with the tank bottom and having a laterally extending flange making water-tight engagement with said gasket.

2. A combination as in claim 1, wherein the seat portion extends inwardly and downwardly from the upper extremity of the valve seat member.

3. A combination as in claim 1, wherein said valve seat member comprises a main portion having a flange extending laterally from the lower extremity thereof and engaging said gasket and an integral annular seat portion disposed substantially level with the tank bottom, and an integral overflow-tube portion discharging directly into said main portion.

4. A combination as in claim 3, wherein said overflow-tube portion is generally crescent-shaped in cross-section.

5. A combination as in claim 1, wherein the valve seat portion extends inwardly and downwardly from the upper extremity of the main portion and the flange is at the lower extremity of the main portion, said valve seat member being generally S-shaped in cross-section.

6. An integral combined flush valve and overflow unit comprising a conduit member for discharge of water from a toilet tank to a toilet bowl, said conduit member being generally U-shaped in plan contour and having an upstanding wall portion with an outstanding flange at the bottom thereof for disposition between a

toilet bowl and toilet tank and gasket means disposed on said flange, an annular valve seat element connected to the upper portion of said upstanding wall portion, and overflow means comprising a vertically elongated tubular element joined to said discharge conduit member and connecting the extremities of the legs of said U, and having its outlet disposed below said valve seat element, said tubular element discharging in a continuous vertical flow through said discharge conduit member.

7. A combination as in claim 6 wherein said overflow means is of restricted cross-sectional area and having means thereon above said valve seat element for guiding a valve rod.

8. An integrally molded combined flush valve and overflow means, comprising, in combination, a valve seat member of shell-like formation and generally S-shaped in cross-section, having a laterally outstanding flange at the lower portion thereof adapted to engage a gasket disposed between a close-coupled toilet bowl and flush tank and also having an inwardly and downwardly extending flange at the upper portion thereof, forming a valve seat, said overflow means being positioned directly above said valve seat member and discharging directly therethrough.

9. A combination as in claim 8 wherein said overflow means has outer and inner walls the lower extremities of which are a continuous part of said valve seat member, said lower flange extending continuously around said outer wall.

10. A combination as in claim 9, wherein said overflow means is generally crescent-shaped in cross-section.

11. An integrally molded combined flush valve and overflow means, comprising, in combination, a relatively short, continuous upstanding wall defining a vertical passage and having an outwardly extending substantially continuous flange at the lower extremity thereof, a relatively tall upstanding outer wall substantially continuous with a portion of the perimeter of said short wall, a second relatively tall upstanding wall spaced inwardly of said first outer wall and joined thereto at laterally spaced points by vertically extending junction means, said upstanding walls defining an overflow conduit which is relatively thin in a direction radial with respect to said passage as compared to its dimension transverse to said direction, and a ball-valve seat formed on the upper portion of said short upstanding wall and joined to said second upstanding wall, said overflow conduit discharging in a continuous vertical flow through said passage.

12. A combination as in claim 11, wherein a vertical partition is disposed in said overflow conduit, and valve stem guide means disposed outside said second wall, opposite said partition.

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