March 24, 1959 D. BROWN 2,878,485

FLUSH VALVE CONSTRUCTION

Filed June 10, 1957 2 Sheets-Sheet 1

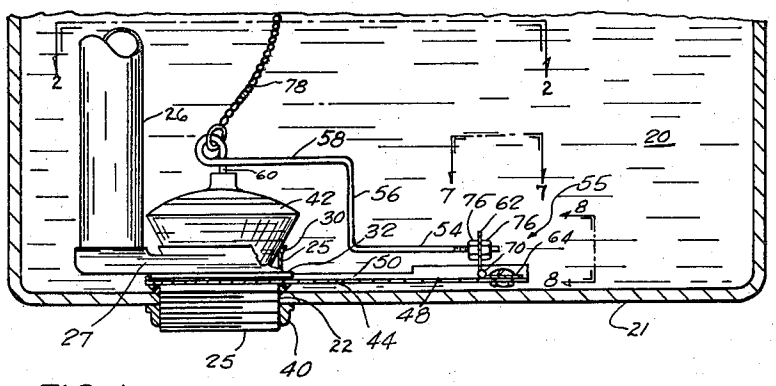


FIG. 1

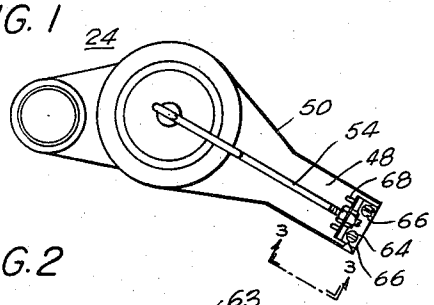


FIG. 2

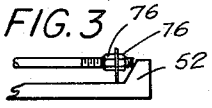


FIG. 3

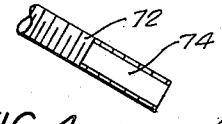


FIG. 4



FIG. 4a

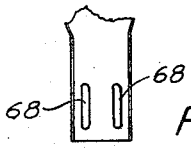


FIG. 7

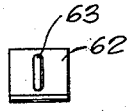
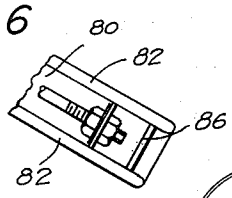


FIG. 8

FIG. 6



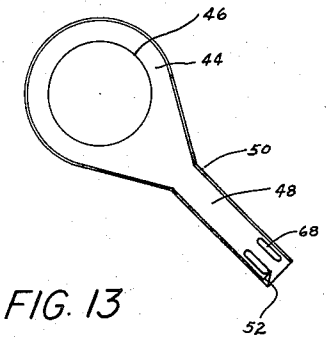


FIG. 13

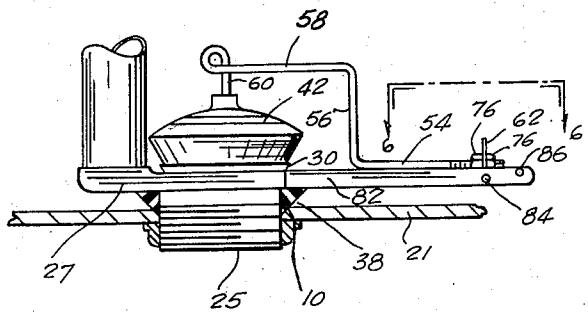


FIG. 5

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FLUSH VALVE CONSTRUCTION

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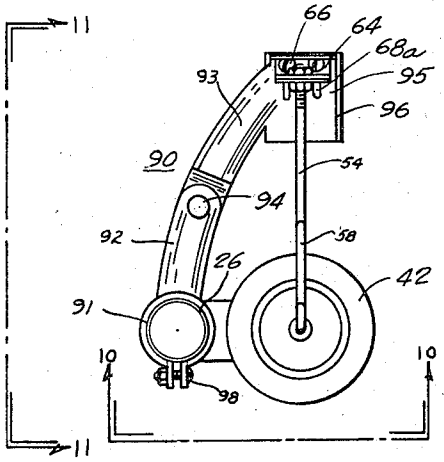


FIG. 9

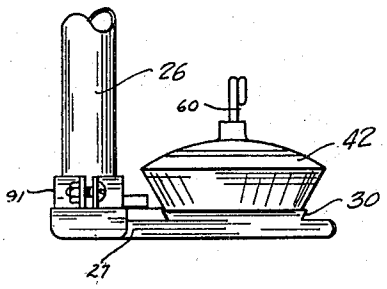


FIG. 10

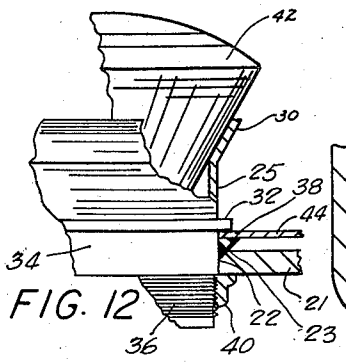


FIG. 12

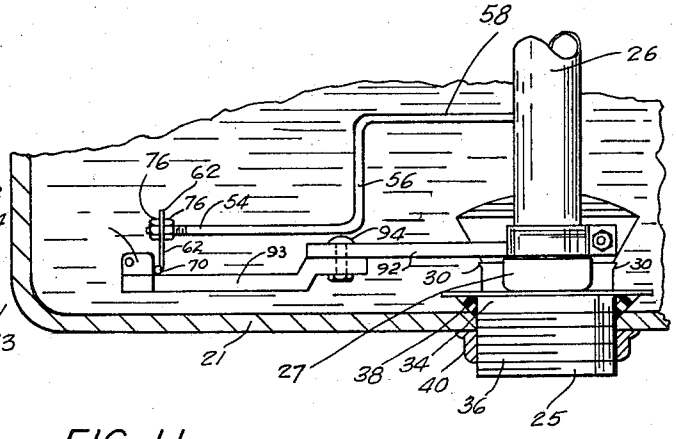


FIG. 11

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2,878,485

FLUSH VALVE CONSTRUCTION

Dewey Brown, Fairborn, Ohio

Application June 10, 1957, Serial No. 664,524

3 Claims. (Cl. 4—57)

This invention is directed to a flush valve construction for a toilet water tank, or the like.

An object of this invention is to provide an improved flush valve construction, which may be used to replace the present flush valve construction.

Another object of this invention is to provide an improved flush valve construction which eliminates the present undesirable vertical slide rod adjacent the overflow pipe in the toilet water tank.

Another object of this invention is to provide an improved flush valve construction which may be used as original equipment, and which does not use the present undesirable vertical tank ball slide rod adjacent the present overflow pipe.

Another object of this invention is to provide a flush valve construction in which a relatively rigid link or rod is hinged at substantially the level of the ball receiving opening in the flush pipe and which extends horizontally and upwardly to a point above the tank ball receiving opening, where it is attached to the tank ball.

Further objects of this invention will become apparent as the description proceeds, with reference to the accompanying drawings, in which:

Figure 1 is a vertical cross-sectional view, somewhat diagrammatic, of one form of the invention.

Figure 2 is a plan view of a portion of Figure 1, taken along the line 2—2 of Figure 1.

Figure 3 is an elevation, in enlarged scale, of a portion of Figure 2, taken along the line 3—3 thereof.

Figure 4 is an elevation of the end of the rod shown in Figure 3, in a further enlarged scale.

Figure 4*a* is an end view of Figure 4.

Figure 5 is a vertical cross-section of another embodiment of this invention.

Figure 6 is a top plan view of a portion of Figure 5, taken along the line 6—6 thereof.

Figure 7 is a top view of the arm shown in Figure 1, as viewed from lines 7—7 thereof, and with the hinge construction removed.

Figure 8 is an end view of the hinge construction shown in Figure 1, as viewed from the line 8—8 thereof.

Figure 9 is a top plan view of another embodiment of the invention.

Figure 10 is an elevation of the structure shown in Figure 9, as seen from the line 10—10 of Figure 9.

Figure 11 is a view, partly in cross-section and partly in elevation, of the embodiment shown in Figure 9, as seen from line 11—11 thereof, the water tank being added in this view.

Figure 12 is an enlarged cross-section of a portion of the embodiment shown in Figure 1.

Figure 13 is a top plan view of the sheet metal member of Figures 1, 2 and 12.

Referring first to Figures 1, 2, 12 and 13, this invention is applied to the toilet water tank 20, which has a flat bottom wall 21, with a flush opening 22, which opening has an upwardly tapered upper end 23. A combined

flush and overflow fixture 24 has a relatively short large diameter flush pipe 25, and a relatively long, small diameter overflow pipe 26 adjacent to and discharging at its lower end 27 into the flush pipe 25 in a manner well known in the art. The overflow pipe 26 extends upwardly with its upper end, not shown, above the normal water level in the tank.

The relatively large diameter flush pipe 25 fits in the flush opening 22 with a ball tank receiving opening 30 at its upper end, such opening preferably being tapered as shown in the drawings.

An outward flange 32 is integral with, and extends from, the flush pipe 25 above and adjacent the flat bottom wall 21. The pipe 25 has a smooth cylindrical surface 34 below and adjacent the flange 32 and has a threaded extension 36 below the smooth surface 34. A sealing or elastic ring 38, also tapered, is placed around the round smooth cylindrical outer surface 34 and fits in the outwardly tapered upper end 23 of the flush opening 22 in the tank wall 21. A threaded nut 40 engages the threaded extension 36 below the bottom wall 21 of the tank.

In the embodiment shown in Figures 1, 2, 12 and 13, a flat horizontal sheet member 44, preferably of metal, such as copper, is provided with an opening 46. The member 44 is placed with its opening 46 surrounding the flush pipe 25 between the outward flange 42 and the sealing ring 38 in a manner not to interfere with the sealing action of the sealing ring 38 against the upwardly tapered opening 23 of the tank wall 21 and the smooth surface 34 of the pipe 25.

The sheet member 44 has an arm 48 extending horizontally a substantial distance from the flush pipe 25. It also has a strengthening upward flange 50 around the periphery of the member 44 of the same or various heights and this flange is slightly higher at the point 52 where a portion of it is bent inwardly to form a stop member for a hinge construction hereafter described.

A relatively rigid link or rod 54 is hinged at 55 adjacent one end of the arm 48 substantially at the level of the ball receiving opening 30. The rod 54 extends horizontally for a short distance, then vertically at 56, again horizontally at 58 and is bent downwardly at 60 above the center of the ball receiving opening 30. The ball 42 is threadedly engaged in the downwardly directed extension 60 by threads, not shown, but well known in the art.

The hinge construction at 55 includes a vertical leaf 62 having a vertical slot 63, and a horizontal leaf 64 having openings for the two bolts 66, which extend into the slotted openings 68 in the end of the arm 48 of the sheet member 44. This allows the hinge construction to be adjusted horizontally, while the slot 63 allows the hinge construction to be adjusted vertically. The hinge has the usual pin construction 70 where the leaves 62 and 64 meet. The rod 54 has a thread 72 formed in the end thereof and has a square portion 74, if desired, which fits snugly in the slot 63 to prevent any substantial turning of the rod 54. The rod 54 is secured by the nut construction 76, which may be drawn up tightly or may have additional locking action, as is well known.

The leaf 62, when it swings backwardly, engages the bent portion 52 of the flange 50, and thus forms an upper stop for the upward movement of the ball 42 after it has been pulled up by the chain 78.

The construction of the embodiment of Figures 1, 2, 12 and 13 is such that it insures the proper seating of the ball 42 at the opening 30 after the ball has been pulled up by the flexible link chain 78 which is attached to the usual flush tank lever and handle, not shown, which is used for flushing the tank.

The embodiment shown in Figures 5 and 6 is for orig-

inal equipment, and is cast with the combined flush and overflow fixture at the time of manufacture thereof. The pipe **25**, the overflow portion **27** of the pipe **26**, the sealing ring **38**, the rod **54**, ball **42**, etc., are substantially the same as previously described. However, the flange **32** of the previous construction is provided with a flat horizontal metal extension **80** which has two upwardly directed flanges **82** at its edges. A pin **84** passes through the flanges **82**, and above the floor of the horizontal extension **80** and forms the hinge pin for the vertical leaf **62** which is substantially the same as the leaf **62** previously described and is provided with a vertical slot, not shown, similar to slot **63** previously described. Another pin **86** also extends between the upward flanges **82** and forms a stop for the leaf **62**. If desired, the horizontal portion **80** may be shorter than the two upward flanges **82**, and the flanges **82** are made of sufficient thickness to support the hinge pins **84** and **86**. This arm construction **80** and **82** is preferably cast with the remainder of the fixture, and the flanges **82** may extend sufficiently far around the pipe **25** to insure the necessary strength to prevent breakage. The operation of the embodiment of Figures 5 and 6 is believed to be apparent from the previous description with respect to Figures 1, 2, 12 and 13. The necessary vertical and horizontal adjustment of the rod **54** may be obtained by proper manipulation of the nut construction **76**, as the leaf **62** is provided with the vertical adjustment slot **63** as previously described.

In the embodiment of the Figures 9, 10 and 11, the arm construction is attached to the overflow pipe **26** immediately adjacent the overflow lower portion **27** of the fixture. The tank **21**, flush pipe **25**, sealing structure **38**, ball receiving opening **30**, ball **42**, the rod or link construction **54**, **56** and **60**, hinge leaf **62**, and other elements correspondingly numbered are substantially the same as previously described in connection with the other embodiments. Where similar numerals are used which were previously used in the other figures, substantially the same construction is used, and the previous description applies to this embodiment. In this embodiment, an arm structure **90** has clamping means **91** in the form of a flanged ring which is integral with a first horizontal arm **92**. The arm **92** is hingedly secured to the second arm **93** by means of the bolt **94**. The arm **93** has an end structure or platform **95** which is located a substantial distance from the overflow pipe opening **30**. The arm **93**, and its end structure **95** has a strengthening flange **96**. The platform **95** has slotted openings **68** similar to those previously described, to receive a horizontal hinge leaf **64** secured to the platform **95** by the bolts **66**. The vertical leaf **62** is provided with a vertical slot, not shown, having the same function as slot **63** of the previous embodiments. Preferably the arm constructions **92** and **93** preferably are made of heavy stock or are cast from brass with the integral flange or clamping ring **91** which is clamped to the pipe **26** by means of the bolt **98**.

The position of the arm structure **90** with relation to the opening **30** may be adjusted, in the first instance, by positioning of the arm **92** when clamping the bolt **98**. Thereafter, the arm **93** may be adjusted in relation to the arm **92** by manipulation of the bolt **94**, and finally horizontal and vertical adjustment may be made in the rod construction **54** by bolts **66** and nut constructions **76**, in the manner previously described.

In the operation of the embodiment in Figures 1, 2, 12 and 13, the original sliding vertical rod construction which was attached to the overflow pipe **26** is removed, and the nut construction **40** is also removed and the fixture is moved upwardly, after which the sheet metal member **44** is placed around the pipe **25** and the fixture is reassembled. The hinge construction **62** and **64** has been previously attached to the member **44** and thereafter the rod **54** is attached to the vertical leaf **62** and the ball **42** is threadedly engaged to the vertical portion **60**. The proper adjustment at the hinge portion of the device properly positions the ball **42** at the center of the opening **30**.

In the modification shown in Figures 9 and 10 and 11, the arm structure **90** is clamped to the vertical pipe **26** after the previous faulty vertical rod has been removed from the pipe **26**. The arm structure **90** may be adjusted by bolts **98**, **94**, **66***a* and nut constructions **76**, as desired, to provide the necessary adjustment to insure the proper centering of the ball **42** in relation to the center of the opening **30** of the pipe **25**.

The embodiments of Figures 1, 2, 3 and 13 and 9–11 may be used as original equipment, as well as replacement equipment, if desired.

In the embodiment shown in Figures 5 and 6, the flange construction **80** and **82** is cast with the original flush and overflow construction **25** and **27** to form an arm extending outwardly where the hinge pin **84** may be placed at the desired distance from the ball receiving opening **30**. Vertical and horizontal adjustment is made by manipulation of the nut construction **76** in a vertical slot in leaf **62**, as previously described.

While the form of the invention now preferred has been disclosed in accordance with the requirements of the statutes, it is understood that other embodiments may be used, within the scope of the claims which follow.

I claim:

1. In combination: a toilet water tank having a horizontal bottom wall with a vertical flush opening therein; a combined overflow and flush fixture having a short, relatively large diameter vertical flush pipe sealed in said flush opening with a tank ball receiving opening at the upper end of said flush pipe, said fixture having a relatively long and relatively small diameter overflow pipe adjacent to and discharging at its lower end into said flush pipe and having a vertical extension, the axes of said extension and said flush pipe having a common vertical plane extending upwardly with its upper end above the normal water level in said tank; an arm structure having clamping means at one end firmly securing said arm structure to said vertical extension of overflow pipe, said arm structure extending in a generally horizontal direction a substantial distance from said overflow pipe and from said flush pipe in a vertical plane at an angle to said common vertical plane; said structure having a first arm rigidly secured to said overflow pipe and a second arm angularly adjustably carried by said first arm; a relatively rigid link hinged to said second arm a substantial distance from said flush pipe and extending above said tank ball receiving opening; and a flush tank ball secured to said link in a position to swing into said ball receiving opening as said link hingedly swings on said second arm.

2. In combination: a toilet water tank having a flat bottom wall with a flush opening therein with an outwardly tapered upper end; a combined flush and overflow fixture having a short, relatively large diameter flush pipe fitting in said flush opening with a tank ball receiving opening at the upper end of said flush pipe, with an outward flange on said flush pipe above and adjacent said flat bottom wall, with a smooth cylindrical outer surface on said flush pipe below and adjacent said flange, and with a threaded extension below said smooth outer surface; a flexible sealing ring around said cylindrical smooth outer surface and fitting in said outwardly tapered upper end of said flush opening; a threaded nut engaging said threaded extension below said bottom wall of said tank; a flat horizontal sheet member having an opening surrounding said flush pipe between said outward flange and said sealing ring, said member having an arm extending horizontally a substantial distance from said flush pipe; a relatively rigid link hinged adjacent one end of said arm; and a flush tank ball secured adjacent the other end of said link and guided into said opening by the hinged movement of said link.

3. In combination: a toilet water tank having a flat

bottom wall with a flush opening therein; a combined flush and overflow fixture having a short, relatively large diameter flush pipe sealed in said flush opening with a tank ball receiving opening at the upper end of said flush pipe, and with an outward flange on said flush pipe above and adjacent said flat bottom wall; a flexible seal between said flush opening and said outward flange, a flat horizontal sheet member having an opening surrounding said flush pipe and the edge of said flush opening extending between said outward flange and said flexible seal, said member extending horizontally a substantial distance from said flush pipe; a relatively rigid link hinged on

said sheet member a substantial distance from said flush pipe; and a flush tank ball adjacent the other end of said link and guided into said opening by the hinged movement of said link.

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