

July 21, 1964

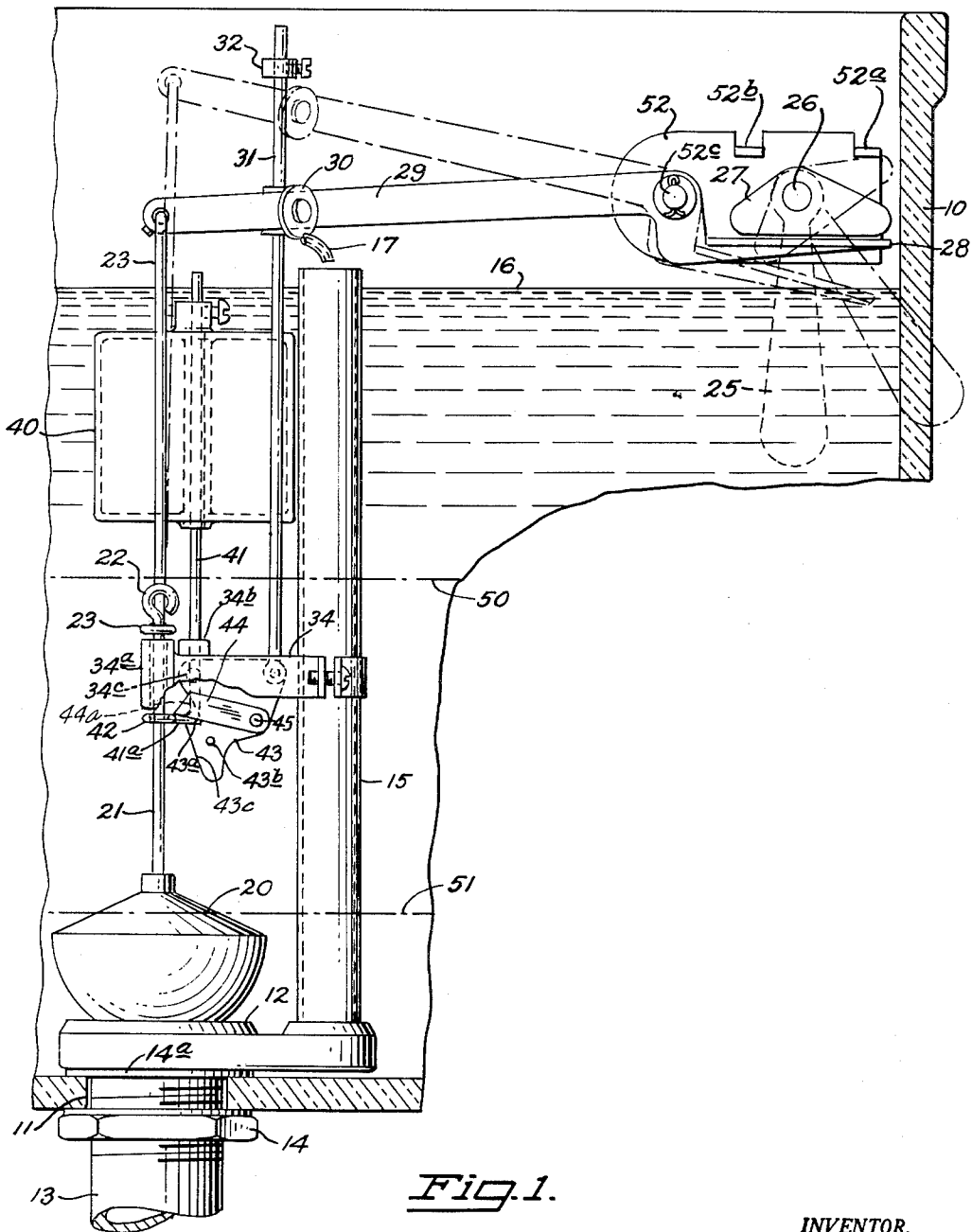
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3,141,177

FLUSH VALVE

Filed Oct. 26, 1962

4 Sheets-Sheet 1



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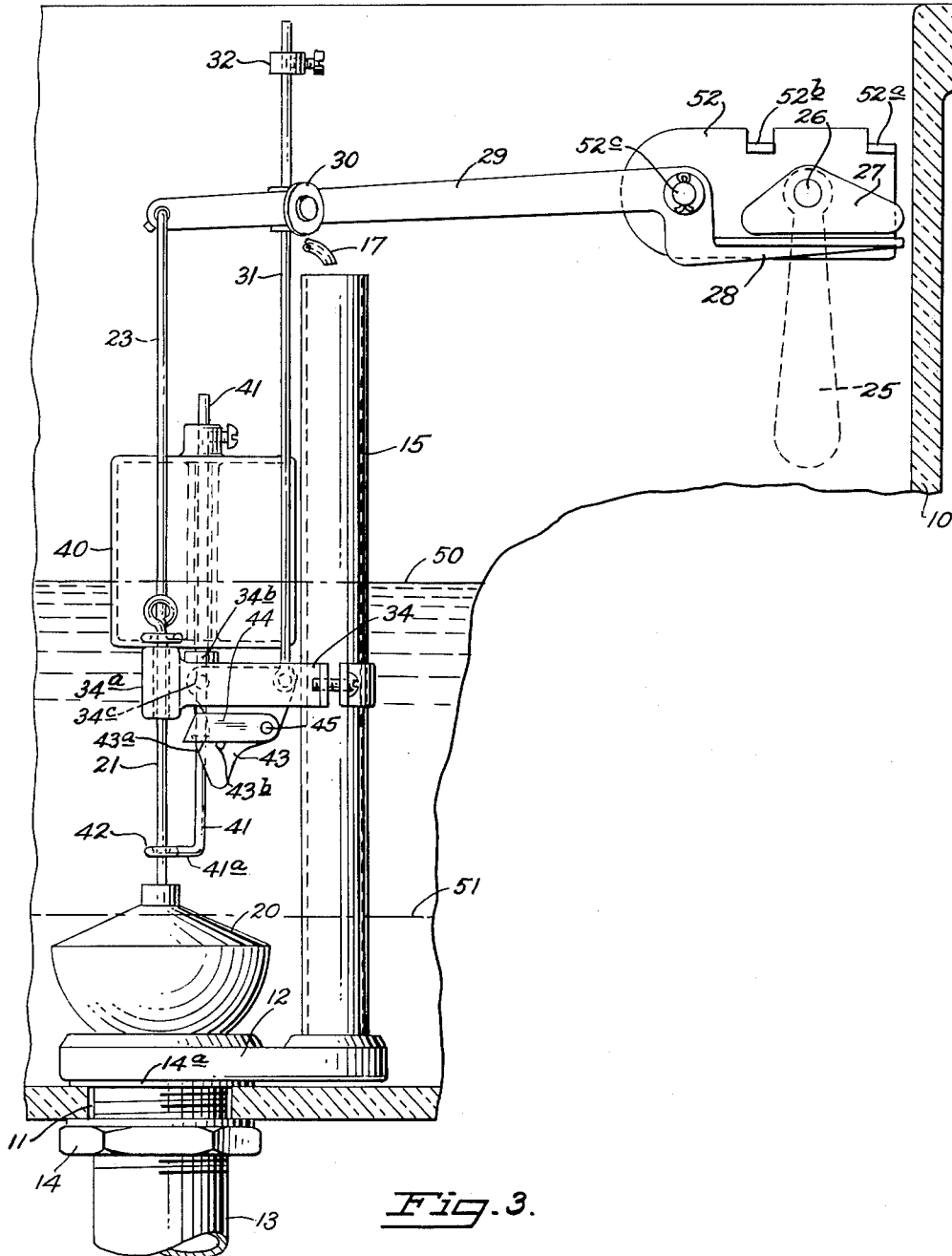


Fig. 3.

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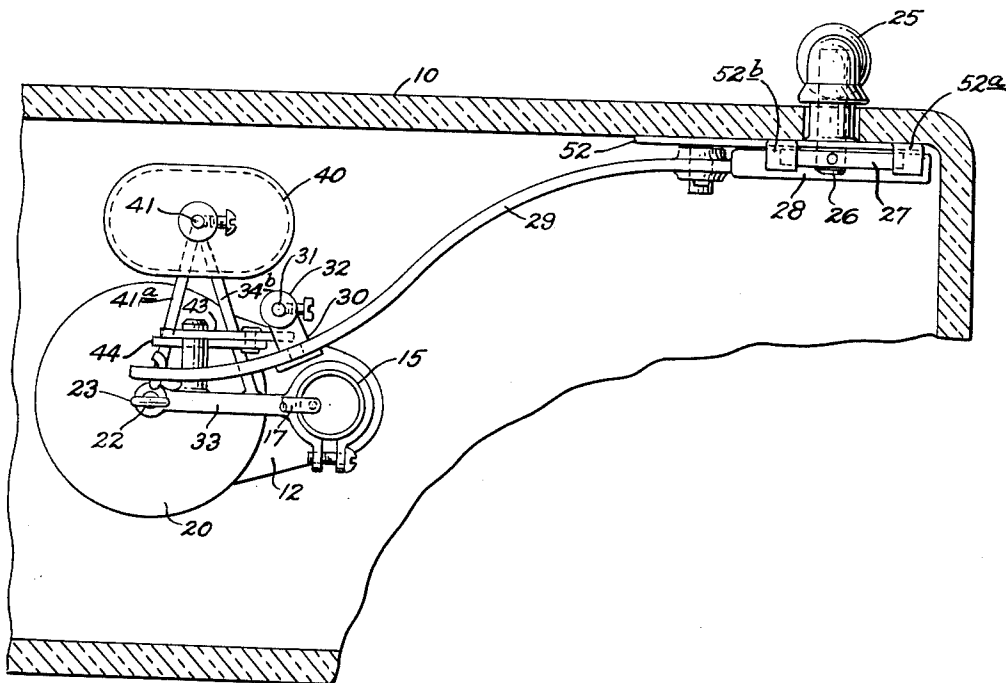


Fig.4.

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FLUSH VALVE

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3 Claims. (Cl. 4—53)

This invention pertains to a toilet type flush valve with two different volumes of flushing water dropped into the bowl from the toilet tank by different motions of the flush valve trip handle.

Previously, inventions have shown ways of obtaining different volumes of flush fluid from the toilet tank by the use of two different height flush valve seats and separate valves. This is more expensive than applicant's construction and cannot readily be used in conventional tanks or with conventional flush valve seats. Such a construction showing the use of two seats is shown in U.S. Patent No. 2,803,833, issued to W. J. Charest, dated August 27, 1957; U.S. Patent No. 2,839,759, issued to J. Martino, dated June 24, 1958; and U.S. Patent No. 2,754,521, issued to F. Marcum, dated July 17, 1956. J. W. Robinson in U.S. Patent No. 2,716,242, dated August 30, 1955, shows a double valve with a greatly reduced rate of flow for the restricted volume flush, compared to applicant's full flow rate at restricted volume secondary or selective flush compared to the normal flush volume and flow rate.

Another feature of this invention is the utilizing of the single valve seat as used in conventional toilet tanks and a single conventional flush valve, but causing it to sink and seat early by other means such as a secondary float for the control of the reduced volume flush.

Water consumption in many areas is very critical and the use of a lesser volume of water for many toilet usages would save many millions of gallons of water in areas like Los Angeles and still give a satisfactory flush. Other uses of the toilet will require the full volume of flush liquid.

Another object of the invention is to make a design that is suitable for use as an accessory change in a conventional toilet tank, with maximum convertibility from single flush to two volume flush.

Other objects will be more particularly pointed out in the accompanying specification and claims.

I have illustrated my invention by way of example in the accompanying drawings, in which:

FIG. 1 is a side elevation partly in section of a toilet tank and valve control mechanism illustrating one form of the invention.

FIG. 2 is a view similar to FIG. 1 but showing the float valve in a different position in its cycle.

FIG. 3 is a view similar to FIG. 2 but showing the float in a still different position of its cycle.

FIG. 4 is a plan view, partly in section, of the construction shown in FIG. 1.

In all figures like numerals of reference refer to corresponding parts.

In FIGS. 1, 2, 3, and 4 I have shown a conventional toilet water storage tank 10, an outlet hole 11, an outlet valve seat assembly 12 with threaded outlet 13 and retaining nut 14 pulling valve assembly 12 tightly on gasket 14a to prevent water leakage. Stand pipe 15 extends to above the normal high water level in tank 10 such as level

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16. A small portion of the new water from the float controlled valve (not shown) usually enters stand pipe 15 through pipe 17. Main float valve 20 is of a rubber-like flexible material that forms a good seal when on seat 12.

Valve 20 is generally mostly full of air (though it can have a bottom opening) when the level of the water is above the top of float valve 20 and when not held on its seat by the water pressure above the open area of valve assembly 12. Valve 20 will float to the upper limit of its travel as limited by its guiding mechanism as long as the water level is above float valve 20, when lifted fully by handle 25 rotated clockwise, as viewed in FIG. 2. Arm 29 is raised by the right hand cam of double cam 27 which is mounted on shaft 26 and depresses end 28 of trip arm 29 to the fully lifted position, as shown in FIG. 2, with the left hand side of cam 27 abutting against stop 52b. Guide 30 rides on control rod 31 and abuts against collar 32 to operate catch bell crank 43 which controls some of the action of float 40 and support rod 41.

Float valve 20 is pulled against the turned end 42 of rod 41 and guide member 34a, as shown in FIG. 2. Horizontal portion 41a of shaft 41 which supports float 40 (through a bearing 34b, similar to guide members 34a of bracket 34) is gripped by hook 43a of catch bell crank 43 after riding up cam face 43c of bell crank 43 and lifting the left end of guard 44 (as shown in FIG. 1). Guard 44 is pivoted to catch bell crank 43 at pin 45 and has a lower position limit pin 43b. This guard 44 prevents horizontal rod portion 41a from catching on hook 43a by cam face 44a riding on horizontal portion 41a of rod 41 after hook 43a has been retracted, as shown in FIG. 2, by the full raising of arm 29 and shaft 31 and then lowered with the water level above float 40 as at or near level 16 of FIG. 1. In this cycle of the operation, guard 44 will ride against horizontal rod portion 41a of rod 41 so that the level falls below the support position below the top of float 40, rod end 42 will pass freely past hook 43a and ride on top of float valve 20 to sink it when float 40 is partially submerged, as shown in FIG. 3. After being tripped by trip position, as shown in FIG. 2, valve 20 will reach seat 12 at a water level near 50 substantially above the level 51 when float valve 20 would sink and seat without the actions of float 40 and its associated parts. This trip position (as shown in FIG. 2), and its subsequent cycle (as shown in FIG. 3), gives a flush volume from level 16 to level 50 rather than from level 16 to 51.

By this mechanism, a full raising of arm 29 by partial clockwise motion of handle 25 and cam 27, as shown in FIG. 2, will result in a lesser volume of flush to about level 50 rather than the full flush lower level 51.

When handle 25 is partially rotated in a counterclockwise direction, cam 27 will be rotated to the dotted position, shown in FIG. 1, to rotate arm 29 about pivot 52c to the dotted position in FIG. 1. In this trip position, float 40, rod 41, and end 42 are retained in their upper position, as shown, by hook 43a of hook bell crank 43 which engages horizontal portion 41a of rod 41. In this position guide 30 was not raised against collar 32 by the left end of cam 27 where the right end of cam 27 is against stop 52a of bracket 52. Bracket 52 is secured to tank 10 in any suitable manner. When float 40 is held up by rod 41, turned end 42, and hook 43a of bell crank 43, main valve 20 is allowed to float down with the surface of the water in tank 10 in the usual manner and

shut off the flow from the flush tank at about level 51 for full volume flush.

I have illustrated my inventions in these various forms; however, many other variations may be possible within the scope of this invention.

To those skilled in the art to which this invention relates many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and description herein are purely illustrative and are not intended to be in any sense limiting.

I claim as my invention:

1. A selective dual volume dump valve mechanism for flush toilets, a flush tank, said valve comprising a drain valve seat, a drain pipe connected to said seat, a float-type flexible valve, a secondary float, said secondary float connected to said valve so as to effectively ride on said flexible valve and sink it prior to the surface of the liquid in said flush tank reaching the top of said flexible valve, a two position trip mechanism connected to said valve and float, said trip mechanism in a first trip position raises said flexible valve off its seat when said flush tank is substantially full and simultaneously holding said float in its raised position, said trip mechanism in its second trip position lifting said flexible valve off its seat and releasing said float so its weight rides on said flexible valve to sink said flexible valve to close the flow to said drain pipe while the level of water in said tank is substantially higher than the level when said flexible valve seats after being tripped in the first position of said trip mechanism.

2. A structure as described in claim 1, in which said float is mechanically connected to said flexible valve after said second trip position and cycle, a latch, said latch controlled by said first position of said trip mechanism to hold said float up for full volume flush, and said latch being released by the second trip position of said trip to allow said float weight to sink said flexible float valve for an early shut off of said drain for a lower volume flush than when tripped in said first position of said trip.

3. A selective flush valve for flush type toilets, a flush tank, a two flush position trip mechanism attached to said tank, a single flush valve seat, a flush pipe, a floating type flexible flush valve, a second float, a first trip position of said trip mechanism in which said flush valve will seat in the normal manner when it floats down on the flush liquid when the flush valve nears said seat, in the second position of said trip mechanism said flexible float valve will be sunk to seat on said flush valve seat when the level of liquid in said tank is at a much greater depth than when seating in said first position of said trip mechanism, the sinking of said flexible float valve being accomplished by the partial weight of said second float which rides on said float valve after the second trip position of said mechanism.

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