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E. D. PARK

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ANTISIPHON SILENT VALVE STRUCTURE

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FIG. 1

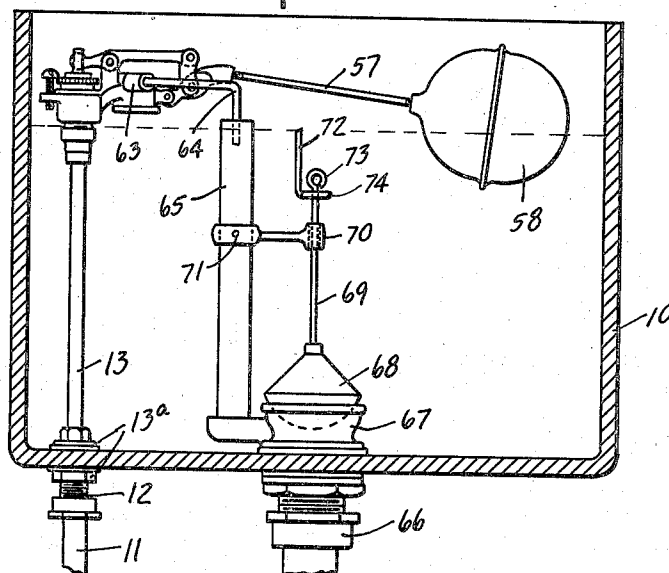


FIG. 2

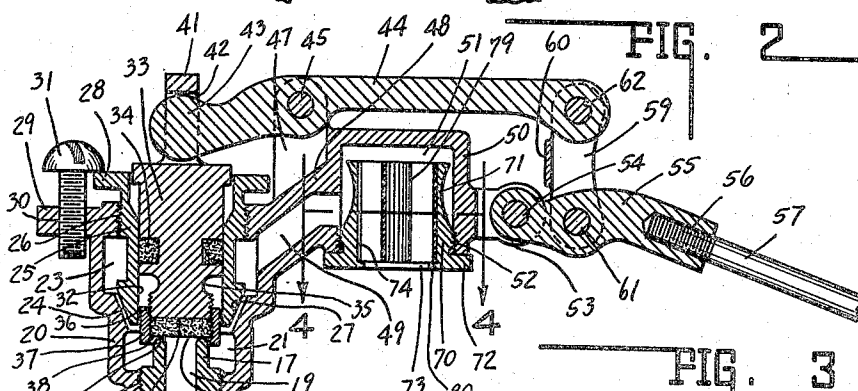


FIG. 3

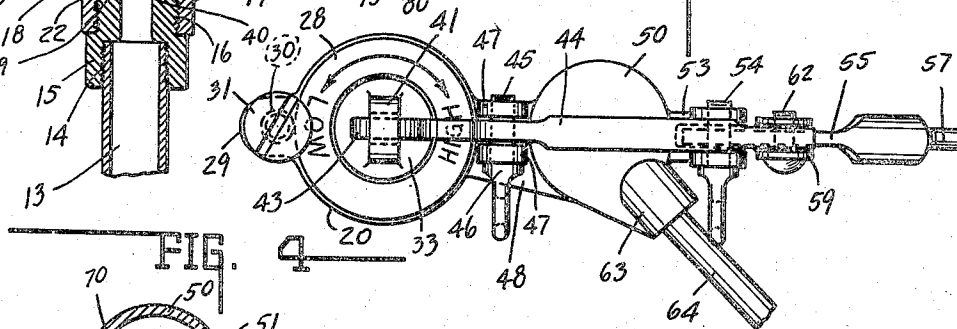
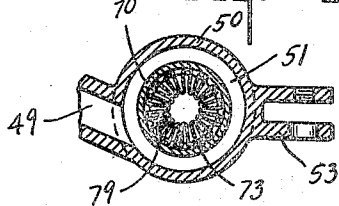


FIG. 4



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ANTISIPHON SILENT VALVE STRUCTURE

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6 Claims. (Cl. 137—111)

This invention relates to a supply fixture and control for toilet storage tanks.

The chief object of this invention is to provide a fixture which is adapted to supply water to such storage tank and in a manner which is of relatively silent character.

Another object of the invention is to provide such a supply fixture which is of antisiphon character, that is, the water in the tank cannot siphon back and commingle with the supply and thus contaminate the latter.

The chief feature of the invention consists in providing a water discharge whereby the water discharged therefrom is caused to plummet as a single column, without lateral dispersion or spraying, to the bottom of the tank, such column of water penetrating the water being collected by the tank and relatively noiselessly entering the collected water. This constitutes the silent feature of the invention.

Another feature of the invention is in positioning the discharge above the normal storage level and also above the overflow level so that at no time is it possible for the water in the tank to be siphoned into the supply line.

A further feature of the invention consists in providing a float operated control valve and associating therewith an adjustable throat for regulating the flow from the valve controlled chamber to the discharge device.

Other objects and features of the invention will be more particularly pointed out hereinafter.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims:

In the drawing

Fig. 1 is a front elevational view of an embodiment of the invention associated with a portion of a tank enclosed mechanism of a toilet storage tank, a portion of the latter being shown in section.

Fig. 2 is an enlarged sectional view of the supply and control fixture embodying the invention.

Fig. 3 is a top plan view thereof.

Fig. 4 is a transverse sectional view taken on the dotted lines 4—4 of Fig. 2 and in the direction of the arrows.

In the drawing 10 indicates a toilet storage tank, the cover being omitted. A pressure supply line 11 is suitably connected as at 12 to a riser structure 13, the latter extending through the tank 10 and being suitably sealed thereto as indicated at 13a. The upper end of the riser 13 is threaded as at 14 to receive a member 15 having an externally threaded portion 16 and

a nozzle portion 17, the latter terminating in a suitably formed end portion 18 which defines a discharge passage 19 that extends through the aforesaid and is in free communication with the riser 13.

A body portion 20 having a chamber 21 adjacent the discharge nozzle 18 and surrounding the portion 17 has threaded connection as at 22 with the threaded portion 16. This constitutes the support for the supply and control fixture. The chamber 21 communicates with a superposed chamber 23 by means of a tapered passage 24. The upper end of the chamber 23 is closed by a plug or closure 25 having threaded engagement 26 with an upper portion of the body casting and in axial alignment with the aforesaid described parts. This closure 25 terminates at its lower end in a frusto conical, preferably complementarily formed, portion 27. The seat 24 and the valve portion 27 when properly spaced apart provide a conically directed channel, providing communication of regulated amount between chamber 21 and chamber 23.

The outer end of the closure 25 integral with the control valve 27 is provided with a lateral flange 28. The body portion includes a projecting flange 29 apertured as at 30 to receive a retaining bolt 31, the head of which overlies the flange 28 of the valve and closure member. This member 25—27 constitutes a closure for the chamber 23 and a valve for controlling communication, as stated, between chambers 21 and 23.

The member 25 has a bore 32 therein of cylindrical character and slidably mounted in said bore is a piston-like valve member 33 provided with a packing construction 34 for leakproof operation. The lower end of said member 33 is reduced as at 35 and is threaded as at 36 to receive a threaded sleeve 37 having an inwardly tapered flange portion 38. Between the end 39 of the member 33 and this flange portion 38 is positioned a seal or valve member 40, the same being retained upon plunger 33 by means of the flanged portion 37—38 and being movable with said member 33. The latter includes an upwardly directed projection 41 slotted as at 42 to receive an arm 43 of a lever member 44 pivotally supported at 45 by means of the thumb screw 46 which is mounted in the spaced ears 47 integral with an upwardly and laterally directed portion 48 of the body portion 20.

Included within said upwardly and laterally directed portion 48 is a supply passage 49 which at its lower end communicates with chamber 23 as shown in Fig. 2. The upwardly and lat-

erally directed portion 48 terminates in an enlargement 50 which is chambered as at 51 and its lower end is open and internally threaded as at 52. The passage 49 communicates with this chamber 51.

Projecting from the enlargement 50 is a pair of ears 53 and the same pivotally support as at 54 a lever 55. This lever terminates in a threaded socket 56 adapted to receive an arm 57 in the form of a rod, or the like, that threadedly supports a float 58. The lever 55 between the connection 56 and the pivotal support 54 is connected to a dual link structure 59 connected together as at 60. This link structure is pivotally connected to the float mechanism as at 61 and is pivotally connected as at 62 to an outer free end of the lever 44.

Extending outwardly from the chamber 50 is a tubular portion 63—see Fig. 1—which supports a tube 64 that discharges into the overflow pipe 65 common to all toilet storage tanks. This overflow pipe discharges to the conduit 66 below the usual manual control "ball" valve. The conduit 66 communicates freely with an intake structure fixture 67 normally. It is maintained in closed position by the rubber ball-like valve 68 carried by the lower end of the rod 69, slidably supported in the guide 70 adjustably supported on the overflow tube 65 as at 71. An actuating mechanism of conventional character common to structures of this general type, includes the lifter member 72 and the head portion 73 of the rod 69 bears on the lateral portion 74 of said lifter member.

It will be noted that as long as water is being supplied to the chamber 23 in regulated amount by means of the adjustment previously mentioned, water will discharge into the chamber 51 and a relatively small amount of this water will discharge through tube 64 into the overflow tube 65 and thence to the line 66.

After the tank has been filled to the level indicated by the dotted line determined by float valve adjustment and the manual member is operated, the rubber ball valve 68 is elevated and the water discharges from the tank into the toilet bowl proper and flushes the bowl. In the event such flushing siphons the water out of the trap normally beyond or included in the bowl, the water discharged by line 64 into the overflow 65 upon closure of the valve 68, supplies water to the bowl and especially the trap portion thereof to water seal the same. This prevents the venting to the bowl of the undesirable odors that might be present in the waste pipe or line from the toilet fixture.

Reference now will be had more especially to Figs. 2 and 3. In the threaded portion 52 there is threaded a sleeve 70 which has a grooved periphery 71 spaced from the inside walls of the chamber 51. It also includes an exposed lateral flange 72 that bears against the end of the chamber 51 and closes said chamber. It includes a central opening 73 which is slightly less in diameter than the diameter of the bore 74. The upper end of the tube or sleeve 70 terminates in spaced relation to the closed upper end of the chamber 51.

As shown clearly in Fig. 4, the passage 49 discharges tangentially into the chamber 51 and by reason of this tangential discharge, the water assumes a circular path about the annular channel between the inside side wall of chamber 51 and the channel type exterior of the sleeve structure

70. The water escapes by flowing over the top edge of the sleeve structure 70 and passes downwardly through the bore and through the central discharge opening 73. The lower level of such opening is above the water level as shown clearly in Fig. 1. Wherefore, this fixture is of anti-siphon character—that is, the water from the bowl tank cannot be siphoned into the supply line. The aforesaid sleeve structure insures to a limited degree the plummeting action or columnizing of the water to be discharged from the fixture to the storage tank.

However, to insure positive formation of such a column and to prevent lateral spraying or departure therefrom, there is provided means which includes an elongated fixture member of corrugated character and rolled into circular form as illustrated in Fig. 4, the same providing a central free channel, as it were, of restricted character, and a plurality of radial channels radiating therefrom and therebetween is a plurality of channels between such fixture and the interior 74 of the bore of the sleeve member.

This fixture is retained within the bore by means of the inwardly directed flange portion 80 defining the central opening 73. The corrugated annularly arranged insert is indicated by the numeral 79. If desired, the insert may be of dual character as shown and each will be substantially identical and superimposed one relative to the other and the same may be offset angularly, one relative to the other, to insure the proper action of this segregating or columnizing device.

While the invention has been illustrated and described in great detail in the drawing and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. A toilet tank fixture including in combination a discharge chamber having an intake tangential thereto and a discharge opening downwardly therefrom, and a sleeve-like closure for and seatable in the opening and terminating in spaced relation to and adjacent the chamber wall opposite the opening and spaced from the side wall thereof to form an annular chamber therewith, the chamber end opposite the opening being of closed character, the sleeve wall adjacent the chamber side wall having a surface arcuate in longitudinal section and concavely arranged relative to the chamber side wall.

2. A toilet tank fixture including in combination a discharge chamber having an intake and a discharge opening downwardly therefrom, a sleeve-like closure for and seatable in the opening and terminating in spaced relation and adjacent the chamber wall opposite the opening and spaced from the side wall thereof to form an annular chamber therewith, and the sleeve wall adjacent the chamber side wall having a surface arcuate in longitudinal section and concavely arranged relative to the chamber side wall.

3. A toilet tank fixture including in combination a discharge chamber having an intake tangential thereto and a discharge opening downwardly therefrom, a sleeve-like closure for and seatable in the opening and terminating in

spaced relation to and adjacent the chamber wall opposite the opening and spaced from the side wall thereof to form an annular chamber therewith, the chamber end opposite the opening being of closed character, the sleeve-like closure wall adjacent the chamber side wall having a surface arcuate in longitudinal section and concavely arranged relative to the adjacent side wall and an annularly arranged corrugated insert in the bore of the sleeve-like closure, forming a plurality of passages longitudinally coextensive with the sleeve-like closure.

4. A toilet tank fixture including in combination a discharge chamber having an intake tangential thereto and a discharge opening downwardly therefrom, a sleeve-like closure for and seatable in the opening and terminating in spaced relation to and adjacent the chamber wall opposite the opening and spaced from the side wall thereof to form an annular chamber therewith, the chamber end opposite the opening being of closed character, the sleeve-like closure wall adjacent the chamber side wall having a surface arcuate in longitudinal section and concavely arranged relative to the adjacent side wall, insert means in the bore of the sleeve-like closure and having a multiple inwardly and radially directed annularly arranged vane arrangement terminating in spaced relation to the axis thereof to form a central clear passage through the sleeve closure and insert means, and a plurality of radiating channels annularly arranged thereabouts.

5. A toilet tank fixture including in combina-

tion a discharge chamber having an intake and a discharge opening downwardly therefrom, a sleeve-like closure for and seatable in the opening and terminating in spaced relation and adjacent the chamber wall opposite the opening and spaced from the side wall thereof to form an annular chamber therewith, the sleeve-like closure wall adjacent the chamber side wall having a surface arcuate in longitudinal section and concavely arranged relative to the adjacent side wall and an annularly arranged corrugated insert in the bore of the sleeve-like closure, the latter including an inwardly directed portion for insert retention.

6. A toilet tank fixture including in combination a discharge chamber having an intake and a discharge opening downwardly therefrom, a sleeve-like closure for and seatable in the opening and terminating in spaced relation and adjacent the chamber wall opposite the opening and spaced from the side wall thereof to form an annular chamber therewith, the sleeve-like closure wall adjacent the chamber side wall having a surface arcuate in longitudinal section and concavely arranged relative to the chamber side wall, insert means in the bore of the sleeve-like closure and having a multiple inwardly and radially directed annularly arranged vane arrangement terminating in spaced relation to the axis thereof to form a central clear passage through the sleeve-like closure and insert means, and a plurality of radiating channels annularly arranged thereabout.

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