

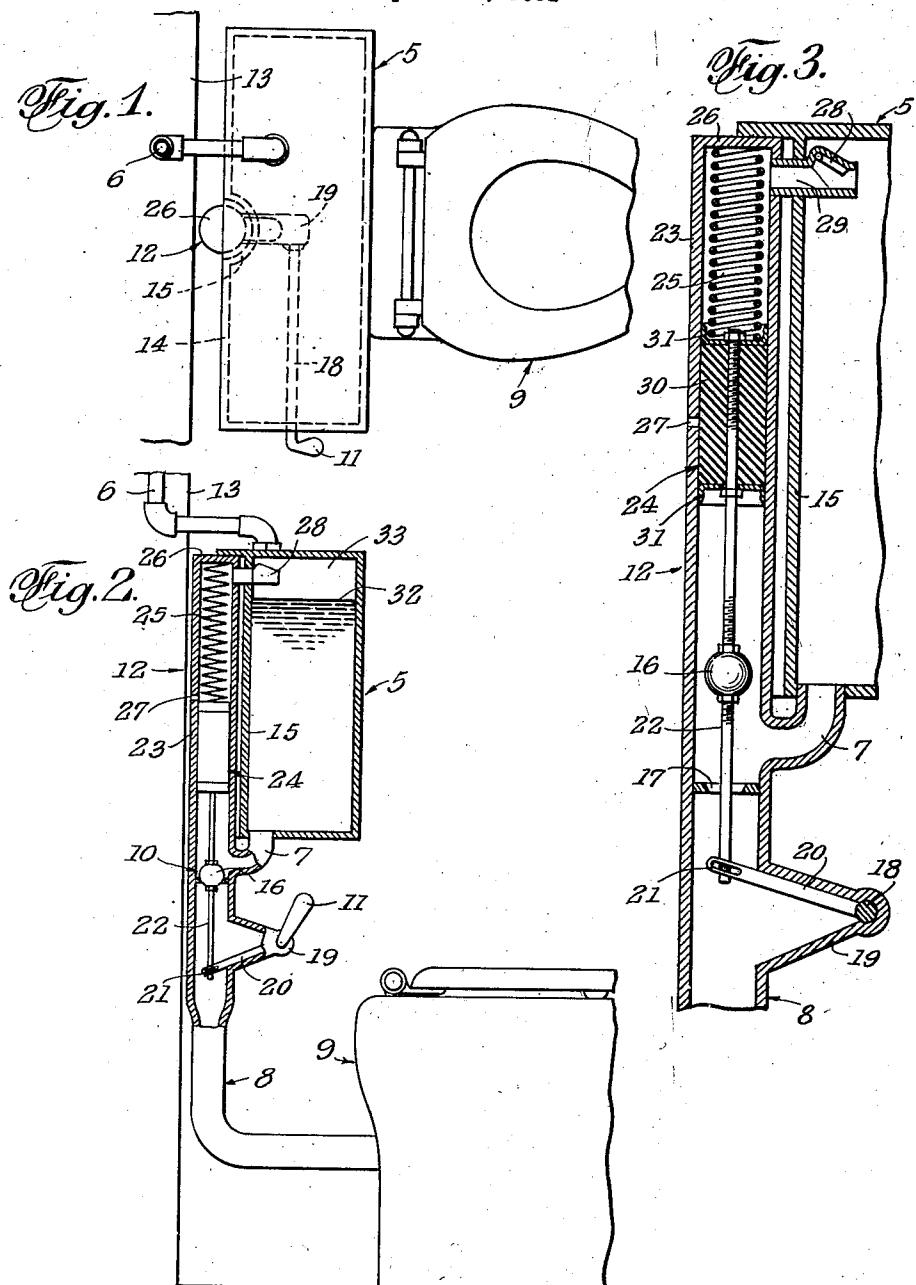
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C. H. DE WITT

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FLUSH TANK

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Inventor

C. HAROLD DE WITT

C. G. Stratton

Attorney

UNITED STATES PATENT OFFICE

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FLUSH TANK

C. Harold de Witt, Santa Monica, Calif.

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1

This invention relates to means for flushing toilet bowls and deals more particularly with a novel form of flush tank characterized by simplicity and ease of maintenance.

An object of the invention is to provide an improved flush tank means in which the flushing water is given an initial impetus through the medium of a head of compressed air within the tank, to thereby effect efficient flushing.

Another object of the invention is to provide such means in which the flush tank is airtight to control inflow of water according to an air cushion trapped therein.

Another object of the invention is to provide novel control means for dumping the water stored in the tank and, thereafter automatically controlling the flow of replenishing water.

The invention also has for its objects to provide such means that are positive in operation, convenient in use, easily installed in a working position and easily disconnected therefrom, economical of manufacture, relatively simple, and of general superiority and serviceability.

The invention also comprises novel details of construction and novel combinations and arrangements of parts, which will more fully appear in the course of the following description. However, the drawings merely show and the following description merely describes one embodiment of the present invention, which is given by way of illustration or example only.

In the drawings, like reference characters designate similar parts in the several views.

Fig. 1 is a top plan view of flush tank means embodying features of the present invention.

Fig. 2 is a vertical sectional view thereof.

Fig. 3 is an enlarged fragmentary portion of Fig. 2, the same being shown in flushing position.

The present flush tank means comprises, generally, a tank 5 having an inlet 6 at the top and a bottom outlet 7, a flow line 8 from outlet 7 to a toilet bowl 9, a valve 10 controlling flow between said outlet and flow line and controlled by a handle 11, and pump means 12 connected to the valve 10 and operable therewith for both effecting sealing of tank 5 and supplying a charge of air to the tank to give impetus to the water flowing therefrom when the valve is opened.

Tank 5 may have any suitable shape and, if desired, may be concealed as by embodying the same in the wall 13 through which inlet 6 passes. In the present case, the tank is shown adjacent such a wall and may be fastened thereon in the usual manner. As shown, the wall 14 of the tank is provided with a channel 15 in which the means

2

12 is housed. Tank 5 is sealed in that the same is not provided with the usual cover and, in effect, constitutes an enlarged closed connection between inlet 6 and outlet 7 to provide a water-storing container of suitable size.

The valve 10 preferably comprises a solid rubber ball 16 that normally closes a valve seat 17 in flow line 8 at any point thereof below where outlet 7 enters said flow line.

The handle 11 is on the end of a laterally extending rod 18 that is rotationally held in a housing 19 that extends forwardly from flow line 8. An arm 20 is affixed to rod 18 and has a slotted end 21 that connects to a rod 22 which is disposed axially in the upper portion of the flow line. Valve-ball 16 is adjustably carried by rod 22. It will be seen that, from a normal position closing valve seat 17, the ball is raised by downward manipulation of handle 11 so that water in tank 5 may freely flow through line 8 into toilet bowl 9.

The means 12 comprises a cylinder that is an upper tubular extension 23 of flow line 8, a piston 24 within said cylinder and connected to move together with valve ball 16 by rod 22, a light compression spring 25 between the upper end of piston 24 and the closed upper end 26 of the cylinder, an air inlet port 27 in the wall of said cylinder immediately above piston 24 when the latter is in its lowermost position, and a check valve 28 in an air connection 29 between the upper portion of cylinder 23 and tank 5. Piston 24 is preferably formed of a hard rubber body 30 at each end of which is provided a leather sealing cup 31 to insure against movement of air past said piston.

Assuming tank 5 is filled with water to the level 32 (Fig. 2). To institute flushing action, handle 11 is swung downward. The first movement of the handle will cause piston 24 to close port 27 and continued movement of the handle will project the piston upwardly in cylinder 23, compressing spring 25. Because port 27 is closed, air in said cylinder above the piston will be displaced into the air space 33 above water level 32, check valve 28 automatically opening to allow such passage of air. Thus, as the valve ball 16 is unseated, the water in tank 5 is propelled downwardly by said displaced air and also by a stored cushion of air as will later be seen, said water entering the toilet bowl under such air pressure and also by force of gravity.

When the handle 11 is released, spring 25 slowly expands and projects piston 24 downward. The first flow into line 8 will fill cylinder 23 below the piston and retard such downward movement

of the piston. However, when tank 5 is substantially depleted, although water is entering the same through inlet 6, the resistance to the piston is removed, and spring 25 becomes effective to depress the piston.

During the first part of the downward movement of the piston, valve ball 16 is still unseated and water continues to flow from tank 5 to that degree supplied by inlet 6. As the valve ball seats to shut off the flow, port 27 opens. Since the interior of tank 5 has become quite rarified since the same was sealed against ingress of air while the water was discharging, check valve is held open or is opened by air entering port 27 and seeking its way into the top of tank 5.

Valve 10 is now closed and inlet 6 is supplying water to tank 5. At any time that the air pressure in tank 5 reaches atmospheric pressure, that is, balances with the pressure in the upper part of tubular extension 23, check valve 28 will close. Now, as water continues to enter the tank, check valve 28 will trap a cushion of air which will shut off flow from inlet when the resistance of said air cushion becomes sufficiently high. The apparatus is now ready for another flushing operation.

While the invention that has been illustrated and described is now regarded as the preferred embodiment, the construction is, of course, subject to modifications without departing from the spirit and scope of the invention. It is, therefore, not desired to restrict the invention to the particular form of construction illustrated and described, but to cover all modifications that may fall within the scope of the appended claims.

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

1. In flushing apparatus, a tank having a water inlet, a water outlet and a check-valve-controlled air inlet, said tank being otherwise airtight, a manually-operated valve to control flow through the outlet, and air-displacing means connected to and simultaneously operable with the movement of the manually-operated valve to intro-

duce air through said check-valve-controlled air inlet into the tank above the water therein, said air-displacing means being operable during the opening movement of the manually-operated valve.

2. In flushing apparatus, a tank having a water inlet, a water outlet and a check-valve-controlled air inlet, said tank being otherwise airtight, a manually-operated valve to control flow through the outlet, and air-displacing means connected to and simultaneously operable with the movement of the manually-operated valve to introduce air through said check-valve-controlled air inlet into the tank above the water therein, 10 said air-displacing means being operable during the opening movement of the manually-operated valve, and air-displacing means connected to and simultaneously operable with the movement of the manually-operated valve to introduce air through said check-valve-controlled air inlet into the tank above the water therein, 15 said air-displacing means being operable during the opening movement of the manually-operated valve, said air-displacing means comprising a piston operating in an upper tubular extension of the water outlet.
3. In flushing apparatus, a tank having a water inlet, a water outlet and a check-valve-controlled air inlet, said tank being otherwise airtight, a manually-operated valve to control flow through the outlet, and air-displacing means connected 20 to and simultaneously operable with the movement of the manually-operated valve to introduce air through said check-valve-controlled air inlet into the tank above the water therein, said air-displacing means being operable during the 25 opening movement of the manually-operated valve, said air-displacing means comprising a piston operating in an upper tubular extension of the water outlet, and a spring in said tubular extension to return the piston and manually-operated valve to initial position after discharge 30 of water from the tank.

C. HAROLD DE WITT.

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40 The following references are of record in the file of this patent:

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