Sept. 22, 1925. 1,554,265

H. E. ELROD

CLOSET FLUSHING APPARATUS

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Fig. 1

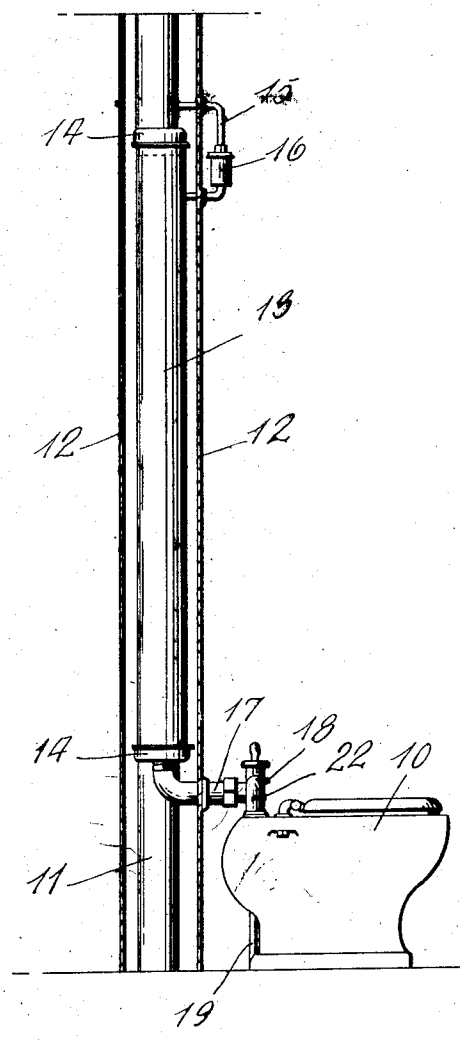
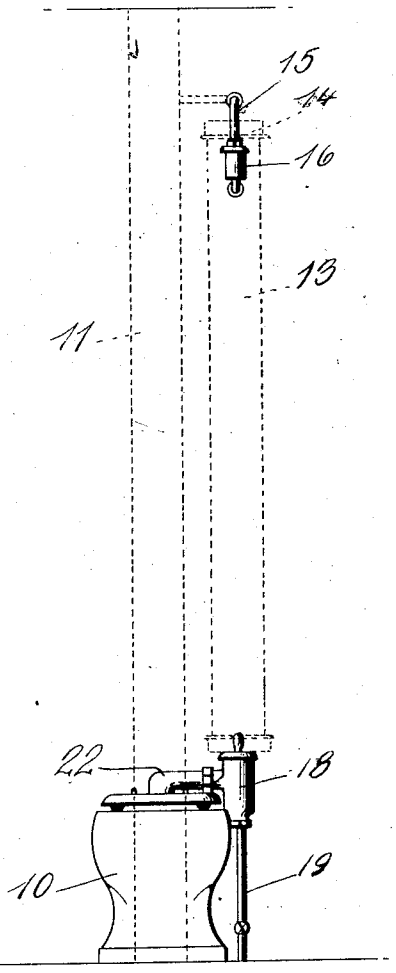


Fig. 2



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FIG. 4.

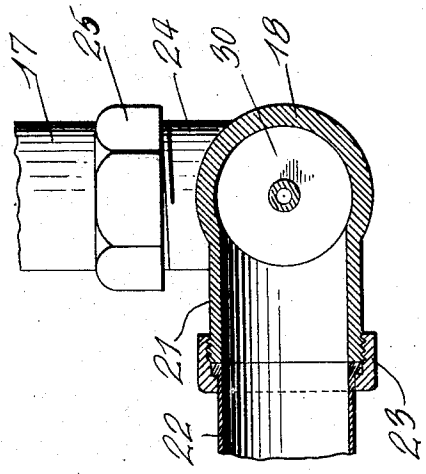


FIG. 5.

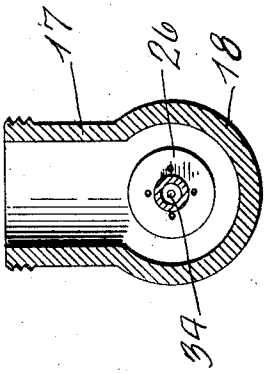
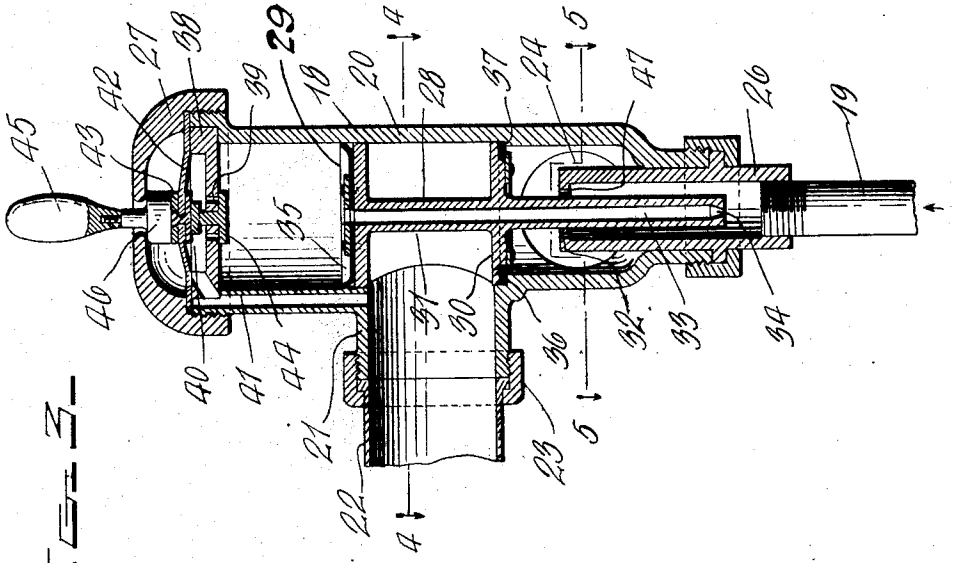


FIG. 3.



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UNITED STATES PATENT OFFICE.

HENRY E. ELROD, OF DALLAS, TEXAS.

CLOSET-FLUSHING APPARATUS.

Application filed February 17, 1921. Serial No. 445,662.

To all whom it may concern:

Be it known that I, HENRY E. ELROD, a citizen of the United States, and a resident of the city of Dallas, in the county of Dallas and State of Texas, have invented certain new and useful Improvements in Closet-Flushing Apparatus, of which the following is a specification.

My invention relates to flushing apparatus particularly for an apparatus adapted for use with toilet bowls.

In toilet equipment heretofore used, it has been customary to provide a flush tank adapted to store water for use in flushing the toilet bowl. This arrangement is generally necessary because the pipe commonly used for residential purposes is not of sufficient capacity to supply the required amount of water to the bowl. Another objection to the use of water directly from the city water main is that the rush of the water caused by the pressure in the city main results in an objectionable noise.

My invention contemplates a tank of small capacity, built in the wall or within a partition and along side of the usual vent stack for the closet. This tank has a capacity of approximately five gallons of water and is formed of ordinary commercial four inch pipe, capped at both ends. This tank is provided with an automatic air valve and communication between the tank and vent stack is provided for through this air valve, and near the top end of the tank.

The air valve permits air to be ejected and admitted from the water tank during the filling and emptying operation and also is arranged so that a small amount of air is trapped at the top of the tank when the same has been filled with water to obviate the objectionable "water hammer."

My invention further contemplates a valve which controls jointly the supply of water from the city main and from this storage tank. This valve in addition to controlling the admission of water to the bowl, also provides means for re-filling the storage tank after its discharge of water.

The various features of the invention will be more fully described in the accompanying specification and drawing in which:

Fig. 1 is a side elevation of a toilet equipt in accordance with my invention,

Fig. 2 is a front elevation thereof,

Fig. 3 is an enlarged vertical sectional view of the controlling valve,

Fig. 4 is a section on line 4—4 of Fig. 3, and

Fig. 5 is a sectional view of line 5—5 of Fig. 3.

Referring more particularly to Figs. 1 and 2, the reference character 10 indicates a usual closet bowl and 11 a vent stack. The vent stack is preferably concealed within the partitions 12 of the wall and positioned adjacent this vent stack I provide a storage tank or reservoir 13. This tank 13 is formed preferably of ordinary commercial four inch pipe and is provided at its open ends with closure caps 14. This tank is designed to have a capacity of between 4 and 5 gallons and is of such dimensions that it may be conveniently concealed between the partitions of the wall.

Communication between the tank 13 and the vent stack is provided by a pipe 15 connected to the tank adjacent its upper end which pipe is provided with an air valve 16 of any suitable construction. The purpose of this valve 16 is to control the admission and escape of air during the filling and emptying of the tank. The position of the valve 16 is such that when the tank 13 is filled the exit of the air will be checked at such time as to trap a small amount of air between the water and the top of the tank, thereby permitting an air cushion which will prevent the objectionable "water hammer."

The lower end of the tank is provided with a discharge pipe 17 which is connected to the control valve 18 positioned adjacent the bowl 10. Connection between the valve 18 and the city water supply is made through a pipe 19.

By referring to Figs. 3 to 5 the construction of valve 18 will be more particularly described. The valve consists of an elongated casing 20 which is provided with a vent 21 connected through a pipe 22 to the toilet bowl 10. This connection may be made by the usual union ring 23. The casing 20 is further provided with a vent opening 24 which is connected to the discharge pipe 17 of the tank 13 by the usual union ring 25.

The lower end of the casing is provided with a tubular shaped nozzle 26 provided

with internal screw threads at its lower end by which connection is made to the pipe 19 of the city water supply. The upper end of the casing 20 is closed by a cap 27 which screw threadedly engages the casing.

Mounted for reciprocation in the casing 20 is a sliding valve 28 provided with a pressure plate 29 and a valve head 30. This pressure plate and valve head are formed integrally with the central stem or body 31 and are further provided with an aligned downwardly extending projection 32. A passage way 33 is bored centrally of the valve, this bore terminating in a restricted vent or opening 34 disposed at the extreme lower end of the projection 32.

The pressure plate 29 is adapted when in its position of rest to be disposed just above the opening 21 of the valve as clearly illustrated in Fig. 3, while the valve head 30 is disposed adjacent the lower edge of this opening. The pressure plate 29 is provided with a flexible gasket or washer 35 adapted to engage the wall of the valve casing while the valve head 30 is recessed to receive a washer 36 adapted to rest upon a valve seat 37 formed in the valve casing.

Disposed adjacent the upper end of the casing 20 and held in place by the cap 27 is a disc 38 provided with centrally disposed apertures 39 and a transversely disposed port 40. The port 40 communicates with a port 41 formed in the side wall of the casing 20, which port in turn communicates with the opening 21 which leads to the bowl 10.

Also secured in place by the cap 27 is a diaphragm 42 which carries a button 43 and a valve 44. The valve 44 is adapted to engage the lower face of the disc 38, to close the aperture 39.

For operating this valve a suitable handle 45 connected to an operating cam 46, is supported by the cap 38. Therefore, by moving the handle 45 in any direction the cam 46 causes a depression of the button 43 and consequently a displacement of the valve 44 with respect to the apertures 39, for a purpose to be more fully hereinafter described.

The nozzle 26 disposed at the lower end of the casing 20 is provided adjacent its upper end with openings 47. In this manner water from the city main may flow through the nozzle 26, the openings 47, the outlet 24 of the valve casing, and through the pipe 17 to the tank 13.

The operation of this improved valve will be described beginning with its position of rest as illustrated in Fig. 3 of the drawings. The pressure plate and valve head 29 and 30 will be retained in their position illustrated in Fig. 3 by the water trapped between the disc 38 and the pressure plate 29. With these members in this position the flow of water from the tank and the city main is cut off. If now, the handle 45 be rocked, the cam 46 will depress the diaphragm 42 and consequently displace the valve 44 and permit water trapped between the pressure plate 29 and the disc 38 to flow through the apertures 39, the ports 40 and 41, and the opening 21 to the toilet bowl. As the pressure is relieved from against the upper side of the pressure plate 29 the valve is caused to move upwardly by reason of the pressure of the water from the tank 13 and the city main, which water acts against the lower side of valve head 30. The valve so continues its upward movement until the pressure plate 29 abuts the disc 38 and closes the valve 44. With the valve in this position water from the tank and city main fill the bowl 10, thoroughly flushing the same.

At the same time there is a restricted flow of water through the bore 33, this flow being restricted by the size of the vent or opening 34. This water from the city main flows through the bore 33 into the chamber formed by the casing, the disc 38 and the pressure plate 29. This flow of water causes the valve to again resume the position illustrated in Fig. 3, the time required for it to assume its closed position, depending on the amount of water entering the chamber at the top of the valve casing When the valve has again assumed the position illustrated in Fig. 3 the flow of water to the bowl 10 has been cut off and the valve head and pressure plate are held against displacement by the water trapped at the top of the valve.

When the valve has reached its closed position water from the city mains will flow through the openings 47, the opening 24 in the valve casing and through the pipe 17 to the reservoir tank 13, thereby again filling the same. Water will fill the tank to within a short distance of the top thereof, the air valve operating to trap a small amount of air to form an air cushion at the top of the tank.

The pressure of water from the city main assists in the discharge of water from the storage tank through its syphonic action and the volume of water from the tank deadens to a great extent the noise of the inrush of water from the city water main, thus eliminating the objectionable noise peculiar to the ordinary automatic flushing valve used with the said water supply.

The system thus described is of simple construction, durable and may be cheaply and easily constructed and installed. It has comparatively few moving parts and these parts are easily accessible. The proportions of the storage tank which is necessary, are such that this tank may be easily obtained and installed at a comparatively small cost. The dimensions of the tank are such as to permit it to be concealed within the wall while the controlling valve is accessible as

hereinbefore stated, should it be necessary to repair the same.

The valve may be installed in connection with any standard make of bowl and requires no adjustment to variable pressures. Furthermore, the valve is positive in its action and will not cause a waste of water by reason of leakage.

Having thus described my invention, what I claim is:

1. A valve of the class described comprising a casing, a pressure plate and a valve head rigidly connected and longitudinally displaceable in said casing, means connecting said valve to a tank and a source of water supply, said valve head being acted upon by the pressure of the water in said tank and from said source of supply, a water trap normally acting upon the pressure plate and means for permitting the water to escape from said water trap to allow the valve to open, substantially as described.

2. A valve of the class described comprising a casing, a pressure plate and valve head spaced apart and rigidly connected together, means connecting said valve to a tank and a source of water supply, the pressure of water from said tank and source of water supply tending to unseat said valve head, a water trap, means for supplying water to said water trap, the water in said trap acting upon said pressure plate to retain said valve head on its seat and means for permitting the water in said trap to escape.

3. A valve of the class described comprising a casing, a valve head, a pressure plate, means integrally uniting said pressure plate and said valve head, an extension projecting from said valve head, said pressure plate and valve head and extension being provided with a central bore, a water trap formed in the upper end of said casing, said pressure plate forming one of the walls of said water trap, means connecting said valve to a water tank and a source of water supply, the water from said tank and source of supply tending to unseat said valve head, the water in said trap acting upon said pressure plate to resist the tendency to unseat said valve head, means connecting said valve to a water closet bowl, means providing communication between said trap and said water closet bowl, a valve for closing this latter communication, means for operating this valve said casing providing means for connecting said source of water supply to said tank, all substantially as and for the purpose set forth.

HENRY E. ELROD.