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DEODORANT SUPPLY MECHANISM FOR TOILETS AND URINALS

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FIG_1

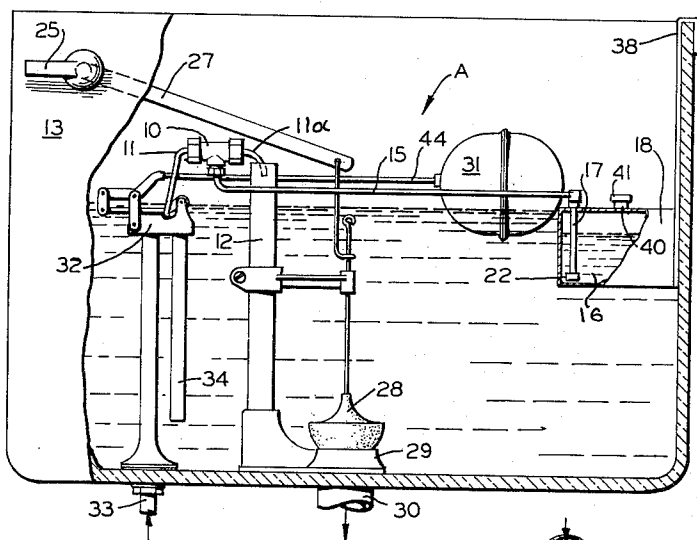


FIG_3

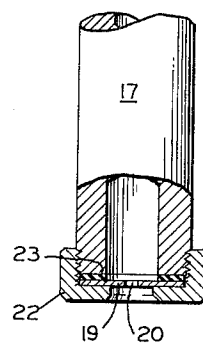
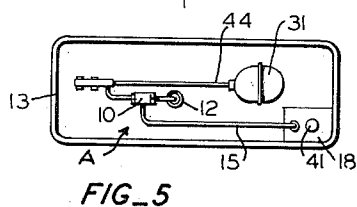


FIG_5

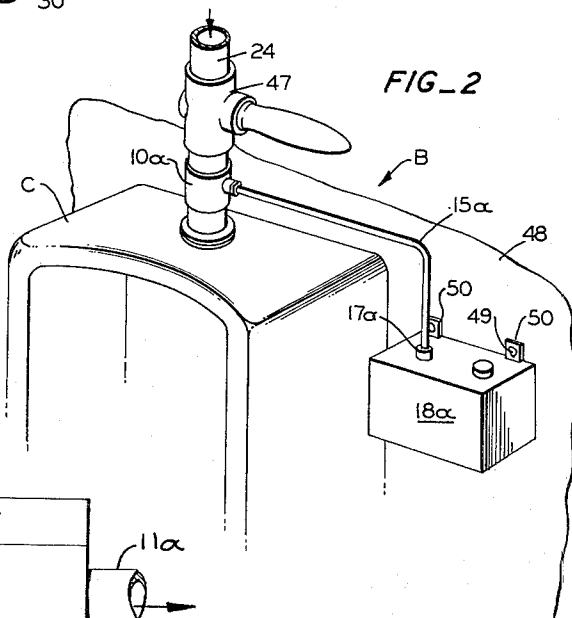


FIG_2

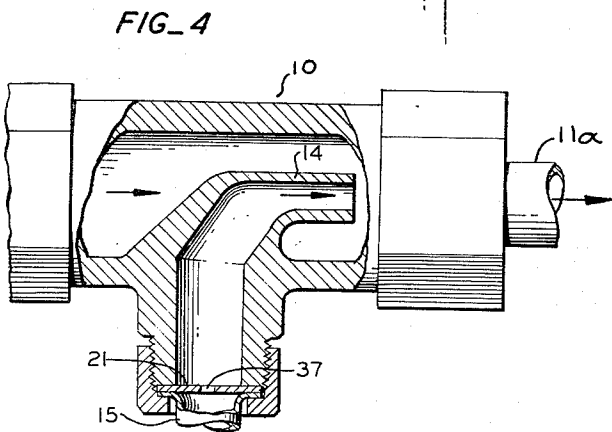


FIG_4

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DEODORANT SUPPLY MECHANISM FOR TOILETS AND URINALS

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2 Claims. (Cl. 4-225)

The present invention relates to a device for feeding deodorant material to a toilet or urinal, and pertains more particularly to a device for feeding concentrated liquid deodorant material to only the portion of the flushing water of such toilet or urinal as will remain therein between uses.

While many types of chemicals are used for feeding to toilets and urinals, for the purpose of the present specification and claims, the term "deodorant" will be used as a general term to include all such chemicals. There are at present available extremely effective deodorizer liquids. These deodorizers are very concentrated and are quite expensive. Some prior art mechanisms have been provided to feed deodorant material to the flushing water of toilets and urinals, but where the deodorant is fed to the flushing water during a flushing operation, a major portion of the deodorized flushing water goes down the drain immediately and hence is not effective for its intended purpose.

The present invention contemplates the provision of a deodorizer supply mechanism which does not supply deodorant to the main body of flushing water, but becomes effective at the terminal end of, or beyond, the flushing cycle so as to treat with deodorizer only the residual water which remains in the toilet fixture between flushing operations.

Another object of the invention is to provide a deodorant supply for flush type toilet fixtures by mounting a flow-type injector in a duct through which flushing water flows to a toilet or urinal and connecting the suction nozzle of said injector to a container of concentrated deodorant liquid mounted below the level of the injector by a suction line having means therein to delay the feeding of deodorant liquid to the injector until a flushing operation is completed, whereby the deodorant is supplied only to the residual water which remains in the toilet or urinal between flushing operations.

A further object of the invention is to provide an improved and simplified mechanism for supplying liquid deodorant to a flush-type toilet or urinal.

These, and other objects and advantages of the invention, will be apparent from the following description and the accompanying drawings, wherein:

FIG. 1 is a side elevational view of a toilet flush tank having the invention embodied therein, a portion of the front walls of the tank and of the deodorizer liquid container being broken away.

FIG. 2 is a fragmentary perspective view showing the upper portion of a direct flushing type urinal with the invention embodied therein.

FIG. 3 is an enlarged, fragmentary view, partly in elevation and partly in medial section, of the lower end portion of an upright suction feed line from the deodorant supply container to the injector, and showing a flow restricting orifice disk mounted therein.

FIG. 4 is an enlarged, fragmentary view, partly in elevation and partly in medial section, showing the injector of FIG. 1.

FIG. 5 is a plan view in reduced scale of the flush tank shown in FIG. 1.

Briefly, and referring first to the form A of the invention shown in FIG. 1, a suitable injector 10 is mounted in a bypass tube 11 through which pressurized water flows into an overflow standpipe 12 during the flushing and tank refilling operations of a conventional toilet flush tank 13.

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From the usual suction nozzle 14 (FIG. 4) of the injector 10, which, in the well known nature of injectors, is under negative pressure during the flow of pressurized water through the injector 10, a suction tube 15 is connected to the upper end of an upright pipe 17 mounted in a deodorant liquid supply container 18. The container 18 is mounted below the level of the injector 10, so that liquid in the tube 15 will drain back into the container 18 between flushing operations.

A first orifice disk 20 (FIG. 3) is provided in the lower end of the pipe 17, and a second orifice disk 21 (FIG. 4) is provided in the injector 10. These two orifice disks restrict and control the flow rate of deodorizer liquid 16 from the supply container 18 to the injector 10, whence said liquid is fed into the water supply pipe 11a. The flow rate of the deodorant liquid is so controlled that the deodorizer liquid 16 from the container 18 arrives at the injector 10 at the completion of each flushing operation, so that no deodorant is supplied to the flushing water which flows at once down the drain, but is supplied, in a small quantity, to the residual water which remains in the fixture between flushing operations.

A generally similar structure and arrangement is provided in the mechanism B shown in FIG. 2, but here the injector 10a is larger than that shown in FIG. 1, and is mounted in the main flushing pipe 24 for the urinal C. The arrangement shown in FIG. 2 may also be employed when the invention is to be incorporated in a direct flushing toilet, not shown.

Referring to the drawings in detail, the flush tank 13 (FIG. 1) is of a well known type, and has a usual flushing lever 25, valve lift arm 27 and flushing ball valve 28. The ball valve 28 is mounted to seat on the usual flush valve seat 29. A conventional overflow standpipe 12 is mounted to extend upwardly to the desired maximum water level in the tank 13, and to drain directly into the flush pipe 30 below the flush valve seat 29. A usual float ball 31, controlling the operation of the usual filling valve 32, is mounted in the flush tank 13. When the float ball 31 is lowered in the tank 13 by the lowering of the water level in the latter by a flushing operation, the filling valve 32 is thereby opened to simultaneously discharge water from a pressurized water supply line 33, through a pipe 34 for filling the tank, and also through the bypass line 11 into the standpipe 12 for refilling the toilet bowl, not shown, after the usual siphoning action upon the completion of a flushing operation has emptied such bowl.

The injector 10, which may be any one of a number of well known forms of injector, all of which operate on a principle which is too well known to require description herein, is mounted in the bypass line 11 (FIGS. 1 and 4). During the entire time the filling valve 32 is open after the initiation of a flushing operation has lowered the float ball 31, and until the rising of the water in the tank 13 has re-elevated the float ball 31 to again close the filling valve 32, the injector nozzle 14 will be subjected to a pressure reduced below atmospheric.

The suction tube 15 is connected to the suction nozzle 14 of the injector 10, as shown in FIG. 4, and the disk 21, having an orifice 37 therein, is mounted across the upper end of the tube 15 to restrict the flow of fluid from the tube 15 to the injector nozzle 14. The other end of the tube 15 is connected to the upper end of the upright pipe 17 mounted in the container 18. The upright pipe 17 extends downwardly in the container 18 to a point closely adjacent the bottom thereof. The other disk 19, having an orifice 20 of desired size therein, is mounted transversely across the lower end of the upright pipe 17 by a screw cap 22 threadedly secured to the threaded lower end of the pipe 18 and is sealed thereto by a resilient washer 23.

The container 18 preferably is mounted in the flush tank 13 by means of strap hooks 38 of metal band material formed to hook over the rim of the flush tank 13 with which the mechanism A is to be used. The container 18 is of a size and shape to permit it to be mounted in a conventional toilet flush tank 13 without interference with the float ball 31 or other operative parts thereof, and slightly below the level of the injector 10, so that any deodorant liquid remaining in the tube 15 and vertical pipe 17, after the flow of water through the injector 10 ceases, will drain back into the container to the level of the liquid therein.

The container 18 may be of conventional sheet metal construction, and preferably is of non-corrosive material, such as, for example, suitable plastic material, copper or stainless steel. It is provided with a conventional filler neck 40, with a loosely fitting or vented cap 41 mounted thereon to provide access for filling the container and to maintain its interior at atmospheric pressure.

The internal diameter of the upright pipe 17 is small, for example, $\frac{1}{16}$ " so as to minimize fluctuations in the flow of deodorant liquid to the injector 10 upon variation of the liquid level in the container 18. For this same reason, the depth of the container 18 is held to a practical minimum, but this is not difficult since its capacity may be small, for example, of the order of one pint or one quart, since when properly adjusted only a few drops of the liquid will be dispensed therefrom upon each flushing operation.

In installing the mechanism A shown in FIG. 1, the injector 10 is mounted substantially medially of the length of an otherwise conventional bypass pipe 11 extending from the filling valve 32 into the overflow standpipe 12. To simplify adjustment after installation it is preferable that the suction tube 15 be of small internal diameter, for example, $\frac{1}{4}$ " copper tubing, and that instructions be furnished for the installer to make such adjustments as may be necessary by bending this tubing rather than by cutting it off, since cutting it off would change its volumetric capacity.

The orifice disks 19 and 21 are mounted in the upright pipe 17, and the injector 10, respectively, and the sizes of the orifices 20 and 37 therein, as provided by the factory, are such as to cause the device to operate satisfactorily within a range of reasonable variations from what has been determined by preliminary tests to be average conditions of water pressure and flow time of a filling valve 32. If, after installation, it is determined by observation that either too much or too little deodorant liquid is being supplied upon each flushing operation, the amount can be regulated by changing either or both of the orifice disks 19 and 21. A larger orifice opening in either of these disks tends to increase the flow of deodorant liquid into the injector 10, while a smaller orifice opening tends to reduce it. Also, the length of the tank filling cycle may be increased in a well known manner by bending the float ball support rod 44 upwardly to raise the water level in the tank 13, or may be shortened by bending the rod 44 downwardly to lower the water level. The injector 10 places a powerful suction on the line 15, so that substantial restricting effect must be provided in the line 15 in order to prevent premature and excessive feeding of deodorant liquid into the injector 10. Once adjusted, the mechanism will continue to operate satisfactorily as long as the conditions present during the adjusting period prevail, requiring only a refilling of the deodorant supply tank as the supply therein becomes depleted.

In the installation shown in FIG. 2, the injector 10a is of a size for mounting in the main flushing water supply line 24, so that upon actuation of the usual delayed-closing flushing valve 47, pressurized water from the water supply line 24 will flow through the injector 10a and

thereby reduce the pressure in the liquid supply tube 15a, corresponding to the tube 15 of FIG. 1.

The parts of the deodorizer supply mechanism B shown in FIG. 2 correspond to the parts of the mechanism A shown in FIG. 1, and are designated by the same reference numerals as the parts shown in FIG. 1 plus the suffix "a." Since the structure and operation of the mechanism B shown in FIG. 2 are similar to those of the mechanism A illustrated and described in detail in connection with FIG. 1, it will be unnecessary to describe them in detail herein.

The deodorant liquid supply container 18a is mounted on a wall 48 adjacent the urinal C by screws 49 passing through support ears 50 secured to the container 18a. A similar installation, not shown, may be employed for mounting the mechanism B on a conventional, direct flushing type toilet, not shown, having a flushing arrangement similar to that of the urinal C illustrated in FIG. 2.

The injector 10a is provided with an orifice disk, not shown, but similar to the disk 21 of FIG. 4, while the upright pipe 17a also is provided with an orifice disk, also not shown, but similar to the disk 19 of FIG. 3. These disks may be exchanged for ones with either larger or smaller orifices as required to control the flow of fluid therethrough as explained for the form of the invention shown in FIGS. 1 and 2, while the length of the flushing cycle of the valve 47 may be adjusted in a well known manner.

The invention provides a simple, positive, and economical deodorizer supply for toilets and urinals, and one which is well adapted for use by operators who make a business of providing deodorizer control for public washrooms and those of large buildings such as office buildings.

The invention, in its appropriate form A or B as required, may be easily and quickly installed on either a flush tank or direct connected toilet or urinal, and may be easily and quickly serviced by a service operator. There are no mechanically moving or loose parts so that there is little, if any, danger of malfunction which might cause property damage or dissatisfaction on the part of a customer or user.

While I have illustrated and described a preferred embodiment of the present invention, it will be understood, however, that various changes and modifications may be made in the details thereof without departing from the scope of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to protect by Letters Patent is defined in the following claims.

I claim:

1. For combination with a flush tank having a water inlet line, a float valve in said inlet line for controlling the depth of water in the tank, an overflow standpipe, and a by-pass line from the float valve into the standpipe for replenishing water in a toilet bowl after a flushing operation; an injector adapted to be mounted in the by-pass line from the float valve into the overflow standpipe, a container for containing a supply of deodorant liquid at atmospheric pressure and adapted to be mounted within such flush tank below the level of the injector, a suction line for connecting the suction side of the injector to the interior of the container and extending to a low level in the container, whereby after each flushing operation of the tank, any deodorant liquid in the suction line drains by gravity back into the container, and means for limiting the flow rate of deodorant liquid through the suction line under the action of the injector when the float valve is open, whereby the length of time required for deodorant liquid to be drawn from the container to the injector after an opening of the float valve corresponds to the flushing time of the tank, so that liquid from the container will be supplied only to water flowing from the by-pass line into the standpipe after the completion of a flushing operation.
2. For combination with a flush tank having a water

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inlet line, a float valve in said inlet line for controlling the depth of water in the tank, an overflow standpipe and a by-pass line from the float valve into the standpipe for replenishing water in a toilet bowl after a flushing operation, an injector adapted to be mounted in the by-pass line from the float valve into the overflow standpipe, a container for containing a supply of deodorant liquid at atmospheric pressure and adapted to be mounted below the level of the injector, a suction line for connecting the suction side of the injector to the interior of the container and extending to a low level in the container, whereby deodorant liquid remaining in the suction line after each flushing operation of the tank, any deodorant liquid in the suction line drains by gravity back into the container, and a restricting orifice in the suction line for limiting the flow rate of deodorant liquid through the suction line under the action of the injector when the float valve is open, whereby the length of time required for deodorant

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liquid to be drawn from the container to the injector after an opening of the float valve corresponds to the flushing time of the tank, so that liquid from the container will be supplied only to water flowing from the by-pass line into the standpipe after the completion of a flushing operation.

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