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D. B. FINKBINER
APPARATUS FOR FORMING AND DELIVERING CHEMICALED
SOLUTIONS TO TOILET BOWLS

3,105,245

Filed Aug. 15, 1962

3 Sheets-Sheet 1

FIG. 1.

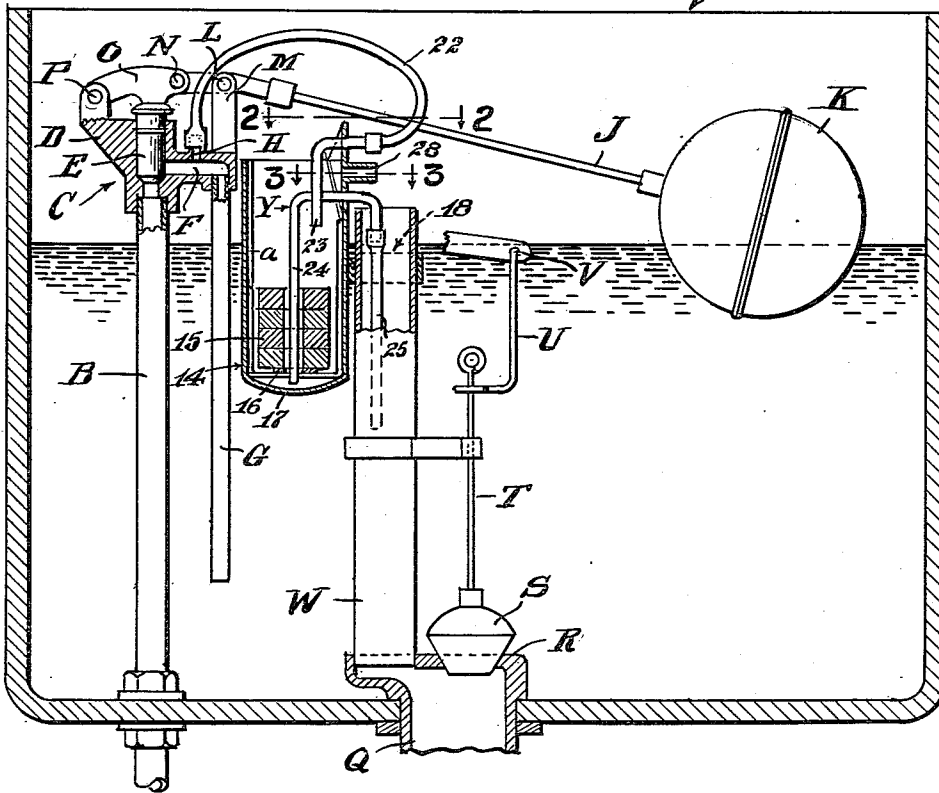
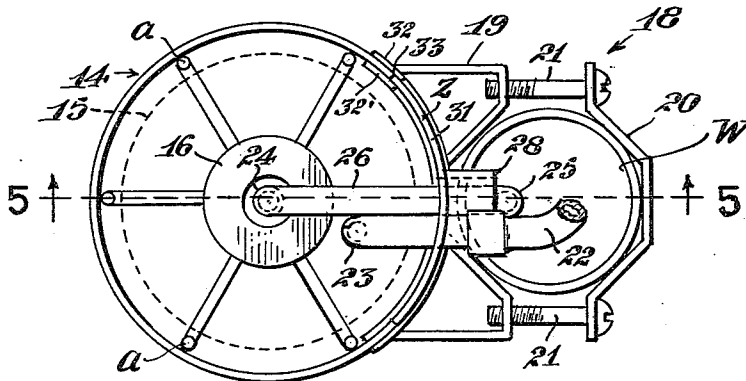


FIG. 2.



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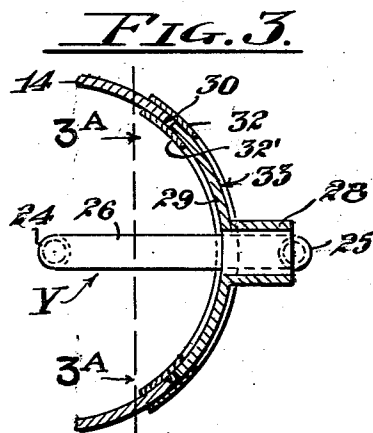
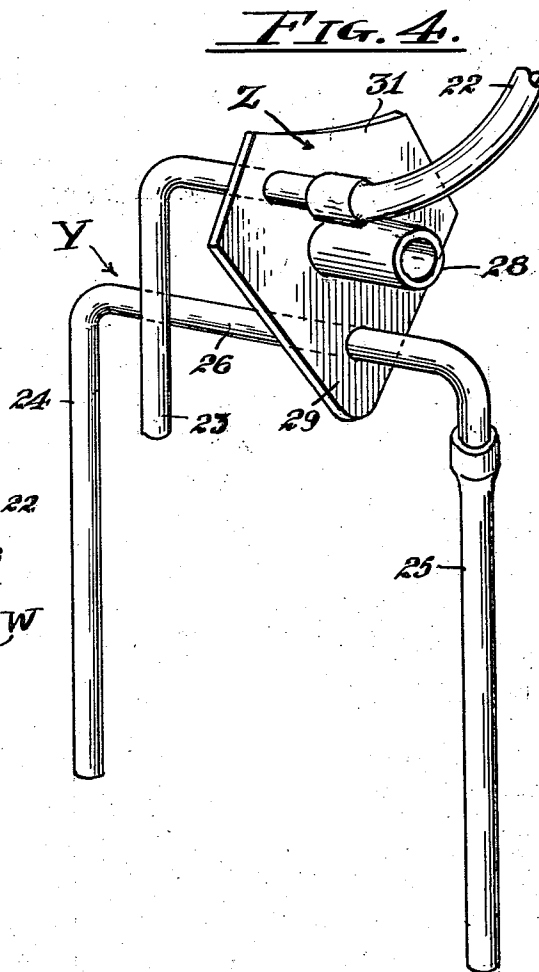
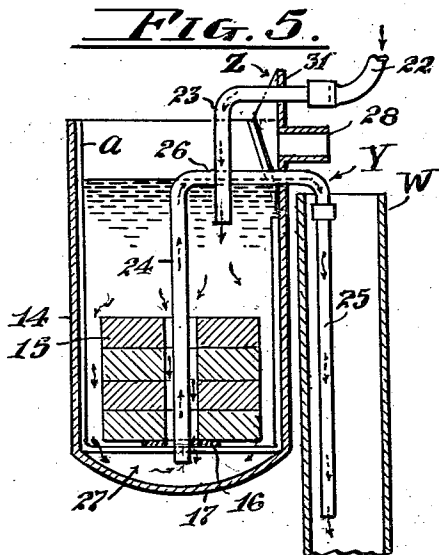
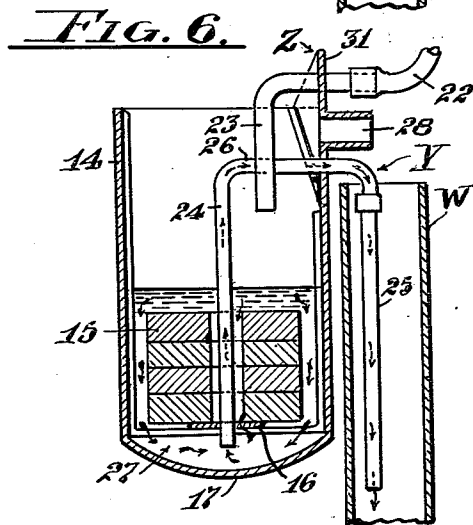
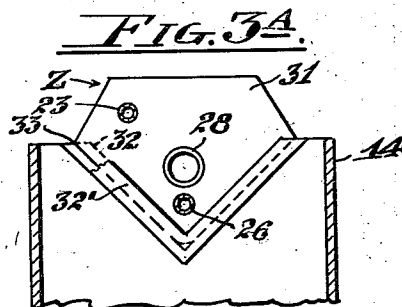
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3 Sheets-Sheet 2



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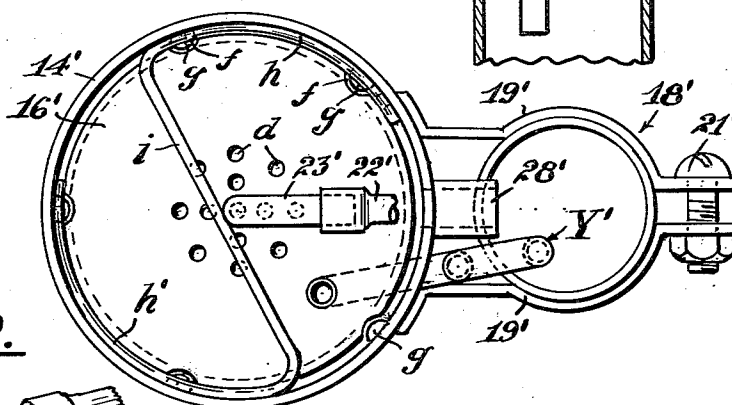
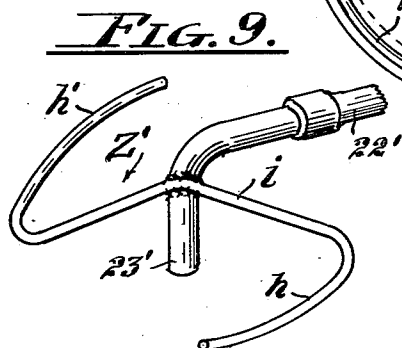
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D. B. FINKBINER **3**
APPARATUS FOR FORMING AND DELIVERING CHEMICALED
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3 Sheets-Sheet 3

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APPARATUS FOR FORMING AND DELIVERING CHEMICALED SOLUTIONS TO TOILET BOWLS

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5 Claims. (Cl. 4-228)

This invention relates to apparatus for forming and delivering to toilet bowls and the like solutions of deodorizing, sterilizing and cleansing agents and similar materials.

The primary object of the invention is to provide an apparatus of the above character wherein the solution is produced by the flow of water over solid bodies of solvent chemical material during the flushing of a toilet bowl or the like, in which such material is subject to the solvent action of water only during a flushing operation and whereby the material is maintained in its normal dry state at least substantially throughout the intervals between flushing operations, thereby effecting economy in consumption of the material as compared with instances where the material is maintained subject to the solvent action of water throughout such intervals.

Another object is to provide the conventional toilet bowl flushing apparatus, wherein a volume of water is delivered to a toilet bowl to flush the latter and wherein a quantity of water is entrapped in the bowl between flushing operations, with simple and effective means whereby a beneficial solution of a soluble chemical agent may be delivered to the bowl with the water entrapped therein and apart from the bowl flushing water.

Another object is to provide an apparatus wherein the dissolving of the chemical solid is effected directly by a stream of water delivery by a ballcock valve controlling refilling of a tank equipped with flushing mechanism adapted to deliver flushing water to a toilet bowl, or the like.

Another object is to provide an apparatus for accomplishing the above recited result which is adapted to be readily applied to the conventional toilet flushing mechanism embodying a flush tank, a ballcock tank refill valve having an outlet leading to a bowl refill tube and an upstanding overflow pipe in the tank connecting with a flush pipe leading from the tank to the toilet bowl and wherein such apparatus is devoid of moving parts and therefore economical in production, not subject to wear, and not liable to get out of order.

A further object is to provide in one form of the invention, a siphon operable to automatically drain a container for the solvent solids at the completion of a bowl flushing action, so that such container will be free of liquid content intermediate the flushing operations.

With the foregoing objects in view, the invention resides in the parts and in the combination, construction and arrangement of parts hereinafter described and claimed, and as illustrated by way of example in the accompanying drawings in which:

FIG. 1 is a view in section and elevation of a conventional form of toilet bowl flushing apparatus showing the invention as applied and with the parts of the apparatus in their normal position;

FIG. 2 is a plan view partly in section as seen on the line 2-2 of FIG. 1;

FIG. 3 is a fragmentary detail in horizontal section taken on the line 3-3 of FIG. 1, showing a tube support as demountably attached to the side wall of a receptacle in which a chemical solution to be dispensed is formed;

FIG. 3A is a detail in section and elevation as seen on the line 3A-3A of FIG. 3;

FIG. 4 is an isometric view of an assemblage of tubes carried on a support adapted to be demountably attached to the side wall of the receptacle in which a solution to

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be dispensed is formed, showing the tube support as detached;

FIGS. 5 and 6 are views in vertical section as seen on the line 5-5 of FIG. 2 depicting the mode of operation of the invention;

FIG. 7 is a view in vertical section of a modified form of the invention showing it as applied;

FIG. 8 is a plan view with parts removed, as seen on the line 8-8 of FIG. 7; and

FIG. 9 is a perspective view of a water discharge nozzle and a demountable support therefor employed in the construction shown in FIGS. 7 and 8.

Referring to the drawings more specifically, reference now being had to FIGS. 1 to 5 inclusive, A indicates a flush tank equipped with conventional flushing mechanism including an upstanding water supply pipe B leading from a source of water supply under pressure. The pipe B is fitted at its upper end with a ballcock valve C embodying a housing D in which is slidably mounted a vertically reciprocal plunger E controlling a water discharge passage F in the housing D leading to a downwardly opening discharge pipe G. A refill outlet H leads from the passage F which is utilized in the present invention as a source of water supply controlled by the ballcock valve C in forming a chemicaled solution.

The plunger E opens the passage F under water pressure imposed on the lower end thereof from the supply pipe B to permit the flow of water from the source through the passage F, discharge pipe G and refill outlet H, and normally closes the passage F under the urge of a lever J fitted on its outer end with a float K controlled by variation of water level in the tank A. The lever J is here shown as pivoted at L on a standard M erected on the valve housing D and as having its inner end pivoted at N to the outer end of a link O pivoted at P to a lug on the housing D. The link O extends over and normally seats on the upper end of the plunger E. The lever J and float K in gravitating downward on lowering of the water level in the tank A acts to elevate the link O to permit opening of the intake valve C, and conversely, on upward movement of the lever J and float K under the lift imposed thereon by raising of the water level, the link O is thrust downward to thereby close the valve C, all in a customary manner.

The tank A is also equipped with a downwardly extending flush pipe Q leading to the trap of a toilet bowl (not shown) in a usual manner; the upper end of the pipe Q opening upwardly to the interior of the tank A and being provided with a seat R for a normally closed flush valve S having an upstanding stem T leading to a link U connected to the outer end portion of a manually controlled lever V, whereby the valve S may be unseated to effect discharge of toilet flushing water from the tank A, in the well known manner. An overflow pipe W leads upwardly from the flush pipe Q and opens at its upper end contiguous the ballcock valve C.

In carrying out the invention, as shown in FIGS. 1 to 5 inclusive, an open topped receptacle 14 is provided as a container for soluble bodies 15 of chemical material here shown as comprising annular cakes arranged in a stack supported on a false bottom 16 spaced above the lower end 17 of the receptacle. Vertical ribs 18 spaced apart at intervals around the interior of the receptacle side wall, serve to space the bodies 15 from the side wall to allow water to flow over substantially the entire surface of the outer sides of the bodies 15.

The receptacle 14 is mounted on the overflow pipe W by a conventional clamp 18 embodying a saddle member 19 fixed on the side wall of the receptacle and held in seated engagement with the overflow pipe by a strap 20 positioned astride the overflow pipe opposite the saddle 19 and maintained in clamping engagement with the pipe

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together with the saddle 19 by means of screws 21 interconnecting the end portions of the saddle 19 and strap 20 as particularly shown in FIG. 2. The receptacle 14 is thus mounted on the overflow pipe W with the open upper end of the receptacle spaced above the open upper end of said overflow pipe.

Connecting with the refill outlet H of the ballcock valve C is one end of a flexible tube 22 the other end of which connects with a downwardly opening nozzle 23 extending downwardly and opening into the upper end portion of the receptacle 14 above the solvent material 15 therein in spaced relation thereto whereby water discharged from said refill outlet H of the valve C will be delivered into the receptacle 14 so as to submerge the chemical material 15 and effect a solvent action thereon and thereby produce a chemicaled solution in the receptacle. The tube 22 may comprise the usual refill tube of the conventional toilet flushing mechanism which ordinarily leads from the outlet H to the overflow pipe W and extends downwardly therein.

Means are provided for delivering the chemical solution from the receptacle 14 into the overflow pipe W, which, in the construction under consideration comprises a siphon Y consisting of an inverted U-shaped, open ended and unrestricted tube embodying spaced parallel upright legs 24—25 of unequal lengths and an end member 26 interconnecting the upper portions of the legs.

The siphon is arranged with the shorter leg 24 thereof extending axially of the receptacle 14 with its open end terminating within a space 27 formed between the false bottom 16 and the contiguous end 17 of the receptacle, while the longer leg 25 extends downwardly into the overflow pipe W with its open end terminating on a plane spaced below the open end of the leg 24. The end member 26 leads from the receptacle 14 at a point spaced below the upper margin of the latter and overlies the upper end of the overflow pipe W.

Leading from the receptacle above the connecting end member of the siphon is an outlet tube 28 the outer end of which opens to the overflow pipe W.

As a means for supporting the water feed nozzle 23, tube 22, siphon Y and outlet tube 28, in fixed but detachable relation to the receptacle 14, such elements are rigidly mounted on and lead through a plate Z having a tapered lower end portion 29 adapted to be removably seated in a V-shaped recess 30 in the upper margin of the receptacle, and having an upper end 31 which projects above the margin of the receptacle when the plate Z is applied thereto.

Projecting from the opposite sides of the margins of the recess 30 are flanges 32—32' forming therebetween a channel 33 in which the margin of the tapered lower portion of the plate 29 slidably seats, as shown in FIG. 3A. The upper portion 31 of the plate in projecting above the margin of the receptacle serves as a convenient handhold facilitating grasping of the plate in effecting its removal and replacement, which is necessary in loading the receptacle with the solvent bodies 15 where the latter are annular in form with the shorter leg 24 of the siphon extending through the openings in such bodies as shown in FIGS. 1, 5 and 6.

In the operation of the invention, chemicaled solution formed by dissolving the soluble bodies 15 occurs in the receptacle 14 only during the period when the ballcock valve C is opened to permit the flow of water through the refill outlet H into the receptacle. This occurs when the float K is lowered from its elevated position which normally occurs by variation of the level of water in the tank A during a flushing operation, that is during the time the float K moves downward when water is discharging from the tank and also during refilling of the tank and consequent restoration of the float K to its normal uppermost position. Such operation of the float and its control of the ballcock valve C is incident to conventional toilet bowl flushing apparatus.

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At all times when the float K is in its elevated position the receptacle 14 will be void of water submerging the soluble bodies 15 which therefor are maintained dry during the intervals between flushing operations, which constitutes an important feature of the present invention.

The solvent forming and dispensing operation of the invention as shown in FIG. 1 is as follows: On opening the ballcock valve C, water flows through the refill outlet H, tube 22, and nozzle 23 and is discharged by the latter onto the bodies 15 of soluble chemical material previously placed in the receptacle and supported on the false bottom 16. The water thus discharged from the nozzle 23 flows over and around the bodies 15 and accumulates in the receptacle until the latter is filled to the level of the interior of the connecting end portion 26 of the siphon Y, thereby effecting a solvent action on the bodies 15 and producing the desired chemicaled solution. The leg 24 and end 26 of the siphon will then be filled with water which will flow to discharge into the overflow pipe W through the longer leg 25 of the siphon, thus automatically placing the siphon in operation which will continue throughout the period of discharge of incoming water through the nozzle 23 and thereafter until the then solvent saturated water will have been siphoned from the receptacle to a point level with the lower end of the shorter leg 24 which level is in the well 27 below the solvent bodies 15. When this occurs air enters the siphon and terminates operation thereof. Such water as may then be contained in the shorter leg 24 will return to the well 27 where it will be entrapped out of contact with the solvent bodies 15. During the above recited operation the flushing valve S will be closed, the siphon through the toilet bowl (not shown) will have stopped, and the chemicaled solution flowing down the overflow pipe will be entrapped in the toilet bowl.

In event a volume of water should be delivered to the receptacle 14 in excess of what the siphon will handle, such excess will be delivered to the overflow pipe W through the outlet tube 28.

In the form of the invention shown in FIGS. 7, 8 and 9, 14' indicates an open topped receptacle having a side wall *b* and a bottom wall *c* which receptacle is fitted with a false bottom 16' spaced above the bottom wall *c* and formed with drain apertures *d*. As here shown the false bottom 16' has downturned marginal flanges *e* which seat on the bottom wall *c* to space the false bottom 16' therefrom. A series of upwardly extending ribs *f* are affixed to the inner face of the side wall *b*, the upper ends *g* of which terminate on a plane spaced below the upper end of the side wall *b* and collectively form a seat for a demountable nozzle support Z' comprising a pair of arcuate wire shoes *h-h'* joined by an interconnecting wire length *i* connected to a downwardly opening nozzle 23' which, when the support Z' is mounted in the receptacle as shown in FIG. 7, extends downwardly and opens into the upper end portion of the receptacle 14' above solvent chemical material 15' contained in the receptacle and supported on the false bottom 16'. The nozzle 23' is connected to a flexible tube 22' leading from the refill outlet H of the ballcock valve C.

Leading from the space 27' formed between the false bottom 16' and the bottom wall *c* of the receptacle is a siphon Y' comprising an open ended, unrestricted tube bent to provide legs 24'—25' of the unequal lengths of which the shorter leg 24' opens to the space 27' at the lower end of the receptacle through the bottom wall *c* while the longer leg 25' is extended downwardly into the overflow pipe W.

The receptacle 14' is mounted on the overflow pipe W by a conventional clamp 18' embodying a pair of saddle members 19'—19' fixed on the side wall *b* which saddle members are disposed astride the pipe W and held in seated engagement therewith by a clamping screw 21' interconnecting the outer ends of the saddle in a usual manner. The receptacle is thus mounted on the overflow

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pipe W with the open upper end of the receptacle on a plane spaced above the open upper end of the overflow pipe.

Leading from the upper portion of the receptacle at a point above the upper end of the siphon Y' is an outlet tube 28' the outer end of which opens to the upper end of the overflow pipe W.

The above described structure of FIGS. 7, 8 and 9 functions in the same manner as that of the form of the invention shown in FIGS. 1-6. In this instance the siphon Y' is arranged exteriorly of the receptacle yet leads from beneath the false bottom in the latter, and the removable and replaceable nozzle support Z' is mounted within the upper end of the receptacle instead of being mounted on a channeled marginal portion of the receptacle side wall, as in the structure shown in FIGS. 1-6.

The chemical employed in either form of the invention may constitute a deodorant, a sterilizing agent, a cleansing agent, or any other desired soluble material, or may consist of a combination of soluble chemicals as occasion may require.

While specific embodiments of the invention have been shown and described, various details of construction may be employed as occasion may require coming within the meaning and scope of the appended claims.

I claim:

1. In an apparatus for delivering chemicaled solution to the flushing intake of a toilet bowl,

(a) a receptacle adapted to contain a solid solvent chemical material, said receptacle having upper and lower ends,

(b) means for feeding intermittent volumes of water into the upper end of said receptacle into contact with the solvent material therein to form a chemicaled solution in said receptacle,

(c) means for automatically draining the solution from the lower end of said receptacle and from the solvent material therein following each intermittent feed of water to said receptacle,

(d) said draining means comprising a siphon having an intake end portion leading from the lower end portion of said receptacle and opening beneath solvent material in said receptacle and having a discharge end portion connecting with said intake end portion at a point near the level of the upper end of said receptacle whereby water fed to said receptacle and filling the latter to a point above the connection of said siphon end portions the siphon will be filled with liquid to thereby set the siphon in operation,

(e) the discharge end portion of said siphon extending downwardly exteriorly of said receptacle and opening at a point below the intake end portion of said siphon,

(f) and means for conveying liquid discharge from said siphon to the flushing intake of a toilet bowl.

2. In an apparatus for delivering a chemicaled solution to the flushing intake of a toilet bowl,

(a) a receptacle adapted to contain a solid solvent chemical material, said receptacle having upper and lower ends,

(b) means for feeding intermittent volumes of water into the upper end of said receptacle into contact

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with the solvent material therein to form a chemicaled solution in said receptacle,

(c) means for automatically draining the solution from the lower end of said receptacle and from the solvent material therein following each intermittent feed of water to said receptacle,

(d) said draining means comprising a siphon having an intake end leading from the lower portion of said receptacle and opening beneath solvent material in said receptacle and having a discharge end leading exteriorly of said receptacle,

(e) said siphon being arranged to be filled and automatically set in operation upon said receptacle being filled with liquid to a predetermined level whereby liquid is automatically drained from said receptacle following each intermittent feed of water to said receptacle.

3. In an apparatus for forming and delivering a chemicaled solution embodying

(a) a receptacle for a solvent solid chemical material, (b) a nozzle adapted to feed water downwardly into said receptacle into contact with the solvent material therein,

(c) a flexible water supply tube connected to said nozzle and leading from a source of water supply,

(d) and a siphon,

(e) the improvement consisting of

(f) a tube supporting plate through which said nozzle and siphon extend and are rigidly mounted,

(g) said plate having a lower end portion,

(h) said receptacle embodying a side wall having an upper end provided with a recess substantially conformable to the lower end portion of said plate,

(i) the marginal portion of the receptacle side wall bordering said recess having a channel extending longitudinally thereof adapted to slidably receive the margin of the lower end of said plate to demountably support the latter on the receptacle side wall.

4. The structure called for in claim 3 in which

(a) said siphon extends through said plate at a point spaced below the upper end of said receptacle when said nozzle and siphon supporting plate is mounted in said recess whereby said receptacle may be filled with liquid sufficiently to completely submerge said siphon.

5. The structure called for in claim 3 in which

(a) said siphon extends through said plate at a point spaced below the upper end of said receptacle when said nozzle and siphon supporting plate is mounted in said recess whereby said receptacle may be filled with liquid sufficiently to completely submerge said siphon, and

(b) an outlet tube leading from said plate at a point between said siphon and the upper end of said receptacle.

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