

Sept. 28, 1937.

C. P. HINDS

2,094,537

TOILET

Filed April 2, 1937

2 Sheets-Sheet 1

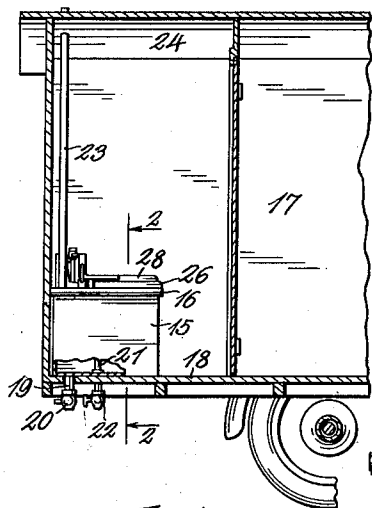


Fig. 1.

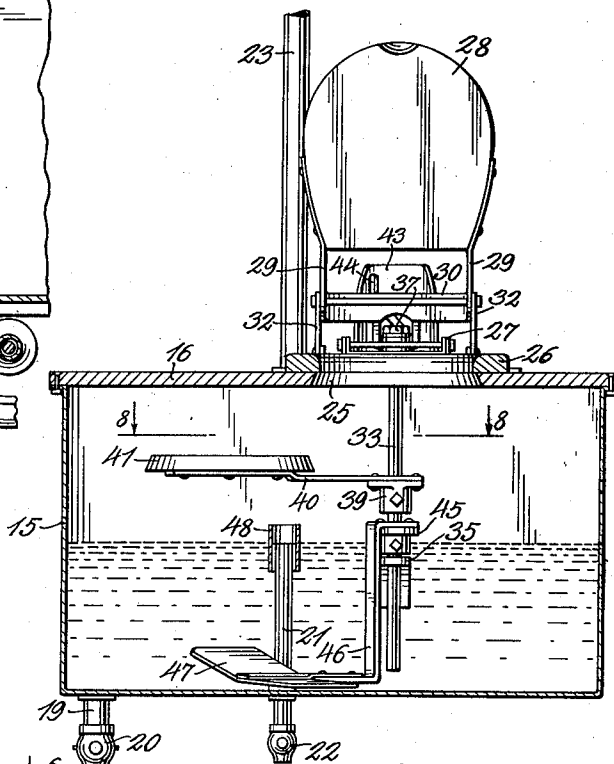


Fig. 2.

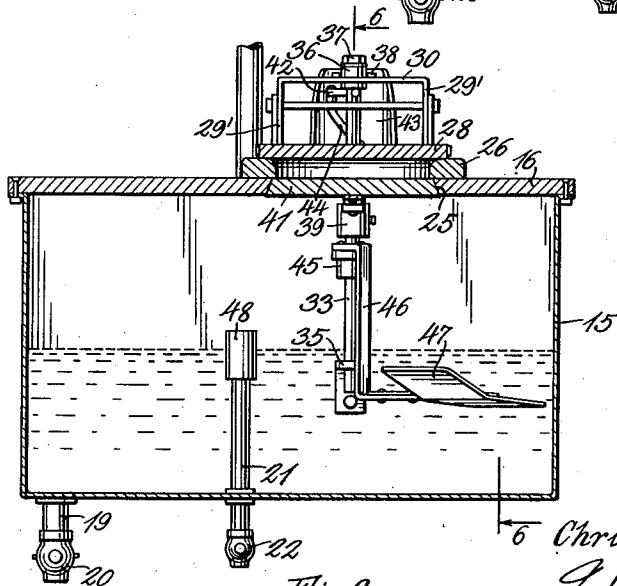


Fig. 3.

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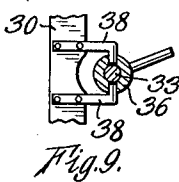
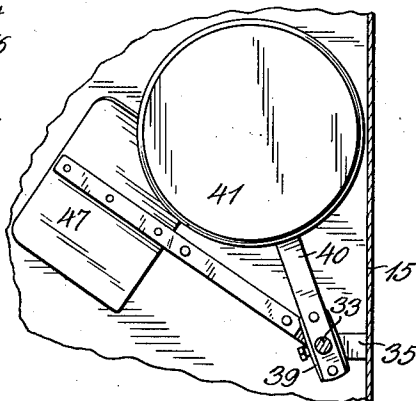
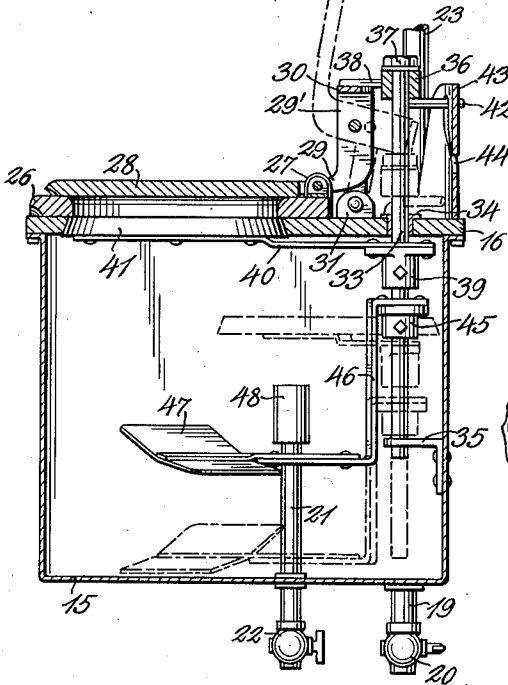
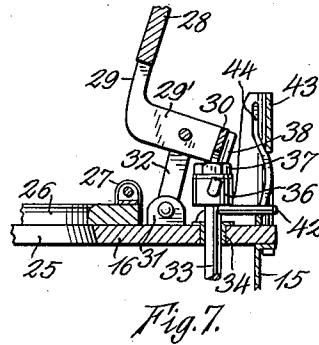
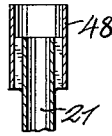
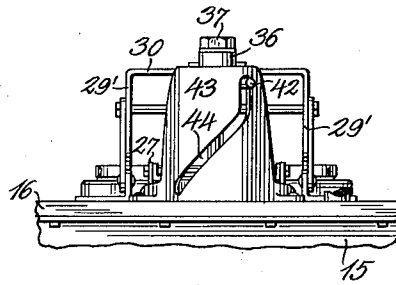
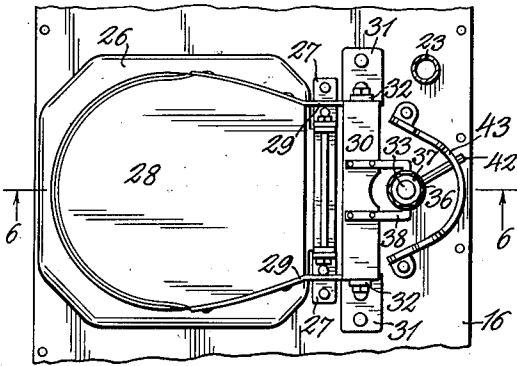
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,094,537

TOILET

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Application April 2, 1937, Serial No. 134,568

13 Claims. (Cl. 4-114)

This invention relates to toilets of a chemical-tank type, and more particularly to toilets of such type arranged for mounting and use within transport agents such as road and rail vehicles, aircraft, and the like, and has as an object to provide an improved construction and combination of elements constituting a self-contained, transportable, sanitary toilet.

A further object of the invention is to provide an improved, self-contained, sanitary toilet of chemical-tank type in the form of a complete unit susceptible of ready installation in and convenient use with transport agents.

A further object of the invention is to provide improved means automatically operable to seal a chemical-tank type toilet unit against escape of its contents during transportation of the unit.

A further object of the invention is to provide an improved chemical-tank type toilet arranged for automatic adjustment between sealed and usable positions through manipulation of a seat cover element carried thereby.

A further object of the invention is to provide improved means for actuating a sealing element between opening and closing relation with a chemical-tank type toilet.

A further object of the invention is to provide an improved, self-contained sanitary toilet unit of chemical-tank type which is simple and inexpensive of manufacture, susceptible of ready installation and convenient use within transport agents, normally sealed against objectionable escape of its contents during transportation, instantly available for use through manipulation of a single cover element, and which requires infrequent attention for its maintenance in usable condition.

My invention consists in the construction, arrangement and combination of elements herein-after set forth, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of a sanitary toilet unit embodying the principles of my invention as installed for use in a conventionalized road vehicle, portions of the latter being broken away to conserve space. Figure 2 is a vertical section through the improved toilet unit as positioned for use, taken on the indicated line 2-2 of and on an enlarged scale relative to the showing of Figure 1. Figure 3 is a vertical section similar to Figure 2 and showing the movable elements of the latter figure in their closing relation with the unit. Figure 4 is a top plan view of the improved unit in its closed position,

portions of the tank being broken away to conserve space. Figure 5 is a fragmentary rear elevation of the showing of Figure 4. Figure 6 is a transverse vertical section through the improved unit in closed position taken on the indicated line 6-6 of Figures 3 and 4. Figure 7 is a fragmentary, detail section of certain of the actuating elements as illustrated in Figure 6 positioned at that limit of their range of actuation opposite to the showing of the latter figure. Figure 8 is a fragmentary, detail section taken on the indicated line 8-8 of Figure 2. Figure 9 is a fragmentary, detail view, partly in section, illustrating a pivotal connection advantageously employed in the improvement. Figure 10 is a fragmentary, detail section of an overflow arrangement particularly adapted for use with the improvement.

In the construction of the improved unit as shown, a suitable receiving, storing and treating tank is indicated generally by the numeral 15 and is illustrated as comprising bottom, side and end walls cooperating to form an open-top container wherewith a top member 16 is permanently associated to complete an enclosed tank. The tank assembly 15-16 may be of any desired size, specific shape, and specific construction, and is preferably formed of non-corrosive material or is suitably treated to resist corrosive action. The tank assembly forms the base and support for the toilet unit and is preferably provided with a flat, smooth bottom adapted to be positioned on and to engage against the floor of a transport agent, such as a bus, trailer, car, aircraft, or other enclosure wherewith the unit is to be associated, a portion of a conventionalized, wheeled enclosure being designated generally by the numeral 17 with a tank assembly suitably positioned on and supported by its floor 18. The tank assembly is provided with a suitably positioned outlet 19 wherethrough the contents of the tank may be gravity-drained, and said outlet extends through the supporting floor 18 and terminates in a suitable valve 20 beneath the floor, which valve is normally closed and is available for manual manipulation to open position when it is desired to drain the tank. To control the level of the liquid tank contents a suitable stand-pipe 21 rises within the tank and terminates in an upper open end positioned at the desired elevation within said tank, said stand-pipe being extended through the floor of the tank 15 and through the supporting floor 18 to terminate in a manually-controlled valve 22 thereby positioned beneath the floor 18. A suitable vent pipe 23

communicates through the tank top 16 with the interior of the tank assembly and extends upwardly therefrom through the roof 24 of the enclosure wherein the toilet unit is positioned, thus providing means for venting gases and odors from the tank assembly exteriorly of the enclosure housing the toilet.

The tank cover 16 is provided with a suitably positioned aperture 25 of any desired size and specific shape, and a conventional toilet seat element 26, of any desired specific form and construction, is positioned to rest on the tank cover 16 in superposed registration of its opening with the aperture 25 and is suitably hinged at its rearward end to bracket means 27 rising in fixed relation from the tank cover 16 in such manner as to mount the seat element 26 for actuation at times through a vertical arc upwardly from its normal engaged relation with the tank cover. A seat cover 28, of a size and shape suitable to close over the opening of the seat element 26, is provided with spaced, rearwardly extending, fixed arms 29 which project rearwardly beyond and in embracing relation with the hinge mounting of the seat element 26 and are then bent at right angles to extend upwardly, as indicated at 29', for rigid interconnection of their upper ends by means of a yoke bar 30. Brackets 31 are fixed to the tank cover 16 adjacent and beneath the vertical portions 29' of the arms 29 and a suitable link 32 pivotally interconnects each bracket 31 with an intermediate point of the adjacent arm portion 29', thus connecting the cover 28 through a swinging hinge joint with the tank assembly and for actuation of the seat cover through a vertical arc into and out of closing relation with the opening of the seat element 26. Save for the specific hinge mounting of the seat cover 28, the seat construction and arrangement hereabove described is strictly conventional and in itself forms no part of the instant invention. In alignment transversely of the tank assembly with the longitudinal median line of the seat assembly, and rearwardly of the latter, a shaft element 33 is vertically disposed for axial reciprocation and rotation about its axis in suitable spaced, vertically-aligned bearings 34 and 35 carried by the tank cover 16 and the rear wall of the tank 15, respectively, said shaft 33 normally projecting above the tank cover 16 and terminating in its lowermost position somewhat above the tank bottom. The upper end of the shaft 33 is rotatably received through a collar element 36 and carries an adjustable head or nut 37 on its upper end in bearing engagement with the upper side of the collar 36, whereby the relative extension of the shaft 33 from the collar 36 may be varied and adjusted. Spaced arms 38 are fixed to and extend rearwardly from the midportion of the yoke bar 30 on opposite sides of the collar 36, and bearing pins carried by the outer ends of said arms 38 are positioned to pivotally engage diametrically opposite points of the collar 36 and thereby support said collar from and in swinging relation with the yoke assembly constituting the hinged support for the seat cover 28. With the arrangement shown and above described, it is obvious that the shaft 33 will be maintained in its maximum upward extension relative to the tank assembly when the seat cover 28 is closed relative to the seat element 26, and that said shaft will be permitted to move axially and downwardly relative to the tank assembly to a minimum extension above the latter when the seat cover is opened to its permissible limit as determined by

its hinge mounting, binding of the shaft 33 in its bearings being obviated by the toggle hinge arrangement resulting from the use of the links 32, as previously described.

Within the tank assembly, the shaft 33 is provided with an adjustable collar 39 which in turn fixedly supports a spring arm 40 extending radially from the shaft 33 and which carries in fixed relation on its outer end a closure valve 41 of a size and shape to fit snugly within and close the aperture 25 of the tank cover 16, at times, engageable margins of the aperture 25 and closure valve 41 preferably being tapered substantially as shown to aid in guiding the valve within and into closely fitting engagement against margins of the aperture 25. The collar 39 is preferably so adjusted on the shaft 33 as to bring the closure valve 41 into seated engagement within the aperture 25 before said shaft reaches its maximum upward extension as determined by closing of the seat cover 28 against the seat element 26, so that, as said seat cover reaches full engagement with the seat element, the final upward travel of the shaft 33 acts to lift the collar 39 sufficiently to impose a spring tension in the arm 40 which tends to hold the valve 41 in closely seated engagement within the aperture 25 against accidental displacement thereof due to bumps, jars and like hazards of transportation. The collar 39 is preferably arranged for convenient adjustment axially of the shaft 33 to permit of such variation in the spring effect imparted by the arm 40 as may be expedient or desirable from time to time. As will be obvious, the foregoing arrangement is effective through manipulation of the seat cover 28 to close or open the aperture 25 in the tank cover 16, but axial travel of the shaft 33 alone serves only to position the closure valve 41 in spaced registration beneath the aperture 25, and hence additional means are required to impart rotation to the shaft 33 for displacement of the closure valve 41 laterally out of alignment with the aperture 25. While various means may be employed to rotate the shaft 33 during or at either limit of its axial reciprocation, the means illustrated and herein-after described are convenient, simple and positively effective to the end desired. As shown, an arm or finger 42 is fixed in and extends radially from the shaft 33 beneath and closely adjacent the collar 36 and is disposed to project generally rearwardly from said shaft. A guide shell 43, generally arcuate in plan, is fixed to and rises from the tank cover 16 in concentric, partially encircling relation with the shaft 33 and rearwardly thereof, said shell rising from the tank cover a distance in excess of the maximum axial travel possible to the shaft 33. A cam slot or guide channel 44 is formed in the vertical wall of the guide shell in position to receive the free end of the finger 42 and guide the latter to effect the desired rotation of the shaft 33 during axial reciprocation of the latter. As will be obvious, the cam slot 44 should have a vertical extent equal to or exceeding the range of vertical travel possible to the shaft 33, and should have a vertically disposed upper portion of sufficient extent to permit seating and unseating of the valve closure 41 unaffected by any rotation of the shaft 33, the remaining portion of the cam slot being spirally disposed in the shell 43 so that engagement of the finger 42 therewith will impart rotation to the shaft 33 during the remainder of its downward travel and cause lateral displacement of the valve closure 41 to the extent necessary to completely clear the aperture 25 when the

seat cover 28 is fully opened. Naturally, closing of the seat cover acts through the agencies above described to return the valve closure into its alignment beneath the aperture 25 and ultimate registered engagement of said closure valve and aperture when the seat cover is completely closed. When the seat cover is open, the weight of the shaft 33 and its attached elements is sufficient to prevent gravity closing of the cover, and when the cover is closed, the toggle hinge arrangement prevents accidental opening of the cover through gravity or similar influence. While the unbalanced weight of the cover 28 deriving from its hinge mounting on the upper ends of the toggles 32 and the arrangement of the hinge pintle relative to the hinge support of the lower ends of said toggles is usually sufficient to maintain the cover in the desired closing relation with the aperture 25, additional means may be provided to limit accidental opening of said cover due to jolts, bumps, and the like affecting the transport agent, such means conveniently taking the form of spring-like frictional engagement between the elbows formed by the junction of the arms 29 and arm portions 29' and the adjacent surfaces of the toggles 32.

The toilet unit being of chemical-tank type, a certain periodic agitation of the tank contents is desirable to aid in the chemical digestion of waste matter received therein, and while the normal travel of the transport agent wherewith the unit is associated is productive of a requisite amount of such agitation, it is desirable to add mechanical agitating means to the unit for effective actuation when the unit is installed in a fixed location or when the transport agent is at rest. The mechanical agitating means combined with the unit may vary through a wide range of specific forms and constructions, but it is expedient and convenient to employ the travel of the shaft 33 for agitator actuation, to which end the construction shown in the drawings is applied. As shown, a suitable collar 45 is mounted on and adjustably fixed to the shaft 33 adjacent and beneath the collar 39, and a supporting arm 46 is fixed at one end to said collar 45 and extends downwardly and radially outwardly therefrom to terminate in a suitable stirring or agitating element 47 in fixed relation with its free outer end, so that, as the seat cover 28 is raised, the element 47 is caused to move arcuately and downwardly through the liquid contents of the tank assembly, and as said seat cover is lowered, the element 47 is caused to move arcuately and upwardly through the tank contents, the size and shape of the element 47 being such as to produce the desired agitation of the tank contents prior to and immediately following use of the toilet unit.

To prevent obstruction and clogging of the stand pipe 21 during use of the toilet unit, it is desirable to provide some form of trap through which only liquid and finely divided matter may pass to the open end of the stand pipe, one practical form of such a trap being illustrated in Figure 10 as comprising a cylindrical sleeve 48 having an internal diameter greater than the external diameter of the stand pipe and open ends, the sleeve 48 being supported on and in fixed, concentric relation with the upper end of the stand pipe 21 in partial telescoping relation with the latter, thereby positioning one end of the sleeve 48 above and its other end below the inflow end of the stand pipe.

In the practical operation of the improved unit shown and described, the unit assembly is suit-

ably installed with its valves 20 and 22 conveniently positioned beneath the floor of an enclosure and its vent pipe 23 opening through the roof of the enclosure, and the tank 15 is then charged with a suitable, chemically-charged solution such as is commonly employed in chemical-tank type toilets for the digestion of waste matters, the valves 20 and 22 being normally closed. With the seat cover 28 in its normal closed position, the valve 41 is seated in tightly closing relation with the aperture 25 and the tank assembly is thus adequately sealed against the escape of its gaseous or liquid contents save through the vent pipe 23 which discharges exteriorly of the unit enclosure. When the seat cover 28 is raised, the valve 41 is automatically unseated from the aperture 25 and moved laterally out of registration therewith and the agitator assembly simultaneously actuated to stir the tank contents and further the chemical action therein, the unit being then ready for use. Closing of the seat cover 28 reseals the tank unit and reagitates the tank contents. During travel of the transport agent equipped with the improved unit, the valve 22 may be opened to permit escape of excess liquid from the tank assembly, the liquid thus discharged being free from objectionable odor or character as a result of the chemical action within the tank, the travel of the transport agent being productive of adequate agitation of the tank contents and consequent continuous chemical digestive effect therein. When the transport agent is at rest for any considerable length of time, it is expedient to prepare a small drainage pit beneath and in position to receive discharge from the valve 22, which valve can then be left open in the same manner and to the same end above recited. From time to time, depending on the amount of use to which the unit is subjected, complete draining, flushing, and recharging of the tank assembly is required, the outlet 19 and valve 20 providing convenient means for the discharge of the entire tank contents.

Since many changes, variations, and modifications in the specific form, construction and arrangement of the elements shown and described may be had without departing from the spirit of the invention, I wish to be understood as being limited solely by the scope of the appended claims, rather than by any details of the illustrative showing and foregoing description.

I claim as my invention—

1. A toilet unit comprising a receiving and treating tank, a top element in fixed closing relation with said tank, and formed with an opening communicating therethrough with the interior of said tank, a cover hinged to said top element for closing registration at times with said opening, a valve plug movably supported within said tank and arranged for seating at times in closing relation within said opening, and means interconnecting said cover and valve plug for simultaneous actuation in opposite directions.

2. A toilet unit comprising a closed receiving and treating tank formed with an opening in its top member, a cover hinged to said top member for closing registration at times with said opening, a valve plug movably supported within said tank and arranged for seating at times within said opening, and means interconnecting said cover and valve plug whereby manipulation of the former is automatically transmitted to effect simultaneous actuation of the latter in an opposite direction.

3. A toilet unit comprising a closed receiving and treating tank formed with an opening in its top member, a cover hinged to said top member for closing registration at times with said opening, a valve plug movably supported within said tank and arranged for seating at times within said opening, and means interconnecting said cover and valve plug and operable through manipulation of the former to seat the latter within said opening when said cover is closed and to unseat and laterally move said plug relative to said opening when said cover is opened.

4. A toilet unit comprising a closed receiving and treating tank base formed with an opening in its top member, valved drain and valved liquid-level control means associated with said tank, a toilet seat hinged to said top member in registering relation with said opening, a seat cover hinged to said top member for closing registration at times with said seat, a valve plug movably supported within said tank and arranged for seating at times within said opening, and connections between said seat cover and valve plug operable through manipulation of the former to position the latter in a relation with said opening corresponding with that of said seat cover.

5. A portable, self-contained, sanitary toilet unit of chemical-tank type comprising a closed receiving and treating tank formed with an opening in its top member, valved drain and valved liquid-level control means associated with said tank, a toilet seat hinged to said top member in registering relation with said opening, a seat cover separately hinged to said top member for closing registration at times with said seat, a valve plug supported for simultaneous vertical and horizontal actuation within said tank and arranged for seating at times within said opening, and connections between said seat cover and valve plug operable through manipulation of the former to actuate the latter between closed and open relation with said opening simultaneously and corresponding with the actuation of said seat cover relative to said opening.

6. In a toilet unit having a closed tank base formed with an opening in its top member, a seat cover hinged to said top member for closing registration at times with said opening, a valve plug supported within said tank for seating registration at times within said opening, and connections between said seat cover and valve plug operable through manipulation of the former to seat and unseat said valve plug relative to said opening as said seat cover is moved between corresponding closed and open relation with said opening.

7. In a toilet unit having a closed tank base formed with an opening in its top member and a seat cover hinged to said top member for closing registration at times with said opening, a valve plug supported within said tank for seating registration at times within said opening, an agitator within said tank in adjustably fixed relation with said valve plug, and connections between said seat cover and valve plug operable through manipulation of the former to seat and unseat said valve plug relative to said opening and to simultaneously actuate said agitator as said seat cover is moved between corresponding closed and open relation with said opening.

8. In a toilet unit having a closed tank base formed with an opening in its top member and a seat cover hinged to said top member for closing registration at times with said opening, a

shaft element rotatably mounted for axial reciprocation through said tank top member and hingedly connected with said seat cover for actuation simultaneously therewith, and a valve plug adjustably fixed to said shaft element for seating registration within said opening when said shaft element is elevated through manipulation of said seat cover to closed relation with said opening.

9. In a toilet unit having a closed tank base formed with an opening in its top member and a seat cover hinged to said top member for closing registration at times with said opening, a shaft element hingedly connected with said seat cover in rotatable, axially reciprocable relation through said tank top member, a valve plug adjustably fixed to said shaft element within said tank for seating registration within said opening when said seat cover is closed and to unseat said opening when said seat cover is raised, and an agitating element adjustably fixed to said shaft element within said tank for agitating actuation of the tank contents simultaneously with actuation of said valve plug deriving from manipulation of said seat cover.

10. In a toilet unit having a closed tank base formed with an opening in its top member and a seat cover hinged to said top member for closing registration at times with said opening, a shaft element rotatably disposed through said tank top member and hingedly associated with said seat cover for axial reciprocation controlled by the arcuate travel of the latter, a valve plug adjustably fixed to said shaft element within said tank for seating registration within said opening when said seat cover is closed, and means for rotating said shaft element during its reciprocation to move said valve plug laterally out of registration with said opening when said seat cover is opened.

11. In a toilet unit having a closed tank base formed with an opening in its top member and a seat cover hinged to said top member for closing registration at times with said opening, a shaft element rotatably disposed through said tank top member and hingedly associated with said seat cover for axial reciprocation controlled by the latter, a valve plug adjustably fixed to said shaft element within said tank and arranged for seating registration at times within said opening, an arm fixed radially of said shaft, and a fixed cam slot engaged by said arm and arranged to control rotation of said shaft element to move said valve plug laterally out of registration with said opening when said seat cover is open and to register said valve plug with said opening when said seat cover is closed.

12. In a toilet unit having a closed tank base formed with an opening in its top member and a seat cover hinged to said top member for closing registration at times with said opening, a shaft element rotatably disposed through said tank top member and hingedly associated with said seat cover for axial reciprocation controlled by the arcuate travel of the latter, a valve plug adjustably fixed to said shaft element within said tank for seating registration within said opening when said seat cover is closed, and means for rotating said shaft element during its reciprocation to move said valve plug laterally out of registration with said opening when said seat cover is opened; together with an agitator adjustably fixed to said shaft element within said tank for actuation deriving from manipulation of said seat cover.

13. In a toilet unit having a closed tank base
formed with an opening in its top member and a
seat cover hinged to said top member for closing
registration at times with said opening, a shaft
5 element rotatably disposed through said tank top
member and hingedly associated with said seat
cover for axial reciprocation controlled by the
latter, a valve plug adjustably fixed to said shaft
element within said tank and arranged for seat-
10 ing registration at times within said opening, an
arm fixed radially of said shaft, and a fixed cam

slot engaged by said arm and arranged to control
rotation of said shaft element to move said valve
plug laterally out of registration with said open-
ing when said seat cover is open and to register
said valve plug with said opening when said seat
5 cover is closed; together with an agitator adjust-
ably fixed to said shaft element within said tank
for actuation deriving from manipulation of said
seat cover.

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