Aug. 13, 1935. T. BENNETT ET AL 2,011,511

TOILET

Filed April 28, 1934 2 Sheets-Sheet 1

Fig. 1.

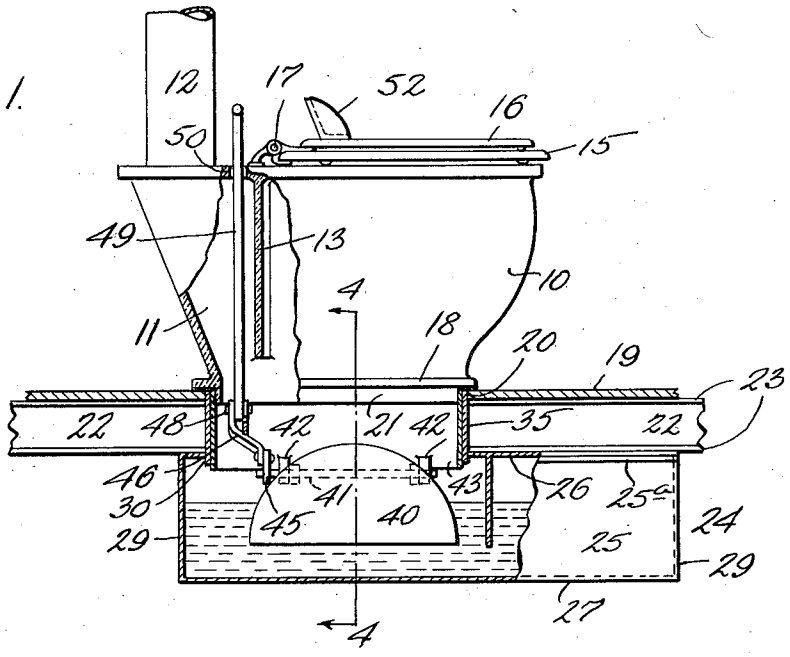


Fig. 2.

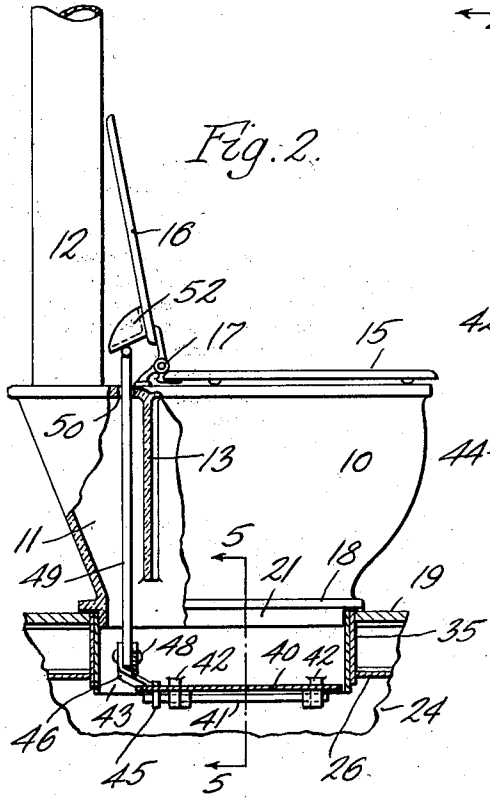
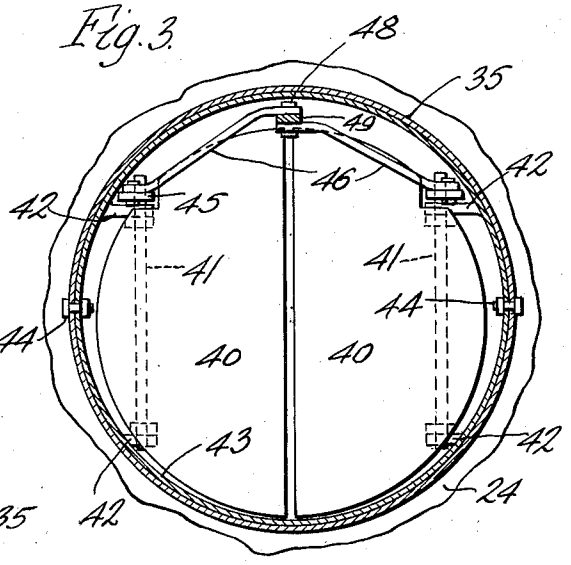


Fig. 3.



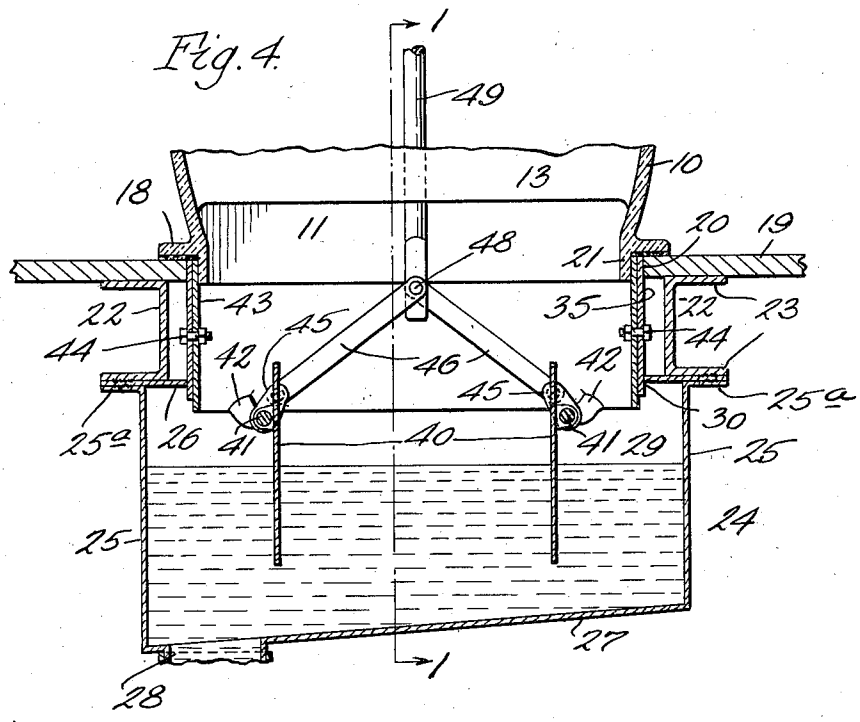
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Fig. 4.



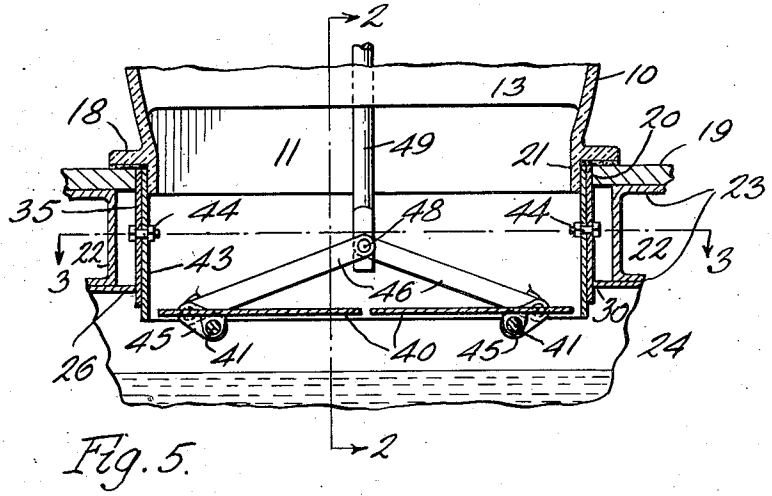


Fig. 5.

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UNITED STATES PATENT OFFICE

2,011,511

TOILET

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Application April 28, 1934, Serial No. 722,958

8 Claims. (Cl. 4—8)

This invention relates to improvements in waterless toilets of the kind including a chemical or aseptic solution tank for the reception of sewage. Our invention has especial utility in connection with railroad cars, buses, and other conveyances, although our improved toilet can be used to advantage in other locations.

The objects of the invention are to provide a toilet of the character stated which shall consist of a compact, unitary structure such that the solution tank and connections between the same and the bowl of the toilet may be readily installed and adequately supported in the necessarily shallow space beneath the floor of a railroad car or other vehicle; also to provide a toilet of this kind in which splashing and surging of the solution from the tank into the bowl during the use of the toilet is prevented in an improved manner; in which sewage receiving and splash-preventing means of improved and simplified construction are employed; in which such means are constructed so as to facilitate the assembly and mounting thereof in and the removal thereof from the toilet; in which such means and the support therefor may be constructed as a simple and rugged unit which can be separately assembled and detachably secured in and removed or renewed when necessary; and with which easy operation of the sewage-receiving and splash-preventing means may be positively and automatically effected to place said means in operative position when the toilet is to be used by the raising of the toilet cover or analogous member, and which means are automatically returnable to an inoperative position by gravity when the seat or like member is lowered.

Various other objects and advantages will be apparent from the following description of one embodiment of the invention, the novel features of which will be particularly pointed out in the appended claims.

An embodiment of the invention, as used in connection with a railroad car or the like conveyance, is illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation, partly in section, on line 1—1 of Fig. 4 of our improved toilet mounted on the floor of a railroad car or conveyance, the various parts being in the position occupied when the toilet is not in use;

Fig. 2 is a similar view showing the parts in position for use, the figure being partly in section on line 2—2 of Fig. 5;

Fig. 3 is a horizontal section thereof, on an enlarged scale, taken on line 3—3 of Fig. 5;

Fig. 4 is a fragmentary, vertical section thereof, on an enlarged scale, taken approximately on the line 4—4 of Fig. 1, and

Fig. 5 is a similar view taken on the line 5—5 of Fig. 2.

In the embodiment illustrated, our improved toilet includes a bowl 10 of usual or standard construction having at the rear thereof a vent chamber 11 connecting at its upper end with an upright vent pipe or duct 12. The vent chamber 11 may be formed by the provision of an upright partition 13 extending across the rear portion of the bowl and having its lower edge terminating near the bottom of the latter. The toilet may also be provided with the usual annular seat or member 15 and a cover 16, both of which may be conveniently pivoted at the rear of the bowl upon hinges 17 in the usual manner.

The lower portion of the bowl is provided with an exterior horizontal flange 18 which rests upon the floor 19 of the car or other support and extends about an opening 20 in the latter, and depending from said flange 18 is a marginal bottom flange or skirt 21 which extends into said opening 20.

The floor 19 may be supported upon any usual or suitable frame members or joists, horizontal channel members 22 being shown, each of which includes upper and lower horizontal flanges 23 connected by a vertical web.

Arranged immediately below the floor members or joists 22 is a solution tank 24 which preferably is of relatively shallow construction and may be of rectangular form having side walls 25, the upper edges 25a of which are turned outwardly and are welded to a top plate or wall 26. The lower edges of said side walls are connected by a bottom plate or wall 27 which, if desired, may be integral with the side walls, and said bottom wall 27 is preferably inclined and provided with a detachable closure member or drain 28, a portion of which is shown in Fig. 4. The tank is completed by upright end walls 29.

The top wall 26 of the tank 24 is formed with an opening 30 which is aligned with and corresponds approximately in size to the bottom opening 31 of the bowl 10, which opening is defined by the bottom annular flange 21 thereof.

Projecting upwardly from and secured to the edges of the opening 30 in the tank is a fixed collar or annular flange 35 which extends through the floor opening about the flange 21 of the bowl with its upper edge abutting the horizontal flange 18 of said bowl, thereby forming a communicating passage between the bowl and the tank.

In view of the limited space available beneath the floors of railroad cars and the like conveyances, the shallow solution tank 24 is disposed so that its top wall 26 abuts against the bottom flanges 23 of the adjacent frame or floor supporting members 22 at opposite sides of the collar 35, said top wall 26 being preferably welded to said flanges 23 and the attached outwardly extending edges 25a of the side walls 25 to form a rigid or permanent connection or mounting for the tank 24. As a result of this arrangement, it will be obvious that a relatively short or low collar 35 must be provided, since the length or vertical height thereof is limited to substantially the combined vertical dimensions of the floor 19 and floor supporting or frame members 22.

Obviously when a toilet of this type is installed in a railroad car, bus or other conveyance, the solution in the tank is often subjected to more or less violent surging or disturbance, such as to tend to splash some of the solution upwardly through the collar 35 into the bowl 10, and in order to reduce or substantially prevent this objectionable feature during the use of the toilet, we have provided improved novel means which are automatically operable, preferably by the act of raising the seat cover 16, to form an obstruction extending substantially across the area of the collar 35. This obstruction acts to intercept any solution tending to pass from the tank to the bowl during the use of the latter and said means also act, when in this position, to receive and retain sewage and prevent it from being introduced into the solution during the use of the toilet with consequent splashing. Said means also automatically act, after the use of the toilet and the lowering of the seat cover 16, to move to a position in which the sewage-receiving portions thereof will depend into the solution in the tank to facilitate the dislodgement of the sewage therefrom.

In the particular embodiment of the invention illustrated, the means above mentioned includes a plurality of drop plates 40, two of which are shown and each of which are preferably of semicircular form such that when moved to horizontal sewage-receiving position, they will extend in the same plane and form a substantially circular obstruction extending across and conforming approximately to the horizontal dimensions or form of the space within the collar 35.

Each of the plates 40 is rigidly secured to a horizontal rock shaft or pivot 41 which is rotatably journalled in bearing lugs or brackets 42 extending inwardly from the lower edge portion of a second annular collar or member 43 which is of substantially the same vertical dimensions as the fixed collar 35, and is of such size in a horizontal direction that it may fit snugly within the collar 35. The collar 43 is preferably detachably secured to the collar 35 by suitable bolts or other fastenings 44.

Rigidly secured to each of the rock shafts 41 is a short crank or rock arm 45 to the free end of which is pivoted a link 46, and the link for each of the rock shafts in turn has its other end secured by a pivot 48 to the lower end of a common operating member which is preferably in the form of an upright rod or rigid bar 49.

The parts just described are so arranged and positioned that the rod 49 may extend upwardly within the collars 43 and 35 and through the vent chamber 11, passing thence through a hole 50 in the top rear portion of the bowl 10 where it terminates, as shown, somewhat above and in the rear of the hinges 17.

When the toilet is not in use and the seat 15 and cover 16 are in their lower horizontal positions, the combined weight of the drop plates 40, links 46 and the rod 49 will act to cause the rock shafts to turn until the drop plates assume by gravity the upright positions shown in Figs. 1 and 4, and in which the rod 49 will be in its upper position, as indicated clearly in Fig. 1.

As shown in Figs. 1 and 2, the cover 16 is provided upon its upper or outer face and preferably near the rear portion thereof with an offset part or projection 52, which is so disposed that when the cover 16 is raised, said part 52 will be moved rearwardly about the hinges 17 into such position that it will engage the upper end of the rod 49 and depress the same to such an extent that, through the links 46, the rock arms 45, rock shafts 41 the drop plates 40 will be swung bodily in unison from the position shown in Figs. 1 and 4 to the position shown in Figs. 2, 3 and 5, with the result that the drop plates 40 will now be in a transverse position extending in a common plane across and substantially filling the passage or opening defined by the collars 35 and 43.

When the drop plates have been moved to the position just described, they will be disposed above the level of the solution in the tank and will not only act to prevent passage of the solution upwardly into the bowl by the surging action caused by movement of the conveyance, but will also act to intercept the passage of sewage into the solution and thereby prevent objectionable splashing of the solution into the bowl during the use of the toilet.

The subsequent lowering of the cover 16 to closed position will, in the manner described, cause the drop plates to again assume their substantially upright positions shown in Figs. 1 and 4, in which they extend into the solution in such a way that the sewage on the plates will be readily dislodged.

The aforementioned connections between the operating rod 49 and the plates 40 constitute a toggle mechanism, such that the force required to move the plates out of the solution into sewage-receiving position gradually lessens as the pivotal connection at 48 moves downwardly from the position shown in Fig. 4, and the links 46 almost assume a dead center position. Thus only a slight pressure is required from the cover to keep the plates in sewage-receiving position and consequently, no particular effort is required to hold the cover in upright position.

Even should the cover 16 be left in an upright or open position in which the drop plates remain in crosswise position, the movement of the train or conveyance together with the weight of the drop plates and associated parts and the toggle connections described will cause the cover 16 to fall to its closed position, and thereby permit the drop plates 40 to swing about their pivots into their upright positions extending into the solution.

It will be seen from the foregoing description that the operative parts of the toilet are all of relatively simple and rugged construction consisting of a few parts which are readily and positively operated with little effort to perform their intended functions.

Also by mounting the pivots 41 for the drop plates in the detachable collar 43 and connecting all of the movable parts in such a way that they are all arranged in the collar and supported on

the rock shafts or pivots 41, the entire operating mechanism including the operating rod 49 can be assembled as a unit in the collar 43, thereby enabling the entire unit to be installed by inserting the collar 43 in and securing it to the collar 35, before setting the bowl in position. The unit can also be subsequently removed and replaced easily and quickly by merely first detaching the bowl from the floor.

Another desirable and practicable feature of our improved toilet is that by making the two drop plates of a semicircular form and mounting them so that when moved to their sewage-receiving position, they may together form in effect a continuous plate or obstruction substantially filling the opening in the collar 43. These drop plates, when in their vertical or depending positions, will extend only a relatively short distance below their pivots and the adjacent collar 43. This results from the fact that the rock shafts or pivots 41 are arranged approximately in or only slightly below the plane of the bottom flanges 23 of the floor members and extend parallel to the diametrical edges of the plates and across intermediate portions of said plates, so that said shafts form a chord to the circumferential edges of said plates. Thus a relatively shallow solution tank 24 can be utilized since the top thereof can be attached directly to said flanges, while the diametrical edges of the plates are supported well above the bottom of the tank, when the plates are in their upright positions, as shown and described.

We claim as our invention:

1. In a toilet, the combination of a bowl, a solution tank below and in communication with the bottom of said bowl, an upright rod, a drop plate mounted upon a pivot beneath said bowl so as to depend by gravity from said pivot in a substantially upright position extending into the solution in said tank, a link pivoted at one end to the lower end of said rod and having at its other end an operative connection with said drop plate so that, by axially depressing said rod, said plate will move out of said solution and swing into a position for receiving sewage and for preventing splashing of solution from said tank into said bowl, and whereby said drop plate will return to its upright pendant position by gravity when said rod is released and will raise said rod to its upright former position.

2. In a toilet, the combination of a bowl having a hinged cover, a solution tank below and in communication with the bottom of said bowl, an upright rod extending into proximity to said cover, a drop plate mounted upon a pivot beneath said bowl so as to depend by gravity from said pivot in a substantially upright position extending into the solution in said tank, a link pivoted at one end to the lower end of said rod and having at its other end an operative connection with said drop plate, and a part on said cover, which when said cover is raised, directly engages and depresses said rod lengthwise of itself and effects a swinging movement of said drop plate out of said solution to a position for receiving sewage and for preventing splashing of solution from said tank into said bowl, and whereby when said cover is lowered and said part thereon is moved out of engagement with said rod said drop plate will return by gravity into its former upright pendant position and will raise said rod.

3. In a toilet, the combination of a bowl having a hinged cover, a solution tank below and in communication with the bottom of said bowl, a plurality of rock shafts interposed between said bowl and tank and each having fixed thereon a drop plate which normally depends from its pivot by gravity and assumes a substantially upright position extending into said solution, a crank arm on each rock shaft, a plurality of links each pivoted at one end to one of said crank arms and having their other ends pivoted to the lower end of a common operating rod extending into proximity to said cover, said rod being engageable by a part on said cover when the latter is raised so as to be depressed directly by said part and thereby actuate said cranks through said links to turn said rock shafts and swing their attached drop plates into a substantially common plane for receiving sewage, and said drop plates together forming an obstruction between said tank and bowl to prevent splashing of solution from said tank into said bowl.

4. In a toilet, the combination of a bowl, a solution tank below said bowl, a collar interposed between said bowl and tank and affording communication therebetween, horizontal pivots mounted upon and extending crosswise of said collar, a drop plate fixed to each of said pivots and normally depending from its pivot and assuming a substantially upright position by gravity, a crank on each pivot, and a link connecting each crank with a common operating rod extending upwardly within said collar into proximity to said bowl, whereby by depression of said rod said drop plates may swing into a position within said collar such as to substantially cut off communication between said tank and bowl, and in which position said drop plates may receive sewage thereon and prevent splashing of solution from said tank into said bowl.

5. In a toilet, the combination of a bowl, a solution tank below said bowl, a relatively fixed collar connecting said bowl and tank and affording communication therebetween, a second collar fitting within said first collar, drop plates pivotally mounted within and supported upon said second collar so as to depend by gravity in a substantially upright position, a link operatively connected to each drop plate and to the lower end of a common operating rod, which rod extends thence upwardly within said collars into proximity with said bowl, whereby by depression of said rod said drop plates may swing into a position for receiving sewage and for preventing splashing of solution from said tank into said bowl, and means for detachably securing said second collar to said first collar so that said second collar, together with said drop plates, links and rod may be assembled and inserted or removed as a unit.

6. In a toilet to be mounted upon a floor, the combination of a bowl resting upon said floor, a relatively shallow solution tank disposed beneath said floor and bowl and having a top wall abutting the latter, a short collar extending the height of and through said floor and connecting the bottom of said bowl with an opening in said top wall of said tank, horizontal, rotatable pivots extending across said collar and having rigidly secured thereto drop plates, which in one position of said pivots depend into the solution in said tank and in another position of said pivots extend crosswise of said collar and together form an obstruction therein substantially shutting off said tank from said bowl and act to receive sewage, and means arranged within said collar and operatively connecting said pivots with an oper-

ating member extending upwardly within said collar and above said floor to a position adjacent said bowl for turning said pivots to shift said drop plates from one position to another.

7. In a toilet, the combination of a bowl, a solution tank below and in communication with the bottom of said bowl, a plurality of drop plates pivotally mounted beneath said bowl so as to assume by gravity substantially upright positions in which portions of said plates extend into the solution in said tank, and said plates being movable into sewage-receiving positions under said bowl and out of said solution, links having one end thereof pivotally connected with a drop plate, the other ends of said links being connected to a common pivotal member, and a rod arranged to apply force to said common pivotal member to effect raising of said plates into sewage-receiving positions by a toggle action of said links.

8. In a toilet, the combination of a bowl, a solution tank below and in communication with the bottom of said bowl, a pair of drop plates pivotally mounted beneath said bowl so as to assume by gravity positions in which portions of said drop plates extend into the solution in said tank and said plates being movable out of said position into sewage-receiving positions under said bowl, a pair of links each having one end connected with a drop plate, said links having their other ends pivotally connected with each other and with a rod which is movable to produce a toggle action of said links for raising said drop plates into sewage-receiving position by a movement of the pivotally connected ends of said links with each other toward dead center positions, whereby a relatively small force is required on said rod to hold said plates in sewage-receiving position.

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