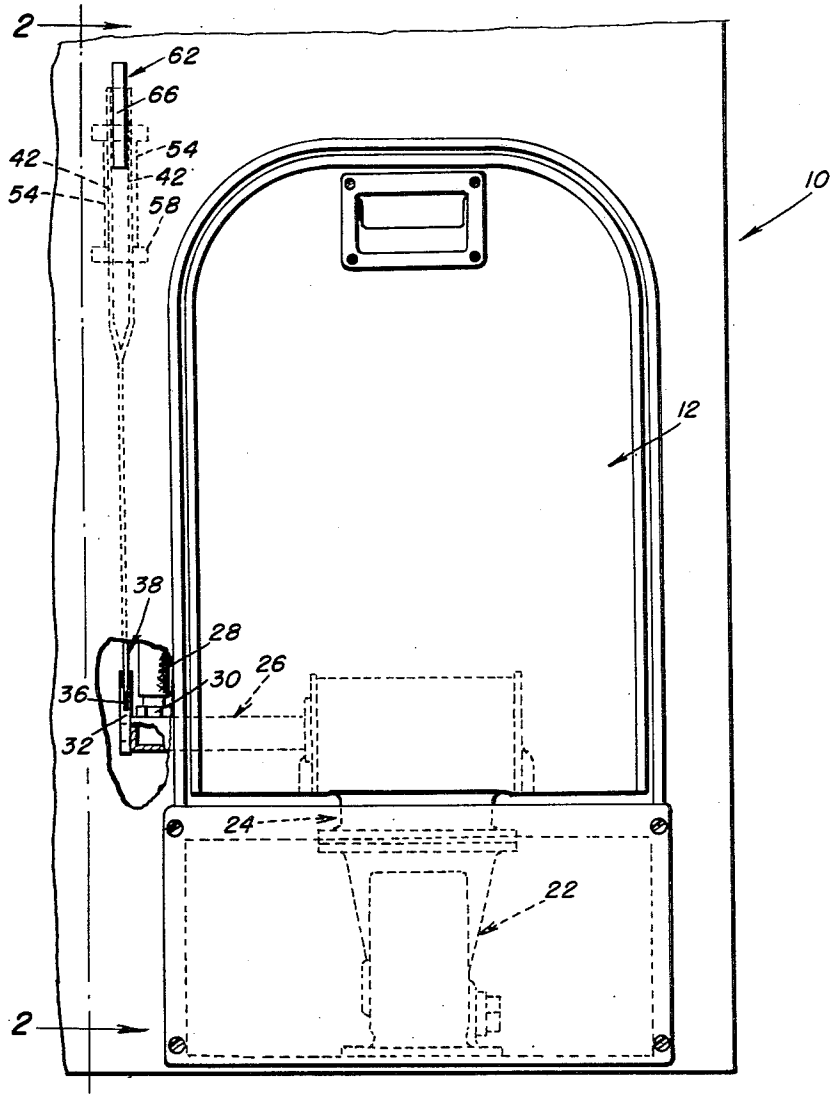
July 23, 1957 A. COLONNA 2,799,864

FOLDING TOILET WITH FLUSH VALVE AND CONTROLLING LINKAGE THEREFOR

Filed Jan. 19, 1956 4 Sheets-Sheet 1

Fig. 1



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FOLDING TOILET WITH FLUSH VALVE AND CONTROLLING LINKAGE THEREFOR

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Fig. 2

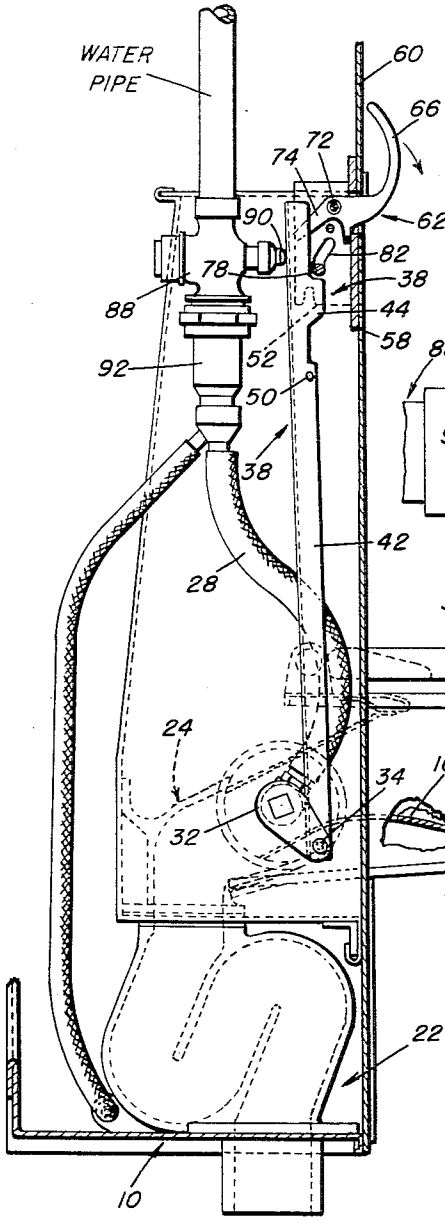
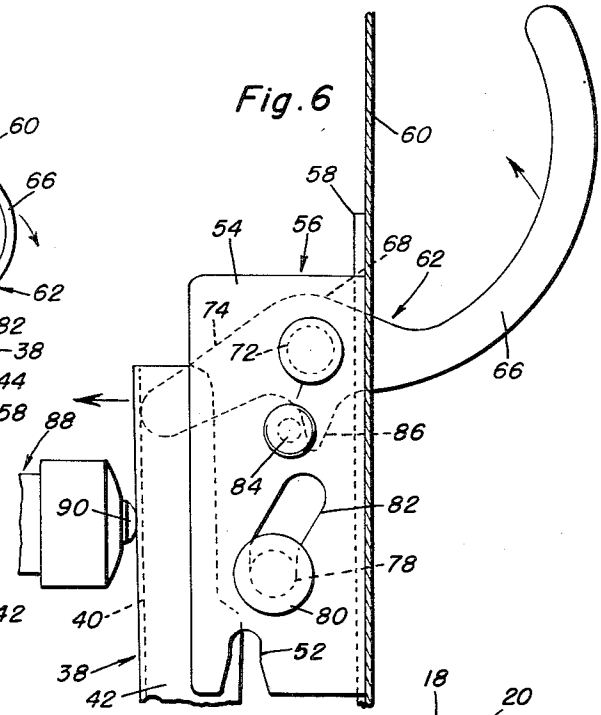


Fig. 6



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FOLDING TOILET WITH FLUSH VALVE AND CONTROLLING LINKAGE THEREFOR

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Fig. 4

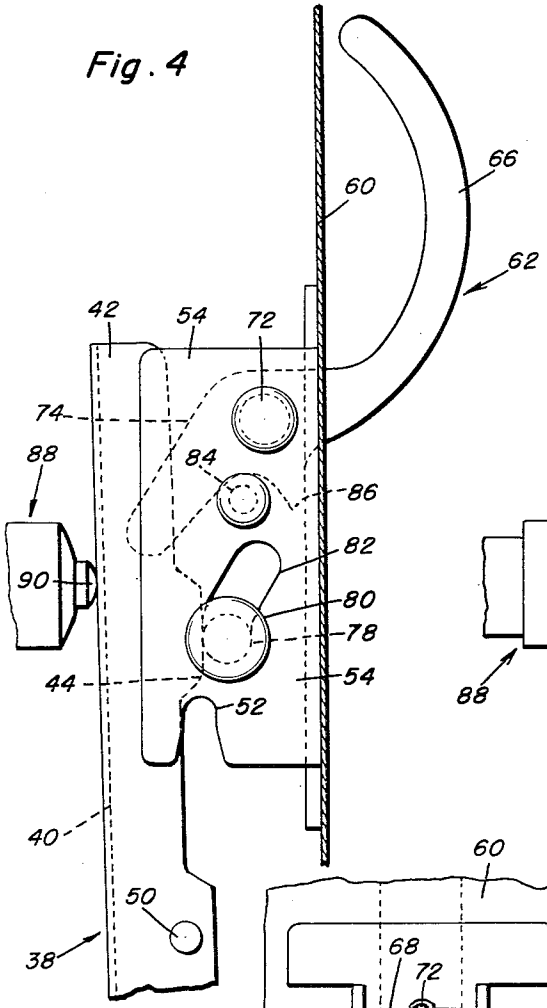
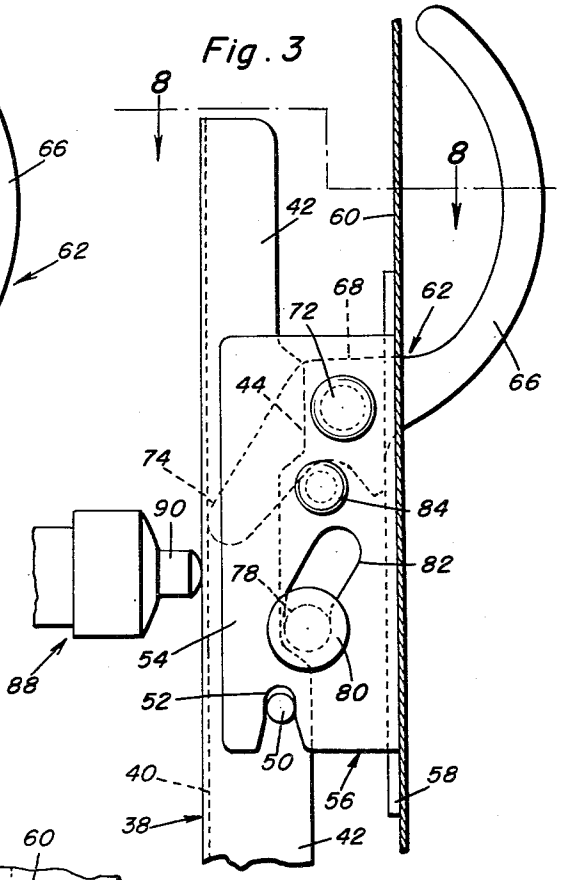


Fig. 3



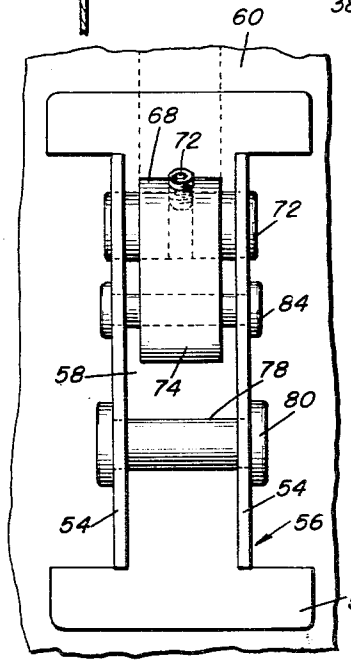


Fig. 7

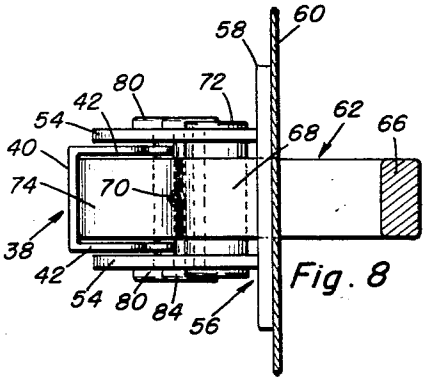


Fig. 8

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FOLDING TOILET WITH FLUSH VALVE AND CONTROLLING LINKAGE THEREFOR

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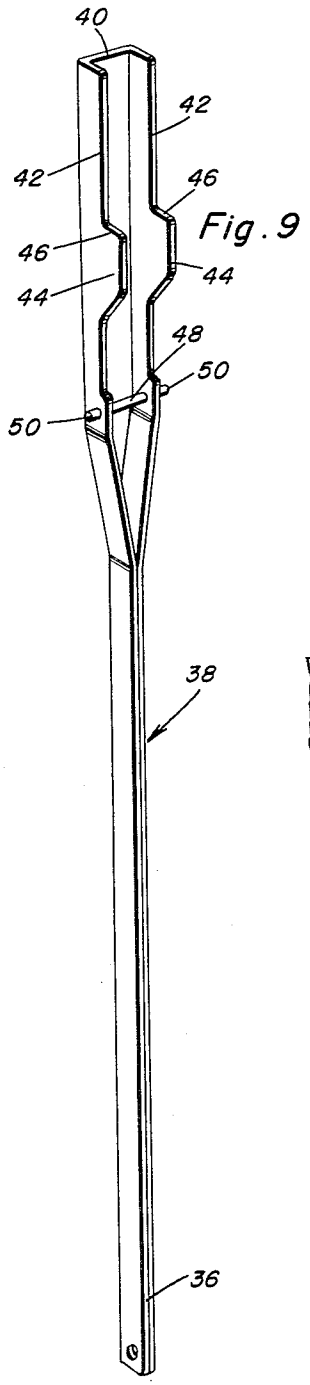


Fig. 9

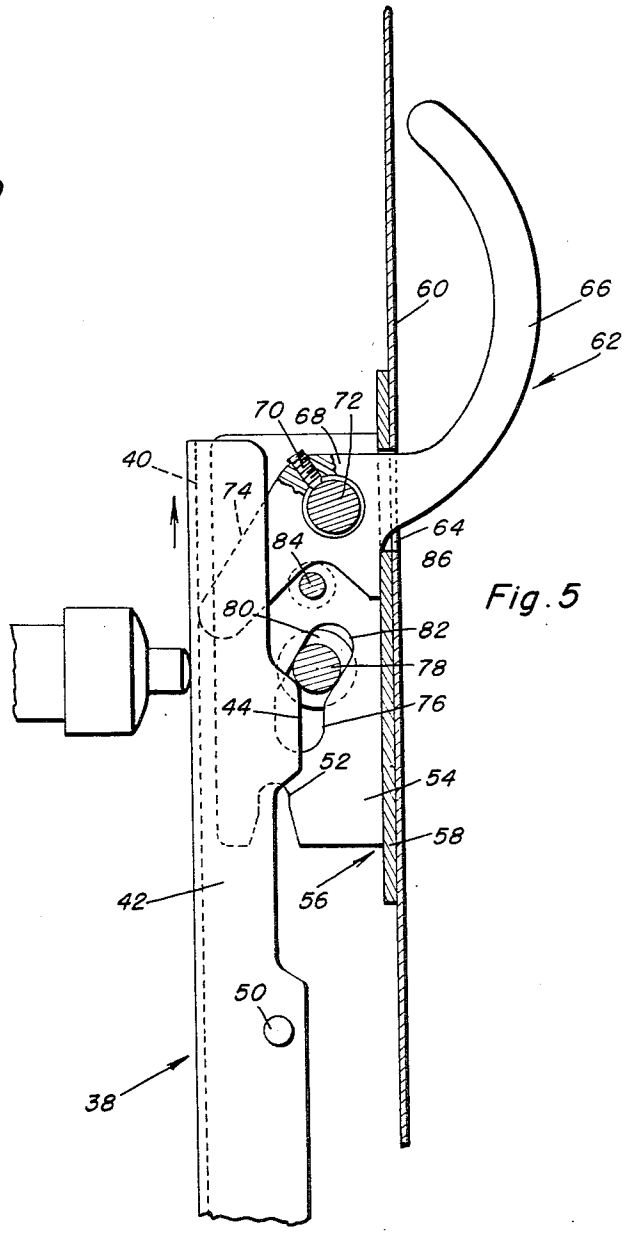


Fig. 5

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United States Patent Office

2,799,864

Patented July 23, 1957

2,799,864

FOLDING TOILET WITH FLUSH VALVE AND CONTROLLING LINKAGE THEREFOR

Angelo Colonna, Philadelphia, Pa.

Application January 19, 1956, Serial No. 560,198

10 Claims. (Cl. 4—10)

The present invention relates to certain new and useful improvements in a fold-away toilet, that is, a construction which is characterized by a toilet bowl which is adapted to assume a horizontal position when in use and which is swung up to a vertical out-of-the-way position into an appropriate compartment in a cabinet when not in use, said bowl having a flush rim with jet distributing orifices communicating with the receptacle portion of the bowl and having a fecal matter emptying or discharge neck, the neck being hingedly mounted for operation in bearing means provided on a fitting, the fitting being communicatively mounted atop a stationary waste disposal trap-equipped conduit. Folding water closets of the above mentioned type are not new. For example reference may be had to Patent No. 2,725,575 covering a folding water closet granted to me on December 6, 1955. There are other structurally similar and functioning adaptations; namely, the built-in fold-away water closet identified as Patent 2,750,599, dated June 19, 1956, and the folding water closet also filed by me on December 10, 1954 and identified as Serial No. 474,370. All of these are characterized, broadly construed, by means functioning in the manner set forth above. It is the consensus of opinion that it is highly unsatisfactory in this category of inventions to use a bowl which is dry. In these circumstances it is therefore conventional to ensure that the receptacle portion of the bowl be wet and this result is attained in a number of different ways as for example in the previously mentioned prior patents and the copending application referred to above. For instance, in Patent 2,750,599 the rear portion of the flush water rim is imperforate and serves to hold a limited amount of flush water when the bowl is up, this in a manner so that when the bowl is again swung down for use to occupy its usuable horizontal position, the water which has been previously trapped is then gravity-spilled from the rim through ports in the rim and is allowed to flow and pool itself in the bottom of the bowl, means being provided for delivering flush water under pressure to the flush water rim, and there being at least one reservoir which is communicatively connected with the flush rim and in which a limited quantity of flush water is temporarily trapped and collected when the bowl is down and flushed and which retains the thus collected water when the bowl is raised to its up position but empties itself in the flush rim when the bowl is next swung down for use. In Serial No. 474,370 a different arrangement is provided and this has to do with a novel reservoir which is directly connected with the flush valve by way of a vacuum breaker and which has the flushing water and reservoir water hose connected therewith by suitable connections. The stated reservoir traps a limited supply and has a valve and a depending plunger bar or rod with special means on its lower end which cooperates with a cam on a hollow hinging shaft for the bowl so that a limited supply of pooling water is trapped in the reservoir at the proper time, that is when the toilet bowl is up and out-of-the-way, and is

readied to be delivered or emptied into the rim and successively the bowl when the latter is swung down and just before it is occupied by the user.

Carrying these ideas further with a view toward manufacturing advantages, ecomonies, efficiency of use and achievements mutually beneficial to the manufacturer, retailer, purchaser and user the water supply and flushing facilities are herein redesigned, so to speak, making it possible to use a self-closing valve to provide a pool of water in the bottom of the toilet bowl when this is lowered for use and using the same valve when flushing of the toilet is required.

Briefly summarized, novelty is therefore predicated on a combination which is characterized by a stationary waste disposal conduit, a fold-away toilet bowl having a complemental flushing rim and fluid and fecal matter funneling and emptying means hingedly and communicatively mounted on said disposal conduit, a manually operable self-closing flush valve, a flush water supply and delivery conduit operatively connecting said valve with said flushing rim, and means whereby a pool of bowl-wetting water is automatically delivered into said bowl directly from said valve and by way of said delivery conduit when said bowl is swung out from a vertical out-of-use position to a down horizontal in-use position, said means being momentarily in action and having mechanical operating connection with the above named bowl.

More specifically, novelty has to do with the construction stated and wherein the means mentioned utilizes an oscillatory crank arm and a complemental liftable and lowerable rigid link or bar which is pivotally connected at its lower end to the crank arm and has its upper end portion cooperable with the plunger or button on the stated valve, said upper end portion having sliding contact with the button and abutment means being mounted for operation adjacent to but spaced from the button, the upper end portion of the bar being reciprocable in the space intervening between the button and the abutment and having at least one cam. This cam has riding contact with the abutment and it is of a length so that its operation is properly timed and so that it will cause said upper end portion to momentarily depress and operate the button allowing a small amount of water to be squirted or delivered from the valve into the hose or other conduit and then conducted into the flush rim of the bowl.

A further improvement pertains to the utilization of a pivotally mounted accessible lever for operating the push button of the stated flush valve. The lever handle accessibly arranged in front of the cabinet is pulled and causes a thrust finger on the pivoted end of the lever to press against the aforementioned bar which, in turn, depresses the self-closing valve plunger, releasing the water necessary to flush the toilet. Then, too, novelty is predicated on the structural means used and wherein when the toilet bowl is lifted and folded away into a storage compartment in the cabinet, a keeper pin on the bar slips into a keeper seat or notch provided therefor in a special bracket and locks the bar against pivotal movement so that the lever is in turn locked and so that the toilet cannot be accidentally flushed when it is in its stored away position.

Features and advantages in addition to those specifically mentioned above will become self-evident from the following detailed description, illustrative drawings, and the subjoined claims.

In the drawings:

Figure 1 is a fragmentary front view with portions broken away and other portions appearing in phantom lines and wherein the folding toilet bowl is in its up and out-of-the-way or stored position;

Figure 2 is a view with parts in section and elevation

taken on the vertical line 2—2 of Figure 1 looking in the direction of the arrows;

Figure 3 is a fragmentary view with parts enlarged and appearing essentially in elevation showing the control lever, push button of the flush valve and intervening parts in what may be said to be their normal positions, that is, when the bowl is up and the handle of the lever is locked against operation;

Figure 4 is a view which may be said to be similar to Figure 3 and which shows the position of the upper portion of the liftable and lowerable bar tilted or swung to the left and momentarily and partially depressing the button of the flush valve for purposes of delivering pooling water into the bowl when the latter is on the way down;

Figure 5 is a view similar to Figure 4 with parts in section and elevation and showing the return stroke of the aforementioned bar and how the cams thereon serve to lift and push the abutment pin up and to what may be called an out-of-the-way position in a manner to be described;

Figure 6 is a view which ties in with Figures 3, 4 and 5 and which shows the position and relationship of the parts with the bowl down (not shown) and with the control lever swung out and down in a manner to operate the flush valve;

Figure 7 is a view which may be said to be observing Figure 8 in a direction from left to right but with the lifting and lowering bar omitted;

Figure 8 is a section on the irregular line 8—8 of Figure 3, looking in the direction of the arrows; and

Figure 9 is a perspective view of the aforementioned liftable and lowerable bar which cooperates with and operates the push button or plunger of the flush valve.

With reference now to the drawings and particularly to Figs. 1 and 2 the numeral 10 designates the aforementioned cabinet and insofar as the instant invention, patentably speaking is concerned, the cabinet may be of any appropriate construction to include a compartment for the vertically swingable hingedly mounted fold-away part 12 which is here referred to, generally speaking, as a fold-away bowl. More specifically, the bowl or pan is denoted in Fig. 2 by the numeral 14 and includes a receptacle portion having a fecal matter disposal neck 16 and a suitably perforated flush ring or rim 18. The seat is denoted by the numeral 20. The details of construction are similar to those seen in copending Serial No. 474,370 and not being patentably important here are not specifically described. The disposal conduit, including an S-strap is denoted at 22 and is of a suitable construction and there is a hollow fitting 24 mounted atop the same and in communication therewith and provided with suitable bearings (not detailed) in which the hinging means (not detailed) of the fold-away toilet bowl is mounted for oscillation permitting the bowl to swing up and down. The hinging means includes a hollow water intake pipe or shaft 26 to which a flexible hose or equivalent conduit 28 is communicably connected at 30 (Fig. 1). On the outer end of this hollow shaft there is a rocker arm or crank arm 32 which obviously swings or moves up and down in unison with the bowl. The rocker arm has its outer end bifurcated and the furcations straddle and are pivotally connected as at 34 with the lower end portion 36 of a liftable and lowerable part here referred to as a bar 38. The bar is preferably fashioned from sheet metal stamped out to the construction shown in Fig. 9 with the upper portion channel-shaped in cross section and including a web 40 and a pair of spaced parallel flanges 42 having projecting portions 44 which function as cams in a manner to be described. The upper ends of these cams are denoted and distinguished by the numerals 46. Below the cams there is a pin or rod member 48 and this spans the space between the flanges and has its projecting end portions constituting keeper pins 50. These keeper pins are adapted to be removably seated in keeper notches or keeper seats 52 formed in the flanges 54 of a bracket 56 having its base portion 58 suitably mounted on the interior of the front wall 60 of the cabinet. As seen in Fig. 8 the flanges 42 slide up and down between the flanges 54 of the bracket 56. At this time attention is directed to the aforementioned valve flushing or control lever and this is denoted by the numeral 62 and has a portion operating through a slot 64 provided therefor and a curvate portion extending to the right and beyond the slot as shown in Fig. 5 which functions as a valve flushing handle 66. The intermediate portions 68 of the lever is secured by a set-screw or the like 70 to a pin 72 journaled for oscillation in bearings provided therefor in the flanges 54. The lower end portion of the lever is fashioned into a rigid thrust finger 74, which cooperates with the web 40 of the liftable and lowerable bar 38.

The same flanges 54 are provided with opposed registering slots the lower portions of which are denoted at 76 in Fig. 5. These serve as seats for an abutment pin 78 sometimes referred to as a roller because of the fact that it has end flanges or heads 80 on the ends thereof and because it also may turn freely as a sort of an anti-friction roller when in the seats 76 as shown, for example, in Figs. 3, 4 and 6. The upper laterally directed portions 82 of the slots are there for the purpose of permitting the pin to be thrust to one side to pave the way for the return movement of the rod 38 as will be hereinafter described. The numeral 84 designates a shoulder forming pin and the numeral 86 a stop lug forming a part of the valve flushing lever 62 and cooperable with said shoulder 84 all as clear from Fig. 5.

With reference now to Fig. 2 the self-closing manually openable flush valve is denoted generally by the numeral 88 and is of any appropriate construction so that it includes a plunger terminating in a push button 90. The valve is communicably connected with a vacuum breaker 92 of a conventional form to which the upper end of the flexible conduit or hose 28 is communicably connected.

It will be clear from the drawings that when the bar 38 is in its fully "up" position as shown in Fig. 3 the keeper pins 50 are then seated in the keeper notches or seats 52 and since this bar is interposed between the push button 90 of the valve and the thrust finger 74 of the control lever 62 the control lever is mechanically locked and consequently the flush valve 88 cannot be opened. This is the position of the parts when the bowl is stored away in its up or out-of-use position, for example, as shown in Fig. 1. Consequently, the bowl cannot be accidentally flushed. Or, to put it otherwise, the bowl has to be in the "down" position shown in Fig. 2 before the valve can be flushed and obviously as the bowl is swung down and assumes its horizontal position the crank or rocker arm 32 takes the position seen in this figure and exerts downward pull on the bar 38 and hence the keeper pins 50 are released from the keeper seats 52 and the handle of the control lever 62 may be grasped and yanked down with the result that the thrust finger 74 will engage the web 40 and push the web over against the valve button and depress the valve button in the manner shown in Figs. 2 and 6 respectively.

Assuming that the handle 66 is locked as shown in Fig. 3 it will be evident that if the user swings the bowl out and down from its cabinet compartment the crank arm 32 will begin to pull down on the bar 38 and will cause the cams 44 to ride down against the seated abutment pin or roller 78 as shown in Fig. 4. This will cause the bar 38 to swing from right to left on its own accord inasmuch as it is being jammed between the pin and the push button and therefore the push button will be shoved in slightly, that is partially, and the valve will be momentarily open. Just enough water will be delivered from the valve into the delivery hose or conduit 28 to feed a limited supply of pooling water into the bowl for wetting the bottom of the bowl in an obvious manner.

Repeating, when the toilet bowl is lowered, the driving

link or crank **32** lowers the bar and cam combination **38** and the cam engages the travelling pin or abutment **78**. This forces the bar and cam combination against the self-closing valve plunger which is then depressed to release a small amount of water in order to provide a water pool in the bottom of the toilet bowl. However, when the cam has fully passed the travelling pin, the bar and cam combination returns to its original position, and the toilet is ready for use as shown in solid outline in Figure 2. At the same time, the abutment pin **78** is carried to one side in the slot-ends **82** leaving the lever handle free to operate.

To flush the toilet, the lever handle is pulled, rotating on the pivot pin **72** causing the finger **74** of the lever handle to press against the bar which in turn depresses the self-closing valve plunger.

When the toilet bowl is raised and folded away in its housing, the driving link or crank **32** drives the bar and cam combination **38** up and the cam means **44** pushes the travelling pin **78** away preventing any pressure against the self-closing valve plunger. The keepers **50** seat in the keeper notches **52** of the support bracket **56** to prevent flushing the toilet while it is in a closed position.

There are three objectives, as before stated. First, when the toilet bowl is lowered, the bar means **38** is activated and this in turn depresses the plunger of the self-closing valve which releases a small amount of water to provide a water pool at the bottom of the toilet bowl.

Second, after the use of the toilet, when flushing is required, the lever handle **66** in front of the cabinet is pulled which causes the thrust finger **74** of the lever handle to press against the bar and cam combination which in turn depresses the self-closing valve plunger, releasing the water necessary to flush the toilet.

Third, when the toilet bowl is lifted and folded away into its cabinet, a pin in the bar and cam combination engages in the lever handle support bracket and thus locks the lever handle to prevent flushing.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A folding toilet comprising, in combination, a stationary waste disposal conduit, a fold-away toilet bowl having a flushing rim and fluid and fecal matter funneling and emptying means hingedly and communicatively mounted on said disposal conduit, a self-closing valve, a water delivery conduit operatively connecting said valve with said flushing rim, and means whereby a limited pool of bowl-wetting water is automatically delivered into said bowl directly from said valve and by way of said delivery conduit during the interval that said bowl is swung from an up vertical out-of-use position to a down horizontal in-use position, said means having mechanical operating connection with the above named bowl and embodying an oscillatory crank arm operated by movement of the bowl and a complemental liftable and lowerable bar pivotally connected at its lower end to said crank arm and having its upper end portion cooperable with said valve, said valve having a push button and said upper end portion having sliding and operating contact with said button just before the bowl reaches its down position and being out of operating relation with said button during the movement of the bowl from its down to its up position.

2. The structure defined in claim 1, and in combination abutment means mounted for operation adjacent to but spaced from the button, said upper end portion of said bar being reciprocable in the space intervening between said button and abutment and having at least one

cam which, when riding downwardly against the abutment causes said upper end portion to move toward and depress and operate said button, whereby said valve is opened to allow a small amount of water to flow therefrom into said conduit.

3. The structure defined in claim 2 and wherein said abutment is journalled for rotation, as well as sliding, in slots, each of said slots having a portion inclined upwardly and away from said button; so that said bar, on its upward return stroke causes said cam to engage, lift and force said abutment out of the path of movement of said bar, whereby the said button is not acted on during this cycle of operation.

4. The structure defined in claim 3, and wherein said upper end portion is provided with locking means including a keeper pin, and a keeper seat separate from said portion in which said keeper pin is seated, that is, during such time that the bowl is in its up folded-away position, a pivotally mounted manually actuable lever having a handle and an operating finger, the latter having cooperating contact with the upper end portion of said bar.

5. A folding toilet comprising, in combination, a stationary waste disposal conduit, a fold-away toilet bowl having a complemental flushing rim and fluid and fecal matter funneling and emptying means hingedly and communicatively mounted on said disposal conduit, a manually openable self-closing normally closed flush valve, a flush water supply and delivery conduit operatively connecting said valve with said flushing rim, said valve having a depressible push button, a valve flushing lever pivotally mounted adjacent to said button and embodying a handle and a rigid presser finger, means embodying a crank arm carried by and operated by movement of the bowl, a liftable and lowerable vertically disposed bar having its lower end pivotally connected to said crank arm and its upper end portion slidably and swingably mounted in an existing space between said push button and the free end of said finger, said upper end portion having a keeper pin, and fixed bracket means having a keeper seat into which said keeper pin is slipped and held to prevent said upper end portion from being operatively pressed by accidental operation of said handle against said button.

6. A folding toilet comprising, in combination, a stationary waste disposal conduit, a fold-away toilet bowl having a complemental flushing rim and fluid and fecal matter funneling and emptying means hingedly and communicatively mounted on said disposal conduit, a manually openable self-closing flush valve, a flush water supply and delivery conduit operatively connecting said valve with said flushing rim, said valve having a push button, a valve flushing lever pivotally mounted adjacent to said button and embodying a handle and a rigid presser finger, means embodying a crank arm operated by movement of the bowl, a liftable and lowerable vertically disposed bar having its lower end pivotally connected to said crank arm and its upper end portion slidably and swingably mounted in an existing space between said push button and the free end of said finger, said upper end portion having a keeper pin, and fixed bracket means having opposed keeper seats into which end portions of said keeper pin are temporarily seated to prevent the upper portion from being pressed forcibly against said button, said bracket having spaced parallel flanges provided with slots, an anti-friction pin having end portions slidable and rotatable in said slots, the upper portion of said bar having outstanding projections constituting cams and said cams being slidably engageable with said pin.

7. A folding toilet comprising, in combination, a stationary waste disposal conduit embodying a trap and an attending and communicating fitting carried by and connected with the upper portion of said trap, said fitting having bearing means, a bowl adapted to assume a horizontal position when in use and which is swung up to a vertical out-of-the-way position when not in use, said

bowl having a flush rim provided with jet distributing openings communicating with the receptacle portion of the bowl and said bowl also having a fecal matter emptying neck, means integral with said neck and hingedly mounted for operation in the bearing means on said fitting and said means including a horizontal hollow shaft which is coaxial with the axis about which the hinge means rotates, the hollow portion of said shaft providing a passage and serving to conduct flushing water to said bowl by way of a suitable connection between the bowl and hollow shaft, said hollow shaft being provided at one end with a crank fixedly connected thereto, a self-closing flush valve including a plunger with a push button, a liftable and lowerable bar pivotally connected at its lower end to said crank and having its upper end in sliding contact with said button, a bracket fixedly mounted and provided with flanges having slots, an abutment pin mounted for operation in said slots, the upper portion of said bar being between said button and said pin and having cams and said cams having operating contact with said abutment pin.

8. The structure defined in claim 7 and wherein said flanges on said bracket have keeper notches therein, the upper portion of said bar having keeper pins releasably engageable in said keeper notches, a pivotally mounted control lever having a handle and a thrust finger, said thrust finger being engageable with the upper portion of said bar to depress said button.

9. A folding toilet comprising, in combination, a stationary waste disposal conduit embodying a trap and an attending and communicating fitting carried by and connected with the upper portion of said trap, said fitting having bearing means, a bowl adapted to assume a horizontal position when in use and which is swung up to a vertical out-of-the-way position when not in use, said bowl having a flush rim provided with jet distributing openings communicating with the receptacle portion of the bowl and said bowl also having a fecal matter emptying neck, means integral with said neck and hingedly mounted for operation in the bearing means on said fitting and said means including a horizontal hollow shaft

which is coaxial with the axis about which the hinge rotates, the hollow portion of said shaft providing a passage and serving to conduct flushing water to said bowl by way of a suitable connection between the bowl and hollow shaft, said hollow shaft being provided at one end with a crank fixedly connected thereto, a self-closing flush valve including a plunger with a push button, a bracket fixedly mounted in a position in general alignment with but spaced from the operating tip of said button, said bracket having spaced flanges and the lower end portions of the flanges being provided with opposed keeper seats, a lever pivotally mounted between its ends and situated between the flanges and above said keeper seats, one portion of the lever constituting a handle and the other portion thereof being provided with a presser finger, a vertically liftable and lowerable bar pivotally and operatively connected at its lower end to said crank and having its upper end portion channel-shaped and operating slidingly between the flanges of the bracket and having a web portion in cooperating contact with said button, said finger being operatively cooperable with said web, and keeper pins fixedly mounted on said upper portion of the bar and aligned with and movable into said keeper seats when the bar is locked in a manner to prevent said handle from being accidentally operated.

10. The structure defined in claim 9 and wherein the flanges of said bracket are provided with oppositely disposed elongated slots situated above the keeper seats and below the pivot point of said lever, the upper end portions of each of said slots sliding in a direction away from said button, an abutment pin mounted for free rotation and sliding in said slots, that portion of the bar which is operatively movable between the button and abutment pin having cams of limited length operatively cooperating with said abutment pin.

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