

[54] WATER CLOSET

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[57] **ABSTRACT**

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A water closet assembly adapted to be mounted on any one of a variety of bases for discharge of waste material into a drainage system, a holding tank, or the like, and which includes features for making optimum use of the flush water. The assembly includes a bowl and a pivotally mounted pan for closing the discharge outlet of the bowl and shaped so that it can provide a water seal when the pan is in its closed position. The pan can be tilted to an open position to discharge the contents of the bowl, and the actuator mechanism for tilting the bowl is operable to open a valve so that flush water will flow into the bowl in timed relation to movement of the pan. The actuator mechanism is also operable to be moved in another direction so that water can be introduced into the bowl to a desired depth in the pan while the pan is in its closed position.

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[51] Int. Cl..... **E03d 11/10; E03d 1/34**

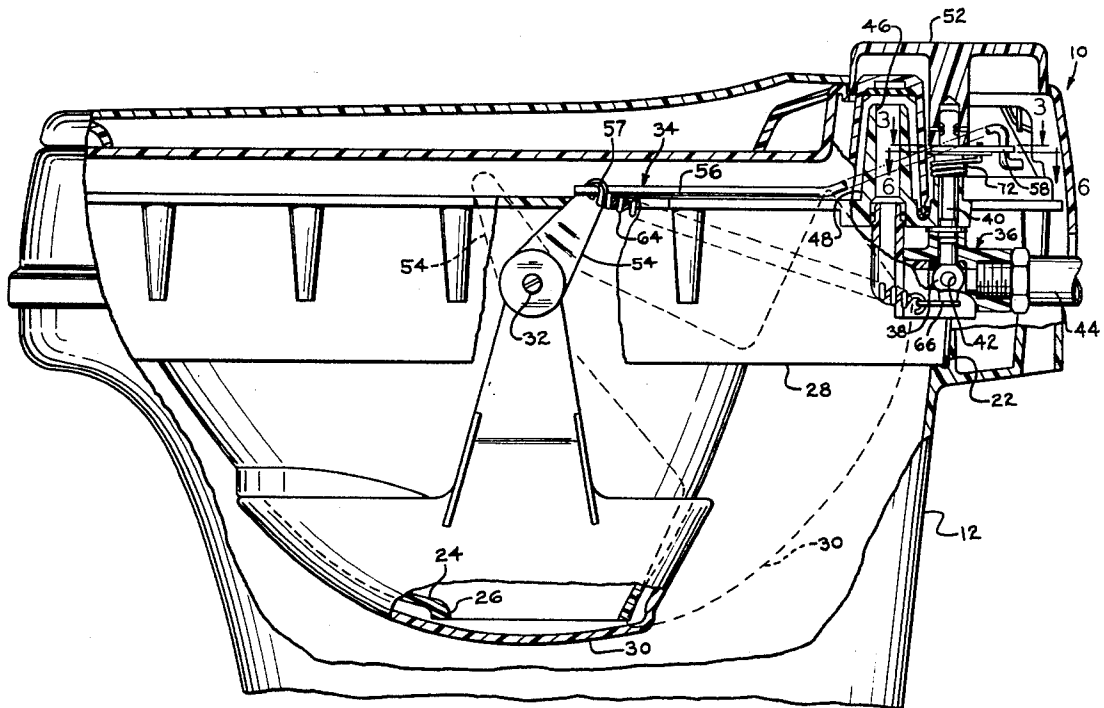
[58] Field of Search ..... **4/10, 85, 93, 84**

[56] **References Cited**

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**4 Claims, 8 Drawing Figures**



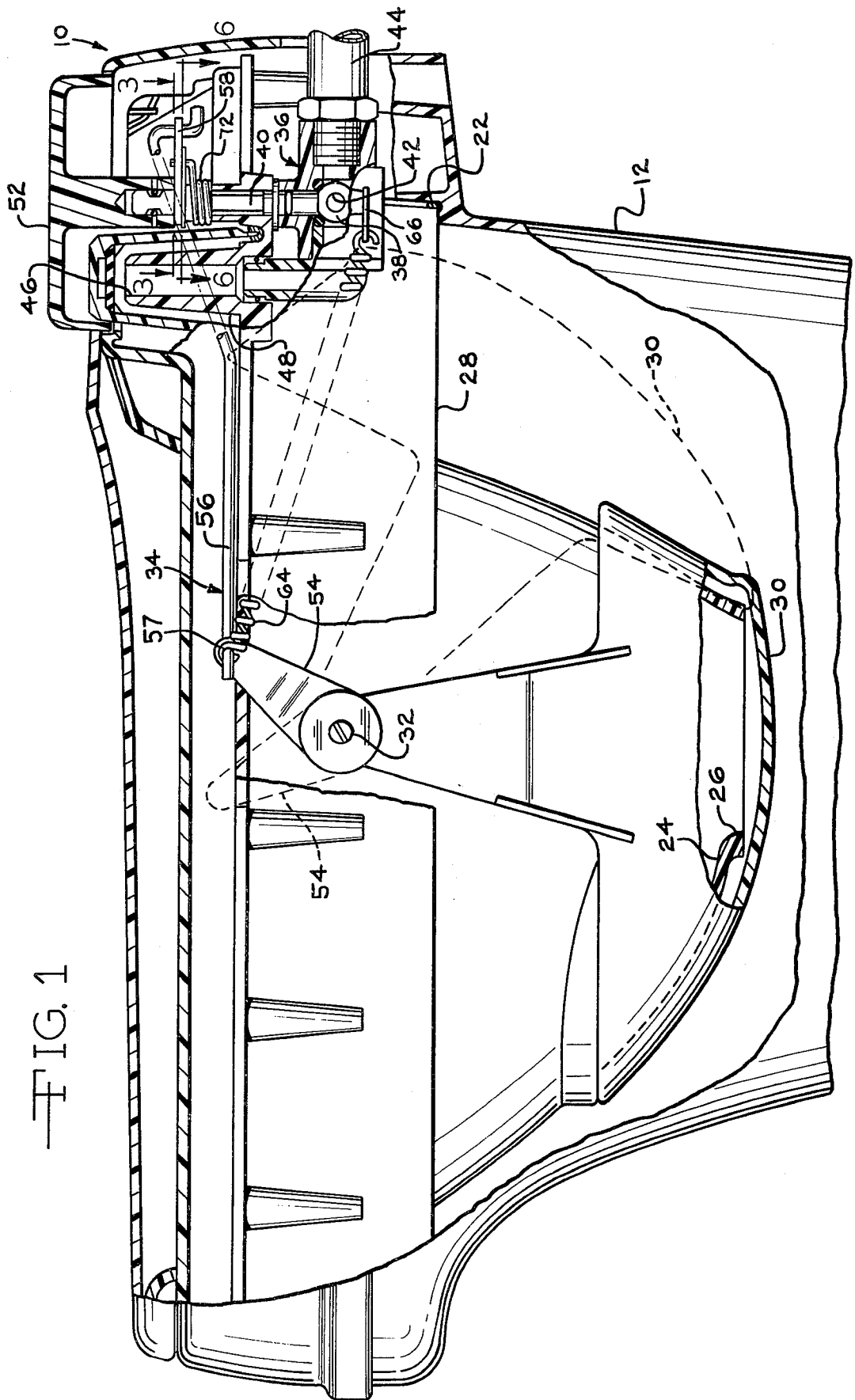
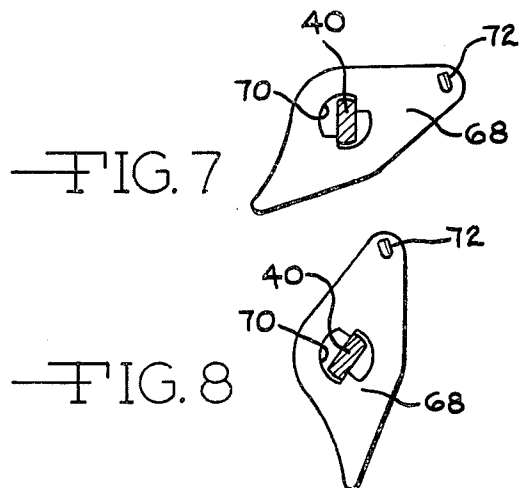
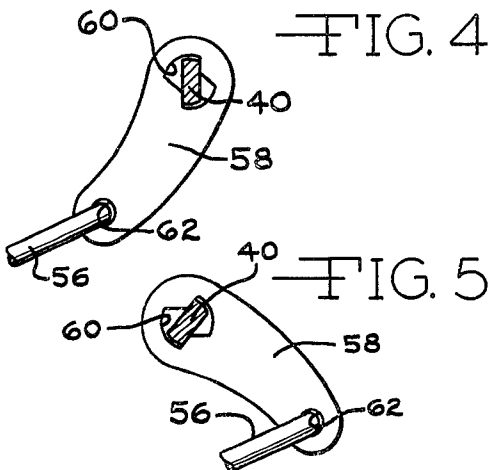
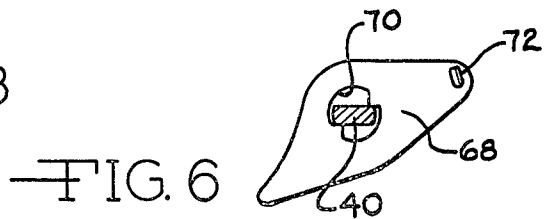
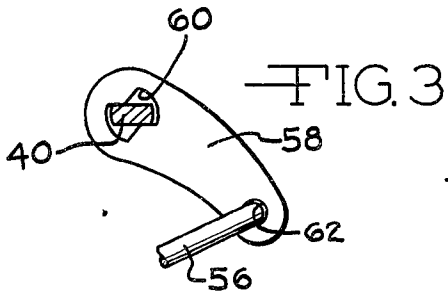
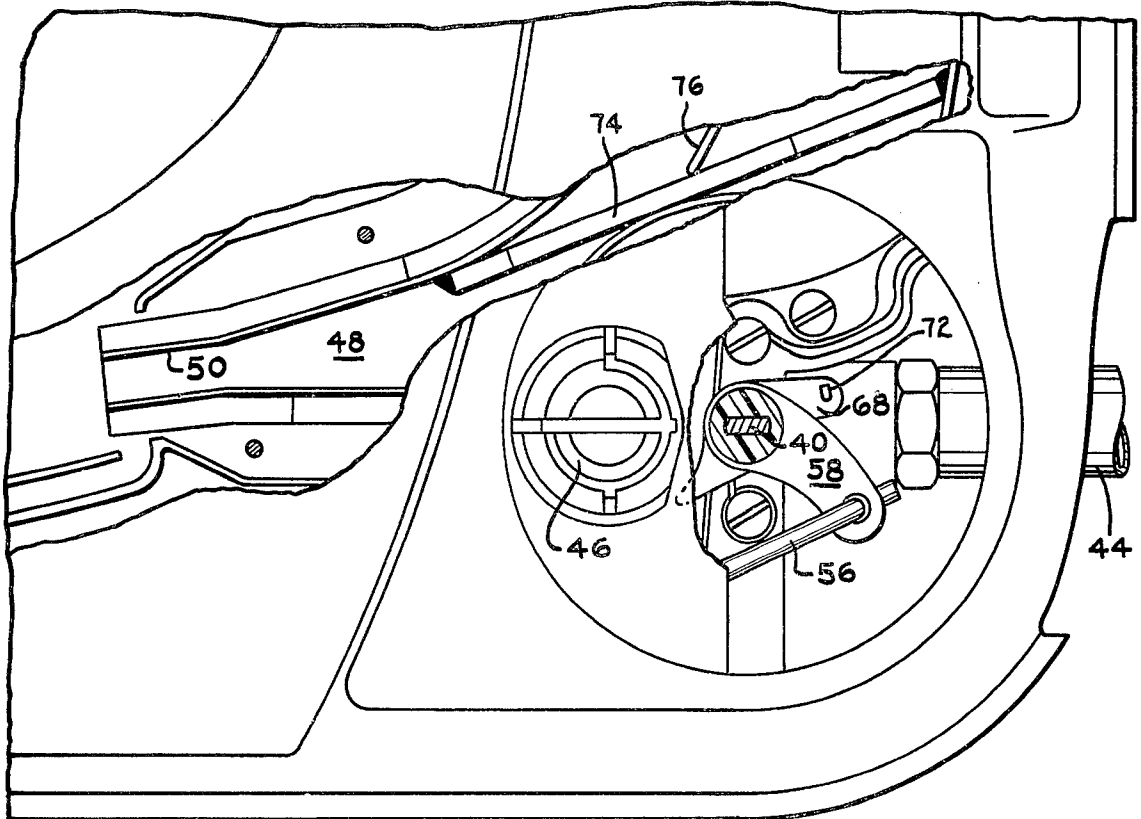


FIG. 1

FIG. 2



## WATER CLOSET

## REFERENCE TO RELATED APPLICATION.

Reference is made to copending application, Ser. No. 427,338, filed Dec. 21, 1973, in the name of Marshall W. Miller et al.

## BACKGROUND OF THE INVENTION.

This invention relates to improvements in water closets for conserving water and space, and which can be economically manufactured and sold while meeting these and other requirements.

Water conservation is progressively becoming a greater problem in our society, and one of the areas where waste of water resources occurs is in sanitation apparatus such as water closets and the like. The conventional water closets use substantial volumes of water for flushing purposes and for providing sanitary water seals or traps, and such volumes of water are excessive of that which is necessary merely for use as a vehicle to dispose of the waste and to provide a sanitary seal when the water closet is not in use. Some efforts have been made in the past to provide flushing apparatus different from that which is found in the conventional water closets in use today. Examples of the other efforts can be seen in U.S. Pat. No. 5,066, reissued Sept. 24, 1892 to H. H. Craigie and in U.S. Pat. No. 3,251,068, issued May 17, 1966 to Kenneth A. Millette. These citations disclose the use of pivotal pans for holding flush water in the bowl, and for discharging waste materials from the bowl by tilting the pan so that some degree of water conservation occurs. However, these prior art efforts have failed to meet fully the needs for water closets which make the most effective use of the flush water and which are constructed and arranged to provide optimum space utilization and efficient movement of parts. Further, needs exist in the prior art for improved water closets that have actuating mechanisms for flushing purposes which are shielded or protected from damage from external sources or from corrosive or other harmful conditions that may exist within the water closet. Needs also exist for actuating mechanisms which have components constructed and arranged to provide ease of movement at all phases of the flushing operation to assure substantially effortless operation and long, trouble-free life of the flush actuating mechanisms. Improvements of this character are disclosed in the aforesaid copending application, Ser. No. 427,338 assigned to the assignee of the present application.

In some instances, it is also desired for the conservation of water that the extent of recharging water into the pan after the flush operation be manually controlled so that a minimal amount of water, if any at all, can be fed into the pan for rinsing purposes or for providing a wet spot. Again, the prior art have not fully met the demands of users in this respect.

## SUMMARY OF THE INVENTION

The present invention has overcome the inadequacies of the prior art, and provides a water closet that meets the needs of today and which can be produced in an economical manner and which has application in a variety of forms of water closet installations.

According to one form of the present invention, a water closet is provided having a bowl with an open lower end, a concave pan beneath the bowl supported

thereon adjacent to the upper end for pivotal movement about a horizontal axis between a first position in which the pan encloses the open lower end of the bowl and a second position in which the pan is tilted in an elevated position at one side of the bowl. The pan has a depth so that when in its first position its peripheral lip is at a higher elevation than the open lower end of the bowl so that a water seal can be provided. Water flushing means are provided which are actuatable for discharging flush water to the interior of the bowl. An actuator mechanism is connected to the pan and to the water flushing means either (1) for moving the pan to its second position and for simultaneously actuating the water flushing means to deliver flush water to the bowl while the pan is tilted and for returning the pan to its first position and for rendering the flushing means inactive, or (2) for actuating only the flush means while the pan remains in its first position so that a desired quantity of water can be introduced into the bowl and pan. The actuator mechanism includes a rotary control means, and the water flush means includes a rotary ball valve connected to the control means for controlling the flow of water. The control means is rotatable and is connected to the ball valve for rotating the latter in either direction of turning between its open and closed positions. The rotary control means preferably is a knob mounted on the shaft of the ball valve and having finger grip portions for turning the knob in either direction to the open position of the ball valve. The rotary control means is connected through the actuator mechanism to the pan for pivoting the latter only when the knob is turned in one direction. Thus, the knob can be turned in one direction to provide simultaneously pivoting of the pan and flow of flush water or it can be turned in the other direction to provide only flow of water to the bowl and pan.

Thus, it is an object of the present invention to provide an improved water closet that will assure minimal water requirements for cleaning and flushing purposes.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

## BRIEF DESCRIPTION OF THE DRAWINGS.

FIG. 1 is a side elevation, partly in section, of a water closet embodying the present invention;

FIG. 2 is a fragmentary top plan view with portions broken away to show details of the actuator mechanism for selectively actuating the pan and flush valve together, or the flush valve alone;

FIG. 3 is a section taken on the lines 3—3 of FIG. 1, showing a crank and linkage of the actuator mechanism when the pan and flush valve are in closed positions;

FIG. 4 is a section similar to FIG. 3, showing the crank and linkage when the pan and flush valve are in open positions;

FIG. 5 is a section similar to FIG. 3, showing the crank and linkage when the rotary control means has been turned in the opposite direction to open only the ball valve;

FIG. 6 is a section taken on the lines 6—6 of FIG. 1, showing a second crank of the actuator mechanism in a position when the pan and flush valve are in closed positions;

FIG. 7 is a section similar to FIG. 6, showing the position the second crank assumes when the first crank assumes the position shown in FIG. 4; and

FIG. 8 is a section similar to FIG. 6, showing the position of the second crank when the rotary valve is in an open position corresponding to the setting of the rotary control means shown in FIG. 5.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

The present invention is a modified form of the water closet shown and described in copending U.S. Application Ser. No. 427,338, filed Dec. 21, 1973, in the names of Marshall W. Miller et al., and reference is made to the copending application for a more detailed description of the water closet, details of which had been omitted from the present application.

Referring now to the drawings, the invention will be described in greater detail. The water closet 10 includes a base 12 which in the illustrated embodiment is molded from a suitable organic plastic material and has an outlet at its lower end for discharge into a conventional outlet drain.

The base 12 has a hollow interior and an upper annular portion 22 which serves as a mounting place for the bowl 24. The latter has an open lower end 26 and an open upper end with a downturned flange 28 which is seated in the annular portion 22.

A closure member or concave pan 30 is positioned beneath the bowl 24, and is supported on the downturned flange 28 for pivotal movement between a first position shown in solid lines in FIG. 1 in which the pan 30 encloses the open lower end 26 of the bowl 24 and a second position shown in broken lines in FIG. 1 in which the pan 30 is tilted at an elevated position at one side of the bowl 24. The pan 30 is in close spaced relationship to the bowl 24 so that when water in the pan 30 provides a water seal in the opening 26, a minimal amount of water will be required for this purpose. Thus, a minimal amount of water is required to serve as a seal and also to provide a desired wet spot in the bowl 24.

The pan 30 is supported for pivotal movement on the downturned flange 28 of the bowl 24. For this purpose, the downturned flange 28 has aligned holes (not shown) on the axis of pivotal movement of the pan 30, and the pan 30 has hubs (also not shown) extending outwardly through these holes for supporting the pan. The hubs are secured in place by suitable fastening means 32. An actuator mechanism 34 is connected to one of the hubs (not shown) for pivoting the pan 24 between its first and second positions.

Associated with the actuator mechanism 34 is the water flush means 36 which includes the rotary ball valve 38 and valve stem 40 which can be rotated about its axis for turning the ball valve 38 between open and closed positions. When the ball 38 is rotated 90° by turning of the stem 40, the valve will be open and when

returned to the position shown in FIG. 1, the hole 42 therein will be aligned perpendicular to the passageway through the valve 38. When the valve is open, water can flow from the inlet conduit 44 through the ball 38 and outward through the riser 46 for flow into the compartment 48, and from there out the discharge outlet 50 to the interior of the bowl 24 where the flow will be in a tangential direction.

The actuator mechanism 34 is operatively connected to the pan actuating and to the water flushing means 36 for moving the pan 30 to its second position and for simultaneously actuating the flushing means 36 to deliver flush water to the bowl 30 while the pan is tilted and for returning the pan to its first position and for rendering the flushing means inactive by closing the ball valve 38. The actuator mechanism 34 includes the control member of knob 52 and the crank 54 which is connected at one end to the hub of the pan 30 for causing pivotal movement around the axis of the pan. A link 56 is connected to the outer end of the crank 54 by means of the hole 57 therein, and longitudinal movement of the link 56 will serve to move the crank and thereby the pan 30 between the solid and broken line positions shown in FIG. 1.

The actuator mechanism 34 also includes the crank 58 which has an aperture 60 which is fitted over the upper end of the ball valve stem 40 for rotation therewith in one direction of turning, as can be seen in FIGS. 3, 4, and 5. The crank 58 also has an aperture 62 therein for receiving the end of the link 56. When the ball valve stem 40 is rotated in a clockwise direction from the closed position shown in FIG. 3, the crank 58 will be turned in a clockwise direction to the position shown in FIG. 4, thereby moving the link 56 longitudinally so that it can move the crank 54 associated with the hub of the pan 30 to the broken line position shown in FIG. 1. Thus, turning the knob 52 in one direction will have the effect of opening the valve 38 and also of pivoting the pan 30 to the broken line position shown in FIG. 1, and when the knob 52 is released, the pan 30 will return to the solid line position shown in FIG. 1. To aid in returning the pan 30 and the ball valve 30 to their proper closed positions, a coil spring 64 is connected at one end to the crank 54 and at the other end to the stationary bracket 66 to urge the pan 30 and valve 38 to the solid line positions of FIG. 1.

As previously indicated, the present invention also permits the operator to selectively introduce water into the bowl 24 and pan 30 while the pan 30 is in the solid line position shown in FIG. 1. This is accomplished by turning the knob 52 in the other direction of rotation or in a counterclockwise direction. Referring to FIGS. 3, 4, and 5, it will be apparent that when the valve stem 40 is turned in a counterclockwise direction from the position shown in FIG. 3, no movement of the crank 58 will occur because the valve stem 40 can then rotate to the position shown in FIG. 5 without engaging the abutment surface within the aperture 60. Also fitted on the valve stem 40 is the crank 68 which also has an aperture 70 therein fitted over the valve stem 40. As can be seen in FIGS. 6, 7, and 8, if the valve stem 40 is turned in a clockwise direction from the position shown in FIG. 3 or FIG. 6, it will have no effect upon the position of the crank 68 which will then remain in the position as shown in FIG. 7. However, if the valve stem 40 is turned in a counterclockwise direction from the position shown in FIG. 6, it will cause the crank 68 to turn

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to the position shown in FIG. 8, and it will be recognized that this will have the effect of at least partially opening the ball valve 38 so that water can flow from the inlet water conduit to the bowl 24 and pan 30. A coil spring 72 is mounted on the valve stem 40 and is fixed at its lower end against movement and has its upper end connected to the outer end of the crank 68 for returning the latter to the position of FIG. 6 when the knob 52 is released. Thus, it can be seen that if it is desired to introduce only a very limited quantity of water into the bowl 24, this can readily be accomplished merely by rotating the knob 52 in a counterclockwise direction. This feature of the present invention is a departure from the invention disclosed in the aforesaid copending application Ser. No. 427,338, in that it has eliminated the use of a separate accumulation chamber 76 into which a measured quantity of water can flow before being discharged into the bowl 24. In the present invention a baffle plate 74 has been inserted to eliminate the use of the accumulation chamber 76 which will be isolated from the water flow passage by the baffle 74. Thus, when the flush cycle is completed after turning the knob 52 in a clockwise direction, the pan 30 will move to its closed position and water will immediately be interrupted in its flow to the pan 30 and bowl 24 so that very little water will be in the bowl 24 to provide a wet spot or seal. The operator at that time or if desired at some later time can turn the knob 52 in a counterclockwise direction to measure the desired quantity of water that is to be introduced into the pan 30 and bowl 24.

It is claimed:

1. A water closet comprising a bowl having an open lower end, a concave pan beneath said bowl and supported thereon adjacent to the upper end thereof for pivotal movement about a horizontal axis between a first position in which said pan encloses said open lower end and a second position in which said pan is tilted in an elevated position at one side of said bowl, said pan having a depth so that when in its first position its peripheral lip is at a higher elevation than the open lower end of said bowl, water flushing means actuable for discharging flush water to the interior of said bowl, and an actuator mechanism connected to said pan and to said water flushing means and selectively operable either

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(1) for moving said pan to its second position and simultaneously actuating said flushing means to deliver flush water to the bowl while the pan is tilted and for returning the pan to its first position and rendering said flushing means inactive, or (2) for actuating only said flush means to deliver a desired quantity of water to said bowl while said pan is maintained in its first position.

2. The water closet that is defined in claim 1, wherein said water flush means includes a rotary ball valve for controlling flow of the flush water, and said actuating mechanism includes a rotary control means that is rotatable and is connected to said ball valve for rotating the latter in either direction of rotation between open and closed positions, said concave pan being operably connected to said rotary control means for pivoting from its first to its second position only in response to rotary movement of said control means in one direction.

3. A water closet comprising a bowl having an open lower end, a closure member mounted for movement between a first position in which it closes said open lower end and a second position in which it is at one side of the lower end of said bowl, water flushing means actuable for discharging flush water to the interior of said bowl, and an actuator mechanism connected to said closure member and to said water flushing means and selectively operable either (1) for moving said closure member to its second position and for simultaneously actuating said flushing means to deliver flush water to the bowl while the closure member is out of said first position and for returning the closure member to its first position and for rendering said flushing means inactive or (2) for actuating said flush means independently of said closure member, said actuator mechanism including a rotary control knob mounted for hand actuation in either direction of turning for selectively operating said actuator mechanism.

4. The water closet that is defined in claim 3, wherein said water flush means includes a rotary ball valve for controlling flow of the flush water, said rotary control knob being operably connected to the stem of the ball valve for turning said ball valve in either direction of rotation.

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