

May 2, 1967

K. NEWKIRK

3,316,561

ACTUATING MEANS FOR TOILET SEATS AND LIDS

Filed Feb. 10, 1964

4 Sheets-Sheet 1

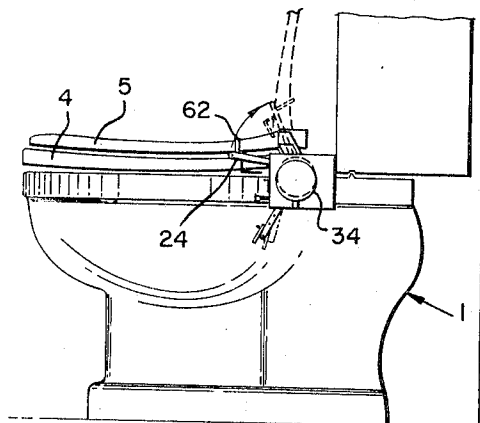


FIG. 1

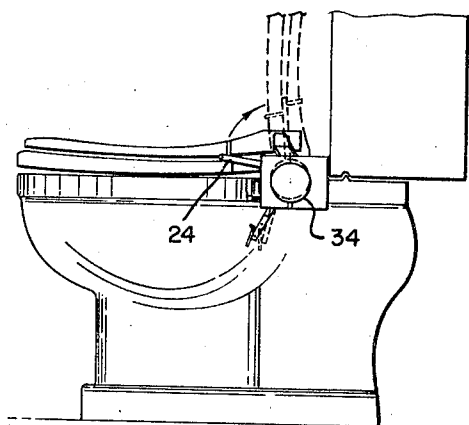


FIG. 2

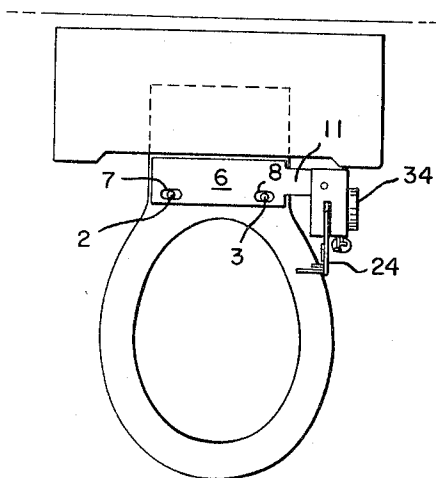


FIG. 3

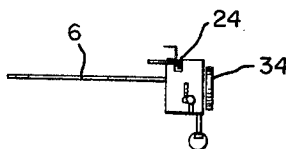


FIG. 4

INVENTOR.
KENNETH NEWKIRK

BY

Gordon Wood

ATTORNEY

May 2, 1967

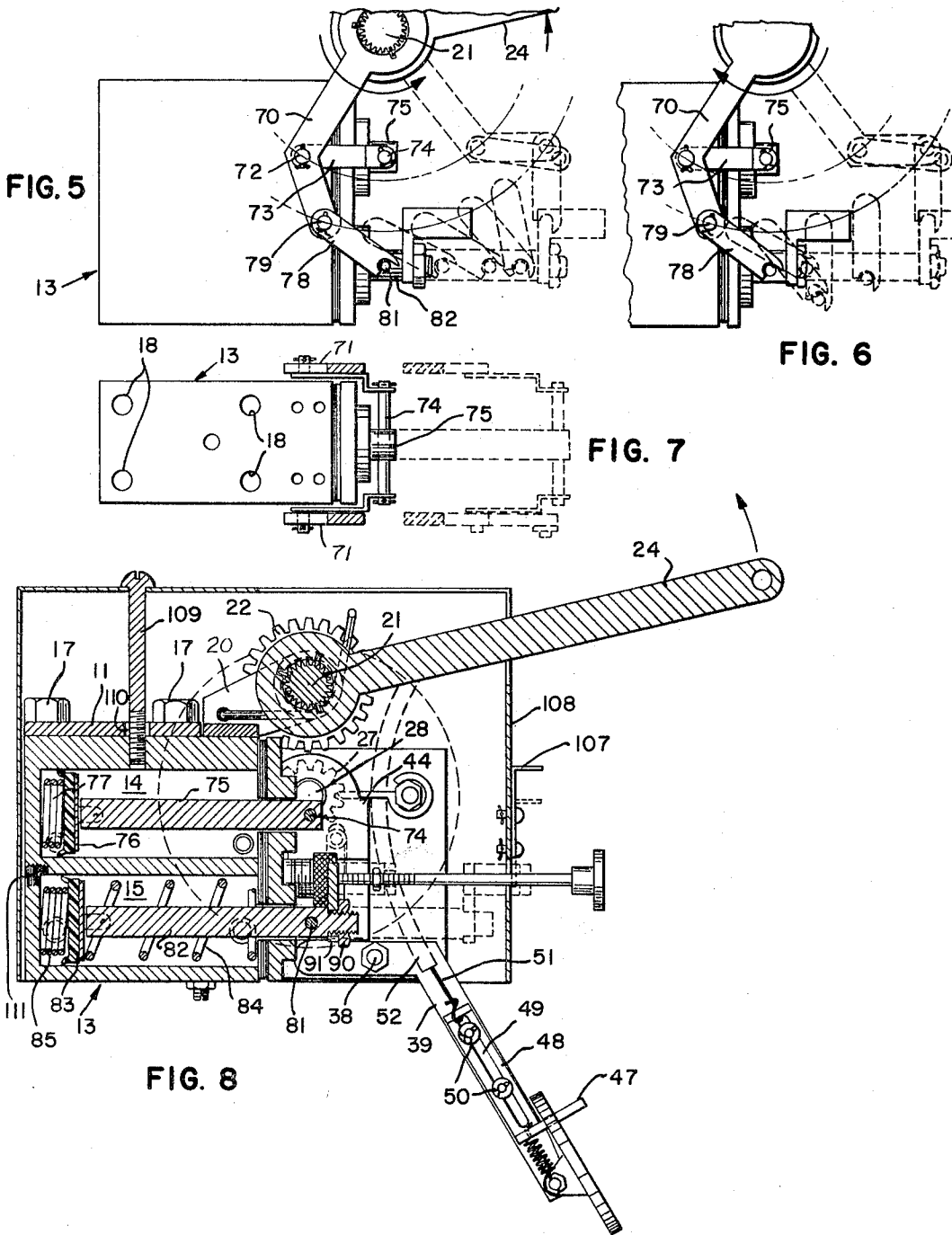
K. NEWKIRK

3,316,561

ACTUATING MEANS FOR TOILET SEATS AND LIDS

Filed Feb. 10, 1964

4 Sheets-Sheet 2



INVENTOR.
KENNETH NEWKIRK
 BY
Gordon Wood
 ATTORNEY

May 2, 1967

K. NEWKIRK

3,316,561

ACTUATING MEANS FOR TOILET SEATS AND LIDS

Filed Feb. 10, 1964

4 Sheets-Sheet 3

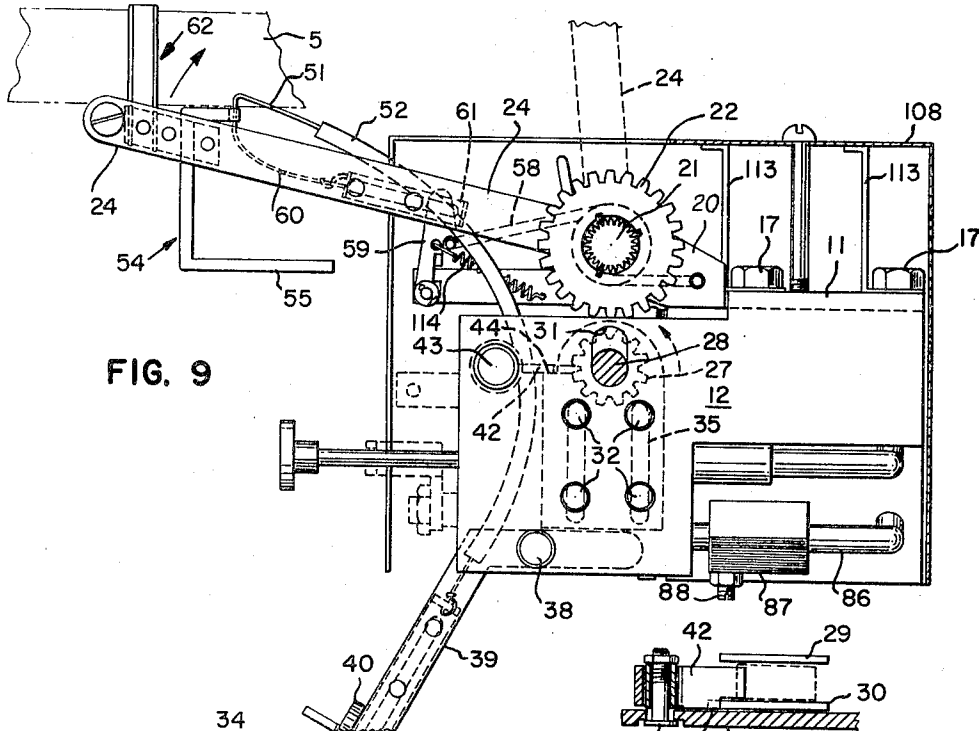


FIG. 9

FIG. 12

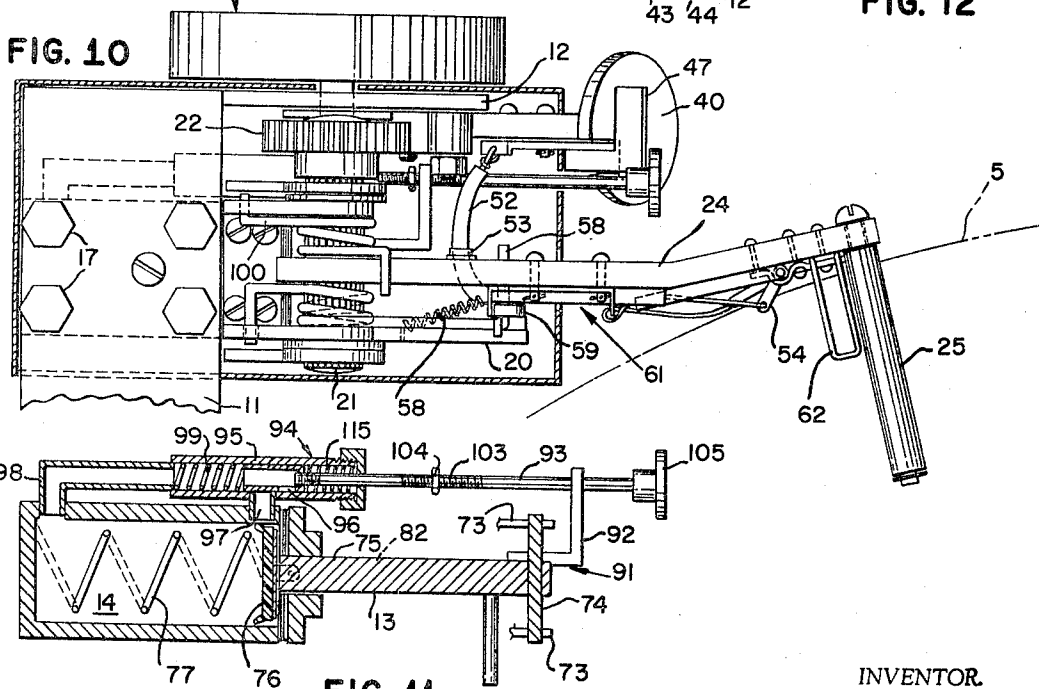


FIG. 10

FIG. 11

INVENTOR
KENNETH NEWKIRK
BY
Gordon Wood
ATTORNEY

May 2, 1967

K. NEWKIRK

3,316,561

ACTUATING MEANS FOR TOILET SEATS AND LIDS

Filed Feb. 10, 1964

4 Sheets-Sheet 4

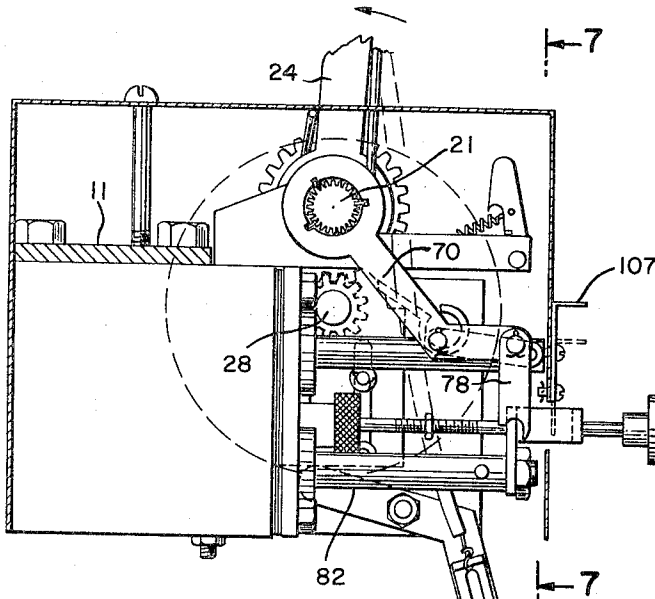


FIG. 13

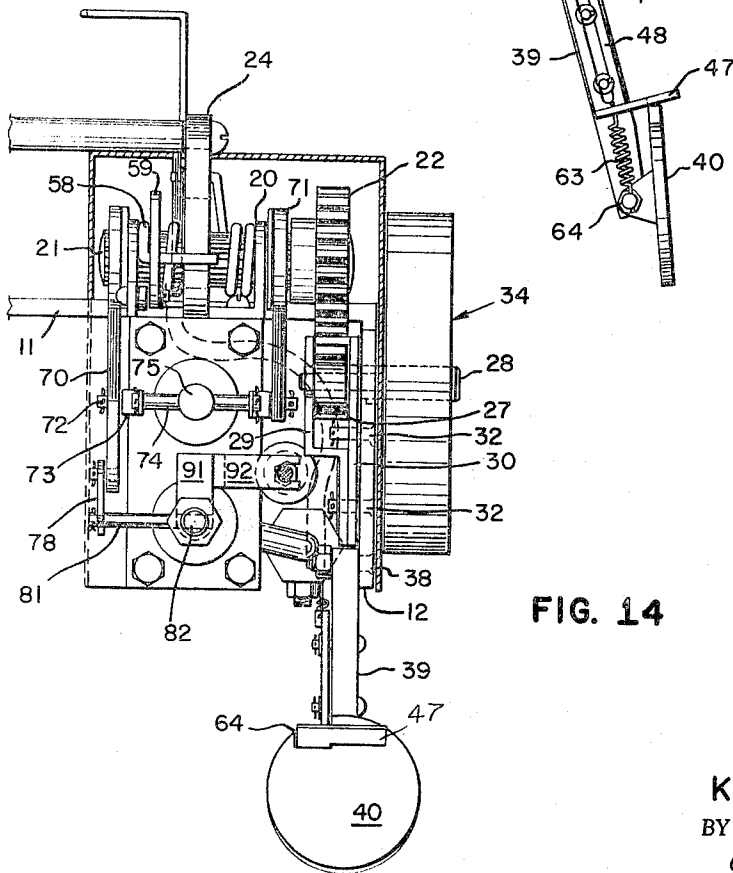


FIG. 14

INVENTOR.
KENNETH NEWKIRK
BY
Gordon Wood
ATTORNEY

3,316,561
**ACTUATING MEANS FOR TOILET SEATS
 AND LIDS**

Kenneth Newkirk, 866 Green St.,
 San Francisco, Calif. 94133
 Filed Feb. 10, 1964, Ser. No. 343,659
 4 Claims. (Cl. 4-251)

This invention relates to toilet seats and toilet lids and more particularly to a mechanism for opening and closing said seats and lids.

The main object of the present invention is the provision of means for automatically closing the toilet seat so that the latter is normally in a down position.

Another object of the invention is the provision of means for actuating both the toilet seat and the toilet seat lid so that the assembly always has a neat appearance at all times.

Another object of the invention is the provision of means for raising the toilet seat or lid, or both, and providing for the automatic closure of seat and lid after a predetermined length of time so that the assembly is always in a neat condition with both the seat and the lid down.

Other objects and advantages of the invention will be apparent from the following specification and drawings in which:

FIG. 1 is a side elevation of the left hand side of a toilet showing the invention attached thereto with the seat and lid in closed position, and with the lid shown in dotted lines in raised position.

FIG. 2 is a side elevation similar to FIG. 1 but with the seat and lid both indicated in dotted lines in raised position.

FIG. 3 is a top plan view of the assembly of FIG. 1 with the seat and lid removed for clarity.

FIG. 4 is a front elevation of the invention only.

FIG. 5 is a fragmentary side elevation of the operating unit taken from the right hand side of the same and showing schematically the manner in which the seat is raised to the open position.

FIG. 6 is a view similar to FIG. 5 showing schematically the closing movement of the linkage.

FIG. 7 is a top plan view of the unit of FIG. 5.

FIG. 8 is a vertical cross section through the entire device.

FIG. 9 is a side elevation of the device taken from the left hand side with the cover plate and spring motor removed.

FIG. 10 is a top plan view of the invention with the top cover plate removed.

FIG. 11 is a horizontal section through the upper or holding cylinder.

FIG. 12 is a fragmentary horizontal section through the housing of the unit showing the pinion gear detent.

FIG. 13 is a side elevation of the invention with the side of the cover removed and showing the actuating pedal in depressed position and with the selection lever in the lid raising position.

FIG. 14 is a front elevation of the invention with the front portion of the cover removed.

Referring first to FIG. 1, a conventional toilet is indicated generally at 1, the same being provided with a pair of vertically extended threaded bolts 2, 3 (FIG. 3) which extend vertically through corresponding holes formed in the toilet bowl and which serve to mount the bearings (not shown) on which the seat 4 and lid 5 are swingably connected. The invention is adapted to be secured to the toilet by means of a base plate 6 (FIG. 3) provided with holes 7, 8 for receiving the bolts 2, 3 therethrough. It will be noted that the plate 6 may be interposed between the toilet and the existing bearing supports for the seat and lid without modification of the existing structure.

The plate 6 is formed to provide an extension extending to one side of the toilet (preferably the left side) so that the mechanism of the invention to be described may be fixedly secured to said extension of plate 6. The extension of base plate 6 is indicated at 11 in FIGS. 3, 8, 9, 10, 13 and 14 and, as best seen in FIGS. 9 and 14, said extension includes a downwardly turned portion 12 which acts as a sidewall for the mechanism to be described.

Fixedly secured to the underside of the horizontally extending portion of extension 11 is a housing generally designated 13 which houses a unit comprising upper and lower hydraulic cylinders 14, 15, respectively (FIG. 8). The securing of said housing 13 to extension 11 may be effected by means of cap screws 17 received in holes 18 in the upper side of housing 13 (see FIG. 7).

Secured to the upper side of housing 13 is a bearing bracket 20 which serves to rotatably support a horizontally extending shaft 21 to which is secured a spur gear 22. Also fixed to shaft 21 is an elongated arm 24 to the outer end of which is rotatably supported a horizontally extending roller 25 which is adapted to be received within the space between the toilet seat 4 and the toilet seat lid 5 (see FIGS. 1 and 10). As best seen in FIG. 10 the arm 24 may be bent so that the above described mechanism may be placed as closely as possible to the toilet. Naturally the exact position of the roller 25 will depend on the particular installation.

The spur gear 22 is adapted to be engaged by a pinion gear 27 secured to a shaft 28 extending between and rotatably supported on a pair of opposed plates 29, 30 which in turn are secured to the vertically extending portion 12 of extension 11. Plates 29, 30 are connected by screws 32 to sidewall 12, and plates 29, 30 are provided with vertically extending slots 35 to permit vertical reciprocation of plates 29, 30 together with pinion 27, shaft 28, and a spring motor 34 adapted to drive shaft 28.

Pivotally supported on a pivot 38 adjacent the lower edge of side plate 12 is a generally downwardly extending pedal lever 39 at the lower end of which is provided a pedal 40 (FIGS. 13, 14). From FIG. 9 it will be apparent that upon counterclockwise movement of pedal lever 39 the upper end of the same will engage the lower edges of plates 29, 30 and raise the same so that pinion 27 engages spur gear 22 in which position the gear 22 may be driven from spring motor 34.

In order to lock pinion 27 when it is in the down position of FIG. 9, a detent 42 is provided swingably supported on a pin 43 carried by side plate 12. Detent 42 may swing upwardly from the position of FIG. 9 but is prevented from swinging downwardly by plate 30 which is formed to provide a shoulder portion 44 for engaging said detent 42. The length of detent 42 is such that it prevents counterclockwise rotation of pinion 27 (FIG. 9) but, upon upward movement of the latter, the detent 42 is released from engagement with the teeth of pinion 27 at the same time the teeth of pinion 27 engage the teeth of gear 22. In this manner upward movement of the pinion 27 by actuation of the pedal lever 39 automatically results in the gear 22 rotating shaft 21 in a clockwise direction as shown in FIG. 9. This results in the lid 5 being raised from the closed position of FIG. 1 to the open position of FIG. 2.

If it is desired to raise the seat 4 as well as the lid 5, the user may engage with his foot a selection lever 47 carried by pedal lever 39 and push the same upwardly along the length of the pedal lever 39 from the position of FIG. 8 to the position of FIG. 13. Selection lever 47 is fixedly secured to a sliding plate 48 on lever 39; said plate 48 being provided with an elongated slot 49 for receiving therethrough fasteners 50 (FIG. 8). Secured to one end of plate 48 is a flexible but relatively rigid cable 51 which is housed in a flexible tube 52 se-

cured to arm 24 by means of collar 53 (FIG. 10). As best seen in FIGS. 9, 10 when cable 51 is urged upwardly its upper end swings a generally C-shaped clip generally designated 54 to a position so that the lower leg 55 of the clip engages under the toilet seat 4 which, it will be understood, is spaced slightly upwardly from the toilet 1.

Since it is undesirable to require the spring motor 34 to expend the power necessary to raise the seat as well as the lid 5, the torque required to raise the seat is provided by a torsion spring 58 in FIGS. 9, 10. The working end of torsion spring 58 is held in a cocked position by means of detent 59 (FIG. 9) which is swingably secured to bracket 20 which supports shaft 21.

Extending from clip 54 is a portion 60 of cable 51 which is connected at its free end to a slide generally designated 61 (FIG. 9) and which slide engages the upper end of detent 59 so that upon actuation of clip 54 to engage the toilet seat 4, detent 59 is automatically released permitting the working end of torsion spring 58 to engage arm 24 and urge the same upwardly in the same direction as the arm is being urged by the spring motor 34.

By the above described structure it will be apparent that the seat and lid 5 may be operated as a unit or, if desired, the lid only may be actuated. As will be apparent later on in connection with the downward movement of the lid and seat, it is preferable to provide a light weight connection between the arm 24 and the upper side of the lid 5. This is accomplished by means of a wire clip 62 which extends upwardly from the arm 24 and over the top of the lid 5 (FIGS. 1, 9 and 10).

In order to return the toilet seat clip 54 to its normal position out of engagement with the seat 4, a tension spring 63 is provided extending between the plate 43 of the selection lever 47 and a pivot 64 on pedal lever 39 on which the pedal 40 is oscillatably supported. The pedal 40 is provided with a notch 64 (FIG. 14) that receives therethrough the selection lever 47. It will be apparent from FIG. 13 that the selection lever 47 may be retained in the up position to actuate seat 4 at all times by swinging the pedal 40 downwardly at its upper end. To return the selection lever to its down position it is merely necessary to tilt the actuating pedal 40 in a clockwise direction as seen in FIG. 13.

Secured to the shaft 21 are a pair of levers 70, 71 (FIG. 5) which extend generally downwardly from shaft 21 and are pivotally connected by means of pins 72 to a pair of generally horizontally extending links 73 to the corresponding ends of which are connected a cross pin 74 which is passed through the piston rod 75 of cylinder 14. By this structure when the arm 24 is swung upwardly piston rod 75 is projected outwardly from cylinder 14 so as to move piston 76 to the right as seen in FIG. 8. In this movement the piston is assisted by compression spring 77 on the opposite side of piston 76 from rod 75. Hydraulic fluid is permitted to flow from the right to the left hand ends of cylinder 14 through a bypass to be described.

Referring to FIG. 5, an auxiliary link 78 is pivotally supported on the lower end of lever 70 by means of pivot 79 and said auxiliary link is shaped as shown at its outer end to engage a pin 81 fixed to the outer end of piston rod 82 of cylinder 15. From FIGS. 5 and 6 it will be apparent that as the lid is moved upwardly by arm 24 and the piston rod 75 is projected outwardly of cylinder 14 the piston rod 82 of cylinder 15 is also projected outwardly by link 78 until said link 78 releases pin 81. Piston rod 82 is secured to piston 83 and a relatively strong spring 84 urges the piston 83 to the retracted position of FIG. 8. A relatively weak spring 85 is preferably positioned on the opposite side of piston 83 to oppose strong spring 84. After piston rod 82 has been moved to its projected position by opening of the toilet lid 5, it then starts its movement inwardly of the cylinder 15 at a relatively slow rate under the urging of spring 84 with the fluid being bypassed through conduit 86 (FIG. 9) which in-

cludes a needle valve assembly 87. It will be apparent at this point that the rate of movement of the piston 83 may be regulated by adjustment of needle valve 87 by means of adjusting screw 88.

Secured to the outer end of piston rod 82 by means of nut 90 is a bent plate 91 which is provided with a horizontally extending portion 92 (FIGS. 11, 14) which is formed at its outer end to closely engage a horizontally extending rod 93 which extends outwardly from a valve generally designated 94 and which is best seen in FIG. 11. The inner end of rod 93 is secured to a slide valve 95 which is apertured at 96 to register with a connection 97 at the right hand end of cylinder 14 (FIG. 11). A conduit 98 cooperates with connection 97 and valve 94 to provide a bypass between the opposite ends of cylinder 14. Slide valve 95 has a normal position shown in FIG. 11 wherein the bypass is closed. Said bypass may be opened by moving slide valve 95 to the left against the urgency of compression spring 99.

The toilet lid 5 is urged downwardly to a closed position at all times by means of a torsion spring 100 (FIG. 10). However, downward movement of the lid is prevented by upper cylinder 14 which has been projected to its outer position by means of lever 70. Movement of the piston 76 to the left is prevented because the bypass controlled by slide valve 95 is closed.

Adjustably positioned on a threaded portion 103 of rod 93 is a nut 104 which is adapted to be engaged by the horizontally extending portion 92 of plate 91 which in turn is carried by the lower piston rod 82. As seen in FIG. 11, after an interval of time during which the piston 83 is moving to its retracted position, the nut 104 is engaged by portion 92 so as to urge the slide valve 95 to the left as seen in FIG. 11 thereby opening the bypass between the opposite ends of the cylinder 14 and permitting the upper piston 76 to move to the left under the urgency of the strong torsion spring 100 which tends to close the toilet lid at all times. By this structure it will be apparent that an adjustable time delay is effected so that the toilet lid will close automatically a predetermined length of time after it has been opened. If it is desired to close the lid before such time period has elapsed, it is merely necessary to manually push on rod 93 by means of head 105 (FIG. 11) in order to open slide valve 95. On the other hand, if it is desired to have the lid remain open after such predetermined length of time, movement of piston rod 12 inwardly of cylinder 15 may be arrested by means of a holding slide generally designated 107 (FIGS. 8, 13) which is reciprocally supported on the casing 108 of the device so that it may be moved from the full line position of FIG. 8 to the dotted line position where it engages horizontal portion 92 of plate 91 and prevents inward movement of the piston rod 82.

It will be understood that the above described operations may be carried out with both the lid and seat being actuated or with only the lid being actuated depending upon whether or not the clip 54 is brought into operation by means of selection lever 47.

The entire device may be encased in the casing 108 formed of light sheet metal and secured to the housing 13 by means of screw 109 (FIG. 8) which may also provide means for closing the filling hole 110 of cylinder 14. The lower cylinder 15 may be filled through filling hole 111 (FIG. 8). Suitable spacers 113 may be employed to space the upper portion of the casing 108 from the housing 13 as seen in FIG. 9.

It will be apparent that the above described structure provides, first, an effective time delay means for automatically closing the toilet lid or seat, or both, after a predetermined interval of time has elapsed since the same were raised. Furthermore, the invention provides a convenient and effective method of raising the lid and seat to an open position. It will be also understood that the motor driven means for opening the lid and seat is not

5

essential to the operation of the closing device which may be actuated in the same manner even though the lid and seat are opened without the aid of power.

When the seat 4 returns down to its closed position the torsion spring 58 is also returned to its normal position in which it is engaged by detent 59, the latter swinging counterclockwise (FIG. 9) against the urgency of retainer spring 114 and then clockwise to hold the spring 58 in its wound position.

In the event a user, unacquainted with the operation of the device, forces the seat or lid downwardly, the very high pressure imparted to the fluid in the left hand end of cylinder 14 (FIG. 11) causes slide valve 95 to move to the right against the urgency of compression spring 115 so that the left hand end of the slide valve uncovers connection 97 and permits retraction of piston 76. By this structure any damage to the device is obviated.

It will be understood that the very specific description given above of the preferred forms of the invention is not to be taken as restrictive as it will be apparent that various modifications in design may be resorted to by those skilled in the art without departing from the scope of the following claims.

I claim:

1. In combination with a toilet provided with a hinged lid:

closing means urging said lid to closed position,
holding means for holding said closing means at a point with said lid in open position,

time delay means actuated by opening of said lid and adapted to release said holding means after a predetermined time interval whereby said closing means automatically closes said lid a predetermined length of time after it is opened,

said time delay means including a hydraulic cylinder.

2. In combination with a toilet provided with a hinged lid:

closing means urging said lid to closed position,
holding means for holding said closing means at a point with said lid in open position,

time delay means actuated by opening of said lid and adapted to release said holding means after a predetermined time interval whereby said closing means automatically closes said lid a predetermined length of time after it is opened,

said holding means including a hydraulic cylinder and a conduit connecting opposite ends of said cylinder,

6

a valve in said conduit adapted to be actuated by said time delay means.

3. In combination with a toilet provided with a hinged lid:

opening means for engaging said lid and swinging the same from a horizontal to a generally vertical position,

closing means urging said lid to closed position,
holding means for holding said closing means at a point with said lid in open position,

time delay means actuated by opening of said lid and adapted to release said holding means after a predetermined time interval whereby said closing means automatically closes said lid a predetermined length of time after it is opened,

said holding means including a hydraulic cylinder provided with a bypass conduit, a valve in said conduit for controlling the rate of flow through said conduit to control the rate of closing of said lid.

4. In combination with a toilet provided with a hinged lid:

opening means for engaging said lid and swinging the same from a horizontal to a generally vertical position,

closing means urging said lid to closed position,
holding means for holding said closing means at a point with said lid in open position,

time delay means actuated by opening of said lid and adapted to release said holding means after a predetermined time interval whereby said closing means automatically closes said lid in a predetermined length of time after it is opened,

said opening means including a spring motor and an actuating arm adapted to be swung by the user for actuating said motor to open said lid.

References Cited by the Examiner

UNITED STATES PATENTS

1,946,577	2/1934	Frazendin	49-30
2,200,687	5/1940	Bercot	4-251 XR
2,214,323	9/1940	Carter	4-251
2,440,231	4/1948	Davidson	4-251 XR

45 LAVERNE D. GEIGER, *Primary Examiner*.

HAROLD GROSS, *Assistant Examiner*.