A still further object of the invention is to provide such an apparatus which is mountable conveniently on the floor.

Yet another object is to provide a toilet seat lifter of streamlined appearance and simple construction.

In general, the present invention may be described as an adjustable foot operable toilet seat lifter employing a floor-mounted fulcrum. A lever having a foot pedal at one end thereof is pivotally mounted on a base secured to the floor. A sleeve is rotatably attached to the end of the lever opposite the foot pedal. A right angle rod extends from the end of the sleeve opposite the lever, the amount of such extension being adjustable. The leg of the right angle rod farther from the sleeve extends across the lower side of a toilet seat, to a point at least past its center line, and is secured thereto.

It should be noted that the extension of the arm of the right angle proximate the seat to a point past the center line of the seat is an important aspect of the present invention which permits smooth operation of the seat on its hinges and materially reduces possibility of damage to the seat and the lifter mechanism by eliminating uneven rotation and binding action. Moreover, an important feature cooperating with the elongated rod arm to cause even seat rotation and minimize damage is the adjustability of the amount of extension of the right angle rod from the sleeve. The adjustment means may be precisely manipulated to cause the lifter device to be in optimum working engagement with the seat, thereby eliminating binds and misalignment, and the resulting damages, difficulties, and short service life they cause.

Also in accordance with this invention, a hydraulic cylinder mounted to the base is coupled to the rotatably mounted sleeve for controlling the rate of descent of the toilet seat from its open to its lowered position. Automatic flushing is provided by extending the arm past the toilet seat and connecting it to a flushing handle by means of a chain.

SUMMARY OF THE INVENTION

A toilet seat lifting device operated by means of a floor-mounted foot pedal rotatably connected to a right angle rod extending across the longitudinal axis of a toilet seat. Another feature includes the lowering of the toilet seat by means of a hydraulic cylinder connected to the foot pedal mechanism. Further, automatic flushing is provided by connecting a flushing handle to the right angle rod.

For a more complete understanding of the present invention and for further objects and advantages thereof, reference may now be had to the following description taken in conjunction with the accompanying drawings in which:

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is an oblique view of an apparatus embodying the present invention connected to a conventional toilet;

FIGURE 2 is a side elevational view of the apparatus and toilet shown in FIGURE 1, with the toilet seat lowered;

FIGURE 3 is a side elevational view of the apparatus and toilet shown in FIGURES 1 and 2, with the toilet seat raised;

FIGURE 4 is an oblique view of a portion of a modified embodiment of the present invention;

FIGURE 5 is an elevational view, partially cut away, of a portion of the apparatus shown in FIGURE 1;

FIGURE 6 is a side elevational view of a hydraulically controlled toilet lifter in accordance with this invention;
FIGURE 7 is a cross-sectional view of the hydraulic cylinder of FIGURE 6;
FIGURE 8 is a front view of a portion of a modified embodiment of this invention incorporating automatic flushing;
FIGURE 9 is an oblique view of a portion of the automatic flushing mechanism of FIGURE 8; and
FIGURE 10 is an oblique view of the connection of the automatic flushing mechanism to a toilet lid lifter.

FIGURE 10 shows a lever 10 which is shown rotatably fixed to tab 11 on a base 12 by means of a shoulder bolt 14. The shoulder bolt 14 is particularly well suited for coupling lever 10 and base 12. It has a narrow diametrical portion extending through base 12 to function as a bearing member so that rotation is permitted. The bolt 14 also in effect provides an inward facing shoulder holding the lever 10 proximate to the side of tab 11. The base 12 is secured to the floor 16 adjacent to a conventional toilet 18 as by conventional bolts or screws. The forward end of the lever 10 is equipped with a pedal 20, suitably shaped to receive a human foot.

The end of the lever 10 opposite the pedal 20 is pivotally connected to the end of a sleeve 22 by means of pin 23. A right angle rod 24 extends from the other end of sleeve 22 and arm 26 of rod 24 extends across most of the rearward underside of toilet seat 28. Particularly note that arm 26 extends past the longitudinal axis of toilet seat 28. This is important to insure that the seat pivots properly on its hinges and that problems of binding and misalignment are minimized.

The arm 26 is secured to the toilet seat 28 by means of semicircular support brackets 30 and 32 which in turn are secured to the rearward underside of the seat by conventional means, such as screws (not illustrated). The brackets 30 and 32 will permit the arm 26 to rotate about its longitudinal axis relative to the seat 28.

As best illustrated in FIGURE 5, the end portion 33 of sleeve 22 is tapered and externally threaded. A plurality of longitudinal slots, such as slot 35, are formed in end portion 33, permitting the diameter of end portion 33 to be reduced by radial compression. The rod 24 is thus secured in sleeve 22 by tightening internally threaded nut 34 onto end portion 33. Thus, the amount of extension of rod 24 from sleeve 22 is adjustable so that the apparatus may be attached to toilets of varying heights. Moreover, rod length may be carefully set on a given toilet to provide optimum working engagement through which binds, misalignment and uneven rotation are largely eliminated.

In operation, the apparatus is normally in a first position, illustrated in FIGURE 2, with the toilet seat 28 lowered and the foot pedal 20 off the floor 16. When it is desired to raise the seat 28 the pedal 20 can be depressed by the foot to rotate lever 10 and force sleeve 22 and rod 24, and thence seat 28, upward into a second, raised position, illustrated in FIGURE 3. When pressure is removed from the pedal 20, the seat 28 returns to its lowered position.

It is to be understood that in the second position, the seat 28 is not back against the toilet lid 36 as its own hinge 38 will permit it to be. Thus, it is still possible to raise the seat 28 by hand past the second position that it assumes when the pedal 20 is depressed, and thus have it rest against the lid 36 without applying a continuous force to it.

A modified embodiment of the present invention is illustrated in FIGURE 4. In this embodiment, the lever 10 of FIGURE 1 is replaced by a crank-shaped lever 39. The lever 39 is seated in a floor-mounted pivotal support 40. The lever 39 is rotatably connected to sleeve 42, the equivalent of sleeve 22 in FIGURE 1. Foot pedal 44 mounted on lever 39 is comparable to pedal 20 of FIGURE 1. Sleeve 42 receives a right angle rod like rod 24 of FIGURE 1, which rod is to be fastened to a toilet seat as is rod 24.

The operation of the modified embodiment of FIGURE 4 is much the same as that of the FIGURE 1 apparatus. The toilet seat is lifted and lowered by action of the foot on pedal 44. The crank shape of lever 39, however, gives better definition to the pivot point thereof. The result is a smoother turning action which reduces wear in the apparatus, particularly in the mounting means of support 40.

Referring to FIGURE 6, there is shown another embodiment of the invention whereby the seat 28 is lowered by means of a hydraulic cylinder. A lever 10 is rotatably mounted to a tab 11 on a base 12 by means of a shoulder bolt 14 as described with reference to FIGURE 1. The base 12 is secured to the floor adjacent to a conventional toilet by screws or by an epoxy cement process. One end of the lever 10 is equipped with a pedal 20 and the other end is pivotally connected to a sleeve 22 by means of a shoulder bolt 23. A right angle rod 24 extends from the upper end of the sleeve 22 and arm 26 of rod 24 is secured to a toilet seat 28 by means of plastic bearing blocks 51 and 52, such as shown in FIGURE 8. Rotatably mounted to the arm 10 by means of a bolt 53 is a swivel or spring loaded strut 54 for holding the seat 28 in an open position. During normal operation of the seat lifting mechanism, the strut 54 is rotated clockwise and latched to the arm 10 by means of a clip 56. A lid 36 follows movement of the seat 28 by the attraction of a permanent magnet 86, embedded in the lid, to a permanent magnet 87 embedded in the seat. A hydraulic cylinder 57 having a push rod 58 coupled to the sleeve 22 is pivotally mounted to the base 12 by means of a pivot bolt 60 assembled through a tab 59.

Referring to FIGURE 7, there is shown in detail the hydraulic cylinder 57. Connected to the push rod 58 within the cylinder 57, between two lock bolts 61 and 62, is a leather cup 63 and a tension spreader 64. A spring 65, located in the upper section of the cylinder 57, and a spring 66, located in the lower section of the cylinder, act as cushions to slow the movement of the plunger 58 as it reaches its uppermost and lowermost positions, respectively. The rate at which air is expelled from the cylinder 57 during the downward motion of the push rod 58 is controlled by means of a thumb screw 67 threaded into a passage 68 opening into the lower section of the cylinder.

In operation, the start 54 is latched to the arm 10 and the seat 28 in normally in a first or lowered position such as shown in FIGURE 2. When it is desired to raise the seat 28, the pedal 20 is depressed to rotate the lever 10 and force sleeve 22 and rod 24, thence seat 28, upward into an open or raised position as illustrated in FIGURE 6. The push rod 58 and the leather cup 63 move along with the seat 28 as it moves from a closed to an open position. It will be noted from FIGURES 2 and 3, that as the seat 28 moves from its closed to its open position, the rod 24 rotates through several degrees in a clockwise direction. Consequently, the hydraulic cylinder 57 also must rotate clockwise. It is essential for proper operation of the hydraulic cylinder 57, that a parallel relationship be maintained between the arm 22 and the plunger 58. This parallel operation is accomplished by means of offsetting from the center line of the cylinder 57, the pivotal connection to the tab 59 as shown in FIGURE 7.

When pressure is removed from the pedal 20, the seat 28 begins descending to its lowered position. The time required for the seat 28 to move from an open position to a lowered position is determined by the rate at which air is expelled from the hydraulic cylinder 57 through the passage 68. It is possible, by means of the thumb screw 67, to permit air from escaping the cylinder 57 and thereby lock the seat 28 in its upper.
position. Thus, the seat 28 can be locked in its open position by either the strut 54 or the thumb screw 67. Referring to FIGURE 8, there is shown an embodiment of the invention whereby the downward movement of the seat 28 actuates an automatic flushing device. The arm 26 is extended past the end of the seat 28 and is connected by means of a chain 69 to a flushing mechanism 71. The flushing mechanism 71 is shown in greater detail in FIGURE 9. The chain 69 connects to a handle 72 that is positioned against a stop 73 by means of a spring 74. Pivotally mounted to the handle 72 by means of a bolt 76 is an arm 77 positioned against a stop 78 by means of a spring 79. The arm 77 engages a notched wheel 81 connected to a shaft 82. The shaft 82 is part of a standard flushing mechanism which includes a lifting arm 83. To provide manual flushing, a handle 84 is threaded onto the shaft 82. This handle operates the flushing mechanism according to well known procedures independent of the automatic flushing device.

Referring to FIGURE 10, there is shown a means for connecting the chain 69 to the arm 26. A loop 92 is attached to the chain 69 by means of a clip 93. The loop 92 is secured between tabs of a clamp 94 by means of a bolt 96. In operation, as the seat 28 rotates from its open position to its closed position, the arm 26 travels several inches downward as illustrated in FIGURES 2 and 3. As the arm 26 moves downward, the chain 69 exerts a counterclockwise pulling force on the handle 72. The counterclockwise rotation of the handle 72 causes the arm 77 to rotate the disk 81 and thereby raise the lifting arm 83, thus actuating a standard flushing mechanism. As the disk 81 rotates, the arm 77 becomes disengaged from the notch 85 and the lifting arm 83 returns to its normal position in accordance with the usual method of operation of standard flushing mechanisms. The arm 72, however, continues to rotate counterclockwise until the seat 28 is in its lowered position. The arm 77 will remain disengaged from the notch 85 and be merely riding against the disk 81, thus permitting manual flushing by means of the handle 84.

The cocking action for the automatic flushing device 71 takes place during the upward motions of the seat 28. As the seat 28 is pushed upward by means of the arm 26, the chain becomes slack and the spring 74 rotates the handle 72 against the stop 73. As the handle 72 reaches the position shown in FIGURE 9, the arm 77 engages the notch 85 and the automatic flushing mechanism 71 is in its cocked position.

Again referring to FIGURE 8, there is shown in addition to the bearing blocks 51 and 52 a positioning block 88. The positioning block 88 not only provides a bearing surface for the arm 26, it facilitates the use of the lifting device of this invention with toilet bowls and seats that differ materially in size and configuration. The bearing blocks 51 and 52 are first attached to the seat 28 by conventional means, such as an epoxy cement process. The positioning block 88 is then attached to the seat 28 in such a manner that the retaining pins 89 and 91 can be inserted into grooves formed in the arm 26. If the automatic flushing feature is not used, only pin 89 is required since the bearing block 52 would act to restrain movement of the arm 26 in one direction.

It can be seen that the present invention provides for a toilet seat lifting device which operates smoothly and positively and which accordingly has a long service life. The provision of adjustability assures a more versatile device, and the streamlined appearance and simple construction afford additional advantages.

Having described the invention in connection with certain embodiments thereof, it will be understood that further modifications will now suggest themselves to those skilled in the art and it is intended to cover such modifications as fall within the scope of the appended claims.

What is claimed is:

1. A foot operable toilet seat lifting device which comprises:
   (a) a pivotal support adapted for attachment adjacent the toilet bowl equipped with a conventional rotatably mounted annular toilet seat,
   (b) a lever pivoted on said support,
   (c) a foot pedal mounted on one end of said lever,
   (d) a right angle rod connected rotationally to the end of said lever opposite said pedal and to said toilet seat,
   (e) support means adapted to be carried by said toilet seat and rotatably support the arm of said right angle rod in engagement therewith,
   (f) a hydraulic cylinder including a push rod connected to said right angle rod and having a pivotal support offset from the longitudinal axis thereof for attachment adjacent said toilet bowl, said offset pivotal support maintaining a substantially parallel relationship between said push rod and said right angle rod during movement thereof.

2. In combination with a conventional annular toilet seat, the device of claim 1 including a spring loaded strut rotatably connected to said lever and rotatable from a position in alignment with said lever to a position in engagement with said pivotal support for holding said lifting device in one position, said strut returnable to a position in alignment with said lever by a slight upward movement thereof.

3. In combination with a conventional annular toilet seat, the device of claim 1 wherein said hydraulic cylinder further includes an air escape adjustment for controlling the rate at which air is expelled therefrom.

4. In combination with a conventional annular toilet seat, the device of claim 3 wherein said support means are plastic bearing blocks affixed to said toilet seat by means of an epoxy cement process.

5. In combination with a conventional annular toilet seat, the device of claim 1 including a first permanent magnet embedded in said toilet seat and a second permanent magnet embedded in a toilet lid in a manner such that the magnetic attraction of said two permanent magnets causes the toilet seat and lid to move as a unit.

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