Feb. 10, 1953 L. K. EDWARDE 2,627,608

TOILET BALL VALVE ACTUATING LINKAGE

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Fig. 1.

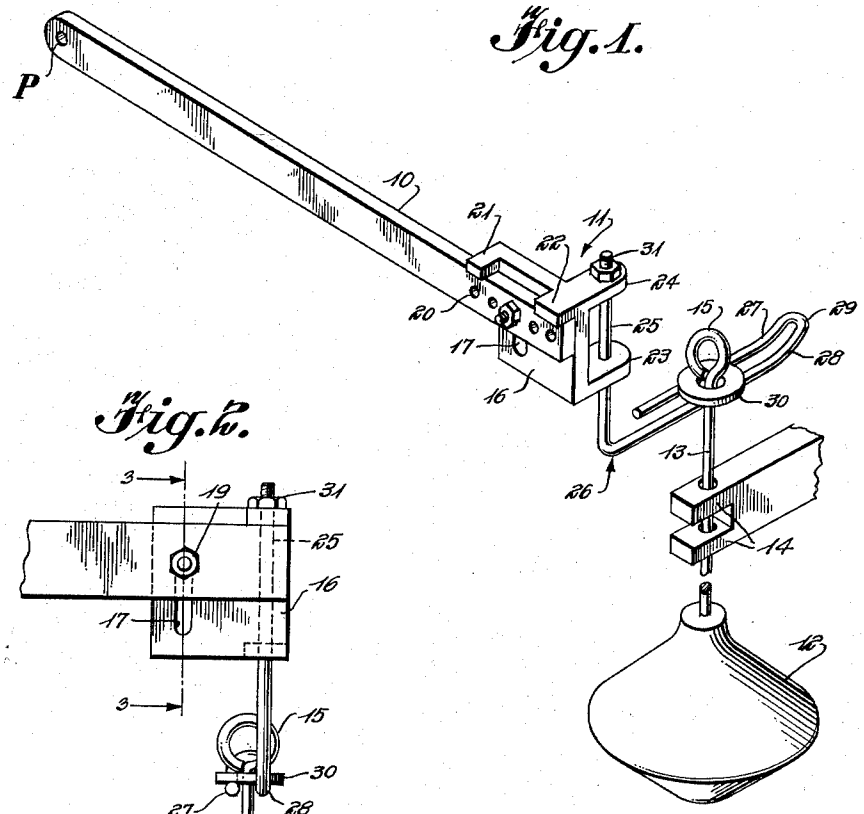
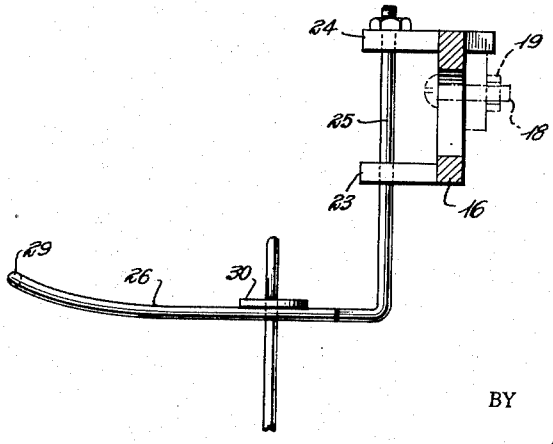


Fig. b.

Fig. 3.



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TOILET BALL VALVE ACTUATING LINKAGE

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1 Claim. (Cl. 4—67)

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This invention relates generally to an improved actuating linkage for use in conventional toilet flushing systems.

The usual household toilet includes a water tank within which the various operating elements such as the valve, float and actuating means therefor are located. Most systems presently being used employ a ball type valve of rubber or the like for regulating flow of water from the tank, it having been found that such provides an inexpensive, simple, and durable operational means. The rubber ball is raised from its seat through the agency of a linkage including a stem on the ball and a handle operated actuating bar and lifting hook.

Difficulty has been experienced by virtue of the hook and stem binding and becoming misaligned during the flushing operation, thereby preventing the ball from resuming its seated position. Unpleasant noise as well as waste of water continues until the binding condition is corrected, which frequently can only be accomplished after removal of the tank cover in order to permit manual realignment of the linkage elements.

The present invention overcomes the disadvantages of these systems by providing a linkage arrangement which prevents binding of the ball stem. It is adapted to be incorporated in conventional systems by means of a bracket which is fastened to the operating arm.

One of the objects of the present invention, therefore, is to provide a non-binding actuating linkage in a system of the character described.

In its more specific aspects a further object of the present invention is to provide a bracket and lifting finger of new and unique form for raising the ball of the conventional ball valve in the well known toilet flushing systems.

Further objects will be apparent from the following description and in the accompanying drawings wherein:

Fig. 1 is an isometric view of an illustrative embodiment of the present invention;

Fig. 2 is an end view; and

Fig. 3 is a section taken through line 3—3 of Fig. 2.

In the embodiment, as illustrated in Fig. 1, the lever arm 10 of a conventional toilet flushing system has fastened thereto the bracket of the invention indicated generally at 11. A rubber ball 12 is shown having a stem 13 guided by posts 14, with a ring 15 at the end of said stem 13 as is usually provided.

It is clear that the arm 10 may be operated by a handle, not known, located usually on the outside of the toilet water tank. The arm describes a rocking movement about the pivot P in order to raise the ball 12 from its seat to start the flushing operation.

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The bracket 11 comprises a body portion 16 provided with a slot 17 for reception of a bolt 18 and nut 19. On the conventional lever arm 10 there are found holes 20 which hold the usual hook in operative relation with respect to the ball stem. In accordance with the teachings of the present invention, however, bolt 18 is passed through the hole 20, and upon threading nut 19 thereon, securely fastens bracket 11 to the lever arm 10.

Body portion 16 is provided with shoulders 21 and 22 which protrude therefrom and fit over the lever arm 10 providing a T-type grip for holding the unit in place.

Systems of the present type may perform satisfactorily for substantial periods of time as the elements are capable of withstanding the abuse occasioned by frequent use and movement. The shoulder portions 21 and 22, by resisting rotational movement of the bracket about the axis of the bolt 18, prevent loosening of the nut 19 and aid in providing a permanent connection.

Foot 23 and flange 24 of bracket 11 form a yoke which is provided with holes for receiving pin portion 25, a prolongation of finger unit 26. Finger unit 26 comprises parallel arms 27 and 28, and end loop 29, and is hung loosely from the bracket, the holes in the yoke functioning as a bearing for the pin portion 25. In the illustrated embodiment a nut 31 is used for retaining the finger 26 in place; however, it is clear a cap screw, cotter pin or similar device could be utilized in place thereof.

Washer 30 is held on stem 13 by the ring 15 and cooperates with finger 26 to provide a bearing surface for the parallel arms 27 and 28. As shown in Fig. 2, the stem 13 passes between the arms 27 and 28 of the finger 26 and obviously may move through the lengthwise path provided therebetween. End loop 29 prevents the stem 13 from moving beyond the end of finger 26 while washer 30 in cooperation with ring 15 prevents stem 13 from falling vertically downward through the space formed between arms 27 and 28.

As the lever arm is rocked for raising ball 12 relative movement of the bracket and the ball stem 13 will occur because of the arc described by the end of lever 10 during its movement. The present invention provides the swivel mounted finger 26 with parallel arms 27 and 28 embrac-

ing stem portion 13 which is slidable therebetween to compensate for the relative movement and thereby prevent binding.

The body of the bracket as well as the bolt, nut and finger may be made of non-corrodible material. It is contemplated that plastics as well as non-corrodible metals may be utilized so as to provide a device which will last indefinitely. Replacing of the fixture is thereby made unnecessary so long as the system functions correctly, but should the ball and stem have to be repaired or any other element of the system repaired or replaced, the detachable method of connecting the bracket to the lever arm permits easy removal.

Various modifications may be effected without departing from the spirit of the invention as defined in the appended claim.

I claim:

A linkage for use in a toilet system having a water tank, a ball valve located at the bottom of the tank for regulating the flow of water therefrom, a stem extending substantially vertically upward from the ball of the ball valve, and an operating lever having a free end located at a level above the ball valve and also having openings through the lever spaced apart lengthwise of the lever adjacent the free end thereof; said linkage comprising a bracket having a substantially vertical body portion, substantially horizontal shoulder portions extending from the upper end of said body portion, and a pair of substantially horizontal arms extending from said body portion in an opposite direction from the direction in which said shoulder portions extend, each of said arms having a vertical opening extending therethrough and said openings being positioned in substantially vertical alignment; a connecting member connecting said bracket to said operating lever adjacent the free end of said lever with said body portion being located against one side of said lever and said shoulder portions being located against the upper surface of said lever to substantially prevent twisting of said bracket on said lever, said connecting member being positionable through any one of said spaced openings extending through the operating lever whereby said bracket may be positioned in different positions spaced apart lengthwise of said lever and thus may be adjusted lengthwise of said lever; a lifting hook including a loop portion having spaced-apart substantially parallel horizontal arms defining a space extending lengthwise between said horizontal arms, and a substantially vertical arm extending upwardly from one of said horizontal loop arms, said vertical arm extending through the vertically aligned openings in the arms which extend from the body portion of the bracket and being pivotally connected to said arms whereby said lifting hook may swivel with respect to said bracket, said upwardly extending ball valve stem extending through the space between said horizontal loop arms, said arms being spaced apart a distance greater than the thickness of said stem whereby said arms may move substantially horizontally relative to said stem to avoid binding said stem; and a washer carried by said stem, said washer being engageable by said horizontal loop arms to raise said stem when the lifting hook is lifted by the operating lever.

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