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ARM LIFT BRACKET AND SHAFT FOR FLUSH VALVE MECHANISMS

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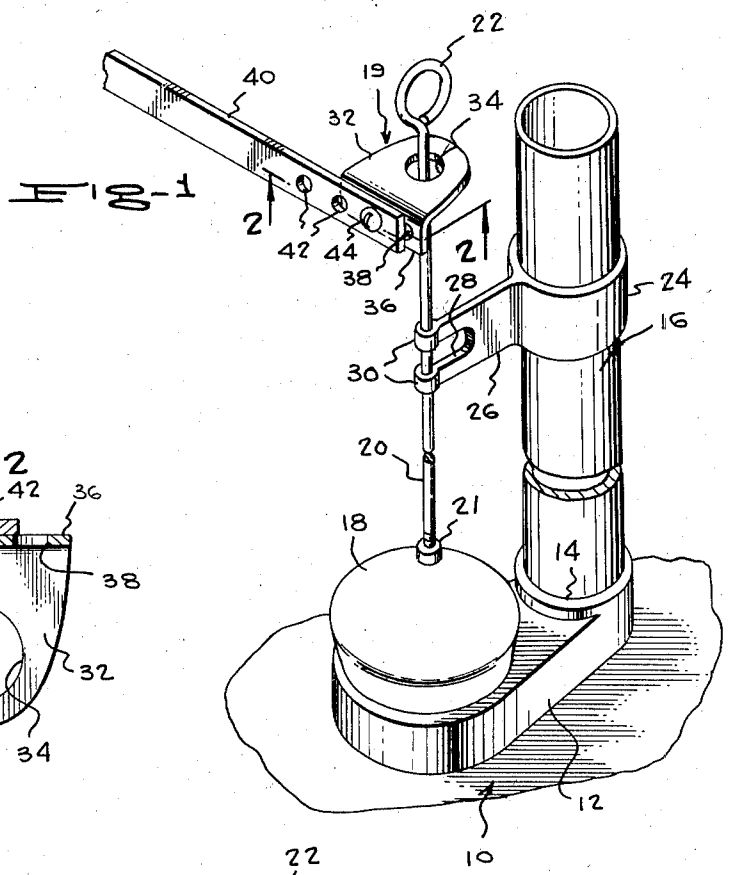


FIG-1

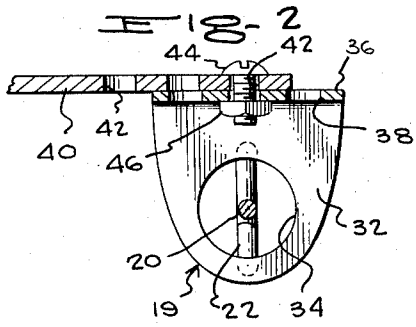


FIG-2

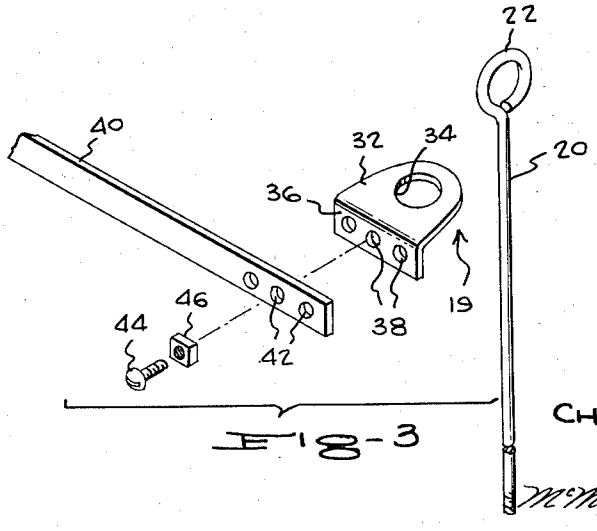


FIG-3

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ARM LIFT BRACKET AND SHAFT FOR FLUSH VALVE MECHANISMS

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1 Claim. (Cl. 4—67)

This invention relates generally to flushing mechanisms of the type provided in the flush tanks of toilets. More particularly, the invention has reference to a novel, improved construction of an arm lift bracket and of the shaft elevated thereby and connected to the conventional ball valve.

Conventional flushing mechanisms have a notable deficiency, in respect to the tendency thereof to "hang" when in elevated position. As a result, the ball valve fails to seat, resulting in continuous flushing of the toilet. The result is that there is a serious and large scale wastage of water, as well as considerable inconvenience and annoyance so far as the homeowner is concerned.

The hanging of the ball, when in its elevated position, is primarily caused by the prevailing type of mechanisms employed for attachment to the short rod. In some instances, such mechanisms may be hooks to which are directly connected the short rod, and by virtue of these hooks the short rod is often caught or bound therein. Where such mechanisms include a hook carrying a chain, with the short rod dependingly attached to the chains, the chain is often caught, and hence, the short rod is unable to plumb properly, resulting in the rod being bound and hung.

Due to the difficulties which have been described above, producing faulty seating of the flush ball, considerable efforts have been expended to provide improved flush control attachments. There are a number of such attachments commercially available, but these are distinguished by their relatively high cost. Even so, their tendency toward faulty operation is definitely pronounced and it thus follows that they have not met the problem and solved it.

In view of the above, the main or broad object of the present invention is to provide an improved bracket and shaft for flushing mechanisms of the character described, which will be so designed as to insure positively against hanging or other defective operation of the shaft and of the associated components of the flushing mechanism.

Another object is to insure that the wholly efficient, sure operation of the device will continue without any maintenance or repair for many years.

A further object is to provide the improved components at a very low cost, sufficient to bring the same within the reach of the ordinary homeowner, with said cost being so low as to be covered in a very short time by pronounced savings in water bills.

A further object is to permit the swift and easy installation of the device in flushing mechanisms already in use, without requirement of special skills or of special tools, thereby to permit the installation to be carried out by the home owner himself.

A further object is to permit the invention to be used with wholly conventional flushing mechanism components already in use, whereby to require no modification or redesign of the lift arm, shaft guides, etc.

Still another object is to so design the construction as to permit the same to be incorporated in new flush tank

construction at a cost which, compared to that required in the manufacture of flush mechanisms now in use, will be only slightly higher, with the difference being fully offset by the pronounced benefits to be gained from use of the invention.

Other objects will appear from the following description, the claim appended thereto, and from the annexed drawing, in which like reference characters designate like parts throughout the several views, and wherein:

Figure 1 is a perspective view of a bracket and shaft construction according to the present invention, as it appears when in use;

Figure 2 is an enlarged sectional view substantially on line 2—2 of Figure 1; and

Figure 3 is an exploded perspective view of the device, portions being broken away, the lift arm being illustrated fragmentarily.

Referring to the drawing in detail, designated generally at **10** is a wholly conventional flush tank, only a fragmentary portion of which is shown. The flush tank includes the usual outlet fitting **12** having at one end the low, upstanding neck **14** in which is engaged the lower end of a vertically upwardly extending overflow tube **16**. At **18** there is designated a conventional flush ball or valve, which normally engages against the usual valve seat provided at the larger end of the fitting **12**.

All this is conventional construction and does not per se constitute part of the present invention.

The arm lift bracket and shaft constituting the present invention has been generally designated at **19**, and included in the invention is an elongated, straight, vertically disposed shaft **20** formed from stout, comparatively rigid rod material, the lower end of said shaft being threaded for engagement in the usual internally threaded annulus **21** of the flush ball **18**.

At its upper end, the shaft **20** is integrally formed with a circular, closed loop **22**. Loop **22** is of substantial diameter. At this point, it should be noted that no dimensions will be specified for the several parts described herein. It is mainly important to note the relative proportions of the parts, and the dimensions might be varied in different commercial embodiments. It is thus not desired that protection for the invention be limited except as necessarily required by the scope of the appended claims, since limitations on the scope of the invention might be imported into the same if specific dimensions were set out and subsequently regarded as critical.

In any event, the loop **22** and the elongated, straight body portion of the shaft are all disposed in a common vertical plane.

Designated at **24**, is a sleeve integrally or otherwise rigidly formed with a radial guide support arm **26** the outer end of which has a longitudinal slot **28** separating from one another vertically aligned guides **30** integrally formed upon the arm **26**. Sleeve **24**, arm **26** and guides **30** are a conventional part of the flushing mechanism and do not per se constitute part of the present invention.

Forming part of the present invention is an annular bracket **32** formed from a wide piece of heavy sheet metal material. Bracket **32** is of inverted L-shape in cross section, and has a horizontal upper leg **32** projecting across the path of vertical movement of the shaft **20** and formed with a large diameter opening **34**. The diameter of opening **34** as shown in Figure 2 is slightly less than the outer diameter of loop **22**. The diameter of opening **34**, however, is very much greater than the diameter of the body portion of the shaft **20**.

In any event, bracket **32** has a vertical leg **36** depending from the inner end of the leg **32** and elongated in a horizontal direction. Leg **36** has a row of openings **38** formed therein.

Designated at **40** is the conventional lift arm or operat-

ing lever of the flushing mechanism, and this also does not constitute part of the present invention, per se. Lever **40** has the usual row of openings **42** at its distal end, and a selected opening **38** is registered with a selected opening **42**, to receive a connecting bolt **44** having a nut **46**, whereby to fixedly secure the bracket to the lift arm. As will be understood, the bracket could be rocked about the axis of the connecting bolt, before the nut **46** is tightened, and it will therefore be considered that the invention encompasses tiltable adjustment of the bracket about an axis extending perpendicularly of the length of the lift arm **40** and disposed parallel to and below the plane of the leg **32**. The axis about which the bracket tilts will normally be disposed substantially radially of the body portion of the vertical shaft **20** as will readily be seen from Figure 2.

In any event, the use of three openings **38** in the bracket, taken in combination with a plurality of openings **42** of the lift arm, serves to provide a wide range of adjustments of the bracket, longitudinally of the arm **40**, and this permits wholly accurate placement of the bracket in respect to the shaft **20**. Further, in each position to which the bracket is adjusted longitudinally of the lift arm **40**, the bracket is tiltably adjustable about the axis of the connecting bolt or screw **44**.

It will be readily seen that a highly simplified construction is included in the invention, with the shaft **20** and the bracket being quickly and easily substituted for analogous components already in use. One need merely remove the old shaft from the flush ball **18**, after which the new shaft **20** is extended through the opening **34** and then through the guides **30**. The bracket **32** is then swiftly adjusted through the desired position, with opening **34** being aligned vertically with guides **30** so that the shaft will be centered in the opening **34**. Then the connecting bolt is applied to secure the bracket to the lift arm. Further adjustments, including titlable adjustments, can be made as necessary. With the ball valve seated and the lift arm in its normal, rest position, the upper leg of the bracket **32** will be substantially horizontal. The bolt may now be tightened and the shaft connected to the ball **18**.

In use of the invention, on upward movement of the arm **40**, there will be immediate upward pressure exerted against the lower portion of the loop or ring **22**, so that shaft **20** is immediately elevated, to unseat the flush ball. However, it is important to note that when the arm **40** swings upwardly, it cannot under any circumstances exert a lateral pressure against the shaft in a manner such that the shaft would cock or hang in its elevated position. Rather, the shaft is permitted a straight vertical movement both upwardly and downwardly, without any interference whatever from the lift arm or from the connection between the shaft and the lift arm. The bracket **32** swings in an arcuate path with the arm **40**, of course, but the opening **34** at all times will merely be disposed in positions such that diametrically opposite portions of the edge thereof will bear lightly and slidably against angularly spaced portions of loop **22** located in the lower half of said loop. In other words, during the arcuate travel of the bracket, said bracket may have a slight movement transversely of the loop **22**, but the bracket is merely in light, sliding contact with the loop so that it does not tend to bias the same transversely out of the vertical path in which the loop is to travel with the shaft **20**. Further, when the shaft has been elevated and the arm **40** is swung back to its lower position, there will not be any interference with the subsequent downward movement of the shaft at the time the flush ball is to seat once agin. The shaft, in fact, in these circumstances will be wholly out of contact with any component of the lift arm or equivalent swinging operating mechanism of the flushing assembly, as will be readily seen from Figure 1.

It is believed apparent that the invention is not necessarily confined to the specific use or uses thereof described above, since it may be utilized for any purpose to which it may be suited. Nor is the invention to be necessarily limited to the specific construction illustrated and described, since such construction is only intended to be illustrative of the principles of operation and the means presently devised to carry out said principles, it being considered that the invention comprehends any minor change in construction that may be permitted within the scope of the appended claim.

What is claimed is:

The combination, with a lift arm of a flush tank mechanism, said arm having at least one aperture, a flush ball, and a guide means, of a vertically extending flush ball support shaft and lift arm bracket, said bracket being formed from a single length of sheet material and being of an inverted L-shape including a pair of wide legs each of which is wholly flat, said legs lying in perpendicularly related planes, one leg being in face-to-face contact with the arm and having a row of apertures extending longitudinally of said arm, the centers of said apertures being aligned on a line parallel to the plane of the other leg, said aperture being registrable with a selected aperture of said one leg, said other leg having a large diameter opening, the shaft being of a diameter substantially smaller than that of said opening, said shaft being loosely engaged in said opening and including a straight, vertical portion integral at its upper end with a loop overlying said other leg and formed to a greater diameter than the opening so as to engage diametrically opposite portions of the edge of the opening on upward movement of the arm and bracket, the diameter of said opening being selected of a value in relation to the shaft's diameter and loop diameter such that throughout the range of movement of the shaft between its lower and upper extreme positions, the loop will engage the edge of the opening, at locations angularly spaced about the loop circumference from the straight portion of the shaft, with said straight portion wholly out of engagement with said edge of the opening.

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