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FLUSH VALVE LIFT ROD GUIDE

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Fig. 1

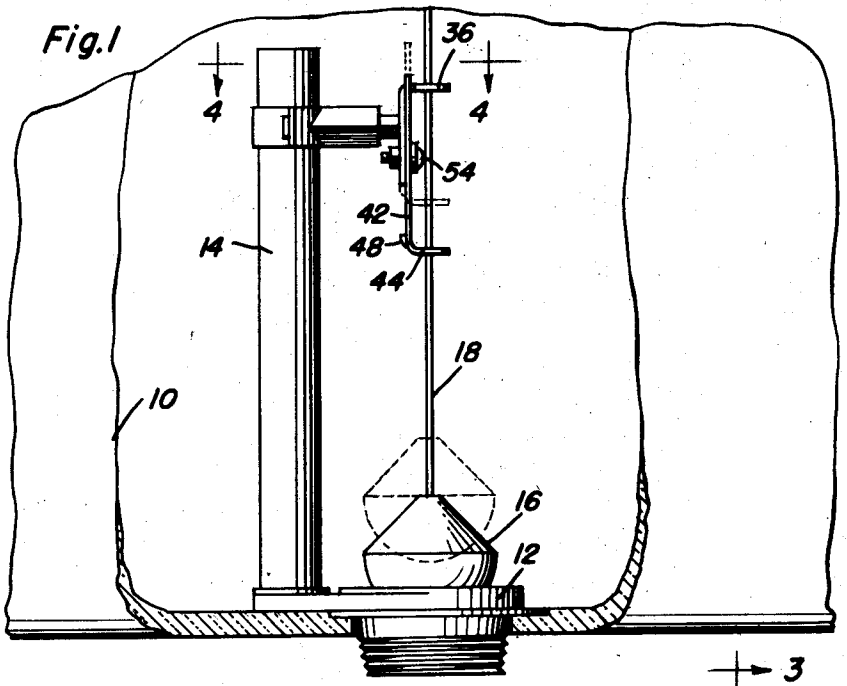



Fig. 3

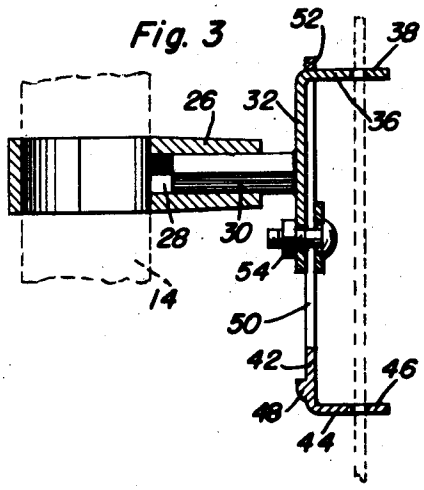



Fig. 2

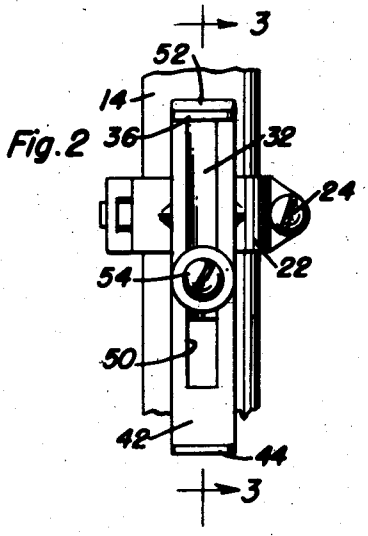
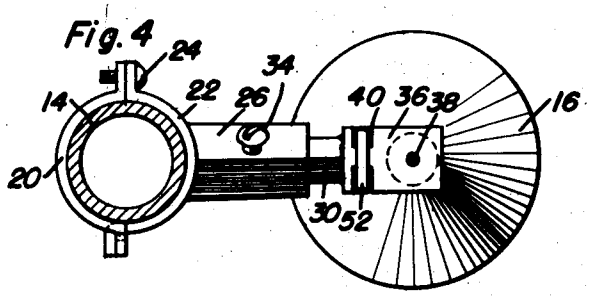



Fig. 4




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## FLUSH VALVE LIFT ROD GUIDE

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8 Claims. (Cl. 4—57)

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This invention comprises novel and useful improvements in an automatic flush guide and more specifically pertains to a guiding attachment adapted for mounting in a toilet flush tank upon the overflow pipe valve to provide an improved guiding action of the flush valve stem and thereby enhancing the efficiency of operation of the flush valve.

The principal object of this invention is to improve the action of the flush valves of toilet tanks by providing means for guiding the motion of the flush valve stem and flush valve with respect to the flush valve seat and for limiting the movement of the flush valve from its seat with a view to insuring the proper and efficient seating of the flush valve upon its seat.

A further object of the invention is to provide a flush valve guide in conformity with the preceding object which may be applied to existing conventional flush tanks and their equipment without the necessity for alteration of conventional structure.

A further object of the invention is to provide a guide attachment in conformity with the preceding object which may be readily vertically adjusted and supported upon the overflow pipe; and may be readily laterally adjusted with respect to the overflow pipe for the purpose of centering the guide means upon the vertical axis of the flush valve seat.

A still further important object of the invention is to provide a guiding device in accordance with the preceding objects in which a stationary guide bracket imparts a positive guiding action to a vertically movable flush valve stem, while a second guide bracket is secured to the valve stem for movement therewith and is slidingly and guidingly mounted upon the first bracket.

A still further object of the invention is to provide a guiding device in conformity with the foregoing objects in which the guiding device is provided with a limiting stop for positively limiting action of the flush valve vertically upward from its seat.

And a final important object of the invention to be specifically enumerated herein, is to provide a flush valve guiding device in conformity with the above mentioned objects in which a greatly improved retaining and guiding action is provided between the two bracket members, one being stationary for slidably receiving a valve stem, and the other being fixedly secured upon a valve stem for sliding movement upon the first bracket.

These, together with various ancillary features and objects of the invention, which will later become apparent as the following description proceeds, are attained by the present invention, a preferred embodiment of which has been illustrated, by way of example, in the accompanying drawings, wherein:

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Figure 1 is a fragmentary elevational view of a portion of a flush tank, parts being broken away and shown in section, and showing the manner in which the guide attachment of this invention is associated with the overflow pipe, the flush valve and its stem and the flush valve seat, alternative positions of the flush valve and the guiding device being indicated in dotted lines therein;

Figure 2 is an elevational view, taken from the right side of Figure 1, and illustrating certain details of the bracket members forming a part of the guiding device;

Figure 3 is a vertical central sectional view, taken substantially upon the plane indicated by the section line 3—3 of Figure 2 and illustrating further features of the adjustments of the device; and,

Figure 4 is a horizontal sectional view taken substantially upon the plane indicated by the section line 4—4 of Figure 1.

Reference is now made more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, and where the invention is illustrated as operatively associated with a flush tank 10 of any conventional and known design, having the usual flush valve seat 12, the overflow pipe 14 and a flush valve 16 with a flush valve stem 18. It is understood that the valve stem 18 is attached to suitable and conventional operating mechanism, not shown, whereby the flush valve may be lifted from its seat to permit discharge of the flush water within the tank 10 through the flush valve 12 in a known manner.

The operation of mechanisms of this type is rendered faulty frequently by virtue of the failure of the flush valve 16 to properly return to and center itself upon its seat 12, this faulty action resulting in a failure of the valve to fully close the seat thereby wasting water; causing undue wear of the valve; and either causing undue wear of the valve stem and the associated mechanism or preventing the valve from returning by gravity to its seat.

The above common difficulties encountered in the operation of mechanisms of this type are satisfactorily overcome by the improved valve stem guide attachment forming the subject of this invention. This attachment includes a clamping device consisting of the complementary clamping members 20 and 22, hingedly secured to each other and provided with a fastening bolt 24 for encircling and clampingly engaging the overflow pipe 14, whereby the clamp may be vertically adjusted upon the overflow pipe, horizontally or circumferentially adjusted thereabout, and securely locked in the adjusted position. The member 22 is provided with a laterally extending boss 26 having a socket 28 therein, see Figure 3. This socket slidably receives a laterally projecting rod or arm 30 to the outer end of

which is welded or otherwise fixedly secured an upper bracket **32**. A set screw **34** provides means whereby the arm **30** and consequently the upper bracket **32** may be adjusted laterally with respect to the clamping device and the overflow pipe. Preferably, the bracket **32** consists of sheet metal, metallic stampings or any similar and suitable member, and is vertically disposed with respect to the overflow pipe and the flush valve seat, being provided, as at its upper end, with a laterally extending flange **36** having a guide aperture **38** therein. The flange **36** is connected to the vertical portion of the bracket **32** by a narrowed neck portion **40**, the opposite sides of which constitute guide surfaces for a purpose which will be subsequently set forth.

The aperture **38** of the flange **36** is adapted to slidably receive the valve stem **18** for guiding the same during vertical travel of the valve stem.

Mounted upon the bracket **32** for guided sliding movement thereon is a lower bracket member **42**. This latter bracket is provided with a laterally extending flange **44** which is adapted to underlie the upper flange **36**, and likewise has an aperture **46** therein for receiving the valve stem **18**.

Opposite the flange **44**, or upon what may be termed the rear surface of the same, the bracket **42** is provided with a laterally extending lug **48** which constitutes a stop member, and which is adapted to abut the bottom edge of the bracket **32** in the fully raised position of the lower bracket. This lug limits upward movement of the lower bracket.

As shown more clearly in Figure 2, the lower bracket is provided with a medially disposed elongated vertical slot **50**, the top portion of this slot being closed by the horizontally extending end portion **52** of the lower bracket. This top portion **52** constitutes a stop which upon engagement with the upper surface of the upper bracket **36** limits downward movement of the lower bracket with respect to the supporting upper bracket. The walls of the slot **50** embrace the guide surfaces of the neck portion **40** of the upper bracket, this neck portion thus constituting guiding slots or notches on the opposite sides of the upper bracket which permits vertical sliding movement of the lower bracket but prevents relative lateral movement of the two brackets.

A further guide is provided for the bracket assembly which may conveniently comprise a conventional bolt or rivet **54** which extends through the slot **50** and is fixedly secured to the lower portion of the upper bracket **32** as shown clearly in Figure 3. The arrangement is such that the member **54** serves to retain the two brackets in close contact with each other, but permits vertical sliding movement. Thus, the member **54** and the neck portion **40** of the upper bracket constitute guides for the vertically sliding lower bracket.

It is preferred to fixedly secure the flange **44** of the lower bracket to the valve stem **18** in any desired manner so that the lower bracket moves vertically with the valve stem as a part thereof. Thus, the valve stem is guided by its engagement with the aperture **38** of the fixed upper bracket, and by the sliding engagement of the lower bracket with the upper bracket as above mentioned.

The device thus limits vertical movement of the valve **16** from its seat and positively confines this movement of the valve to movement axially of the valve seat.



From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not desired to limit the invention to the exact construction shown and described, but all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. A flush valve guide comprising upper and lower brackets, a fastener securing said brackets together for relative vertical sliding movement, apertured portions on each bracket for receiving the stem of a flush valve, a support attached to one of said brackets for mounting the same within a flush tank in fixed relation to a flush valve seat, one bracket being fixedly secured to a flush valve stem for movement therewith, the apertured portion of the other bracket guidingly and slidingly receiving a flush valve stem.

2. The combination of claim 1 wherein one of said brackets has a stop member engageable with a portion of the other bracket for limiting relative vertical movement therebetween.

3. The combination of claim 1 wherein one of said brackets has a longitudinal slot, said fastener being on the other bracket and extending through said slot.

4. The combination of claim 1 wherein one of said brackets has a longitudinal slot, said fastener being on the other bracket and extending through said slot, the apertured portion of the other bracket having a guide surface received through said slot.

5. A flush valve guide for flush tanks of the type having an overflow pipe, a flush valve seat and a flush valve with a stem, comprising: a clamp adapted for adjustable mounting on said overflow pipe, a first bracket supported by said clamp, a second bracket mounted on and vertically slidable upon said first bracket, means securing said brackets together, vertically spaced apertured portions on said brackets for receiving the stem of a float valve during vertical movement thereof, the second bracket being fixedly attached to the stem for movement therewith, cooperating vertical guide surfaces on said brackets.

6. The combination of claim 5 including a stop on the second bracket adapted for abutting engagement with the other bracket to limit movement of the valve stem.

7. The combination of claim 5 wherein the apertured portion of the first bracket includes a laterally extending guide portion, the second bracket having a slot whose longitudinal side edges slidably embrace said guide portion.

8. The combination of claim 7 wherein the fastener extends through said slot for guiding the relative movement of the brackets.

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