April 5, 1960 R. E. OHNSTAD 2,931,049

FLUSH BALL GUIDE SHAFT AND SLEEVES

Filed May 14, 1958

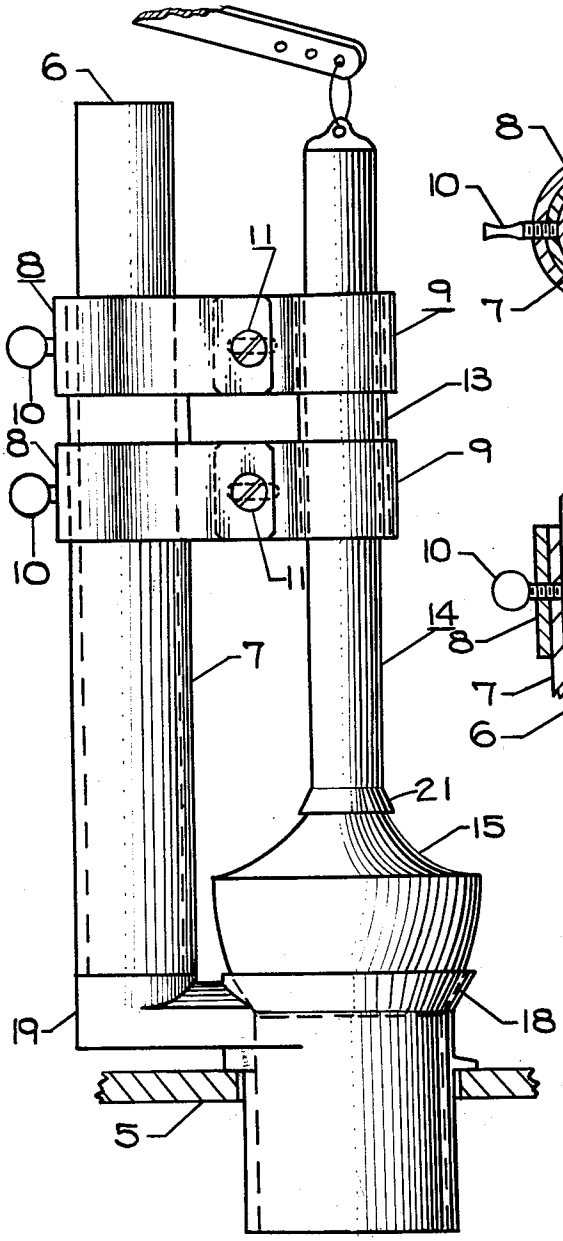


FIG. 1

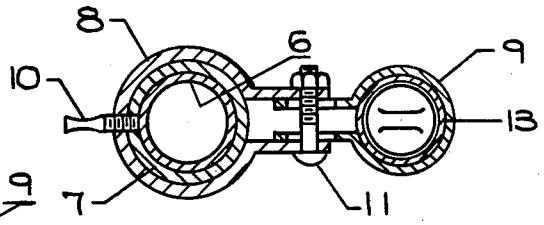


FIG. 2

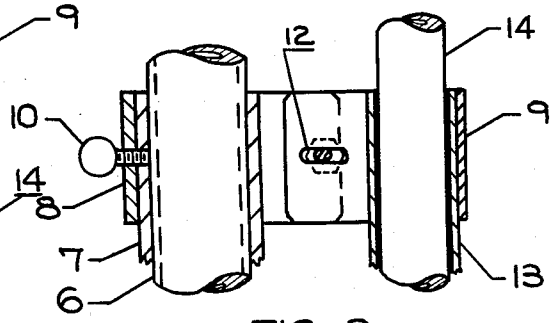


FIG. 3

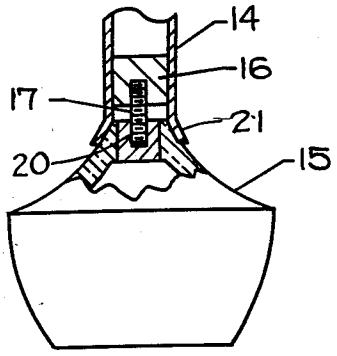


FIG. 4

INVENTOR.

BY Joseph E. Ohnstad

United States Patent Office

2,931,049

Patented Apr. 5, 1960

2,931,049

FLUSH BALL GUIDE SHAFT AND SLEEVES

Ralph E. Ohnstad, Inglewood, Calif.

Application May 14, 1958, Serial No. 735,315

2 Claims. (Cl. 4—57)

This invention relates to a toilet flush tank and more particularly to a valve ball guide shaft, a guide sleeve for same, a valve ball adapter and an overflow pipe sleeve for use in such a flush tank. In the toilet flush tank using a discharge valve it is necessary that a sturdy lift shaft and guide be used to properly align and seat the valve ball to the discharge outlet. In the conventional toilet flush tank, using a wire lift rod or valve stem, it is rarely the fault of the valve ball, but rather the fault of said wires or rod or guide to drop the valve ball properly into place upon the valve seat.

An object of this invention is to provide a one piece valve ball guide shaft, operating vertically in a telescoping action within an outer guide sleeve, secured by two vertically spaced and horizontally adjustable clamping units.

Another object of the invention is to provide a valve ball guide shaft with a rust proof sealed unit adapter for removing and replacing a standard and conventional valve ball. Since the valve ball guide shaft is made of tubing its flanged adapter is shaped to seal and fit the valve ball and thus prevent the corrosion and eventual breaking as is so common with the conventional wire lift rod.

A further object of the invention is to provide a guide sleeve for the valve ball guide shaft adequate to allow the shaft to function within it, without a sticking action. The guide sleeve provides adequate tolerance for the guide shaft and ball for proper alignment to the valve seat, in the event the installer has not properly centered the entire unit as it is secured by the clamping device and thumb set screws to the overflow pipe.

Another object of the invention resides in providing for rapid installation of the entire unit for the skilled or unskilled user; this is accomplished by the process of the entire unit, ready for the user, being secured to an automatic position finding overflow pipe sleeve which surrounds the overflow pipe. After the sleeve which holds the unit has been placed in position surrounding the overflow pipe, the proper vertical position is attained. By rotating the entire unit upon its axis, the centering of the valve ball guide shaft and valve ball upon the valve seat is easily accomplished. Two thumb screws thus hold the entire unit in proper position and alignment for use.

Other objects and advantages of the invention will be apparent during the course of the following description. In the accompanying drawing, forming a part of this specification like numerals are used to designate like parts throughout the same.

Fig. 1 is a side elevation view of the invention showing its association with the overflow pipe, the valve ball guide shaft, and clamping unit holding the overflow pipe sleeve and ball guide shaft sleeve;

Fig. 2 is a top plan view of a clamp unit composed of two separate slotted and horizontally adjustable clamps united and secured by a nut and bolt. Two of the described clamping units are used and spaced vertically as is shown in Fig. 1. Referring to Fig. 2 clamp 8 is somewhat larger than clamp 9 due to size of metal tubing it embodies;

Fig. 3 is a view showing the overflow pipe sleeve on the left and the valve ball guide sleeve on the right as they are secured by the clamp showing slotted area 12 for horizontal adjustment and thumb set screw 10 for alignment of entire guide unit and for fastening to the overflow pipe 6;

Fig. 4 is a view of the valve ball adapter as it relates to the valve ball guide shaft and shows the flanged adapter opening of the guide shaft tube with adapter plug and ball adapter screw.

Referring to the drawing, for the purpose of illustration there is shown the bottom of a conventional flush tank 5 and the overflow pipe 6 and a flush valve seat 18 which is normally closed by flush ball 15 connected to the lower end of a lift rod, but herein referred to as a valve ball guide shaft 14.

Referring specifically to this invention, an overflow pipe sleeve 7 to which the entire unit is securely attached vertically surrounds the overflow pipe 6 and extends downward to the base 19. The overflow pipe sleeve 7 is lowered around the overflow pipe 6 and contacts the base 19 and places entire guiding unit automatically in proper vertical position. Two horizontal clamps 8 surround the overflow pipe sleeve 7 through which are threaded holes and align with threaded holes of the overflow pipe sleeve 7 and provide for thumb screws 10 to be tightened after valve ball 15 has been centered properly upon valve seat 18, clamps 8 intersect and are joined by clamps 9 and are held firmly together by horizontally adjustable nut and bolt 11 by means of a horizontal slot 12 in clamps 8 and 9. Clamps 9 surround and secure the guide sleeve 13 through which the valve ball guide shaft 14 operates vertically. The guide sleeve 13 provides a guiding surface for the valve ball guide shaft 14 of a size and length to avoid a sticking action.

The essence of the invention resides in the manner of mounting the valve ball 15 on the guide shaft 14 in a fashion whereby a threaded stem engaging the ball valve is housed within the guide shaft to shield it against surrounding water and thereby minimize or prevent its corrosion. The construction involved is particularly shown in Fig. 4 wherein 16 indicates a plug inset and tightly fitted in the lower end of the tubular shaft 14 and 17 designates a screw threaded into and projecting axially from the outer end of the plug 16, the threads of which screw are adapted to be engaged in the usual internally threaded socket 20 with which the conventional valve ball 15 is ordinarily equipped. The shaft 14 has an outwardly flared seat 21 on its lower end spaced from the plug 16 which snugly conforms to the usual tapered upper end of the valve 15 when the latter is screwed into engagement with the screw 17 as shown in Fig. 4 thus sealing the open end of the shaft 14 against ingress of water.

In operation, the overflow pipe sleeve 7 with the valve ball guide unit attached will be placed over and surrounding the overflow pipe 6, after aligning valve ball guide shaft 14 properly over valve seat 18 the thumb set screws 10 will hold entire unit in rigid position for use. The set screws 10 are designed with a cup shaped end surface where they contact the overflow pipe 6 so as not to injure the surface of same.

An advantage of this invention is that tools are not required to install it, since the overflow pipe sleeve to which the entire unit is attached gives the automatic vertical adjustment and the horizontal adjustment is obtained by tightening the thumb set screws that penetrate through the clamps and the overflow pipe sleeve and thus holds the entire guiding unit in operating position.

It is to be understood that the form of invention herein

shown and described is to be taken as a preferred example of the same and that various changes, including the size, shape and arrangement of parts may be made without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. The combination with a toilet valve ball having a tapered upper end fitted with an internally threaded socket; a guide shaft having a tubular outwardly flared lower end adapted to snugly receive the tapered end of said valve ball, and an axially extending screw mounted interioraly of the lower end of said shaft detachably engageable in the threaded socket of said valve ball to retain the latter seated against the inner face of the flared lower end of said guide shaft.

2. The combination with a toilet valve ball embodying a tapered upper end having an internally threaded socket, of a guide shaft embodying a tubular lower end having an outwardly flared marginal portion into which

the tapered end of said valve ball extends, a plug tightly engaged in the tubular lower end of said shaft in inwardly spaced relation to the outwardly flared marginal portion thereof, and a screw affixed to said plug and projecting therefrom axially of said tubular lower end and terminating within said flared marginal portion, said screw being detachably engaged in the threaded socket of said valve ball and acting to retain the tapered end of the ball snugly seated against the inner face of said flared marginal portion.

References Cited in the file of this patent

UNITED STATES PATENTS

1,532,324	Lawrence	Apr. 7, 1925
1,990,207	Ruff	Feb. 5, 1935
2,835,900	Gleason	May 27, 1958

FOREIGN PATENTS

7,456	Great Britain	Nov. 30, 1905