

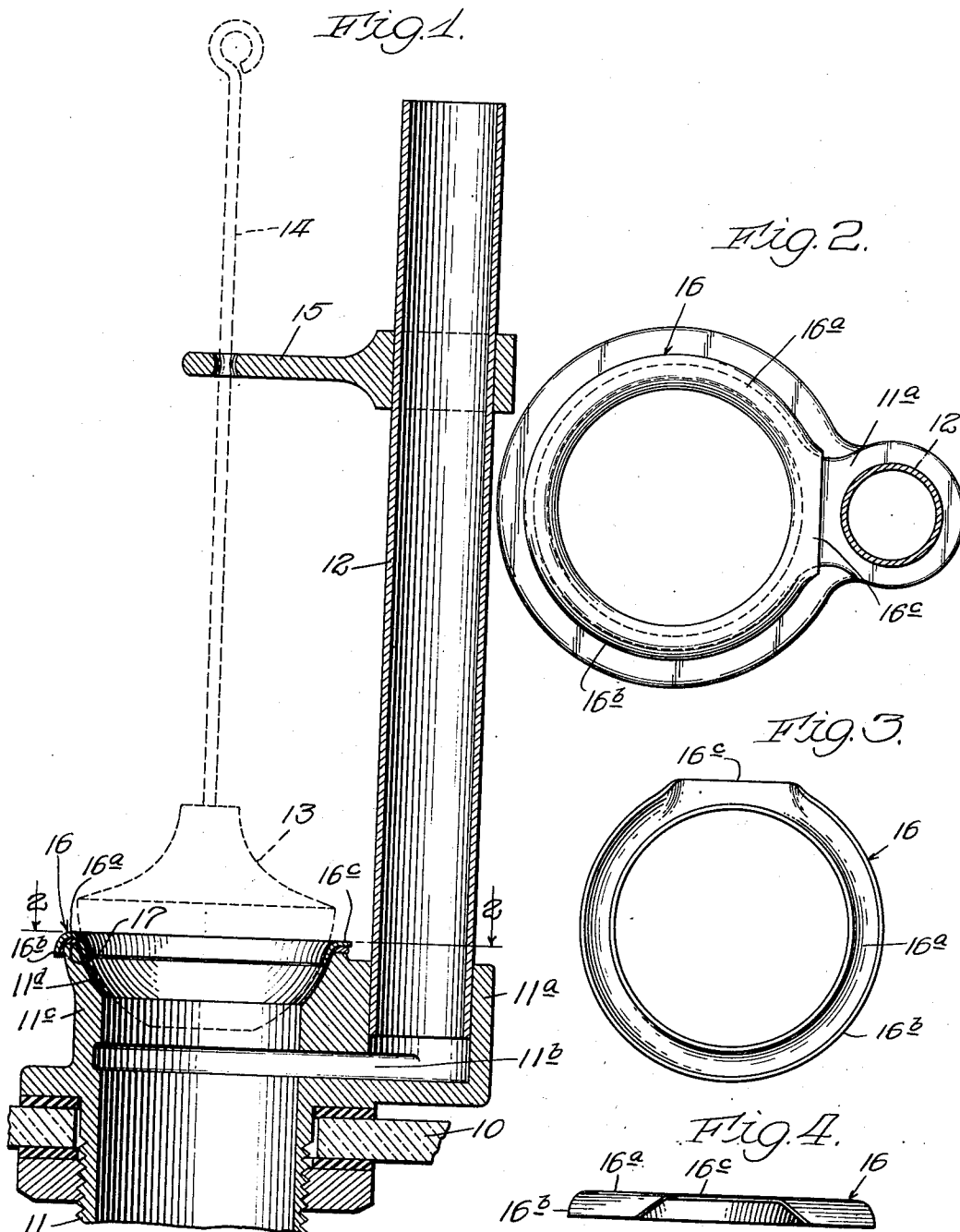
June 19, 1951

E. F. HOWE

2,557,743

REPLACEMENT VALVE SEAT FOR FLUSH BOXES

Filed Feb. 13, 1947



Inventor:
Elva Francis Howe,
By Christy, Elwood, Merriam & Haffey,
Attorneys.

UNITED STATES PATENT OFFICE

2,557,743

REPLACEMENT VALVE SEAT FOR FLUSH BOXES

Elra Francis Howe, Chicago, Ill.

Application February 13, 1947, Serial No. 728,299

1 Claim. (Cl. 4—56)

1

The present invention relates to a valve seat and more particularly to a novel valve seat for use with a ball type flush box.

In the conventional ball type flush boxes in use in millions of homes today the pipe leading from the flush box to the toilet bowl is opened and closed by a ball adapted to seat on a valve at the upper end of the pipe. With use, this valve becomes pitted, corroded, and channeled causing constant leakage from the flush box to the bowl. This results not only in large waste of water but interferes with the proper functioning of the toilet as substantial leakage prevents proper flushing.

While replacement of a pitted or worn ball is relatively simple, repair of the valve seat is difficult and expensive, requiring the attention of a competent plumber. The water supply to the flush box must be turned off, then the flush box must be drained and the pipe, of which the valve is a part, disconnected and removed. This means a substantial disassembly of the entire flush box. In normal times a new pipe and valve seat might be substituted for those removed, but frequently one of the proper make or size is not available. At the present time substantially none is available and therefore the pipe must be taken to a shop where there is a machine tool, as a lathe, for forming a new, smooth seat on the valve. The flush box and pipe must then be reassembled before it can be determined if the new seat has been properly formed and if not, as frequently occurs, the above operation must be repeated. During this time the toilet is, of course, not usable, and the repair operations always result in the spilling of water over the adjacent floor and the dirtying of the floor and room in which the flush box is located. This condition exists whether the valve seat is replaced or repaired as in both cases a substantial disassembly of the flush box is required.

Some efforts have been made in the past to eliminate the above difficulties, but they have been only partially successful. The Weir Patent No. 2,001,830, issued May 21, 1935, discloses a repair valve seat formed of bendable material having a substantially ring shaped body portion with fingers extending from its entire upper edge. The body portion provides the valve seat and the fingers are bent over the top of the old seat to attach the new seat thereto.

This construction has two inherent defects. The first is the practical impossibility of obtaining the right kind of material. If the fingers are sufficiently yieldable to permit them to be easily

2

bent around the old seat they will not hold the new seat in place properly. Frequently the entire seat will be pulled off when the ball is raised by reason of the slight suction existing while the ball is in place. If the material is sufficiently strong or stiff to keep the new seat in place it is substantially impossible to bend the fingers over the old seat even with special tools. Furthermore, the stiffness of the material prevents the ball from adjusting itself to the curvature of the seat and leakage occurs between the ball and seat. Finally, the installation of the new seat is always time consuming as the fingers must be individually bent over the old seat. This necessitates draining the flush box or working in cold water.

The second defect, which exists regardless of the material used, is that it is substantially impossible with the Weir device to attach the new seat to the old in water-tight manner. As a result leakage almost always occurs between the two seats.

The present invention comprises a new and readily attachable member having an annular portion adapted to overlie at least the inner upper portion of the valve seat and extend down on at least the inside thereof to be contacted by the ball valve. The member is shaped to provide an inner top surface spaced from the corresponding top surface of the seat. Means are provided between this inner top surface and the corresponding top surface of the seat to provide a fluid tight seal and also preferably to hold the member in place. This means may be a water-proof cement.

This construction completely eliminates all the above difficulties. No dismantling or draining of the flush box is necessary. The new valve seat member has a curvature such that after it becomes worn or pitted another can be put on over the worn one. Even when a new one is placed on over the worn member, the ball float will still make contact. The only effect would be that the ball would now seat in a slightly higher position. As a practical matter, it is preferred that not more than three new valve seat members be placed in this superposed arrangement, but two should last as long as the flush box.

The curvature of the valve seat member permits different sized floats to seat upon it. The preferred sealing material used in forming a fluid tight seal and in adhering the member to the valve seat is a water insoluble putty compound. This putty is placed between the inner top surface of the member and the top surface of the

3
valve seat. When the member is pressed into place on the valve seat excess putty compound will be rolled or squeezed out so that only enough remains to hold the member in place and to form the seal. After the member is installed, it becomes rigid as the putty is exposed to the air through the overflow tube and the flush elbow. The curvature of the member makes the member rigid and prevents it from being bent when the member is pressed into place. Other features and advantages of the invention will be apparent from the following specification and the drawings, in which:

Fig. 1 is a vertical sectional view of one embodiment of the invention and of the adjacent flush box parts; Fig. 2 is a horizontal section taken along line 2—2 of Fig. 1; Fig. 3 is a bottom view of the new valve seat member; and Fig. 4 is an end elevation of the member.

In the embodiment of the invention shown in the accompanying drawings, the flush box has a bottom 10 in which is secured a pipe 11 leading to a toilet or other object to be flushed. This pipe, as is conventional, is provided with an overflow pipe 12 connected to an extension 11a of the pipe 11 and communicating with the pipe 11 through a conduit 11b.

The upper end 11c of the pipe 11 flares outwardly and the inner portion thereof is curved to provide a valve seat 11d adapted to receive a valve ball 13 thereon to control the flow of fluid entering the pipe 11 from the flush box. The ball 13 is shown in dotted lines in Fig. 1. This ball is provided with an upwardly extending stem 14, the end of which is formed into a loop for attachment to an operating member (not shown) adapted to be actuated in conventional manner by a handle extending from the front of the flush box. This stem is slidably supported in an opening in a bracket 15 secured to the overflow pipe 12.

The above described construction is all well-known and, with minor variations, is incorporated into literally millions of flush boxes in use today. The present invention is a readily detachable and detachable member 16 of rust resisting metal or other material such as a plastic. The valve seat member 16 comprises an annular body portion which is so formed as to overlie the upper portion of the valve seat 11d, and a top portion 16a adapted to overlie the top surface of the valve seat. The member 16 is so shaped that the inner surface of the top portion 16a is spaced from the top of the valve seat 11d to provide room for a waterproof cement 17 such as a putty composition. This cement or putty serves to seal the above space and also attach the member 16 in place. In the embodiment shown the valve seat member 16 is also provided with a downwardly extending edge portion 16b on the outer edge of the member 16. This outer edge, however, is not absolutely required although it does serve to make

a more rigid structure and one which serves to protect the cement or putty 17. The valve seat member 16 is provided with a lip 16c in the area overlying the extension 11a. This lip is formed by a cut-out portion having a substantially straight top edge that is substantially even with the top outer surface 16a of the valve seat member 16. The lip 16c is shaped so as to lie in a single plane.

As is evident, the replacement valve seat member may be easily and quickly inserted by merely raising the ball 13 and inserting the seat member under it and over the top of the pipe 11. The underside of the member should have the cement or putty applied to it before being pressed into place. The inner portion of the member provides a seat for the ball and the cement or putty seals the member in place. When this member becomes worn and pitted, a new one may be placed over it in this manner without removing the old one. The cost of the device is nominal because of the simplicity of its construction and no skilled labor is necessary in connection with its installation or replacement.

While I have shown and described one embodiment of my invention, it is to be understood that it is capable of many modifications; and changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claim.

I claim:

A replacement valve seat for a flush box having a ball valve and a valve seat therefor terminating in an annular lip, comprising: a member having an annular body portion adapted to overlie the upper portion of the valve seat and extend down on either side thereof, said member being substantially U-shaped in cross-section and having a cut-out portion along a section of the outer edge with the top edge of the cut-out portion coinciding with the top plane of the annular member and having a flat outwardly extending portion, said annular member and outwardly extending flat portion being adapted to receive cement material providing a fluid tight seal between the inner top surface and the top surface portion of the valve seat entirely therearound.

ELRA FRANCIS HOWE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
904,228	Richardson	Nov. 17, 1908
1,624,234	Hale	Apr. 12, 1927
1,867,262	Howle	July 12, 1932
2,001,830	Weir	May 21, 1935