I. J. BLAIR

VALVE SEAT DRESSING TOOL.

APPLICATION FILED SEPT. 19, 1919.

1,365,449. Patented Jan. 11, 1921.

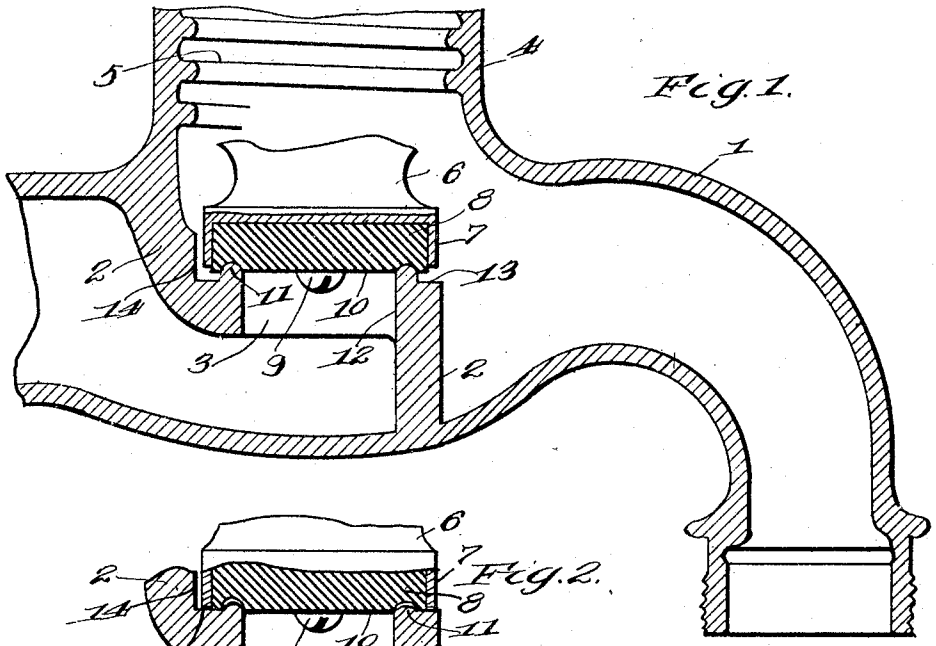


Fig. 1.

Fig. 2.

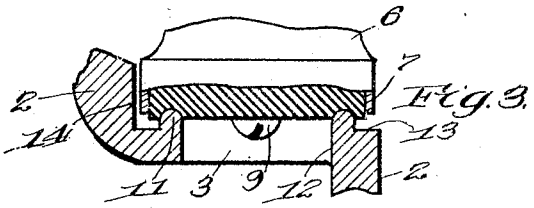


Fig. 3.

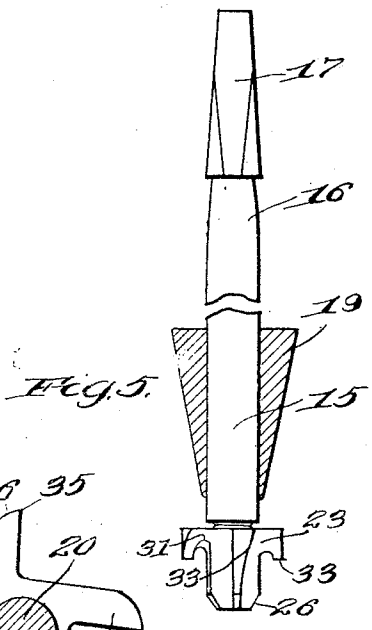


Fig. 5.

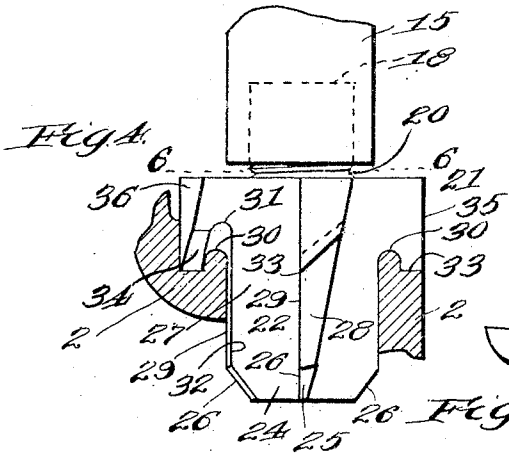


Fig. 4.

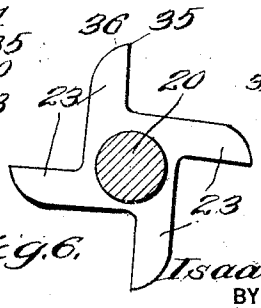


Fig. 6.

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VALVE-SEAT-DRESSING TOOL.

1,365,449. Specification of Letters Patent. Patented Jan. 11, 1921.

Application filed September 19, 1919. Serial No. 325,012.

To all whom it may concern:

Be it known that I, ISAAC J. BLAIR, a citizen of the United States, residing at Spokane, in the county of Spokane and State of Washington, have invented new and useful Improvements in Valve-Seat-Dressing Tools, of which the following is a specification.

This invention relates to improvements in valve seat dressing tools and is limited for use solely in connection with valve seats having a raised or elevated closure engaging bead surrounding the bore of the seat.

Valves provided with these beads insure a water-tight connection with the resilient or packing portion of the valve closure when the latter is firmly seated on the bead, contact being localized on the crown of the bead thereby facilitating a water-tight fit. The presence of this bead maintains the closure, when seated, in spaced relation with the remaining area of the valve seat. Now as the faucet or other valve is continued in service, this bead wears down and therefore its height with respect to that area of the valve seat surrounding the bead, is greatly reduced. It will be understood that these closures slightly overhang the bead, radially outwardly thereof, and when the packing is of a soft nature, the bead will form a groove in the packing and the latter will extend downwardly somewhat about the crown of the bead. After the bead wears down so that the closure is no longer in spaced relation with the outer clearance portion of the valve seat, when the closure is seated, then leakage will occur because of the impossibility of getting a water-tight engagement of the closure against its seat. In all valves of this type known to me, the valve seat has an outward annular depressed face at an elevation slightly lower than the bead, and this clearance area, when the valve is new, is sufficient to prevent the lower peripheral portion of the valve closure from engaging said depressed face when the closure is seated. However, as the bead wears off and flattens this clearance distance is gradually reduced until finally the outer portion of the closure engages the said depressed face thereby preventing engagement of the closure with the bead. It has been proposed heretofore to dress off a beaded valve seat.

However, the primary object of my invention is to provide an improved device for not only dressing and forming or renewing the bead of the valve seat but also dressing down or cutting away the depressed face surrounding the bead so that every time the valve is reseated it will have an outer depressed face in just the clearance relation below the crown of the bead that it had when it was first made.

It is a further object and feature of my invention to provide this device for dressing away that vertical stock of the diaphragm which merges into the valve seat so as to provide and keep forming an arcuate diaphragm clearance for the closure at least equal radially from the bore of the valve seat the outer radius of the depressed face. This feature is of the utmost importance when a valve seat is to be enlarged for an increased sized closure.

My invention also includes the feature of having a portion of the dressing tool shaped for centering engagement with the bore of the valve seat so as to center the tool in the operation of dressing the seat, and in this connection, the tool is provided with a taper to facilitate entrance into the bore in the valve seat when the same is to be enlarged.

Another feature of my invention consists in providing means for avoiding threaded engagement with the threaded gland bore of the valve, this feature of my invention being embodied in a centering cone which is slidable and rotatable on the spindle of the dressing tool to facilitate quick and accurate positioning of the tool in the valve to be dressed.

My invention has many other objects and features which will be more fully described in connection with the accompanying drawing and which will be more fully pointed out in and by the appended claims.

In the drawing:—

Figure 1, is a vertical sectional view of a new valve provided with a beaded valve seat and showing the closure in engagement therewith.

Fig. 2, is a fragmentary view of a valve seat and the closure after the bead is worn down and before it has been dressed.

Fig. 3, is a similar view showing the valve seat after it has been dressed.

Fig. 4, is a view of the valve seat with my improved tool in position to redress the same.

Fig. 5, is a view of the complete tool illustrating the centering cone in section.

Fig. 6, is a sectional view on line 6—6 of Fig. 4.

Like characters of reference designate similar parts throughout the different figures of the drawing.

Inasmuch as my invention, and in fact the whole inventive problem to which this invention is addressed, is the formation of a tool for a special use on a special stock article, I will first describe such article by reference to Fig. 1. As illustrated, 1 designates an ordinary faucet form of valve, the chamber of which is partitioned off by the usual diaphragm 2, in a part of which the valve seat is formed. The bore of the valve seat is indicated at 3. Coaxially disposed above and with respect to the axis of the bore 3 is the gland extension 4 which is shown provided with internal threads 5. A closure is generally indicated at 6 and the same will have a threaded stem of the usual form, not shown, for engagement with the threads 5. The lower end of the closure 6 is cupped and the flange 7 thereof surrounds the packing 8, of the closure. This packing is usually of relatively soft material and is removably secured, as shown, by a headed screw 9. It will be seen that the flange 7 extends downwardly to within a very short distance of the bottom face 10 of the packing 8. This figure is drawn to show a brand new faucet in which a portion of the seat is formed by an elevated bead 11 which merges into the wall 12 of the bore 3, on the interior of said bead. The exterior of said bead terminates at a clearance face 13 which is at a slight elevation below the bead. That portion of the diaphragm 2 which depends toward the valve seat has its stock dressed away as at 14 but inasmuch as this vertical portion of the diaphragm only partly surrounds the valve seat, this dressed-off portion will be only arcuated in extent instead of being circular.

Now when the parts are new, the packing 8 of the closure will seat on the crown of the bead thereby localizing engagement of the closure onto the crown of the bead, the depressed face 13 and the diaphragm portion 14 constituting a clearance area with which the closure is in ample spaced relation. However, as the bead wears down, as shown in Fig. 2, the closure will be brought into engagement with the depressed face 13 and a firm engagement with the bead will be impossible. In fact, the lower edge of the flange 7 will prevent a water-tight engagement of the closure with its seat and the faucet will leak. It is now customary to discard such faucets which are otherwise capable of prolonged service, merely because the bead has been worn off.

In Fig. 3 I have shown the valve seat of Fig. 2 as it would appear after being reseated by my improved tool in which it will be seen that the outer annular clearance is the same as in Fig. 1. In Fig. 4, the tool itself is shown in the position in which it would assume as the reseating operation is just completed, and I will next refer specifically to this device, reference also being had to Figs. 5 and 6.

My improved device includes a spindle having a cylindrical portion 15 provided with a slight taper 16. On its upper end, the spindle is of polygonal cross-section to facilitate the application thereto of a revolving implement. The lower end of said spindle has a threaded bore or socket 18 to which various sized reseating bodies may be applied. A centering cone 19 is slidably and revolubly mounted on the spindle and the parts are so proportioned that this cone may be slipped off from or onto the spindle over the polygonal end. This centering cone is designed to fit any diameter of gland bore with a view of centering the upper portion of the spindle in the valve.

My improved dressing tool body has a threaded shank 20 adapted to be turned into the threaded socket 18 of the spindle. This tool body has what I will term a head portion 21 and a bore centering portion 22. Projecting radially from said body is one or a plurality of wings 23, all of which are identical in form and operation and only one of which need be described in detail. The lower portions 24 of said wings have their edges tapered off, as indicated at 25, and these edges are also chamfered so that each wing will have a cutting edge 26. These cutting edges 26 are of great service when the bore of a valve seat is to be enlarged as they greatly facilitate a centering entrance of the tool. The bore-engaging portions 27, of the wings, have their edges 28 chamfered to provide cutting edges 29, for engagement with the bore. It will be understood that the bore of a valve collects foreign matter and in dressing a seat it is sometimes desirable to not only cut away this foreign matter but also to slightly dress off the surface of the bore. This insures effective centering of the tool in the bore.

The head portions 21 of said wings have bead-forming notches 30 which are suitably chamfered as indicated at 31, the cutting edges merging into the cutting edges 29 and the chamfered edges 31 merging into the chamfered edges 32 of the centering portions of the wings. These notches 30 are of a size and diameter to form the desired shape of bead. Outwardly of the notches, the wings have depending straight cutting edges 33 which are chamfered off at 34 and serve to cut away the depressed face 13 at a prescribed level below the crown of the bead as the latter is dressed down. Thus in each dressing operation, the finished valve seat, or the redressed valve seat, will have the

same clearance area as the valve seat shown in Fig. 1.

In reseating and also in enlarging reseating operations, it will also be necessary to cut away the diaphragm portion 14. Thus the head portions of the wings are provided with cutting edges 35 which are suitably chamfered or rounded off at 36 for dressing down the arcuate diaphragm portion 14.

I have very successfully personally used and sold tools in accordance with this invention and they are now in extensive use and have resulted in a great saving in the reclaiming in what would otherwise have been discarded faucets and valves.

It is believed that my invention will be fully understood from the foregoing description and while I have herein shown and described one specific form of my invention, I do not wish to be limited thereto except for such limitations as the claims may import.

I claim:—

1. A re-seating tool for valve seats having a bead and an annular depressed face and diaphragm wall clearance area about the bead, as described, comprising a tool body having a portion adapted to be centered by engagement with the bore of the valve seat and provided with a winged cutting or dressing portion having a bead forming notch to shape the bead when the seat is dressed, and a lower linear cutting edge outwardly of said notch depending below said notch and having cutting engagement with said depressed face of said seat to dress down said face to a prescribed level below the crown of the bead as the latter is dressed down, the winged portion having an outer cutting edge for dressing away the vertical stock of the diaphragm adjoining said depressed face, whereby the peripheral portion of the closure outside said bead will always be in spaced relation with said depressed face and diaphragm.

2. A reseating tool for valve seats having a bead and an annular depressed face and diaphragm wall clearance area about the bead, as described, comprising the tool body having a plurality of cutting or dressing wings extending radially and said wings having bore portions with cutting edges on the outer margins of the wings for dressing the bore of the valve and centering the tool, the lower ends of said wings having tapered cutting edges for entrance of the tool body into a bore to be enlarged, the upper or head portion of the wings being provided with bead forming notches to shape the bead when the seat is dressed, said wings having depending linear cutting edges disposed radially outwardly with respect to said notches for cutting engagement with said depressed face of said seat to dress down said face to a prescribed level below the crown of the bead as the latter is dressed down, the winged portions having outwardly disposed cutting edges for dressing away the vertical stock of that portion of the diaphragm adjoining said depressed face.

3. A reseating tool for valve seats having a bead and an annular depressed face and diaphragm wall clearance area about the bead, as described, comprising a tool body having a plurality of cutting or dressing wings extending radially and said wings having bore portions with cutting edges on the outer margins of the wings for dressing the bore of the valve and centering the tool, the upper or head portion of the wings being provided with bead forming notches to shape the bead when the seat is dressed, said wings having depending linear cutting edges disposed radially outwardly with respect to said notches for cutting engagement with said depressed face of said seat to dress down said face to a prescribed level below the crown of the bead as the latter is dressed down, the winged portions having outwardly disposed cutting edges for dressing away the vertical stock of that portion of the diaphragm adjoining said depressed face.

In testimony that I claim the foregoing as my own, I hereby affix my signature.

ISAAC J. BLAIR.