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2,082,461

VALVE SEAT DRESSER

Filed May 12, 1934

Fig. 1.

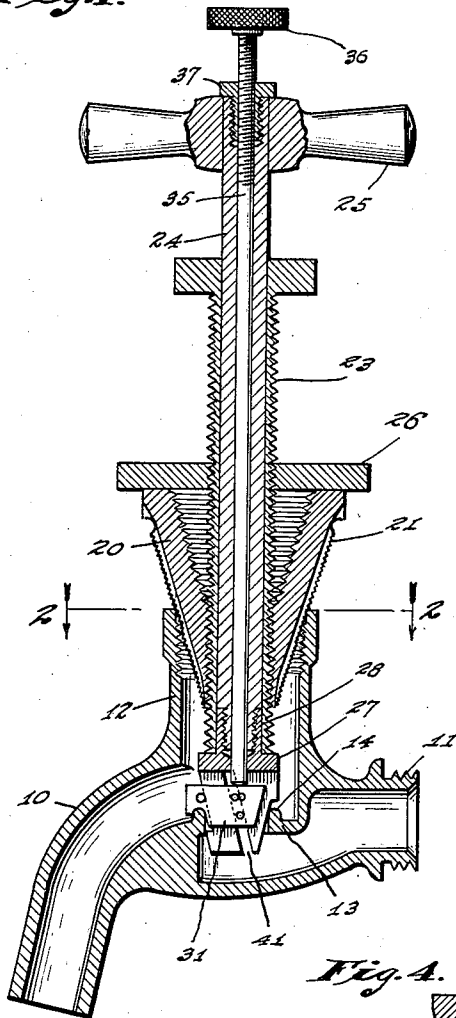


Fig. 2.

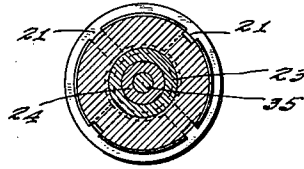


Fig. 3.

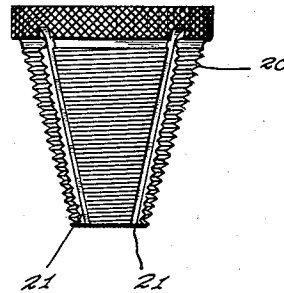


Fig. 4.

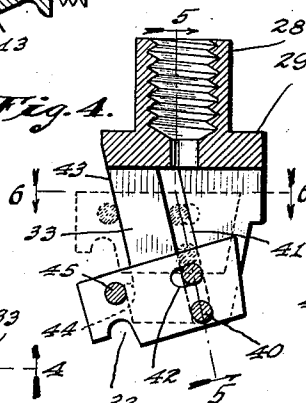


Fig. 5.

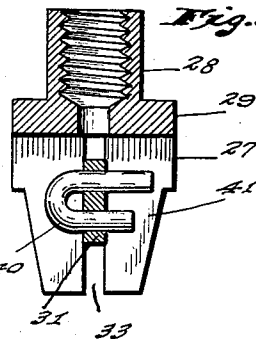
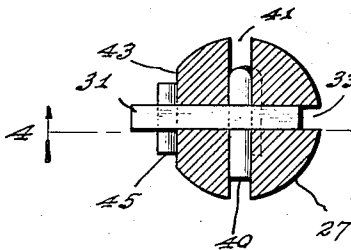


Fig. 6.



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VALVE SEAT DRESSER

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Application May 12, 1934, Serial No. 725,243

2 Claims. (Cl. 90—12.5)

My invention is concerned with tools for facing the valve-seats of plumbing fixtures, and particularly with tools adapted to finish valve seats to a form other than planar. Plumbing-fixture valve-seats of the type with which I am particularly concerned are provided with an upwardly extending annular rib or flange which is adapted to be engaged by a valve faced with some suitable compressible material. If such valve-seats are re-faced merely by the removal of material from their upper surfaces, the effective height of the annular rib is reduced and may become so small that insufficient clearance is provided to secure a firm contact between the valve-seat and the co-operating valve-face.

It is the object of my invention, therefore, to provide a valve-seat re-facing tool which will preserve the form of the valve-seat. A further object of my invention is to provide a re-facing tool which will have a wide variety of applications and will be adapted to be used upon valves of different sizes and in association with plumbing-fixtures of varying character. A further object of my invention is to provide the re-facing tool with a cutting element which will normally be securely held in association with the remainder of the tool but which can be removed readily when desired.

In carrying out my invention I provide a conical cap threaded interiorly and exteriorly so that it can be secured in line with the opening of the plumbing-fixture from which the valve has been removed, and in this cap I mount, through the medium of screw-threads, a hollow sleeve which slidably and rotatably receives the shank of the cutting-head. The cutting-head, different sizes of which may be used, is adapted for attachment to the lower end of the shank and is of generally conical form to enter and be centered by the valve seat. The cutting-head is provided with an axially slidable cutting element the position of which is adjusted by means of a feed-rod that extends upwardly through the shank and is screw-threadedly connected thereto for purposes of adjustment. Means are provided for normally retaining the cutting element in association with the head, such means being arranged to permit removal of the cutting element when desired.

The accompanying drawing illustrates my invention: Fig. 1 is an axial section through the re-facing tool in association with a faucet; Fig. 2 is a transverse section on the line 2—2 of Fig. 1; Fig. 3 is a side elevation of the screw-threaded

cap; Fig. 4 is an axial section on the line 4—4 of Fig. 6 through a cutting head; Fig. 5 is a generally axial section on the line 5—5 of Fig. 4; and Fig. 6 is a transverse section on the line 6—6 of Fig. 4.

The faucet 10 illustrated in Fig. 1 is of a common type. It has a threaded end 11 for attachment to a supply pipe and an upwardly extending neck 12 in which the valve is mounted. The valve-seat 13, with which the valve co-operates, is disposed in line with the neck 12 and provided with an upwardly projecting annular rib or flange 14 which immediately surrounds the valve opening and which, when the valve is closed, is in firm contact with a compressible facing on the valve.

The hollow conical cap 20, by means of which my re-facing tool is secured to the faucet 10, is illustrated in Figs. 1 and 3. As is a common expedient, the cap 20 is provided both interiorly and exteriorly with screw-threads. When the faucet which is to have its valve-seat re-faced has its neck internally threaded, as in the drawing, for the reception of the stuffing-box nut through which the valve-stem projects, the cap 20 is used in the position shown in the drawing with its external screw-threads co-operating with the internal screw-threads of the faucet-neck 12. If the faucet 10 is of a type in which the neck 12 has external threads for the stuffing-box nut, the cap is reversed so that its internal threads will co-operate with the external threads on the faucet-neck. This reversed position is not shown in the drawing, as the use of a reversible conical cap threaded both interiorly and exteriorly is a common expedient in devices of this kind.

I have found, however, that in some faucets the neck 12 has an unthreaded portion at its upper end and that such unthreaded portion is in some instances of sufficient extent to prevent engagement of the threads on the cap 20 with the threads of the neck 12. To provide for secure attachment of the cap 20 to the faucet-neck in such circumstances, I provide the threaded surface of the cap 20 with longitudinally extending grooves or flutes 21 and then harden the cap so that when it is rotated in contact with a faucet-neck it will act as a tap or die and cut its own thread in the neck of the faucet.

The cap 12 has a central opening provided with internal threads for the reception of an externally threaded sleeve 23 within which there is located a rotatable and axially slidable shank 24 that terminates at its upper end in a handle 25 by means of which it can be rotated. To hold the

sleeve 23 in fixed position relative to the head 20, I employ a lock-nut 26 which screw-threadedly receives the sleeve 23 and which can be clamped against the end of the cap 20.

At its lower end, the shank 24 is adapted for attachment to a cutting head 27. Conveniently, the lower end of the shank 24 is reduced in diameter and provided with screw-threads adapted to enter a screw-threaded central opening in an upwardly extending central boss 28 on the cutting head 27. Preferably, the boss 28 has an external diameter equal to that of the shank 24, so that it can enter the sleeve 23. Below the boss 28, the cutting head has an annular shoulder 29 adapted to engage the lower end of the sleeve 23 to transmit the axial reaction of the cutting element as it bears against the valve-seat.

The cutting element 31 is conveniently a flat piece of hardened steel having near its outer lower corner a notch 32 conforming to the shape of the rib 14 of the valve-seat. The cutting head 27 is provided with a downwardly opening axial slot 33 of a width to receive slidably the cutting element 31. The exterior surface of the cutting head 27 is conical in order to enter valve-openings of varying diameter and to properly center the re-facing tool.

For the purpose of locating the cutting element 31 in the proper axial position in the slot 33 I provide a feed-rod 35 which extends completely through the shank 24, bears against the upper surface of the cutting element 31, and has at its upper end a knurled head 36. Below the head 36, the feed rod 35 is provided with screw-threads received in a threaded bushing 37 secured to the upper end of the shank 24.

The cutter 31 is maintained in proper angular position in the slot 33 by means of a guide member 40 which is mounted in the cutter and received in a slot 41 in the cutting head 27. The slot 41 is in a plane perpendicular to that of the slot 33 and is disposed at an angle to the axis of the head, such angle corresponding to that of the conical outer surface of the head. Therefore, as is clear from Fig. 1, as the cutter is moved generally axially by the feed rod 35, the cutting edge of the cutter moves generally parallel to the adjacent portion of the conical surface of the head.

The guide member 40 is conveniently a U-shaped piece of round wire which passes through two vertically spaced openings in the cutter and projects on both sides of the cutter, as is clear from Figs. 5 and 6. The lower leg of the guide member 40 has a fairly close fit in the hole which receives it, but the hole 42 which receives the upper leg of the cutter is elongated so as to permit a limited relative angular movement of the guide member and cutter. This possibility of angular movement is availed of for the purpose of releasably holding the cutter in the head. To this end, that portion of the conical face of the head 27 which lies adjacent that side of the slot 33 through which the cutter projects is flattened, as indicated at 43, to provide a plane surface parallel to the slot 41. The flat surface 43 terminates above the bottom of the head to leave a shoulder 44 which co-operates with a pin 45 in the cutter to retain the cutter in place.

When the guide member 40 is in the clockwise limit of that angular movement permitted by the elongated hole 42, the cutter may be inserted into

or withdrawn from the head, the pin 45 clearing the shoulder 44. However, if the cutter is rocked in a clockwise direction after having been inserted into the head, the pin 45 will be moved into close association with the flat surface 43 and behind the shoulder 44, so that the cutter will not drop from the head. The two conditions of relative adjustment of the guiding member 40 and the cutter 31 are illustrated in Fig. 4, the cutter being shown in full lines in the position it occupies when being inserted into or withdrawn from the head and in dotted-lines in the position it occupies after the operation of inserting it has been completed. There is sufficient friction between the legs of the retaining member 40 and the openings which receive them to prevent any accidental relative movement of the cutter and guiding member.

When the device is to be used, the feed rod 35 is retracted so as to permit the cutting element 31 to rise all the way to the top of the slot 33, the outer conical face of the cutting head 27 is placed in the valve seat to properly center the device, and the cap 20 is then rotated until it has become firmly locked to the faucet-neck 12. The sleeve 33 is then adjusted in the cap 20 until the head 27 will rotate freely in the valve-seat without an excessive amount of play, and the sleeve is then locked in position by the lock nut 26. The feed rod 35 is then rotated to force the cutting element 31 into contact with the annular rib 14 of the valve-seat. By rotating the handle 25, the shank 24, head 27, and cutting element 31 will be rotated, the sides of the notch 32 serving as a cutting edge to re-face the valve-seat. As the re-facing operation continues, the feed rod is rotated to lower the cutting element 31 until a continuous face is provided for the valve.

I claim as my invention:

1. In a valve-seat reamer, a rotatable head, a cutting element, said head having a slot one end of which opens in a face of said head, a guide member mounted in said cutting element and slidably receivable in said slot, said guide member and cutting element being relatively angularly adjustable to a limited extent, and two co-operating abutments on said head and cutting element respectively, said abutments being disposed to interengage and prevent removal of the cutting element from the head when said guide member and cutting element are at one limit of relative angular adjustment and to clear each other and thereby permit removal of the cutting element from the head when the guide member and cutting element are at the other limit of their relative angular adjustment.

2. In a valve-seat reamer, a rotatable head adapted to enter and be centered in the hole in a valve-seat, said head having a generally conical surface for engagement with the edges of the hole in the valve-seat, a cutting element mounted in said head, said cutting element having a cutting edge extending transversely of the axis of rotation of said head, said cutting edge being notched to form an annular rib on the valve-seat as the cutting element is rotated in contact therewith, means guiding said cutting element for movement in said head along a path substantially parallel to an element of said conical surface, and means for adjusting said cutting element along such path.

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