March 5, 1935. R. G. HAWKER 1,993,479

VALVE SEATING APPARATUS

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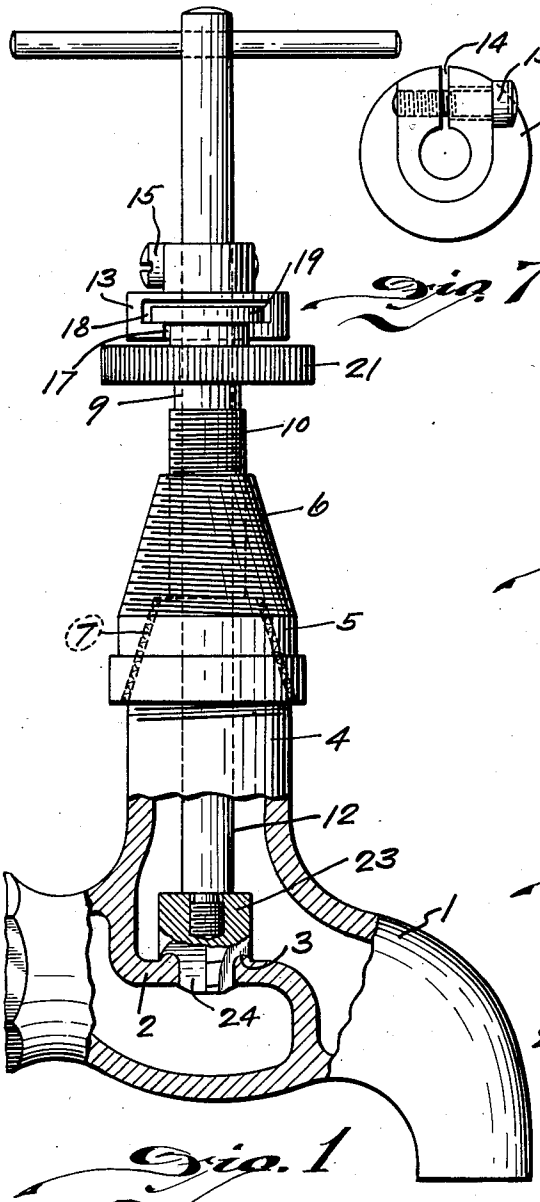


Fig. 1

Fig. 7

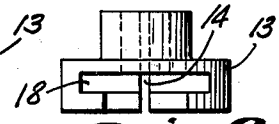


Fig. 2

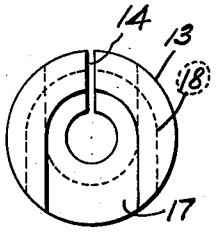


Fig. 8

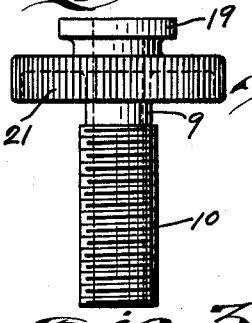


Fig. 3

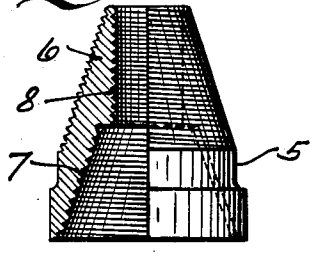


Fig. 4

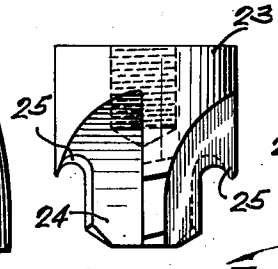


Fig. 5

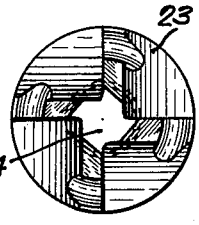


Fig. 6

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VALVE SEATING APPARATUS

Roland G. Hawker, Troy, N. Y.

Application July 11, 1932, Serial No. 621,870

1 Claim. (Cl. 90—12.5)

This invention relates to valve seating tools, and more particularly to an apparatus for refinishing the seating surfaces of globe valves, bibb type faucets, and analogous valve structures having openings surrounded by concentric contoured areas.

In the present invention there is contemplated a mounting device detachably engageable with the valve or faucet structure and forming a support and guide for a revoluble shaft carrying a suitably contoured cutter adapted to automatically and accurately center itself relative to the valve seat to be refinished and having means for positively feeding the revoluble shaft and cutter head axially independently of their rotation.

The object of the invention is to simplify the structure as well as the means and mode of operation of valve seating devices, whereby they will not only be cheapened in construction, but will be more efficient in use, uniform in action, positive in operation, accurate, easily applied and operated, and unlikely to get out of repair.

A further object of the invention is to provide improved positive feeding means for the cutter shaft or stem.

A further object of the invention is to provide an improved form of cutter head.

A further object of the invention is to provide a cutter head which will accurately center itself for the seat refinishing operation.

A further object of the invention is to provide an improved method for accurately reaming or refinishing valve and faucet seats.

With the above primary and other incidental objects in view, as will more fully appear in the specification, the invention consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described and set forth in the claims.

Referring to the accompanying drawing wherein is shown the preferred, but obviously not necessarily the only form of embodiment of the invention, Fig. 1 is a side elevation partly in section illustrating the valve seating device, forming the subject matter hereof, applied to a typical form of bibb type faucet. Figs. 2, 3 and 4, are detail views respectively of the abutment collar for engagement of the feeding device, the shaft bearing and feeding sleeve and the mounting or cone, detached from each other. Fig. 5 is an enlarged detail side view and Fig. 6 is a similar end view of the cutter head.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawing, 1 is a typical bibb type faucet of which 2 is the division wall or partition having therein the valved opening, about which is formed the valve seat 3 to be refinished. The present valve seating device is detachably engageable with the screw threaded head 4 of the valve or faucet which ordinarily receives the cap nut carrying the packing gland for the valve stem. In some instances the portion 4 of a valve or faucet is interiorly screw threaded, while in other constructions such portion is exteriorly threaded. The present apparatus is universally adapted to either type of valve structure.

Detachably engageable with the screw threaded portion 4 of a valve or faucet is a mounting cone 5 having both interior and exterior conical surfaces 6 and 7. By reversing the position of the mounting cone 5 it may be engaged either interiorly or exteriorly of the threaded portion 4 of the valve or faucet operated upon. The conical form of the mounting member 5 affords a relatively wide range of adaptability, such cone being engageable at one point or another with valves or faucets of various sizes. While the conical surfaces 6 and 7 will not conform to the threaded surface of the valve, nevertheless, at a point of corresponding diameter there will be ample interengagement of the threads of the mounting cone and those of the valve or faucet to temporarily hold the cone firmly in engagement during the reseating or seat reaming operation.

Beyond the interior conical threaded portion 7 of the mounting cone 5 such member is provided with a straight interiorly threaded bore 8 to receive a bearing and feeding sleeve 9. This bearing member 9 is provided with a threaded portion 10 adjustably engageable within the threaded bore 8 of the mounting cone 5. The adjustable sleeve 9 is provided with a smooth bore which affords an extended guiding bearing for the cutter head stem 12. The cutter head stem 12 is loosely mounted in the sleeve 9 for revoluble adjustment. Fixedly secured upon the stem 12 is an abutment collar 13, which, in the present instance, is slit at 14 and provided with a clamp screw 15 by which it is contracted tightly upon the stem.

The under side of the abutment collar 13 is provided with a slot 17 having undercut sides or gibbed as at 18. The upper end of the bearing and feeding sleeve 9 is provided with a peripheral flange or head 19 engageable within the undercut slot 18 of the abutment collar into which it is slidable laterally prior to insertion of the cutter head shaft 12. Thus the bearing and feeding

sleeve 9 is freely rotatable about the shaft 12 and within the undercut slot 17 of the abutment collar and likewise the shaft 12 is freely rotatable therewithin. The sleeve 9 has longitudinal thrust bearing upon the abutment collar 13 during the reseating or reaming operation. The sleeve 9 is further provided with an enlarged collar or head 21, preferably peripherally knurled by which the sleeve is manually revoluble. Being screw threaded within the threaded bore 8 of the cone 5, the rotation of the sleeve 9 by engagement of its flanged head 19 within the undercut slot 17 of the abutment collar serves to longitudinally advance the cutter stem or shaft 12.

Upon the lower end of the stem or shaft 12 is a cutter head 23 having a terminal pilot portion 24 of reduced diameter and a secondary portion of larger diameter forming a shoulder 25. The cutter head is longitudinally fluted to form a succession of cutting edges of which four are shown in the drawing, although it may be formed with greater or less number. The terminal or pilot portion 24 has but small degree of peripheral clearance. The terminal face of the pilot portion is beveled to afford a cutting edge and likewise the longitudinal flutes of the pilot portion effect a cutting action. The shoulder 25 is contoured to agree with the shape of the valve seat to be produced. This shoulder 25 may be flat or it may be beveled to produce correspondingly shaped valve seats. That illustrated in the drawing is recessed to produce a convex seat upon which the valve membe. will rest. The longitudinal grooves or flutes in the cutter head, being extended beyond the shoulder 25, form cutting edges upon such shoulder which serve to produce the corresponding valve seat surface. The pilot portion 24 is slightly larger than the opening of the valve to be reseated and consequently the reduced portion 24 will act as a reamer to slightly enlarge the opening whereby the pilot portion 24 is made to accurately fit such opening. Making the opening of exactly the proper size, the cutter head will thus automatically center itself in exact perpendicular relation to the plane of the seat to be cut, and by continued rotation of the cutter head, the seating surface surrounding the enlarged opening is contoured to agree with the shape of the shoulder 25 of the cutter head.

By providing a pilot slightly larger than the original hole in the valve seat which is thereby enlarged to exactly agree, all tendency of the cutter head to wabble in its work is obviated and accuracy of operation is insured. In practice a number of cutter heads 23 of different sizes and particularly having pilot portions 24 of slightly different diameters are provided. The cutter head selected for use is one of which the pilot is slightly larger in diameter than the original hole in the valve and hence effects enlargement of the hole to agree with the pilot portion.

It is to be understood that while the shoulder 25 has been shown recessed to afford a raised or convex valve seat that the shape may be varied according to the type of valve seat desired.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claim.

Having thus described my invention, I claim:

In a valve seating tool, a contoured cutter head, a smooth revoluble stem therefor, a reversible mounting cone interiorly and exteriorly screw-threaded for engagement with the valve member operated upon, said cone being provided with a screw-threaded central bore, an externally threaded sleeve threadedly engaging said bore and interengaging means between the sleeve and the stem, said means including an adjustable collar having a slit provided with a clamp screw for adjustably securing the collar upon the stem, said collar having a laterally opening slot diametrically arranged with respect to said slit, the sides of the slot being undercut to receive a head upon said sleeve, said head having a reduced neck portion and an enlarged peripheral flange, said head being laterally insertable within the slot of the collar with the flange overhanging the undercut sides thereof to prevent axial movement of the sleeve and collar but permitting free relative rotative movement thereof.

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