May 14, 1929. C. A. YERTSON 1,713,316

VALVE RESEATING DEVICE

Filed Sept. 23, 1925

Fig. 1.

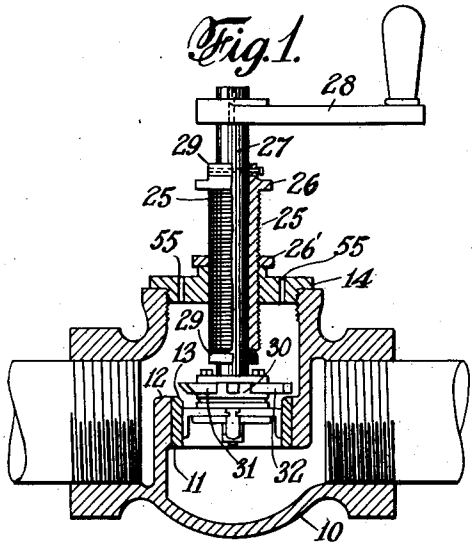


Fig. 2.

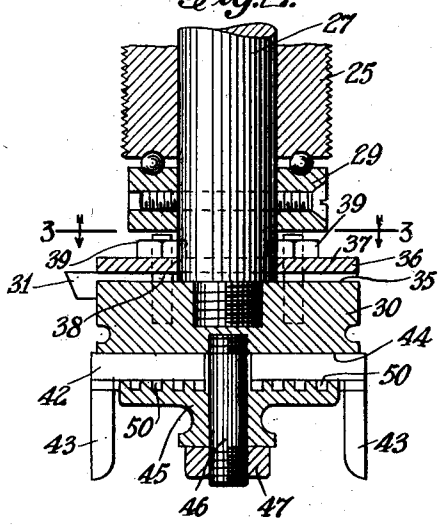


Fig. 3.

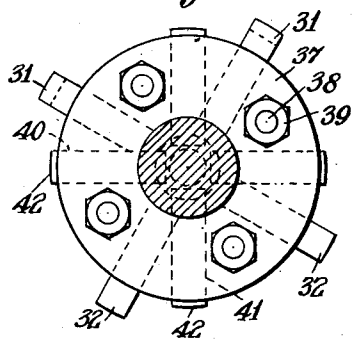


Fig. 4.

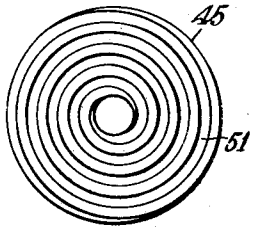


Fig. 5.

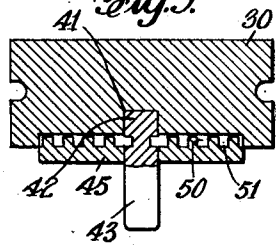


Fig. 6.

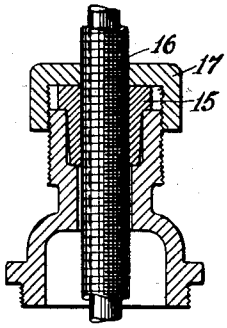


Fig. 7.

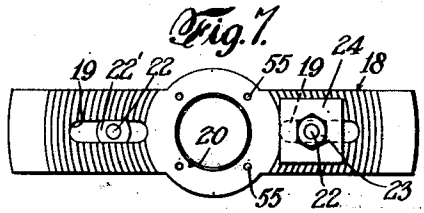
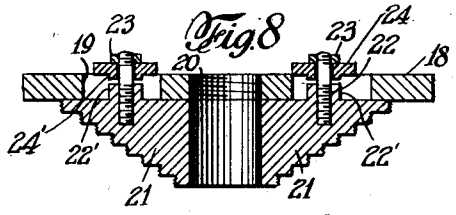


Fig. 8.



INVENTOR

Carl A. Yertson

BY Neal T. Schuetz

ATTORNEY

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UNITED STATES PATENT OFFICE.

CARL A. YERTSON, OF HOBOKEN, NEW JERSEY.

VALVE-RESEATING DEVICE.

Application filed September 23, 1925. Serial No. 58,013.

The invention relates to a device for reseating standard as well as special designs of check and stop valves, faucets, etc., or finishing the seats thereof which have become worn and leaky. It has for its object a device whereby the active fixed surface of a valve seat may be reconditioned, particularly of valves that are not readily removable after installation and especially where space is contracted. The invention contemplates means of a simple, durable and inexpensive construction and which may quickly be adjusted in position. The invention has for a further object to provide a reseating device of the aforesaid character whereby both the bevelled and flat portions of the surface of a seat can simultaneously be machined using, also, standard types of square cutters for this purpose. A still further object of the invention is to provide a device which will admit of viewing the progress of the work without necessitating the removal of the device.

Heretofore, the practice has been to secure a chuck or holding device about the valve body, the same carrying a rotary tool or cutter member for machining the surface of the valve seat; or, when this is not feasible, it is necessary to take down the valve and to mount the same in a lathe. It is extremely difficult, in a reseating device having individually adjustable chuck pieces, accurately to reposition the reseating device after removing same for examination of the work; also, the said individual chuck pieces have a tendency to slip and thus displace the cutter and ruin the valve seat. By the novel means constituting the subject matter of the present invention, this operation is greatly facilitated and the finishing and reseating may be accomplished most accurately and in a comparatively short period of time. For example, by actual use of the novel device, the time of operation required has been reduced to one-tenth. This is effected by attaching to a portion of the valve body, with respect to which the valve seat is already accurately centered, a member adjustable axially relatively to said valve seat and within which there is arranged to be rotated a spindle carrying the tool or tools for machining said seat, said tool support further carrying radially adjustable means to insure accurate centering of the said tool support with respect to the seat to be finished and securing operation of the tools substantially without vibration. To this end, the said adjustable means are carried by the spindle beyond the tool position thereon, the tools thus being located between two supporting means which insure against bending of the spindle or chattering of the tools when in operation of finishing a seat.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings, in which—

Fig. 1 is a vertical section thru a valve with the reseating device secured in position therein for machining its seat.

Fig. 2 is a fragmentary detail sectional view of the lower end of the feed screw and operating spindle carried thereby, together with the holder for the machining tools.

Fig. 3 is a horizontal section taken on the line 3—3, Fig. 2, looking in the direction of the arrows.

Fig. 4 is a detached plan view of a spiral adjusting member.

Fig. 5 is a fragmentary transverse vertical section illustrating the adjustable centering arrangement.

Fig. 6 is a fragmentary sectional view illustrating a modification of the holding member of the device.

Fig. 7 is a plan view of a further modification therein; and Fig. 8 is a vertical section therethru.

Referring to the drawings, 10 designates a valve body or casing having a seat member 11 which is usually provided in larger type valves with both a flat upper surface portion 12 and a bevel portion 13; and which surfaces it is necessary at times to machine in order to secure accurate seating of the disk (not shown) of the valve. In the particular type of valve shown, the cap or bonnet (not shown) has been removed together with the spindle and attached valve disk of the said valve; and there is substituted for said bonnet a cap or guide member 14 arranged to be threaded into the body of the valve 10, replacing the said bonnet. Where external threads are provided in the original valve, it will be understood, of course, that the cap will be correspondingly altered to fit over the outside of the body portion, rather than upon the inside as indicated in Fig. 1. Moreover, with smaller sizes of valves employing a packing gland, the same will be removed and substituted with a preferably tapered gland 15, Fig. 6, said gland being

axially bored and the bored portion threaded to receive a threaded feed screw 16, while the nut 17 of the valve when replaced is used to tighten up the gland and secure thereby the spindle in position. Or, with flanged valves, a cross bar 18, Fig. 7, provided with slots 19 may be used and is arranged to be suitably secured to the valve body or casing by its stud bolts, said cross bar being provided with a central threaded opening 20 which is to be accurately centered relatively to the valve seat and is adapted to receive a threaded feed screw as in the previously described embodiments. In all cases, the feed screw will be accurately locked with its axis coinciding with the vertical axis of the seat.

I prefer with the cross bar 18 to provide a guiding means which may be accommodated to various sizes of valves; and to this end, a pair of separable blocks 21 (Fig. 8) may be utilized, said blocks being provided with stepped threaded portions as shown and corresponding to different sizes of threaded openings. By reversing the blocks, it will be understood that the same may be secured about a valve body when the same is threaded externally rather than internally. By this expedient, the guiding means is readily set up in place with the cross bar positioned to receive the feed screw and spindle as before, said bar being locked and accurately centered by cooperating graduations thru the medium of a stud 22 projecting upwardly from a block 22′ integral with a block 21 and squared along two corresponding oppositely disposed sides to fit a corresponding slot 19 of the cross bar. Over a threaded projecting end of the said studs is mounted a nut 23 to hold, thru an intermediate washer 24, the said cross bar in adjusted position to the blocks 21. Washer 24 to prevent turning is also provided with a downwardly directed projection or guide block 24′ which is squared along two opposite sides to fit within a corresponding slot 19 but of insufficient depth to contact with the guide block 22′ so that the nut 23 may draw the parts together to prevent relative sliding of the same.

Referring to Fig. 1 of the drawings, a feed screw 25 is shown in position in the cap 14, the said feed screw being axially disposed with respect to the seat 11; and is provided with an enlargement or nut 26 whereby it may be rotated to move vertically with respect to said seat, a further nut 26′ serving to secure the feed screw in any particular position to which it may have been adjusted. Passing thru the feed screw 25 is a spindle 27 which may be rotated in any suitable manner as by a crank handle 28 disposed either horizontally as indicated, or vertically if desired, to effect a rotary or oscillatory movement of the spindle in manner well understood. The spindle is secured to be rotatable relatively to said feed screw 25 as by means of collars 29, suitable intermediate ball bearings being provided to afford smooth rotation.

At its lower end, the spindle carries a head 30 rotatable therewith and adapted to support the cutters or finishing members, as the tools 31 and 32, the former being adapted to operate upon the bevel portion 13 and the latter upon the flat portion 12 of the seat member 11. Pairs of these tools may be employed and are held in a suitable chuck, as for example between the upper portion 35 of the head 30 and the lower surface 36 of a circular plate or washer 37 which is mounted about the lower end of the spindle 27 and is removably secured to the head 30 by suitable studs 38 and nuts 39. This affords a ready and convenient means for locking and securing the tools in position.

Over its lower surface, the head 30 is provided with two diametrical grooves 40 and 41 respectively, said grooves being arranged at right angles to each other and adapted to receive the inwardly directed arms 42 of four radially adjustable and downwardly directed guiding feathers or wings 43. These arms 42 are held to the lower surface 44 of the head 30 by a nut or holding member 45 which is mounted over an axially disposed stud 46 projecting downwardly from the head 30; and a nut 47 is screwed over the end thereof and bears against said holding member. By suitably turning the member 45, the feathers 43 are held in the desired position to contact with the wall of the seat port. In order to set these guides 43 to various diameters of seat port, the same are radially adjustable with respect to the head 30; and for this purpose are provided with a series of downwardly projecting radially disposed teeth 50 which are arranged to fit into a spiral groove 51 formed in the upper surface of the holding member 45, so that as the latter (after loosening the nut 47) is rotated about the stud 46, the guides 43 will be correspondingly moved radially inwardly or outwardly and will also be maintained firmly in position thereby when the nut 47 is brought up to tighten the member 45 against head 30.

I have found it desirable, moreover, to arrange for the frequent inspection of the finishing operation without necessitating dismantling of the reseating device. To this end, the cap 14, or cross bar 18 and blocks 21 as the case may be, is provided with a series of perforations 55 substantially in line with the seat of the valve and thru which the interior of the valve may be viewed to disclose the progress made in the reseating operation. In operating the device, the bonnet of the valve is removed together with the valve spindle and attached valve, and

there is then substituted therefor the guide member 14 or the pieces 21, the same being properly positioned and receiving the adjustable sleeve with tool spindle and cooperating mechanism. The centering of the spindle is then assured by properly setting the adjustable guides 43, whereupon the spindle is adjusted downwardly to bring the cutting tools into contact with the valve seat and then rotated to effect a suitable finish thereof, the spindle being fed slowly downward by imparting a slight rotation to the feed screw 16 or 25.

By the hereinbefore described mechanism, the cutting or finishing operation may be readily performed and a new seat effected by rotating or oscillating the handle 28, all the parts being held steadily and a uniform pressure being provided thru the action of the feed screw 25. Moreover, the tools employed may be readily inserted in position and replaced if necessary; also, the guides 43 are conveniently and accurately adjusted to correspond to the diameter of the seat port. In utilizing this device, it has been found possible to materially cut down not only the cost of operation but especially the time required in the entire act of reseating the valve, no taking down of the same being required as the operation may be conducted in situ.

I claim:—

1. A valve reseating device, comprising means adapted to be secured to the valve body coaxially with its longitudinal axis, a feed screw adjustable therein, a continuous tool spindle passing directly through the feed screw, carried thereby and rotatable therein, a pair of collars secured to the spindle about opposite ends of the feed screw to prevent relative axial movement therebetween, and tool holding means secured to the inner end of said spindle.

2. A valve reseating device, comprising means adapted to be secured to the valve body coaxially with its longitudinal axis, a feed screw adjustable therein and means to secure the feed screw in adjusted position to the means to be secured to the valve body, a continuous tool spindle passing directly through the feed screw and rotatable therein, a pair of ball-bearing collars secured to the spindle about opposite ends of the feed screw to prevent relative axial movement therebetween, and tool holding means secured to the inner end of said spindle.

3. A valve reseating device, comprising means adapted to be secured to the valve body coaxially with its longitudinal axis, a feeding member fitted therein, a continuous tool spindle rotatably carried by the feeding member, and means at the inner end of said spindle for securing seat cutting means and carrying adjustable centering elements located beyond the cutting means to center the inner end of the spindle in the valve port.

4. A valve reseating device, comprising means adapted to be secured to the valve body coaxially with its longitudinal axis, a feeding member fitted therein, a continuous tool spindle rotatably carried by the feeding member, and means at the inner end of said spindle for securing seat cutting means embodying a bevel cutting tool and a flat cutting tool and carrying adjustable centering elements located beyond the cutting means to center the inner end of the spindle in the valve port.

5. A valve reseating device, comprising means adapted to be secured to the valve body coaxially with its longitudinal axis, a feeding member fitted therein, a continuous tool spindle rotatably carried by the feeding member, and means at the inner end of said spindle for securing seat cutting means and carrying adjustable centering elements located beyond the cutting means to center and radially support the inner end of the spindle in the valve port.

6. A valve reseating device, comprising means adapted to be secured to the valve body co-axially with reference to the seat and including a slotted cross bar, blocks threaded to fit the threads of the valve body and having outwardly projecting studs to fit within the slots of the cross bar, and means to secure the cross bar and blocks to each other through said studs.

7. A valve reseating device, comprising means adapted to be secured to the valve body co-axially with reference to the seat and including a slotted cross bar, separable and reversible blocks provided with stepped threads and adapted to be secured to the valve body and having outwardly projecting studs to fit within the slots of the cross bar, and means to secure the cross bar and blocks to each other through said studs.

8. A valve reseating device, comprising means adapted to be secured to the valve body co-axially with reference to the seat and including a slotted cross bar, blocks threaded to fit the threads of the valve body and having outwardly projecting studs with threaded ends and two opposite sides squared to fit within the corresponding slots of the cross bar, washers adapted to fit over the projecting studs and having portions squared along two opposite sides to fit within the corresponding slots of the cross bar, and nuts working on the threaded ends of the studs over the respective washers to secure the cross bar and blocks to each other through said studs.

In testimony whereof I affix my signature.

CARL A. YERTSON.