March 10, 1931. J. J. MAHONEY 1,796,208

VALVE SEAT TRUING DEVICE

Filed March 11, 1929

Fig. 1.

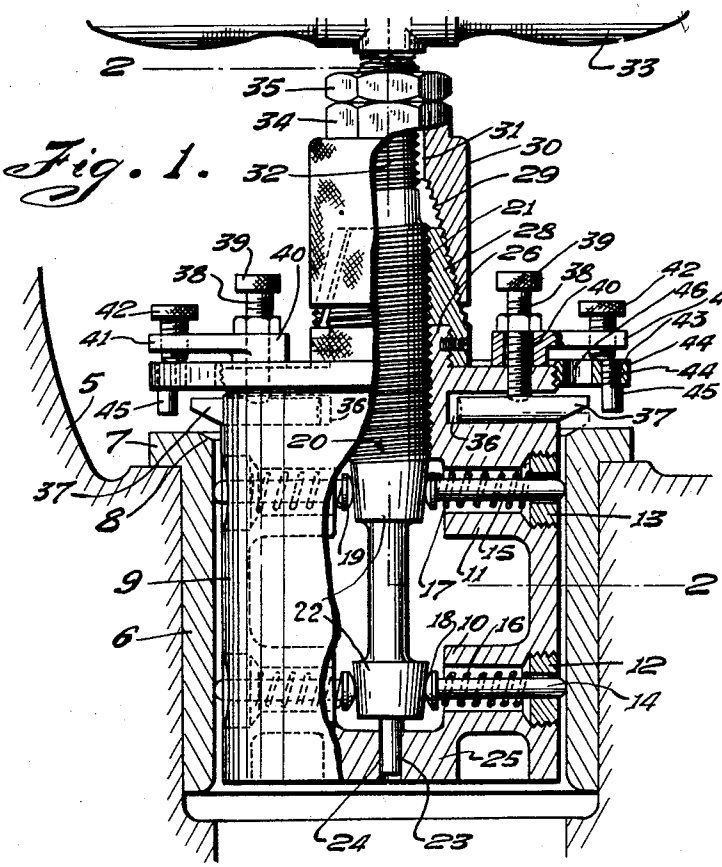


Fig. 3.

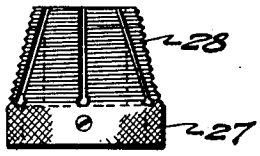


Fig. 4.

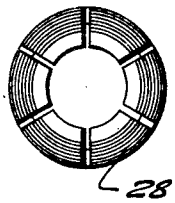
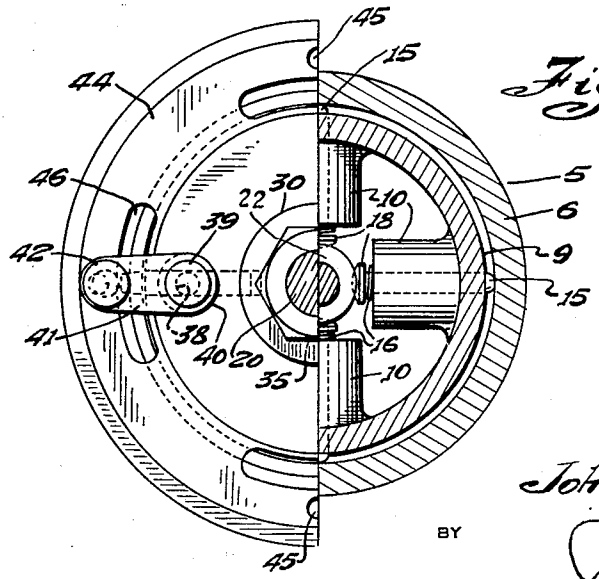


Fig. 2.



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VALVE-SEAT-TRUING DEVICE

Application filed March 11, 1929. Serial No. 346,154.

The present invention relates to improvements in valve seat truing devices, one object of the invention being the provision of a tool which is especially designed for reseating the seats of safety valves while said valve casings are in position on the boiler.

Another object of the present invention is the provision of a device of this character which is provided with centering means and with adjustable means whereby the action of the cutters upon the seat can be limited to insure the proper truing and cutting of the valve seat, said tool also permitting observation of the cutting action at all times, thus providing a thoroughly efficient and practical tool, the construction of which is exceedingly simple and durable.

In the accompanying drawings:

Figure 1 is a sectional view through the body of a boiler and a safety valve seat carrying member with the present tool in operative relation thereto, portions of the same being shown in elevation;

Figure 2 is a top plan view of the present tool with the right hand portion shown in horizontal section on the line 2—2 of Figure 1;

Figure 3 is a side elevation of the contractile clamping member used in connection with the present truing tool;

Figure 4 is a top plan view of the clamping member shown in Figure 3.

Referring to the drawings, the numeral 5 designates the body portion of a boiler adjacent to the safety valve body 6, which is provided with the usual flange 7 and a valve seat 8.

It is desirable in truing, or what is known as reseating, safety valves to have a tool that can be manipulated without removing the safety valve body from the boiler, and the present tool has therefore been devised to be used while the valve body is in position in the boiler, and has a cylindrical portion 9 insertible within the body 6 and spaced therefrom, as clearly illustrated in the drawings, said portions having a plurality of sets of internal radially disposed tubular members 10 and 11. Mounted in the wall of the cylinder 9 coaxially with the respective members 10 and 11 are bushings 12 and 13 through which centering pins 14 and 15 are longitudinally slidable. Springs 16 and 17 surrounding the pins 14 and 15, respectively, with their ends bearing against the bushings 12 and 13 and heads 18 and 19 at the rear ends of pins 14 and 15 tend to move said pins toward the axis of the cylinder 9 and retract the outer ends of said pins. A spindle 20, mounted in the cylinder 9 coaxially with the latter and operable by a handle 33 at its outer end, has external screw threads which work in the internally threaded bores 26 of the head of the cylinder 9. The spindle 20 carries a pair of operating cones or tapered portions 22 which bear against the heads 18 and 19 of the tool centering members or pins 14 and 15 and, when the spindle is moved axially of the cylinder 9 toward the forward end of the latter, exert a wedging action between the inner ends of the pins 14 and 15. The forward end 23 of the spindle 20 is of reduced diameter and is rotatable and longitudinally movable in a depression 24 of the spider 25 formed integral with the cylinder 9 and permits a limited longitudinal movement of the spindle for operating the guiding pins.

The projection or boss 26 of the cover or top of the cylinder 9 is externally screw-threaded so as to receive the forward internally screw-threaded portion of a split externally tapered collar 28. The collar 28 has a second internally threaded portion which is engaged by the threaded portion 21 of the spindle 20. The tapered portion of the collar 28 has external screw threads which are engaged by the internally tapered and screw-threaded portion 29 of the locking sleeve 30. The sleeve 30 has a bore 31 at its rear end which surrounds the spindle but is out of contact therewith. Set screws 28′ carried by the collar 28 and engaging the boss 26 lock the collar 28 in place. After the spindle 20 has been adjusted to project the guide pins 14 and 15, the sleeve 30 may be screwed down on the collar 28 to clamp the latter upon the spindle, whereupon a lock nut 35 engaging the reduced threaded portion 32 of the spindle and the nut 34 can be moved down against the

sleeve 30 to hold it in the desired adjusted position to permit the handle 33 to be manipulated to rotate the entire tool within the casing 6, the purpose of which will presently appear.

Formed at diametrically opposed points in the head of the cylinder 9 are two recesses 36, which constitute the tool receptacles, so that the tools or cutters 37 may each be mounted therein and be held in such position by means of its respective set screw 38, accessible from the exterior of the head of the cylinder 9. Mounted upon each of the set screws 38 with its apertured head 40 mounted thereon for swinging movement and held in locked position by means of the lock nut 39 is a finger or arm 41 which overlies the adjustable annulus 44. This annulus 44 is provided with internal screw threads 44′ which coact with the externally threaded portion 43 of the head of the cylinder so that said annulus may be adjusted to and from the flange 7 of the valve casing 6 and so that the limiting pins 45 carried thereby may bear against said flange and limit the depth of cut that the cutters 37 will perform upon the valve seat 8. Carried by each finger 41 is an adjusting screw 42 which is adapted to engage the rear face of the annulus 44 to act as a brace thereto, and also as a lock, to maintain the same in the desired adjusted position or against upward or outward movement.

The annulus, as illustrated, is provided with a plurality of apertures 46 which expose certain portions of the valve seat so that the same may be observed at all times during the manual rotation of the complete tool.

From the foregoing description, taken in connection with the drawings, the operation of the present tool is readily understood, but briefly stated is as follows:

The cylindrical portion 9 is inserted into the casing 6 of the valve and the spindle 20 is rotated to move the wedges 22 thereof forwardly so as to project all of the centering pins 14 and 15 to cause their ends to engage the inner circumference of the cylinder 6. The spindle is now locked in this position by the collar 28 and sleeve 30, which, after such locking, is secured by the lock nuts 34 and 35 against further movement. The annulus 44 is now adjusted so as to limit the "cut" that the cutters 32 are to take from the valve seat 8, the pins 45 being positioned slightly above the flange 7 and out of contact therewith. The set screws 42 are now adjusted so as to engage the annulus in a firm manner and hold the same against displacement relatively to the cylindrical member 9. The complete tool is now rotated or oscillated, as may be desired, to make the necessary "cut" the valve seat being exposed to view during this operation through the apertures 46. During the operation, and should the operator find that the seat has been cut sufficiently before the pins 45 engage the flange 7, the annulus may be adjusted to bring the pins 45 in contact with the flange 7 and the tool can then be rotated to complete the finish upon the valve seat.

It is evident from the foregoing that a valve seat truing device made according to the present invention provides a tool exceedingly simple to operate and one which can be used in conjunction with a safety valve body without the necessity of removing the latter from the boiler, as the tool itself is provided with the necessary centering means to insure a proper truing cut of the valve seat, while the annulus can be adjusted to insure a desired depth of cut.

I claim:

1. A valve seat truing device, including a cylindrical body for introduction in a valve seat carrying body, a plurality of radially disposed spring retracted members for engaging the valve seat carrying body, a plurality of tools carried by the cylindrical body, a spindle rotatable and longitudinally shiftable in said cylindrical body and having a tapered portion to engage and move said spring retracted members outwardly when said spindle is longitudinally shifted in one direction, said spindle and cylindrical body having directly inter-engaging means operative when said spindle is rotated, to shift said spindle longitudinally, and means carried by said cylindrical body to engage the valve seat carrying body and limit the depth of cut of said tools.

2. A valve seat truing device according to claim 1 including means carried by the cylindrical body and engaging the spindle for securing said member and spindle against relative rotation.

3. A valve seat truing device, including a hollow cylinder having an axially threaded bore through its rear end, a plurality of spring retracted valve seat cylinder engaging pins mounted in the cylinder with their inner ends toward the axis of the cylinder, a shaft having a threaded portion to engage said bore for rotary and longitudinal movement, the forward end of the shaft being tapered and engaging the inner ends of the pins to move the pins outwardly against the springs, a clamp fitting upon the shaft externally of the cylinder, means for operating the clamp to grip the shaft to lock the shaft and pins in adjusted position, and a plurality of seat cutting tools carried by the cylinder.

4. A valve seat truing device, including a hollow cylinder having an axially threaded bore through its rear end, a plurality of spring retracted valve seat cylinder engaging pins mounted in the cylinder with their inner ends toward the axis of the cylinder, a shaft having a threaded portion to engage said bore for rotary and longitudinal movement, the forward end of the shaft being

tapered and engaging the inner ends of the pins to move the pins outwardly against the springs, a clamp fitting upon the shaft externally of the cylinder, means for operating the clamp to grip the shaft to lock the shaft and pins in adjusted position, a plurality of seat cutting tools carried by the cylinder, and adjustable means carried by the cylinder for limiting the depth of the cut.

5. A valve seat truing device, including a hollow cylinder having an axially threaded bore through its rear end, a plurality of spring retracted valve seat cylinder engaging pins mounted in the cylinder with their inner ends toward the axis of the cylinder, a shaft having a threaded portion to engage said bore for rotary and longitudinal movement, the forward end of the shaft being tapered and engaging the inner ends of the pins to move the pins outwardly against the springs, a clamp fitting upon the shaft externally of the cylinder, means for operating the clamp to grip the shaft to lock the shaft and pins in adjusted position, a plurality of seat cutting tools carried by the cylinder, an annulus adjustable longitudinally of the cylinder rearwardly of the tools, and means carried by said annulus to engage the valve seat carrying member and limit the cut of the tools.

6. A valve seat truing device, including a hollow cylinder having an axially threaded bore through its rear end, a plurality of spring retracted valve seat cylinder engaging pins mounted in the cylinder with their inner ends toward the axis of the cylinder, a shaft having a threaded portion to engage said bore for rotary and longitiudinal movement, the forward end of the shaft being tapered and engaging the inner ends of the pins to move the pins outwardly against the springs, a clamp fitting upon the shaft externally of the cylinder, means for operating the clamp to grip the shaft to lock the shaft and pins in adjusted position, a plurality of seat cutting tools carried by the cylinder, an annulus adjustable longitudinally of the cylinder rearwardly of the tools, a plurality of bracing fingers carried by the cylinder and overlying said annulus, and a set screw carried by each finger to engage and secure the annulus in adjusted position.

7. A valve seat truing device, including a hollow cylinder having an axially threaded bore through its rear end, a plurality of spring retracted valve seat cylinder engaging pins mounted in the cylinder with their inner ends directed toward the axis of the cylinder, a shaft having a threaded portion to engage said bore for rotary and longitudinal movement, the forward end of the shaft being tapered and engaging the inner ends of the pins to move the pins outwardly against the springs, a clamp fitting upon the shaft externally of the cylindler, means for operating the clamp to grip the shaft to lock the shaft and pins in adjusted position, said cylinder being provided with a plurality of radially disposed tool receptacles adjacent its rear end and with external screw threads upon its rear end, a tool mounted in each of said receptacles, a set screw adjacent each receptacle for locking the tool in adjusted position, and means for limiting the cut of the tool, said means comprising an annulus provided with internal screw threads engaging the screw threads of the cylinder and annulus bracing means mounted upon the set screws and overlying and engaging said annulus.

8. A valve seat truing device, including a hollow cylinder having an axially threaded bore through its rear end, a plurality of spring retracted valve seat cylinder engaging pins mounted in the cylinder with their inner ends directed toward the axis of the cylinder, a shaft having a threaded portion to engage said bore for rotary and longitudinal movement, the forward end of the shaft being tapered and engaging the inner ends of the pins to move the pins outwardly against the springs, a clamp fitting upon the shaft externally of the cylinder, means for operating the clamp to grip the shaft to lock the shaft and pins in adjusted position, said cylinder being provided with a plurality of radially disposed tool receptacles adjacent its rear end and with external screw threads upon its rear end, a tool mounted in each of said receptacles, a set screw adjacent each receptacle for locking the tool in adjusted position, an annulus provided with internal screw threads engaging the screw threads of the cylinder and forming a means to limit the cut of the tool, a plurality of fingers, one carried by each set screw, and an adjustable screw carried in the free end of each finger for engaging the annulus to brace the same.

In testimony whereof I have hereunto set my hand.

JOHN J. MAHONEY.