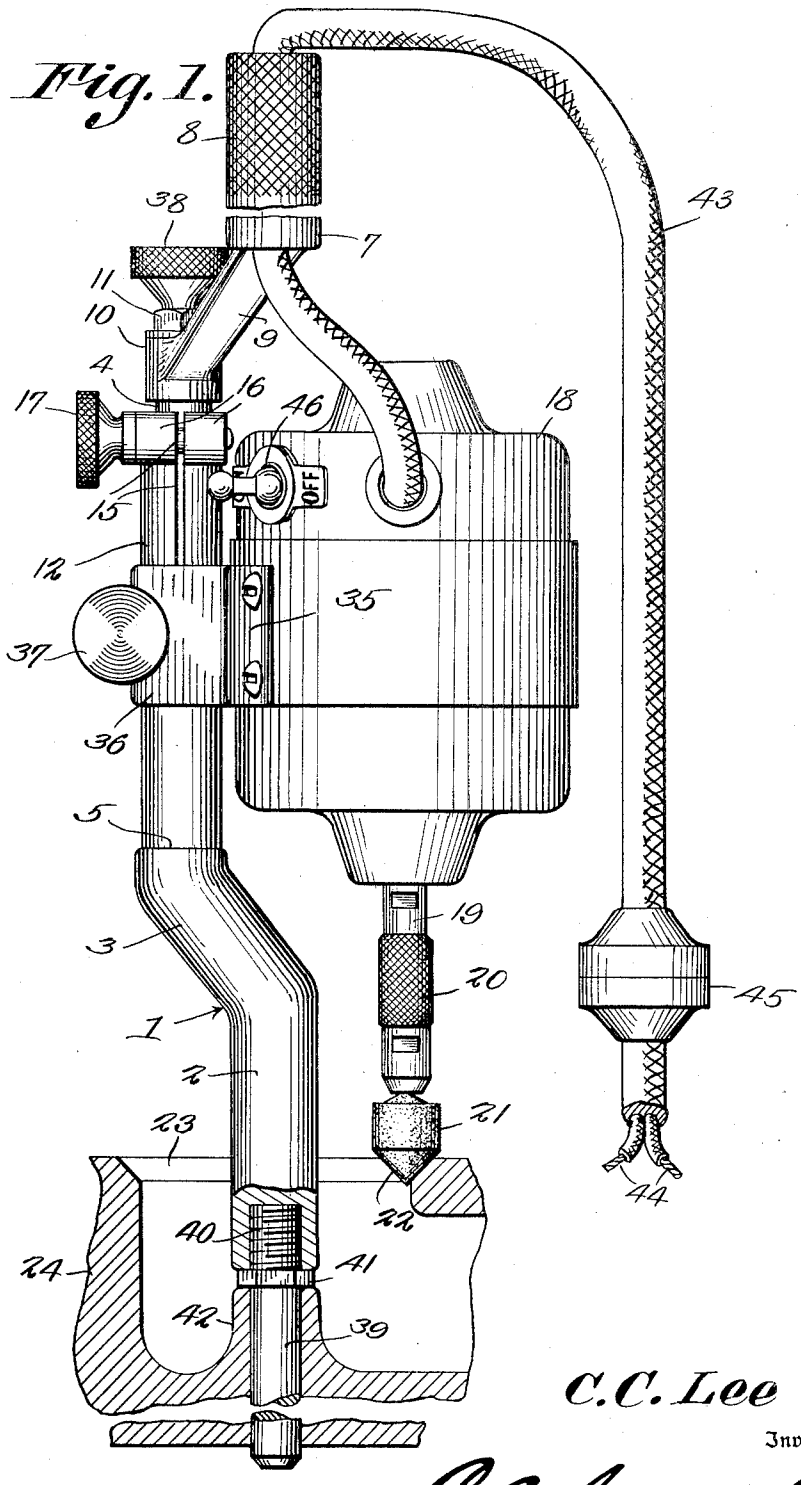
Feb. 27, 1934. C. C. LEE 1,948,792

VALVE SEAT GRINDER

Filed May 27, 1933 3 Sheets-Sheet 1

Fig. 1.



C. C. Lee

Inventor

By C. A. Snow & Co.

Attorneys.

Feb. 27, 1934. C. C. LEE 1,948,792

VALVE SEAT GRINDER

Filed May 27, 1933 3 Sheets-Sheet 2

Fig. 2.

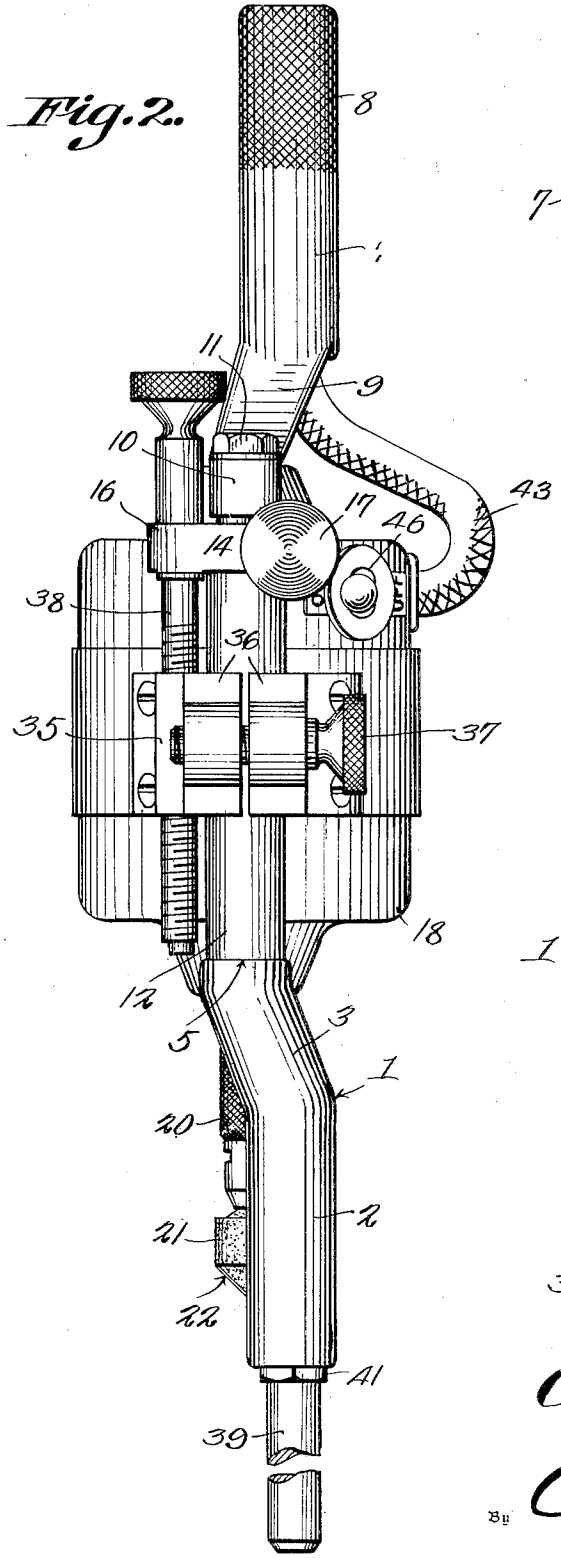
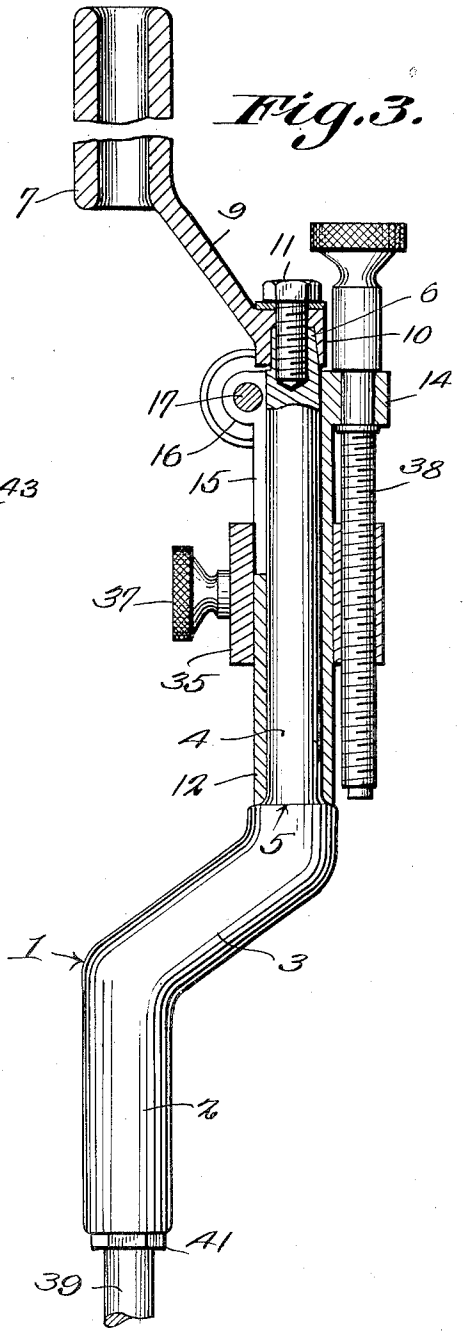


Fig. 3.



C. C. Lee

Inventor

By C. A. Snow & Co.

Attorneys.

Feb. 27, 1934. C. C. LEE 1,948,792

VALVE SEAT GRINDER

Filed May 27, 1933 3 Sheets-Sheet 3

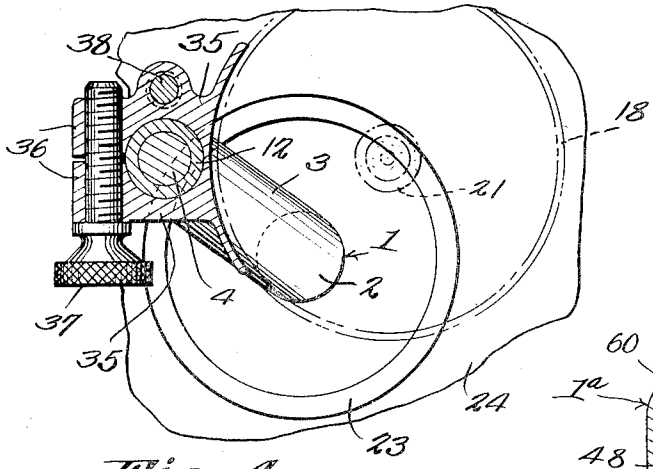


Fig. 4.

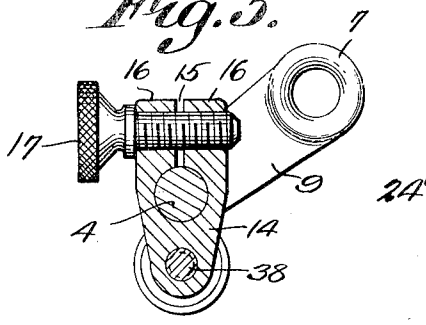


Fig. 5.

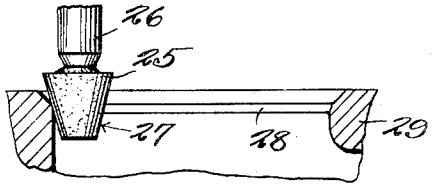


Fig. 8.

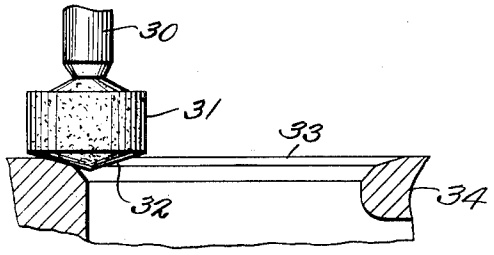


Fig. 9.

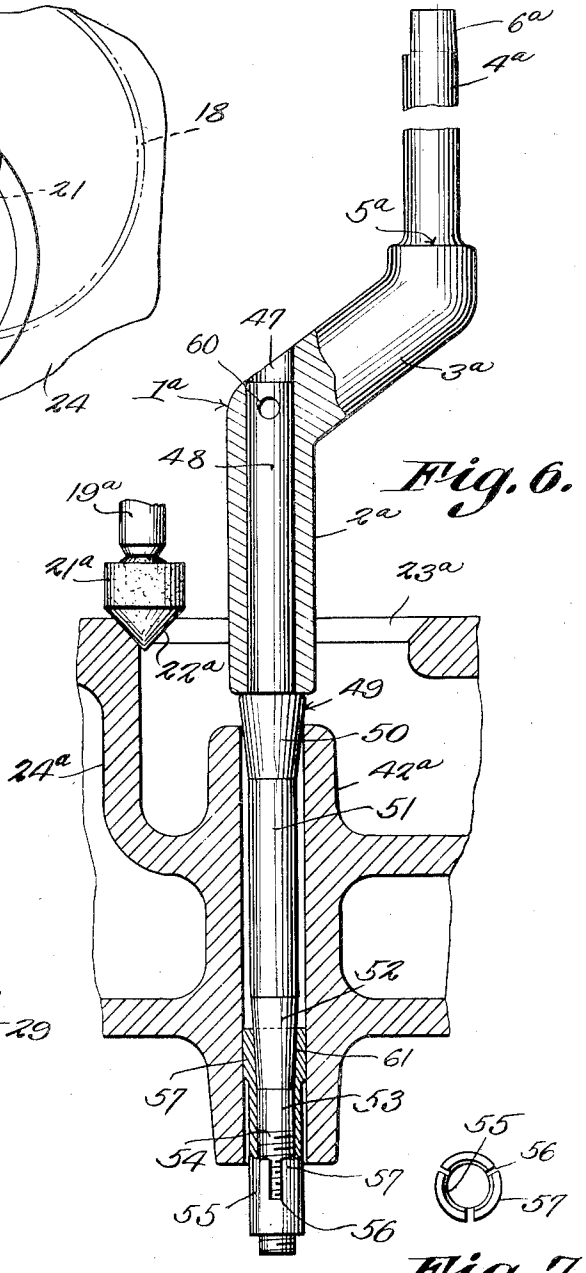


Fig. 6.

Fig. 7.

C. C. Lee
Inventor

By C. A. Snow & Co.
Attorneys.

Patented Feb. 27, 1934

1,948,792

UNITED STATES PATENT OFFICE

1,948,792

VALVE SEAT GRINDER

Clifford C. Lee, Aberdeen, S. Dak.

Application May 27, 1933. Serial No. 673,274

9 Claims. (Cl. 51—241)

The device forming the subject matter of the present application is adapted to be used for grinding the valve seats, such as the valve seats of the internal combustion engines used on automobiles, trucks, motor boats, etc. The invention provides novel means for supporting and rotating the tool which faces the valve seat, and for adjusting the tool in a plurality of directions, so that the said tool will cooperate properly with the valve seat to be faced.

It is within the province of the disclosure to improve generally and to enhance the utility of devices of that type to which the invention appertains.

With the above and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings:

Fig. 1 is a side elevation, showing a device constructed in accordance with the invention, and assembled with a portion of an internal combustion engine, shown in section;

Fig. 2 is an elevation disclosing the device claimed, in a position at right angles to the showing of Fig. 1;

Fig. 3 is a longitudinal section, wherein some parts are omitted, other parts being shown in section;

Fig. 4 is a transverse section taken through the means whereby the motor is assembled adjustably with the carrier;

Fig. 5 is a transverse section showing the means whereby the parts that effect vertical adjustment may be clamped to the shaft of the support;

Fig. 6 is a vertical section showing a modification, parts being in elevation;

Fig. 7 is an end view of the bushing shown in Fig. 6;

Fig. 8 is a fragmental elevation showing a modification in the facing tool;

Fig. 9 is a fragmental elevation showing another modification in the facing tool.

In carrying out the invention in a form found to be acceptable, there is provided a rigid support, which is denoted generally by the numeral 1. At its lower end, the support 1 has a straight shank 2, connected to a laterally inclined or offset arm 3 terminating in a shaft 4, which is parallel to the shank 2. There is a transverse shoulder 5 where the shaft 4 is joined to the arm 3. The upper end 6 of the shaft 4 is tapered, and flattened on one side. The numeral 7 marks a tubular socket and handle. The socket and handle 7 has a common vertical axis with the shank 2 of the support 1. The handle 7 is knurled as shown at 8, so that the operator can grasp the handle and rotate the tool about said common vertical axis. At its lower end, the handle 7 has an offset arm 9 terminating in a socket 10. The socket 10 has a tapered recess which fits on the correspondingly-shaped upper end 6 of the shaft 4 and holds the arm 9 against rotation. A securing element 11, such as a screw, holds the socket 10 of the handle 7 on the upper end 6 of the shaft 4.

A tubular carrier 12 is provided, and is mounted on the shaft 4. The lower end of the carrier 12 rests on the shoulder 5 of the support 1. The carrier 12 can be rotated for adjustment on the shaft 4. Excepting when such an adjustment is being effected, the carrier 12 does not rotate on the shaft 4 but is held fixed on the shaft, by a means next to be described.

At its upper end, the carrier 12 is provided with a transverse bracket 14. The bracket 14 and the upper part of the carrier 12 are slotted at 15 to form compressible jaws 16. The jaws 16 are tightened, to grip the shaft 4, by a transverse screw 17 threaded into one of the jaws and journaled in the other of them.

The numeral 18 designates an electric motor. The shaft 19 of the motor 18 is arranged parallel to the shank 2 of the support 1. The shaft 19 has a chuck 20 holding a facing tool, which may be an abrasive element or grinding wheel 21, on the lower end of the shaft. The facing tool 21 is shown at 22 as having a 45 degree bevel, the bevel being adapted to cooperate properly with the valve seat 23 of the engine structure 24. Any other bevel may be used. Thus, in Fig. 8, the facing tool 25, carried by the shaft 26 (corresponding to the shaft 19) has a sharper bevel 27 for working on the seat 28 of the engine structure 29. In Fig. 9, the shaft is shown at 30 and carries a facing tool 31, having a less pronounced bevel 32, adapted to cooperate with the seat 33 of the engine structure 34. In general, the bevel of the facing tool may be formed as desired.

A laterally projecting slide 35 (Fig. 1) is secured to the electric motor 18, and is divided to form jaws 36, between which the carrier 12 is

located, as shown in Fig. 4. The jaws 36 are connected by a tightening device, for instance a screw 37, rotatable in one of the jaws 36 and threaded into the other of said jaws. The slide 35 (which is secured to the motor 18 as aforesaid) can be moved longitudinally of the carrier 12, and the means for moving the slide and the motor, for adjustment, longitudinally of the carrier, may be a feed screw 38, held against longitudinal movement in the bracket 14 of the carrier 12 (Fig. 3), and threaded into an offset (Fig. 4) on the slide 35.

A spindle 39 is threaded at 40 (Fig. 1) into the lower end of the shank 2 of the support 1, and is held in place by a shoulder 41, which engages the lower end of the shank 2. The spindle 39 is rotatably received in the valve stem guide 42 of the engine structure 24.

The sheath 43, which encloses the conductors 44 (Fig. 1) for the motor 18, extends upwardly through the combined handle and socket 7. The current supplied to the motor 18 is controlled by a switch 46, mounted on the motor. In the sheath 43 and in the conductors 44 may be interposed a connection 45, of such construction as to permit the upper part of the sheath 43 and the corresponding parts of the conductors 44 to rotate with respect to the lower portion of the sheath and the corresponding portions of conductors. Thus, the facing tool 21 can be rotated in a way hereinafter described, without putting kinks into that part of the sheath 43 that extends from the connection 45 to the source (not shown) of electrical energy.

In practical operation, the spindle portion 39 of the support 1 is inserted into the guide 42 of the engine structure 24, as shown in Fig. 1. The tightening screw 17 is loosened, so that the jaws 16 of the bracket 14 on the upper end of the carrier 12 do not grip the shaft 4. Then, the carrier 12 may be rotated for adjustment on the shaft 4, the motor 18 being carried outwardly and laterally until the bevel 22 of the facing tool 21 cooperates with the valve seat 23 to be faced, as shown in Figs. 1 and 4. The screw 17 is manipulated to cause the jaws 16 on the carrier 12 to grip the shaft 4. The motor 18 and the facing tool 21 thus are held in a position wherein the bevel 22 of the facing tool is at a fixed radius with respect to the axis of the shank 2 and the spindle 39 of the support 1.

The current is turned on, by means of the switch 46, and the facing tool 21 is caused to rotate. The operator grasps the handle 7 and rotates the support 1, the spindle 39 turning in the valve stem guide 42. The facing tool 21 is carried around in an orbit represented by the valve seat 23, and the entire surface of the valve seat is reconditioned.

The motor 18 and the facing tool 21 can be raised and lowered, by turning the feed screw 38, the slide 35 being caused to move upwardly or downwardly on the carrier 12. The motor 18 and the grinding wheel 21 may be held in any position to which they have been adjusted vertically, by manipulating the screw 37, the jaws 36 being caused to grip the carrier 12. Because the handle 8 of the support 1 and the spindle 39 thereof have a common vertical axis, the facing tool 21 can be carried around in an orbit by a simple twisting motion applied to the support 1 at the handle 7. At the top of the device there is no long, laterally-projecting operating crank, taking up much room in the restricted space in which the device generally must be employed.

In Figs. 6 and 7, parts hereinbefore described are designated by numerals already used, with the suffix "*a*", and in those figures, a modified form of the invention is shown. In the form of the invention under discussion, the shank 2*a* of the holder 1*a* has a longitudinal bore 47, in which is inserted the end 48 of the spindle 49, the spindle 49 corresponding to the spindle 39 of Fig. 1. There is a transverse hole 60 in the upper end of the end 48 of the spindle 49.

The part 48 of the spindle 49 carries, at its lower end, a tapered plug 50, which is inserted into the upper end of the valve stem guide 42*a*. Below the tapered plug 50, the spindle 49 is provided with a cylindrical part 51, having a tapered portion 52 merging into a cylindrical end 53, the part 53 being threaded, as shown, at 54.

The numeral 55 designates an expansible bushing, shaped to fit in the valve stem guide 42*a*. The bushing is slotted longitudinally, from its upper end downward, as shown at 56, to form resilient arms 57. The arms 57 have an internal taper, shown at 61, and corresponding to the taper of the part 52 of the spindle 49. Assuming that the shank 2*a* of the support 1*a* has not been placed on the part 48 of the spindle 49, a hand-pin (not shown) may be placed in the hole 60, and the spindle 49 may be rotated, the bushing 55 being carried upwardly by the threads 54, and the bushing being expanded by the part 52 to a tight fit in the valve stem guide 42, the tapered portion 50 of the spindle 49 being wedged in the upper end of the valve stem guide. Thus, the spindle 49 is held securely in the valve stem guide 42*a*, and is centered with respect to the valve seat 23*a*.

In the form shown in Fig. 6, the shank 2*a* of the support 1*a* turns on the part 48 of the spindle 49, but in the form shown in Fig. 1, the spindle 39 turns in the valve stem guide 42. The two forms of the invention are marked by no other characteristic difference of operation. The tool may be supplied with the spindle 39 or with the spindle 49, at the option of the manufacturer.

What is claimed is:

1. A device for refacing the valve seats of engines, comprising a support provided at its lower end with means for mounting the support on an engine, for rotation with respect to the valve seat of the engine, the support being provided with a substantially vertical shaft which is laterally offset with regard to said means, a carrier mounted for rotatable adjustment on the shaft, means for holding the carrier releasably against rotation on the shaft, a slide mounted to reciprocate for adjustment on the carrier, longitudinally thereof, means connected to the carrier and the slide for adjusting the slide longitudinally of the carrier, a motor located at the side of the carrier, and secured to the slide, rotatable means mounted on and operated by the motor for working upon the valve seat to be refaced, and means at the upper end of the shaft whereby rotation may be imparted to the support.

2. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the fact that the means for mounting the support on an engine is a spindle fixed to the lower end of the support and arranged approximately parallel to the shaft, the spindle being insertable into the valve stem guide of an engine, and being rotatable therein.

3. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the fact that the means

for mounting the support on an engine is a spindle upon which the lower end of the support is rotatable, and means for securing the spindle in the valve stem guide of an engine.

4. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the fact that the means for mounting the support on an engine is a spindle upon which the lower end of the support is rotatably mounted, the spindle having a tapered plug intermediate its ends and a tapered member near to its lower end, and an expansible bushing threaded on the lower end of the spindle and expansible by said tapered member, the tapered plug and the expansible bushing constituting means for securing the spindle in the valve stem guide of an engine, in centered relation with respect to the valve seat to be worked upon.

5. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the fact that the means for holding the carrier releasably against rotation on the shaft comprises compressible jaws on the carrier, and means connecting the jaws for moving them toward and away from each other.

6. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the fact that the carrier is a straight tube, having a slot at its upper end, the tube being provided with jaws located on opposite sides of the slot, and a tightening device connecting the jaws, the jaws and the tightening device constituting the means for holding the carrier releasably against rotation on the shaft.

7. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the provision of means for clamping the slide to the carrier, against movement longitudinally of the carrier.

8. A device for refacing the valve seats of engines, constructed as described in claim 1, and further characterized by the fact that the means whereby rotation may be imparted to the support is a straight handle, the axis of which coincides with the axis of the lower end of the support, and a laterally offset arm connecting the lower end of the handle with the upper end of the shaft.

9. In a device for refacing the valve seats of engines, a support consisting of a rod formed at its lower end into a shank provided at its upper end with a lateral arm carrying an offset shaft disposed parallel to the shank, a tube rotatable for adjustment on the shaft, means carried by the tube for clamping it to the shaft against rotary adjustment thereon, a slide movable on the tube, longitudinally of the tube, a motor located at one side of the tube and secured to the slide, an adjusting screw held against rotation in the tube and threaded into the slide, a straight handle having its axis coincident with the axis of the shank of the support, an arm connecting the lower end of the handle with the upper end of the shaft, a spindle insertable into the valve stem guide of an engine and assembled with the shank, the spindle constituting means for mounting the support for rotation, and rotatable means mounted on and operated by the motor for working upon the valve seat to be refaced.

CLIFFORD C. LEE.