Dec. 4, 1928. 1,693,767

S. SMITH

TOOL FOR CUTTING VALVE SEATS

Filed Nov. 15, 1926 3 Sheets-Sheet 1

Fig. 2.

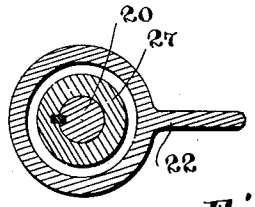


Fig. 3.

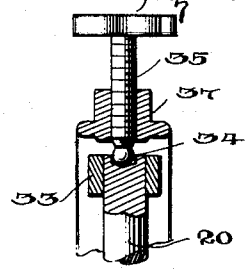


Fig. 1.

Fig. 4.

Fig. 5.

INVENTOR
S. Smith
BY Munn & Co.
ATTORNEYS

Dec. 4, 1928. 1,693,767

S. SMITH

TOOL FOR CUTTING VALVE SEATS

Filed Nov. 15, 1926 3 Sheets-Sheet 2

Fig. 6.

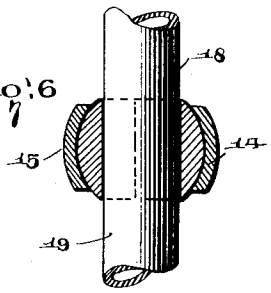


Fig. 7.

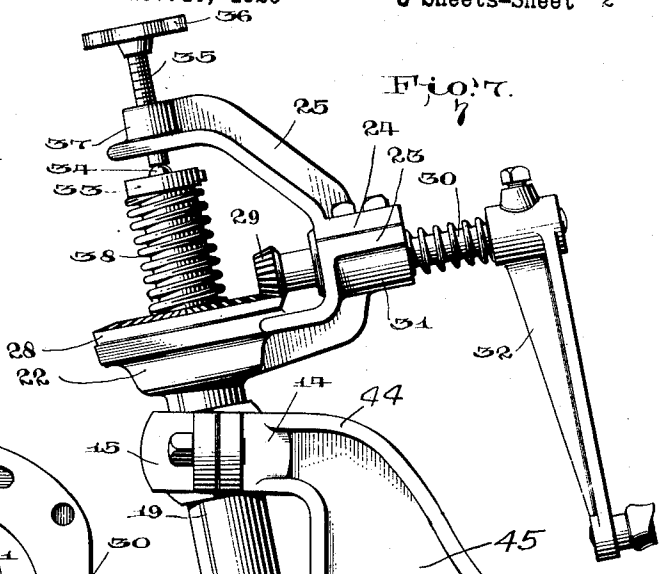


Fig. 8.

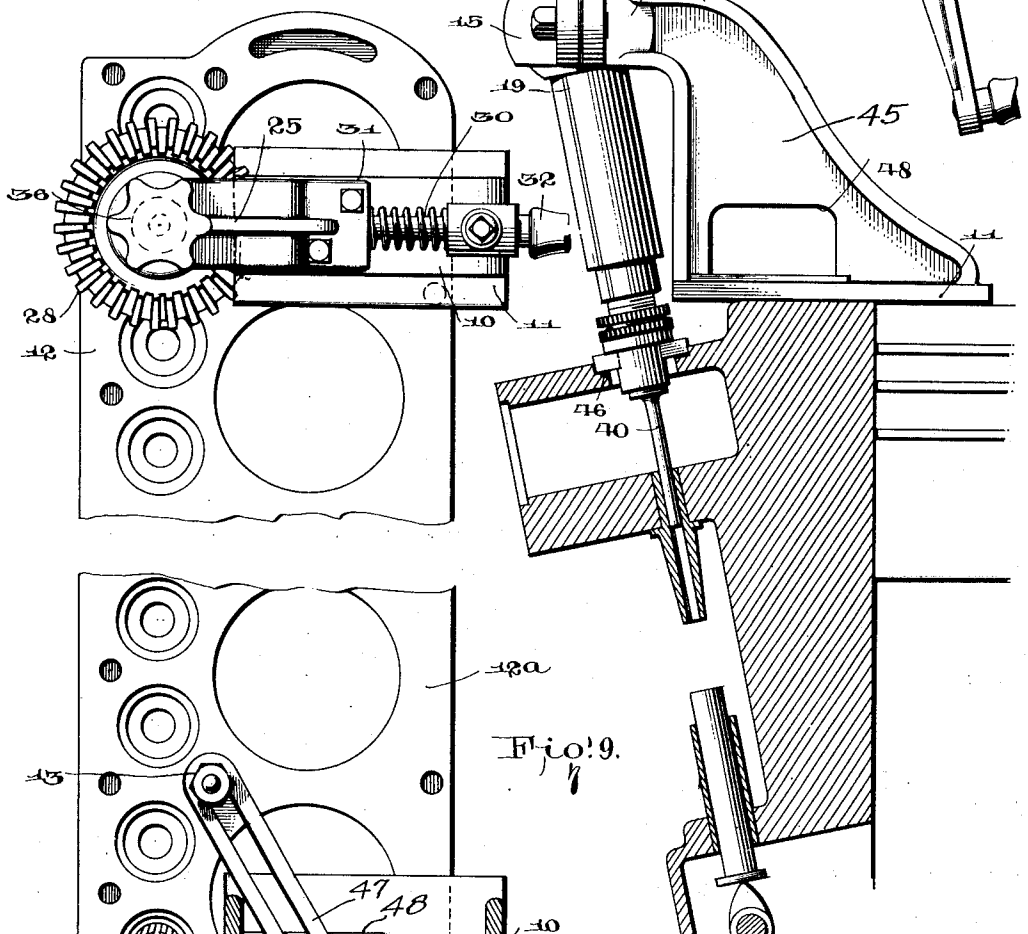


Fig. 9.

INVENTOR
S. Smith
BY
ATTORNEYS

Dec. 4, 1928. 1,693,767

S. SMITH

TOOL FOR CUTTING VALVE SEATS

Filed Nov. 15, 1926 3 Sheets-Sheet 3

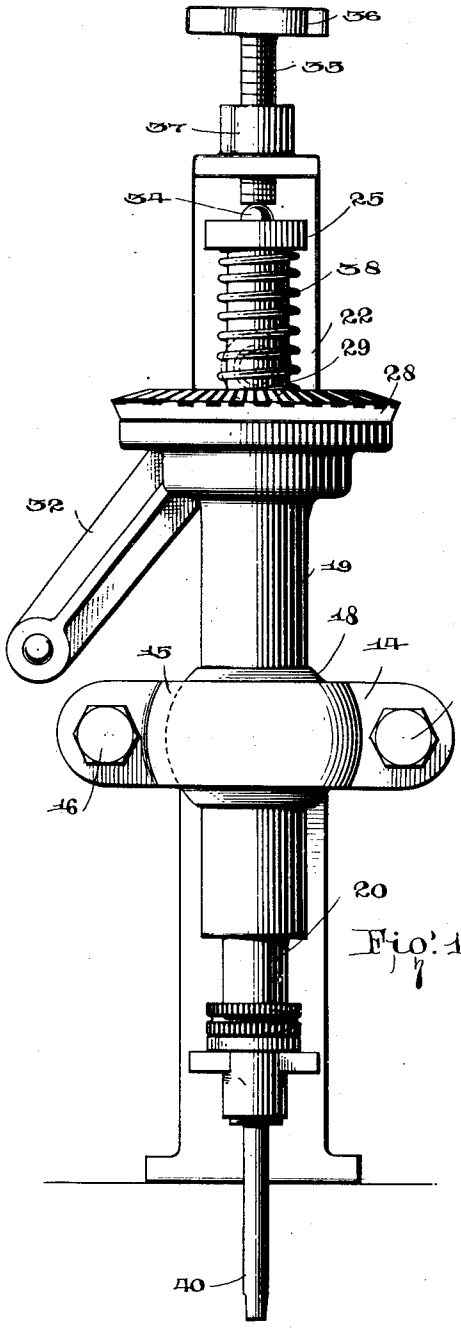


Fig. 10.

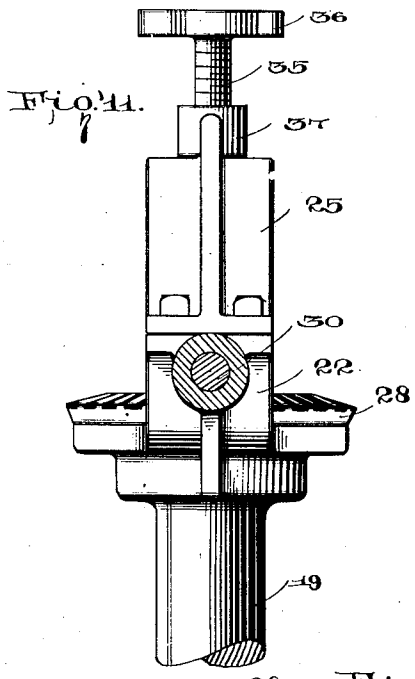


Fig. 11.

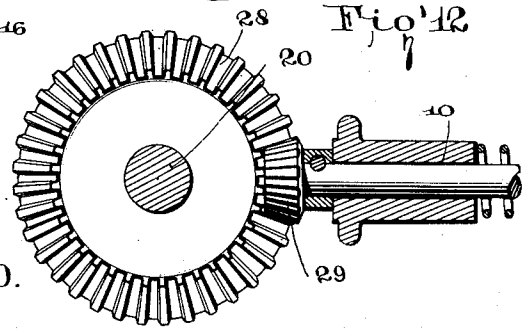


Fig. 12

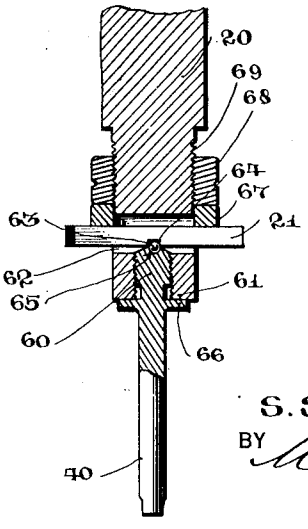


Fig. 13.

INVENTOR
S. Smith
BY Munn & Co.
ATTORNEYS

Patented Dec. 4, 1928. 1,693,767

UNITED STATES PATENT OFFICE.

SYLVESTER SMITH, OF REEDLEY, CALIFORNIA.

TOOL FOR CUTTING VALVE SEATS.

Application filed November 15, 1926. Serial No. 148,522.

This invention relates to a tool for cutting valve seats to provide a countersunk portion at the valve seat to receive a ring forming a new seat for the valve.

An object of the invention is the provision of a device which may be disposed in a vertical position or at an angle to the vertical for cutting the valve seats of the internal engine to provide a countersunk pocket to receive a seat, thus reclaiming cylinder blocks which would otherwise be disregarded.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawings forming a part of the specification; nevertheless it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claim.

Figure 1 is a view in elevation partly in section of a device constructed in accordance with the principles of my invention,

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1,

Figure 3 is a vertical section taken along the line 3—3 of Figure 1,

Figure 4 is a horizontal section taken along the line 4—4 of Figure 1,

Figure 5 is a fragmentary vertical section of a cylinder block showing a new valve seat in position,

Figure 6 is a fragmentary sectional view of the socket joint,

Figure 7 is a view in elevation of the device shown in Fig. 1 and applied to a V-cylinder block,

Figure 8 is a fragmentary plan view of the device and cylinder block shown in Fig. 7,

Figure 9 is a horizontal section through the bracket supporting tool,

Figure 10 is an end view in elevation of the device,

Figure 11 is a fragmentary vertical section of the device shown in Figure 10,

Figure 12 is a horizontal section through the operating means for the cutter, and

Figure 13 is a vertical section of the cutter head and pilot.

Referring more particularly to the drawings 10 designates a bracket having a perforated flange 11 which is adapted to be bolted to the usual cylinder block 12 by means of bolts 13.

The bracket has at its outer end a semi-spherical bearing 14 integrally formed therewith adapted to co-operate with a semi-spherical cap 15 which is bolted, at 16, to the flange 17 of the bearing 14. The bearing receives the ball 18 formed on a sleeve or guide 19 for a shank 20. By means of the ball and bearing the sleeve 19 may be adjusted at any angle to the vertical that may be desired for positioning the cutter 21 on either the valve seat of a vertical engine or the valve seat of a V-cylinder block and the bolts 16 are adapted to lock the ball 18 and likewise the sleeve 20 in position.

At the upper end of the sleeve 19 a bracket or support 22 is formed which is provided with flanges 23 adapted to be clamped to flanges 24 at the lower end of a bracket or member 25. The lower bracket 22 is provided with a socket 26 adapted to receive a hub 27 of a gear 28 meshing with a gear 29 on the end of a shaft 30 carried in a bearing 31 formed integral with the bracket 22. The crank 32 is secured to the end of the shaft 30 for rotating the same.

The upper end of the shank 20 which is embraced by the arm 25 is provided with a collar 33 rigidly secured thereto and provided with a pocket to receive a ball 34. This ball is adapted to be engaged by the free end of a screw 35 rotated by a finger piece 36. The screw is threaded into a bearing 37 formed at the top of the arm 25. A spring 38 engaged at one end by the collar 33 and at its other end by the gear 28 is adapted to resist downward movement of the shank when the screw is so rotated that it will force the shank and likewise the cutter downwardly, the cutter rigidly engaging a seat 39 of the engine 12.

A pilot rod 40 is seated within a bearing 41 of the usual stem and has its upper end, as shown at 42, located in an opening or passage within the lower end of the shank 20, whereby the cutter 21 is properly centered over the valve seat.

In the form shown in Figure 7 the upper end 44 of the bracket 45 is sufficiently extended to permit oscillation of the shank 19 whereby the cutter 21 may be readily applied to the valve seat 46 of the V-type engine 12^a. The shank 19 is oscillated through the ball 18 mounted in the bearings 14 and 15 carried at the end of the arm of the bracket. The other parts of the tool shown in Figure 7 are similar in all respects to the tool shown in Fig. 1.

Referring more particularly to Figure 9 it will be seen that a link 47 is employed passing through an opening 48 in the bracket 10 and is adapted to be secured by means of bolts 13 to the engine block 12^a, whereby the bracket is clamped securely to the upper face of the block.

The operation of my device is as follows: Since the sections 14 and 15 of the ball and socket joint arrangement at the end of the arm 18^a of the bracket 10 supports the sleeve or guide 19 for the shank 20 the nuts 16 may be loosened so that not only the sleeve 19 may be moved downwardly or upwardly in the ball 18 which is split but the sleeve 19 may be tilted in any direction desired around the ball and socket. After the true position of the sleeve 19 is had the bolts 16 are screwed up tight whereby the sleeve or guide is securely locked in a predetermined position on the end of the bracket 10. After the guide or sleeve 19 has been sufficiently lowered so that the cutter 21 is engaged by the valve seat the crank 32 is actuated and the knob 36 is rotated, forcing the shank 20 downwardly so that the proper depth of the new seat-cut will be produced to properly receive the auxiliary ring 50. As the shank is moved downwardly it is forced against the tension of the spring 38 which will cause the shank to move upwardly as the knob 36 is reversely rotated. The cutter is progressively fed in operative relation with the seat as the screw 35 is revolved. A pilot stem 40 passes through the usual bearing 41 for the valve stem and has its upper end threaded, as shown at 60, to engage the threads 61 in the passage in the lower end of the shank 20. The cutter 21 is received within a transverse passage 62 in a shank 20 and a ball 63 mounted in a socket 64 in the underface of a cutter 21 rests in a pocket 65 in the upper threaded end 60 of the pilot 40. Said pilot is provided with a shoulder 66 which engages the lower end of the stem 20 and prevents further inward movement of the stem. A washer 67 rests on the cutter 21 and is maintained in position on the cutter by means of a nut 68 threaded onto the reduced portion 69 of the shank 20.

I claim:

In a device of the character described comprising a bracket having an arm extending therefrom and provided with a bearing, a ball mounted in the bearing, a sleeve carried by the ball and adapted to be oscillated in a plurality of different positions, a shank carried by the sleeve and provided with a threaded passage, a pilot rod having one end threaded in the passage and provided with a socket, a ball mounted in the socket, said shank having a transverse slot, a cutter in the slot and provided with a socket, said ball being forced into the socket and cutter when the pilot rod is screwed into the position so that the cutter is retained against movement in the shank.

SYLVESTER SMITH.