Jan. 7, 1964 R. E. RIGGAN ETAL 3,116,571

UNIVERSAL VALVE SEATING AND FINISHING ADAPTER

Filed Feb. 12, 1962

Fig. 5.

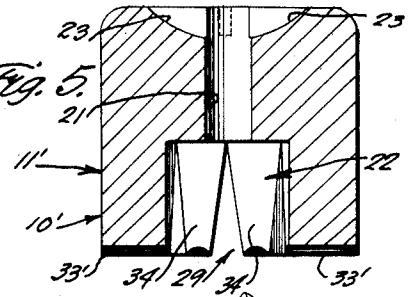


Fig. 1.

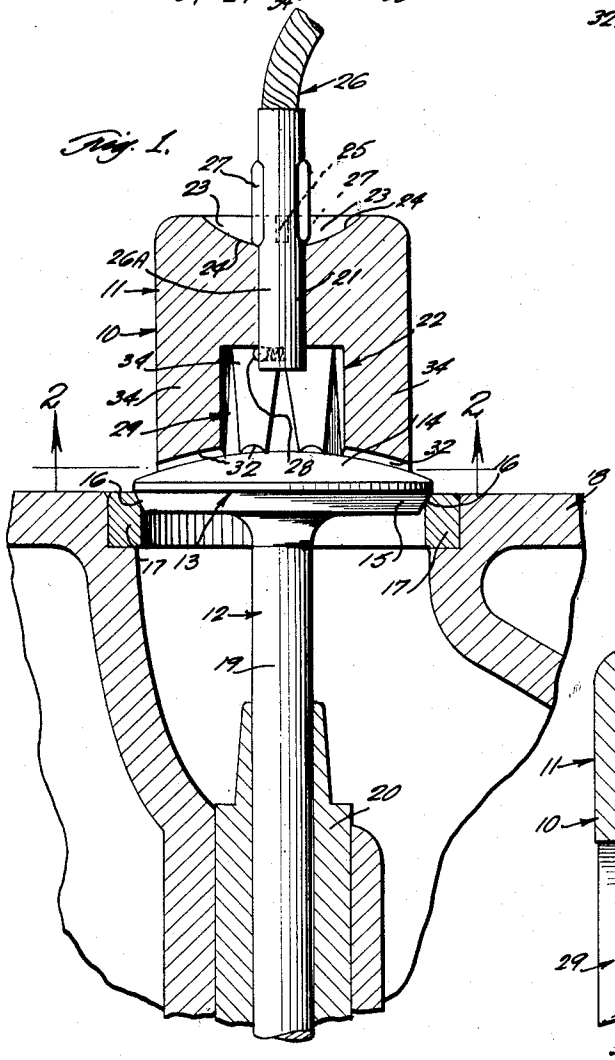


Fig. 2.

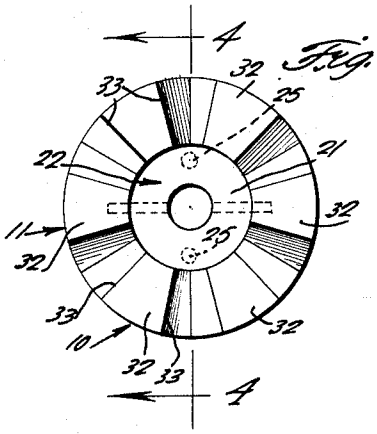


Fig. 3.

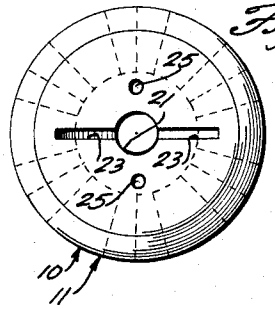
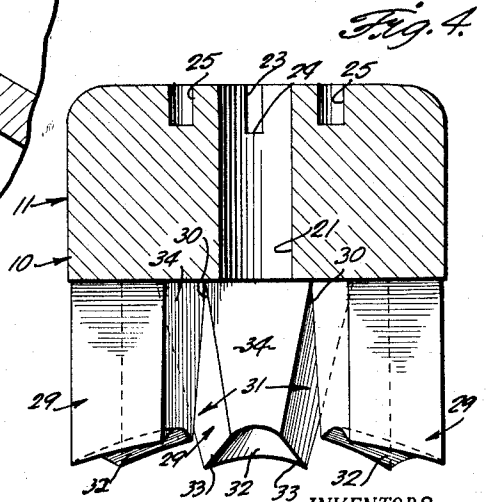


Fig. 4.



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3,116,571 UNIVERSAL VALVE SEATING AND FINISHING ADAPTER

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1 Claim. (Cl. 51—29)

This invention relates to a tool for facilitating the grinding of valves for internal combustion engines or the like.

The primary object of the invention is to provide a tool which is adapted to be arranged in engagement with a valve so that by rotating the tool, the valve can be turned or rotated in order to grind the valve in order to insure that the valve will properly engage its seat.

A further object is to provide a valve grinding and seating tool which includes a member which is adapted to be made of magnetic material, and wherein the tool of the present invention is adapted to be rotated by engagement with a suitable implement or the like, and wherein the tool has means thereon for fixedly gripping the head of the valve so as to insure that the valve will be properly turned as the tool is rotated.

Still another object of the present invention is to provide such a valve grinding tool that is economical to manufacture and efficient in operation and which is rugged in structure and foolproof in use.

These and other objects of the invention will become apparent from a reading of the following specification and claim, together with the accompanying drawings, wherein like parts are referred to and indicated by like reference characters and wherein:

FIGURE 1 is a fragmentary sectional view taken through a portion of a cylinder block of an internal combustion engine and showing the tool of the present invention arranged in engagement with a head of a valve being ground.

FIGURE 2 is a view taken generally on the line 2—2 of FIGURE 1.

FIGURE 3 is a plan view looking down from the opposite end from that shsown in FIGURE 2.

FIGURE 4 is an enlarged sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a sectional view illustrating a modification.

Referring in detail to the drawings, and more particularly to FIGURES 1 through 4 of the drawings, the numeral 10 indicates the valve grinding and seating tool of the present invention which is shown to comprise a body member that is indicated by the numeral 11, and the body member 11 is adapted to be of magnetic material, and as shown in FIGURE 1, the member 11 is adapted to engage the head 13 of a valve 12 which is being ground and seated. The valve 12 has its head 13 provided with an arcuate or rounded outer surface or portion 14, and the head 13 further includes a tapered or beveled surface 15 for engagement with a corresponding beveled or tapered surface 16 in the valve seat 17, and in FIGURE 1 the numeral 18 indicates a portion of a conventional internal combustion engine such as an internal combustion engine forming part of a vehicle such as an automobile or the like. The valve 12 further includes the usual stem 19 which engages and extends through the bushing 20.

As shown in the drawings the body member 11 is provided with a central opening 21, and the opening 21 communicates with an enlarged counterbore or recess 22, and one end of the body member 11 is provided with aligned slots 23 which have arcuate inner surfaces 24. The numeral 25 designates spaced apart apertures or openings which are arranged in an end of the body member 11, and as shown in FIGURE 3, the apertures 25 are arranged approximately ninety degrees away from the slots 23. In FIGURE 1 the numeral 26 indicates a portion of a suitable implement or tool which is adapted to be used for turning or rotating the member 11, and the tool 26 may be of the type that includes portions 27 for engaging the slots 23, and the tool 26 may also include spaced apart teeth or projections for engaging the apertures 25. The numeral 28 indicates a ball and spring holding device or retainer.

There is provided in the body member 11 a plurality of spaced apart V-shaped recesses or slots 29 which surround the counterbore 22, and the slots 29 are shaped so that portions 30 are of less size than the portions 31, and these slots 31 define therebetween a plurality of similar segments 34 which have arcuate or concave surfaces or end portions 32 and wherein there is defined or provided edge portions or shoulders 33 on the lower ends of the segments 34. The concave surfaces 32 are adapted to engage the rounded surfaces 14 of the valve heads 13, as shown in FIGURE 1.

From the foregoing, it is apparent that there has been provided a tool which is especially suitable for use in grinding valves as for example when a mechanic desires to clean carbon and grind valves in a service station or other locality. The tool 10 can be used as part of the hand lapping procedure and wherein a suitable grinding compound such as an abrasive paste or emery powder mixed in vaseline may be placed on the surface of the valve face and wherein the valve can be oscillated on the valve seat until the surfaces are properly mated. Light pressure may be used and the compound may be renewed until all the pits and signs of corrosion disappear from the seating surface of the valve as indicated by the numeral 15 and the valve seat 17. This procedure will provide a gas-tight valve so as to help prevent leakage of hot gas between the valve and seat.

The tool 10 consists solely of the body member 11 which is suitably magnetized, and due to this magnetic effect, the member 11 will be retained by magnetic attraction on the head 13 of the valve 12. Then by arranging an implement such as the implement 26 in engagement with the member 11, and by rotating the implement 26, the member 11 can be rotated to rotate the valve 12.

The member 11 is shaped to include the cutouts or slots 23 and apertures 25 in one end thereof, whereby lugs or projections on the end of the implement 26 can fit into and engage the slots 23 and apertures 25. The opposite end of the member 11 is shaped to include the V-shaped slots 29 as well as the surfaces 32 on the lower ends of the segments 34, and these arcuate surfaces 32 are adapted to snugly receive or engage the rounded surface 14 of the valve head 13 so as to insure that there will be a snug and proper fit between the tool 10 and valve head 13. As shown in FIGURE 1 the lower end of the segments 34 are inclined. Thus, not only are the surfaces 32 shaped to be arcuate, but in addition these surfaces 32 are inclined or sloped downwardly in a direction away from the counter bore 22, and in order to insure that there is a proper fit or engagement of the tool with the head 13.

The tool can be made of any suitable material and in different shapes or sizes.

It will be seen that according to the present invention there has been provided a universal valve seating and finishing adapter which can be made of different sizes, and wherein the member 11 is in the form of a multi-pole magnet, and wherein the apertures or holes 25 and slots 23 define drive holes and slots, and the opening 21 is a through hole which communicates with the counterbore 22. The member 11 has the concave surfaces 32 as well

as the V-slots 29, and the surfaces 32 define lands for contact on the valve head.

The numeral 33 indicates sharp edges, and the drawings show the approximate depth of the concave surfaces 32. The provision of the segments 34 which are magnetized, define a multi-pole magnet, and wherein the magnetic lines of force will provide the maximum driving effect, as for example as compared to a solid obstruction, and thus the provision of the V-shaped slots 29 is important since it defines the segments 34 which help provide the maximum amount of magnetic holding action between the tool 10 and the valve head 13.

The implement 26 is preferably detachably connected to the member 11, or else the implement 26 can be made as an integral or permanent part of the magnetic member 11. The member 26 may have a square shank or a round shank with a square end and may be provided with a spring and ball holding assembly. The member 11 can be made to fit crowned or straight valves, and the apertures 25 are adapted to receive projections on a conventional reciprocating valve grinding implement. The slots 23 also receive projections on the conventional valve grinding tool implement 26. The member 11 is adapted to be made in the form of a permanent magnet.

Many valves being used at the present time are made without holes or slots to permit driving of the same, and thus such valves depend upon rubber suction cups or the like which are not very satisfactory, and the magnetic member 11 will eliminate the necessity of using suction cups and wherein the present invention will insure that there will be a secure hold by the member 11 on the valve head.

Due to the provision of the central opening 21 and recess or counterbore 22, the present invention can be used with a flex drive such as the flex drive 26, and wherein the round portion 26A of the rod fits in the opening 21, and the crimped portions 27 lock in the slots 23. FIGURE 1 shows the ball and spring holding device 28 for holding the drive member 26 against the top of the counterbore 22.

Attention is directed to FIGURE 5 of the drawings wherein there is illustrated a modification which is indicated generally by the numeral 10', and the device 10' includes a body member 11' which has edge portions or

shoulders 33' as well as segments 34. The device of FIGURE 5 is adapted to be used for straight valves wherein the concave surfaces 32 of FIGURE 1 are ground straight across still maintaining their sharp edges such as the sharp edges 33'.

The tool 10 is adapted to be made in several different diameters.

The V-slots 29 need not necessarily be milled since they may be formed in the magnet and ground if necessary. Also, the portions 21, 23, and 25 may be formed or finished in a machine shop.

Although the invention herein described is fully capable of achieving the objects and providing the advantages hereinbefore mentioned, it is to be understood that it is merely illustrative of the presently preferred embodiment of the invention, and that it is not to be limited to the details of construction herein described other than as defined in the appended claim.

What is claimed is:

In a device of the character described, a body member provided with a central opening which communicates with an enlarged counterbore, there being aligned slots in the upper end of said body member communicating with said central opening, there being a pair of spaced apart apertures in said upper end of said body member and said apertures being arranged approximately ninety degrees away from said slots, there being a plurality of spaced apart V-shaped slots terminating at the bottom of said counterbore and in the lower end of the body member, said slots defining therebetween a plurality of segments which each have concave lower end portions, said lower end portions adapted to engage the arcuate outer surface of a valve head which is being ground and seated, and said body member being permanently magnetized.

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