Dec. 26, 1950 E. M. McGOVERN ET AL 2,535,587

RIDGE GRINDING TOOL

Filed May 1, 1948

Fig. 1

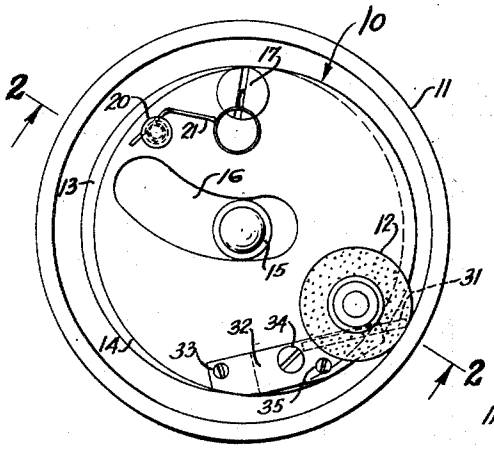
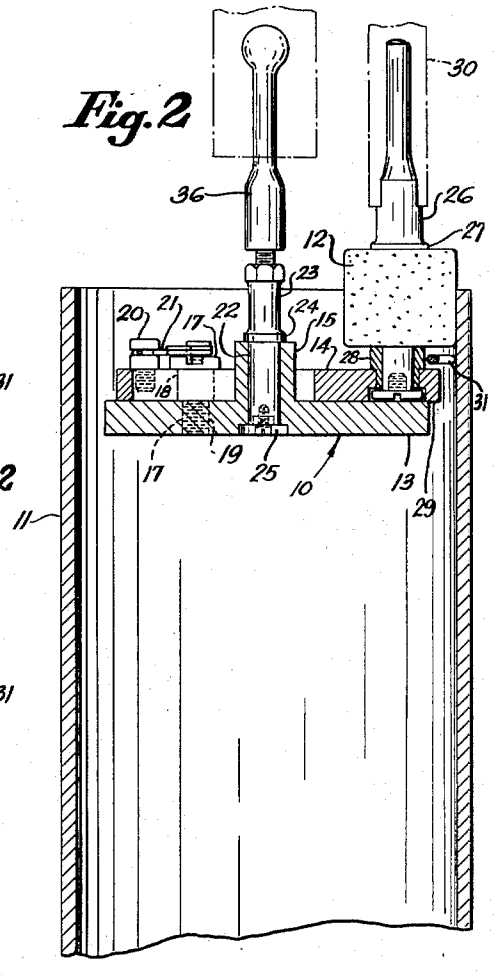


Fig. 2



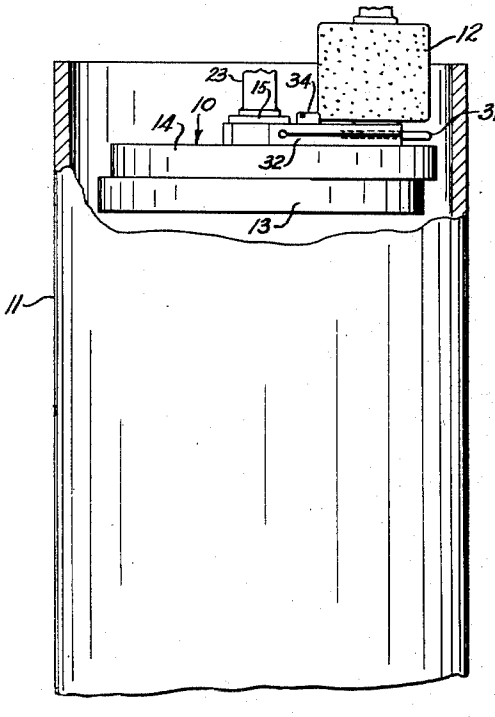


Fig. 3

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Patented Dec. 26, 1950 2,535,587

UNITED STATES PATENT OFFICE

2,535,587

RIDGE GRINDING TOOL

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Application May 1, 1948, Serial No. 24,594

1 Claim. (Cl. 51—245)

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This invention relates to a ridge grinding tool adapted to true the borehole of a cylinder for an internal combustion engine.

It is an object of the instant invention to provide a simple tool for truing the borehole of an engine cylinder with precision.

A further object is to provide a tool of the type described that will decrease labor requirements over prevalent practice.

Still another object is to provide an inexpensive tool which can be readily operated by existing equipment in the average shop.

Other objects of the instant invention will become apparent in the course of the following specification.

The imperfections or ridges in the boreholes of the cylinders of internal combustion engines which remain after the first manufacturing operations or even after reasonable service must be removed to obtain reasonable engine efficiency. In the instant invention, such ridges or imperfections are removed with an abrasive wheel. Since any but a thoroughly controlled abrasive wheel could do as much harm to the borehole as the ridges, the ridge grinding tool is designed to be mechanically lowered in and rotated around the borehole while a guide pin coacting with the abrasive wheel prevents the removal of more than a predetermined amount from the wall of the borehole.

The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing by way of example a preferred embodiment of the inventive idea.

In the drawings:

Figure 1 is a top plan view of the ridge grinding tool inserted in the borehole of a cylinder of an internal combustion engine and constructed in accordance with the principles of this invention.

Figure 2 is a sectional view along the line 2—2 of Figure 1.

Figure 3 is an elevational view of the ridge grinding tool inserted in the borehole of a cylinder, a part of the wall of which has been removed.

Referring now in greater detail to the drawings in which like reference numerals indicate like parts, reference numeral 10 indicates the ridge grinding tool and 11 the cylinder.

The ridge grinding tool 10 comprises the abrasive wheel 12 and a support formed with a lower disc 13 and an upper disc 14 for imparting linear and angular motion to the same in the borehole of the cylinder 11.

The lower disc 13 and the upper disc 14 have the same diameter and are designed for insertion in the borehole of the cylinder 11 in a plane perpendicular to the longitudinal center line

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thereof. At the center of the lower disc 13 is the upwardly extended hub 15 of circular cross section, and formed integral therewith or otherwise as desired. Through the hub 15 is the aperture 22 for the insertion of the rod 23 in such a manner that the collar 24 of the rod 23 coacting with the countersunk screw 25 in the base of the lower disc 13 makes it possible to rotate the lower disc 13 by imparting angular motion to the rod 23. In the upper disc 14 is a slot 16 (Fig. 1) in the second quadrant, as viewed in Figure 1, designed for the insertion of the hub 15 therethrough, the upper disc 14 being pivotally connected to the lower disc 13 along the outer edge by the pivot pin 17 inserted through the aperture 18 in the upper disc 14 and then threaded into a coacting tap 19 in the lower disc 13 so that the radii of the slot 16 are centered at the center of the pivot pin 17, the minimum diameter of the slot 16 being equal to the distance from the center of the pivot pin 17 to the nearest edge of the hub 15 and the maximum diameter being equal to the distance from the center of the pivot pin 17 to the nearest edge of the hub 15 plus the diameter of said hub with due consideration for tolerance. Thus, the upper disc 14 is pivotally connected to the lower disc about the pivot pin 17 and guided by the hub 15 moving in the slot 16. To one side of the pivot pin 17 in the upper disc 14 is an anchor pin 20 while between the two pins is the spring member 21 designed to maintain under tension the upper disc 14 to the right, as viewed in Figure 1, of the lower disc 13. One end of the spring 21 is located in an annular groove formed in the anchor pin 20, while the other end is located in a transverse groove formed in the pivot pin 17.

Substantially opposite the pivot pin 17 and also along the outer rim of the upper disc 14 is the abrasive wheel 12 rotatably and vertically mounted thereon by any suitable means such as the shaft 26 (Fig. 2) secured at the top of the said wheel 12 by the collar 27 and at the base by reducing the diameter of the shaft 26. The end of the shaft 26 is reduced, as shown in Figure 2, to coact with the form of the aperture 28 in the upper disc 14 in which the shaft 26 is held upright by the countersunk screw 29. The upper part of the shaft 26 is designed for insertion in the drive 30 for imparting angular velocity to the abrasive wheel 12.

Below the abrasive wheel 12 is the guide pin 31 adjustably secured in the holder 32, as shown in Figures 1 and 3, attached to the upper disc 14 by the screws 33 and 34 while the set screw 35 provides a means for adjusting the guide pin 31 relative to the abrasive wheel 12.

The operation is as follows: The ridge grinding tool 10 is lowered in the borehole of the cylinder 11 substantially as shown in the various illustrations. The top of the shaft 26 is at-

tached to any suitable drive 30 designed to impart angular velocity thereto. The shank 36 (Fig. 2) is then screwed into the top of the rod 23 as shown and the opposite end secured in a drill press or the like to impart linear and angular motion to the discs 13 and 14. The abrasive wheel 12 is automatically brought into contact with the wall of the borehole by action of the spring member 21 forcing the upper disc 14 counterclockwise relative to the lower disc 13. Of course, prior to the insertion of the tool 10, the set screw 35 is loosened and the guide pin 31 adjusted in the holder 32 until the tip is substantially tangent to a vertical plane in turn tangent to the said wheel 12. Angular velocity is then imparted to the shaft 26 and linear and angular motion to the shank 36, the abrasive wheel 12 removing the ridges and imperfections with mechanical precision within the limits of the guide pin 31.

It is apparent that the specific illustration shown above has been given by way of illustration and not by way of limitation and that the structure above described is subject to wide variations and modifications without departing from the scope or intent of the present invention.

What is claimed is:

A ridge grinding tool for the boreholes of the cylinders of internal combustion engines; the tool comprising a shaft, one end of the shaft being adapted for releasable insertion in the chuck of the drill press, a lower disc mounted upon the other end of the shaft; the tool further comprising an upper disc, means pivotally mounting the upper disc adjacent the periphery of the lower disc, the upper disc having a closed slot therein receiving said shaft which extends therethrough and the rotation of the upper disc on the lower disc being within the limits of the slot, an abrasive wheel rotatably disposed on the top surface portion of the upper disc, a spring member between the pivotal mounting means of the upper disc and said upper disc and adapted to maintain the wheel under tension against the wall of the borehole, and an adjustable guide adjacent the wheel on the upper disc and adapted to limit the depth of the cut of the wheel, said guide projecting into a line parallel to the axis of the shaft and passing through the outer periphery of the abrasive wheel.

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The following references are of record in the file of this patent:

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