May 14, 1946. G. P. MIZELL 2,400,160

VALVE GRINDER

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Fig. 1.

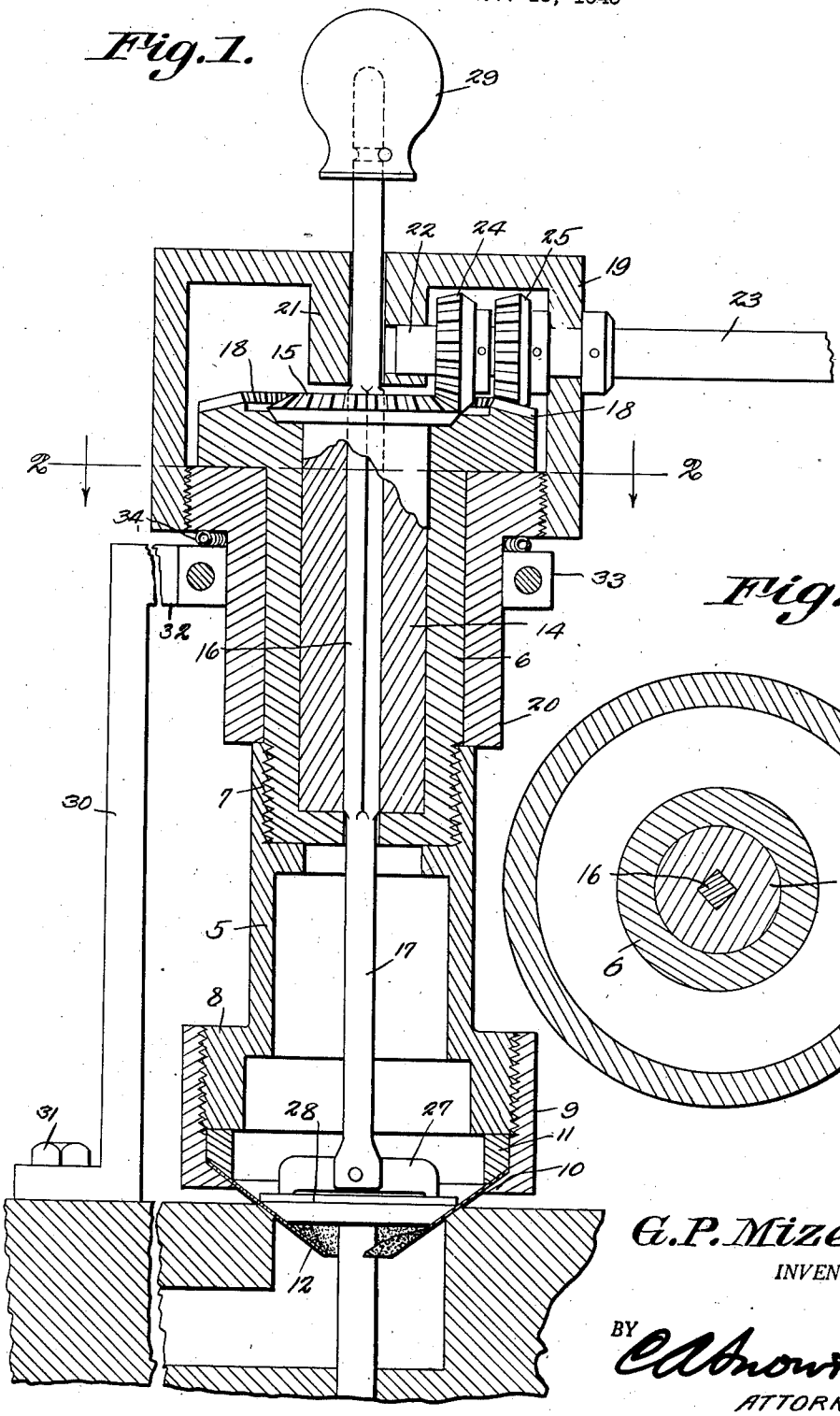


Fig. 2.

G. P. Mizell
INVENTOR.

BY C. A. Knowles.
ATTORNEYS.

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VALVE GRINDER

George P. Mizell, Washington, D. C.

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5 Claims. (Cl. 51—241)

This invention relates to valve grinders, and particularly to grinders of the portable power operated type designed for grinding the valves of internal combustion engines.

An important object of the invention is to provide valve grinding means wherein the valve as well as the valve seat will be ground simultaneously to insure a true seating of the valve after the grinding operation.

Another object of the invention is to provide means for rotating the valve and abrasive member simultaneously and at different speeds.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawing:

Figure 1 is a vertical sectional view through a valve grinding apparatus constructed in accordance with the invention.

Figure 2 is a sectional view taken on line 2—2 of Figure 1.

Referring to the drawing in detail, the valve grinder comprises a body portion including the lower section 5 and upper section 6, the sections 5 and 6 being connected by threads 7, the section 6 being shown as positioned in the upper end of the section 5.

As shown, the lower section 5 is formed with an enlarged portion 8 having external threads to receive the collar 9 that has an inwardly extending beveled flange 10 formed at the lower end thereof. A clamping ring 11 is positioned between the lower end of the section 5 and the beveled flange 10 so that when the collar 9 is rotated to secure the same on the section 5, the abrasive element 12, which is preferably in the form of emery sheet, is clamped therebetween. The emery sheet is substantially cone-shaped so that the surfaces thereof will conform to the beveled surfaces of a valve seat and valve.

Mounted within the upper section 6 is an elongated bearing 14 that has the beveled gear 15 secured at its upper end, the elongated bearing 14 being formed with an opening square in cross-section to receive the squared portion 16 of the shaft 17, so that the elongated bearing and beveled gear rotate with the shaft. An enlarged beveled gear 18 is provided at the upper end of the upper section 6, and is provided with a recess to permit the beveled gear 15 to rotate therein. The reference character 19 indicates a cap or closure which is threaded on the upper threaded end of the tubular support 20, which has its lower end resting against the upper end of the lower section 5 in such a way that the upper and lower sections may rotate within the tubular support 20.

Extending downwardly from the central portion of the cap or closure 19 is a bearing member 21 which is formed with a bearing opening to receive the inner end 22 of the power shaft 23 which is preferably driven by a flexible shaft leading from a motor, or it may be desirable to use a crank shaft whereby the rotation of the body portion may be accomplished by hand.

As shown, the shaft 23 extends through the cap or closure 19 and provides a support for the pinion 24 that meshes with the beveled gear 15 and the pinion 25 that meshes with the substantially large gear 18 formed at the upper end of the upper section 6. The lower end of the shaft 17 is formed with a pivoted arm 27 that has fingers adapted to fit into the usual groove formed in the upper surface of a valve, the valve in the present showing being indicated by the reference character 28. The shaft 17 extends through an opening formed centrally of the cap or closure 19, where it is supplied with a knob or hand grip 29 that is swiveled on the upper end of the shaft 17, providing means whereby the body portion may be held, while in operation.

The support for the device comprises the arm 30 which may be bolted to the cylinder head by means of the bolt 31, the upper end of the arm 30 being provided with a curved laterally extended section 32 adapted to fit around the tubular support 20, there being provided a removable clamping piece 33 adapted to cooperate with the curved section 32 in clamping the body portion in an upright position directly over the valve seat and valve under operation.

Disposed between the tubular support 20 and curved section 32 of the arm 30 is a spring 34 adapted to absorb vibrations to insure the apparatus being held to its work, during the grinding operation.

In the operation of the device, the body portion is rotated, and the shaft 17 is rotated independently of the body at a speed greater than the speed of rotation of the body, thereby grinding the valve and valve seat simultaneously.

In view of the foregoing detailed disclosure, it

is believed that further description of the operation of the device is unnecessary.

What is claimed is:

1. A valve and valve seat grinding device, comprising a support embodying an arm adapted to be bolted on an engine block, a tubular supporting bearing mounted on the arm, a tubular body mounted for rotary movement within the tubular supporting bearing, means at the lower end of the tubular body for securing an abrasive member thereto for operation against a valve seat, a vertical rotary shaft operating within the hollow body, valve engaging means at the lower end of the shaft adapted to rotate a valve as the shaft rotates, and means for rotating the tubular body and vertical rotary shaft simultaneously and at different speeds.

2. A valve and valve seat grinding device, comprising a support adapted to be bolted on an engine block, a tubular supporting bearing mounted on the support, a tubular body mounted for rotary movement within the tubular supporting bearing, a clamping ring resting against the lower end of the tubular body, a collar threaded on the lower end of the tubular body, an abrasive member held between the clamping ring and collar, said abrasive member adapted to simultaneously engage a valve seat and valve operating thereagainst, a shaft extending through the tubular body, means for connecting the shaft and valve, and means for rotating the tubular body and shaft at different speeds.

3. A valve and valve seat grinding device, comprising a support adapted to be secured to an engine block, a vertical hollow shaft operating within the support, a clamping member at the lower end of the shaft, a substantially cone-shaped abrasive member held within the clamping member and adapted to simultaneously engage a valve seat and valve operating therein, a vertical shaft extending through the hollow shaft, means on the lower end of the latter shaft for engagement with the valve connecting the valve and shaft, and means for rotating the shafts simultaneously at different speeds.

4. A valve and valve seat grinding device, comprising a support adapted to be secured to a cylinder block, a vertical hollow shaft mounted for rotary movement within the support, an abrasive cone-shaped member, means for securing the abrasive cone-shaped member to the lower end of the hollow shaft, a vertical shaft extending through the hollow shaft, means at the lower end of the vertical shaft for connecting the vertical shaft with a valve to be ground and means for rotating the shafts simultaneously whereby the valve and abrasive member are rotated at different speeds, grinding the valve and valve seat engaged thereby.

5. A valve and valve seat grinding device, comprising a support adapted to be secured to a cylinder block, a bearing mounted within the support, a hollow shaft operating within the bearing, an abrasive member, means for clamping the abrasive member to the lower end of the hollow shaft, a gear formed at the upper end of the hollow shaft, a vertical shaft extending through the hollow shaft, means at the lower end of the latter shaft for connecting the latter shaft to the valve being ground, a gear secured to the shaft within the hollow shaft, a power shaft operating at the upper end of the hollow shaft, gears on the power shaft engaging the gears of the hollow shaft and shaft operating within the hollow shaft, whereby the shafts are rotated at different speeds.

GEORGE P. MIZELL.