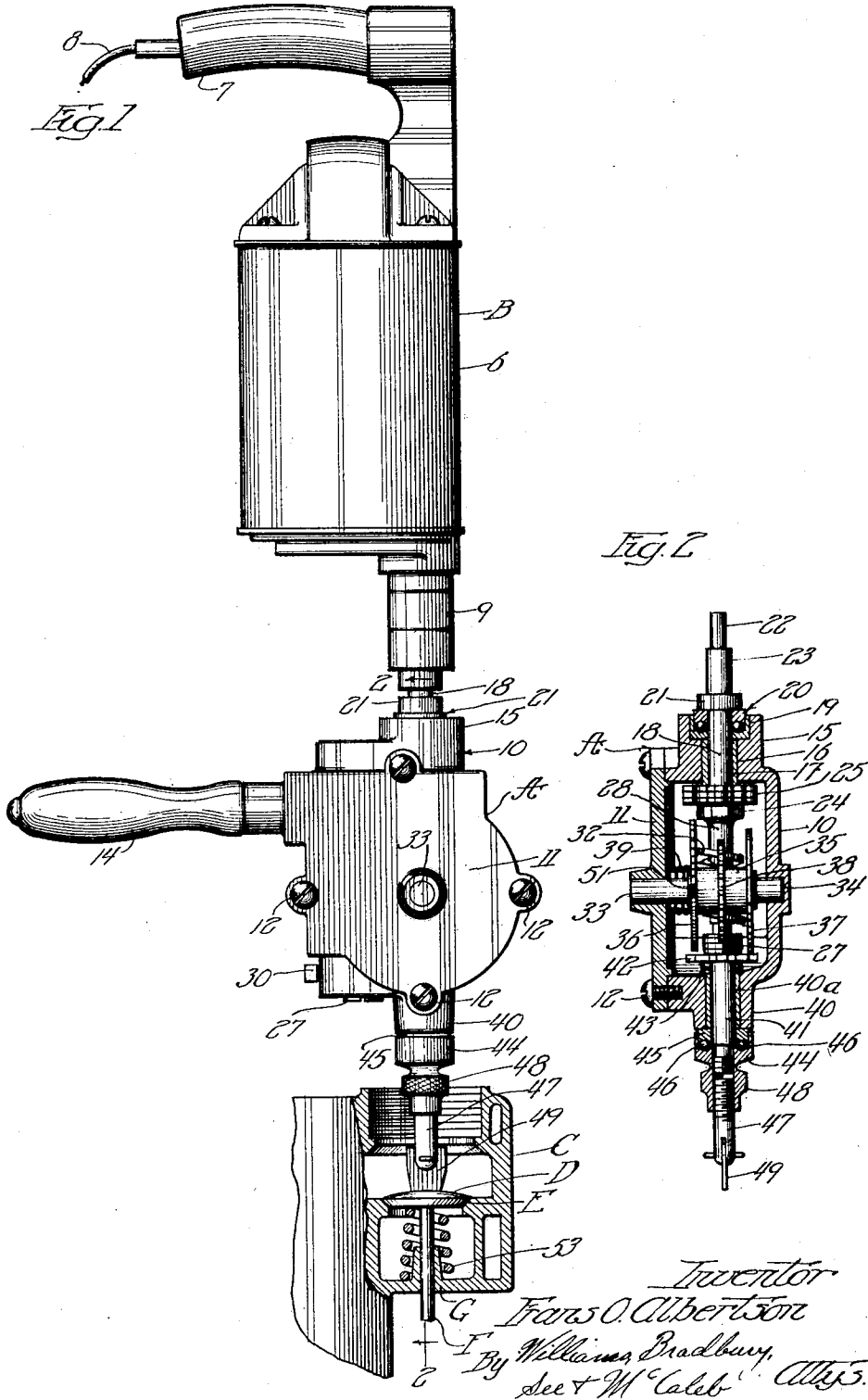


F. O. ALBERTSON.
VALVE GRINDER.
APPLICATION FILED OCT. 13, 1920.

1,386,085.

Patented Aug. 2, 1921.

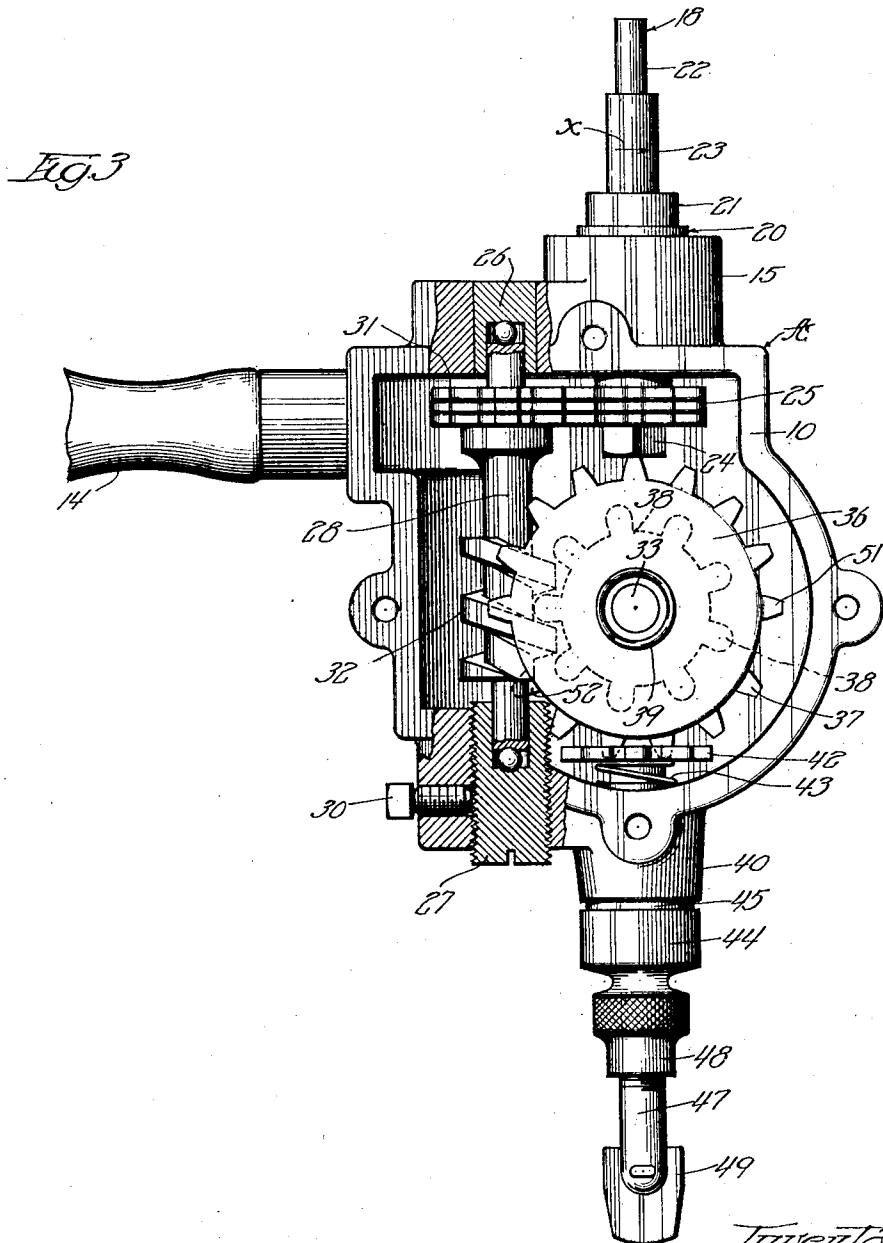
2 SHEETS—SHEET 1.



F. O. ALBERTSON.
VALVE GRINDER.
APPLICATION FILED OCT. 13, 1920.

1,386,085.

Patented Aug. 2, 1921.
2 SHEETS—SHEET 2.



Inventor
F. O. Albertson
By *Williams, Brachman, Lee & McCall*
Attys.

UNITED STATES PATENT OFFICE.

FRANS O. ALBERTSON, OF SIOUX CITY, IOWA, ASSIGNOR TO ALBERTSON & COMPANY,
OF SIOUX CITY, IOWA, A CORPORATION OF IOWA.

VALVE-GRINDER.

1,386,085.

Specification of Letters Patent.

Patented Aug. 2, 1921.

Application filed October 13, 1920. Serial No. 416,625.

To all whom it may concern:

Be it known that I, FRANS O. ALBERTSON, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented a certain new and useful Improvement in Valve-Grinders, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to devices for grinding or refacing valves, and particularly valves of the puppet type commonly employed in internal combustion engines.

In this application, I disclose a device embodying the general features of construction and operation set forth in Letters Patent No. 1,282,018, granted to me on October 22, 1918.

The objects of my present invention are:—

1st. To provide simple and efficient means for grinding or refacing valves;

2nd. To provide a power-driven valve grinder;

3rd. To provide a portable power-driven valve grinder;

4th. To provide a valve grinder adapted to be driven by a portable power unit, the portable power unit having means for detachably engaging and rotating the driving member of said valve grinder;

5th. To provide a valve grinder having a driving shaft adapted to be detachably engaged by portable power units comprising chucks of different capacities; and

6th. To provide a valve grinder adapted to be detachably engaged by a portable power unit, a driving shaft and a driven shaft of said valve grinder having coincident axes, so that the combined weight of the valve grinder and power means may be transmitted to the valve in a straight line coincident with the axis of the stem of said valve.

These and other objects of my invention will appear as this description progresses, reference being had to the accompanying drawings, wherein—

Figure 1 is a side elevation of my improved valve grinder in operative association with a valve and a portable power unit;

Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is a side elevation of my improved valve grinder, the cover plate being removed and a portion of the grinder shown in section, for the purpose of more clearly illustrating the features of my invention.

Similar characters of reference indicate similar parts throughout the several views.

In Fig. 1 I have shown my improved valve grinder at A, a portable power unit at B, and a conventional type of internal combustion engine cylinder at C. The wall of cylinder C is broken away to disclose the usual exhaust valve D seating in the beveled seat F. A valve stem guide G is provided for the valve stem F. The intake valve and its seat have been removed to permit access to the exhaust valve D.

While the particular details of the portable means employed to operate my improved valve grinder do not form a part of my invention, I preferably employ and have illustrated a conventional type of "portable drill" comprising an electric motor carried in a housing 6, the housing 6 having a handle 7, whereby the operator may hold the "portable drill" in any desired position. Energy is supplied to the motor by a flexible cable 8. A shaft carrying a chuck member 9 is journaled in the housing 6 and is driven at a reduced speed by said motor.

As illustrated in the drawings, the improved valve grinder comprises a casing 10 provided with a cover plate 11, said cover plate 11 being secured to the casing 10 by machine screws 12. Fixed to the casing 10 is a handle 14 of suitable design. A boss 15 extending upwardly from the upper end of the casing 10 has a central bore 16. The bore 16 is provided with a bushing 17 to journal a driving shaft 18. A ball thrust bearing 19 is fitted into an enlarged portion of the bore 16 and co-acts with a thrust collar 21 of the shaft 18. The outer end of the shaft 18 is turned to a plurality of diameters, as at 22 and 23, whereby the shaft 18 may be operatively engaged by portable power units having chucks of different capacities. The inner end of the shaft 18 is threaded to receive a nut 24, which prevents longitudinal displacement of a spur gear 25 rigidly secured to said shaft 18.

The casing 10 is provided with combined radial and thrust bearings 26 and 27 to journal the upper and lower ends, respectively,

of a worm shaft 28, the worm shaft 28 having its axis parallel to the axis of the driving shaft 18. The bearing 27 is adjustably secured in the casing 10 and may be locked in an adjusted position by means of a set screw 30. A spur gear 31 is rigidly secured to the worm shaft 28 and meshes with the spur gear 25. A worm 32 formed integral with the worm shaft 28 is disposed intermediate the spur gear 31 and the bearing 27.

A shaft 33 is disposed at right angles to the driving shaft 18. One end of the shaft 33 is journaled in the cover plate 11, and the other end in a socket 34 in the casing 10. Rigidly secured to the shaft 33 is a collar 35 having fixed thereto a pair of mutilated gears 36 and 37. In the preferred form of my invention, the gears 36 and 37 are mutilated so that one of the gears has more teeth than the other. Fig. 3 shows the gear 36 as being provided with nine teeth and gear 37 with six teeth. A gear 38 is rigidly secured to the collar 35 intermediate the mutilated gears 36 and 37 and meshes with the worm 32. Mounted around the shaft 33 and interposed between the cover plate 11 and the mutilated gear 36 is a coiled compression spring 39. The spring 39, as shown in Fig. 2, serves to yieldingly force the right hand end of the shaft 33 into the socket 34. A boss 40 extending outwardly from the lower end of the casing 10 is provided with a bushing 40^a and journals a driven shaft 41. The axes of the driving shaft 18 and the driven shaft 41 are coincident for a purpose which will presently appear. A spur gear 42 is rigidly secured to the inner end of the shaft 41 and meshes with both gears 36 and 37. Interposed between the spur gear 42 and casing 10 is a coiled compression spring 43, tending to move the shaft 41 inwardly. The lower end of the shaft 41 has threaded upon it a ball race member 44 having a co-acting ball race member 45, the ball race member 45 resting against the outer end of the boss 40. Bearing balls 46 are interposed between the ball race members 44 and 45. A shaft 47 is threaded into an extension 48 of the ball race member 44, and has pivotally secured to it, at its lower end, a valve-engaging piece 49. This valve-engaging piece 49 is arranged to fit into the slot usually provided in puppet valves, so that oscillation of the driven shaft 41 may be transmitted to the valve to be re-ground or re-faced.

In the operation of the device, the operator holds the portable power unit B and valve grinder A in operative association with the valve D, by means of the handles 7 and 14. The outer end of the shaft 18 is detachably engaged by the chuck 9 of the portable power unit B and caused to rotate in the direction indicated by the arrow X. (Fig. 3). The spur gears 25 and 31, to-

gether with the worm 32 and gear 38, transmit the rotary motion of the shaft 18 to the shaft 33, thereby causing the mutilated gears 36 and 37 to rotate in a clockwise direction. (Fig. 3.) The leading teeth 51 and 52 of the mutilated gears 36 and 37, respectively, are each bent outwardly in a direction away from the other mutilated gear, as described in the above mentioned patent, the mutilated gears 36 and 37 imparting a progressively advancing oscillatory motion to the driven shaft 41 by means of the successive engagement of the gears 36 and 37 with the spur gear 42.

The driving shaft 18 and driven shaft 41 and the "portable drill" shaft, which carries the chuck member 9, have coincident axes. This arrangement facilitates the grinding operation, and the "portable drill" and valve grinder are easily balanced and held in a proper position relatively to the work. The weight of the valve grinder and its driving means is transmitted in a straight line, substantially coincident with the axis of the valve stem, thus preventing undesirable unequal grinding upon different portions of the valve seat.

I have illustrated a coiled compression spring 53 interposed between the valve D and the valve stem guide G. This spring 53 is adapted to raise the valve D from its seat F when the weight of the valve grinder is not imposed upon said valve D.

While I have described the details of a preferred form of my invention, it is to be understood that my invention is not limited to these details, except by the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. A valve grinder comprising a driving shaft adapted to be engaged and rotated by a chuck, a casing, a removable cover plate for said casing, a spur gear rigidly secured to said driving shaft, a worm shaft disposed parallel to said driving shaft, a second spur gear rigidly secured to said worm shaft and meshing with said first-mentioned spur gear, a worm formed integral with said worm shaft, a third shaft disposed at right angles to said worm shaft, said third shaft being journaled in said cover plate and a socket in said casing, spring means for holding said third shaft in said socket, a pair of mutilated gears rigidly secured to said third shaft, the leading tooth of each mutilated gear being bent outwardly in a direction away from the other mutilated gear, a gear rigidly secured intermediate the said mutilated gears to said third shaft and meshing with said worm, a driven shaft disposed coaxially with said driving shaft and journaled in said casing, an end thrust bearing collar adjustably secured to said driven

shaft, bearing balls between said collar and casing on the inner side of said collar and the outer side of said casing, spring means for maintaining engagement between said collar and bearing balls, and a spur gear 5 rigidly secured to said driven shaft and meshing with said mutilated gears.

2. A valve grinder comprising a driving shaft, a spur gear rigidly secured to said 10 driving shaft, a worm shaft, a second spur gear rigidly secured to said worm shaft and meshing with the first-mentioned spur gear, a worm carried and rotated by said worm shaft, a third shaft, a pair of mutilated 15 gears rigidly secured to said third shaft, a gear rigidly secured intermediate said mutilated gears to said third shaft and meshing with said worm, a driven shaft, and means intermediate the mutilated gears and 20 the driven shaft whereby the driven shaft may be actuated alternately by the mutilated gears.

3. A valve grinder comprising a casing, a vertically disposed driving shaft extending into said casing at the top thereof, and 25 provided on its lower end with a spur gear, a bearing carried by the casing adapted to receive the downward thrust of said driving shaft, a vertically disposed driven shaft 30 extending into said casing at the bottom thereof, and provided at its upper end with a spur gear, a bearing carried by the casing adapted to receive the upward thrust on said driven shaft, and devices within the casing 35 which are actuated by continuous rotary movement of the upper spur gear and which impart oscillatory movement to the lower spur gear.

In witness whereof I hereunto subscribe my name this 8 day of October, 1920.

FRANS O. ALBERTSON.

Witnesses:

B. V. DUMAN,
H. A. JACOBSEN.