G. F. PETERSON.

VALVE GRINDER.

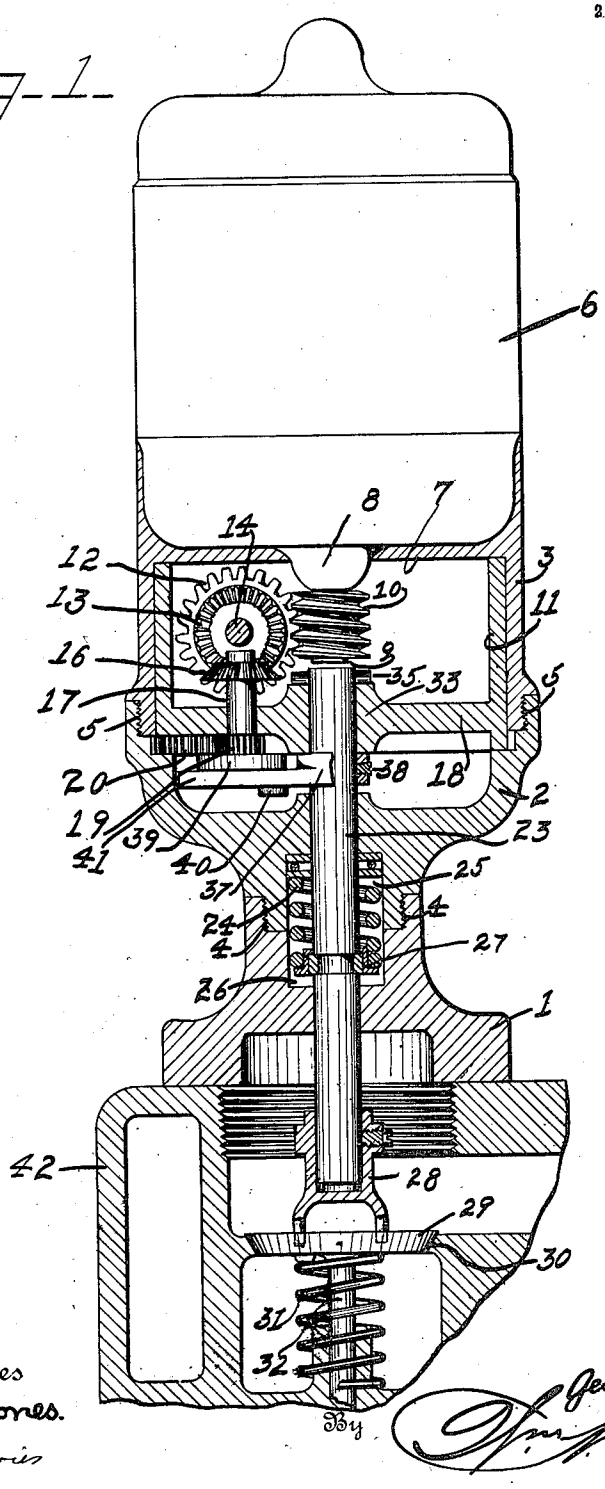
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1,122,998.

Patented Dec. 29, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

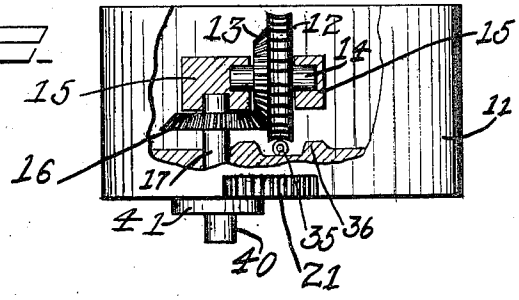


Fig. 3.

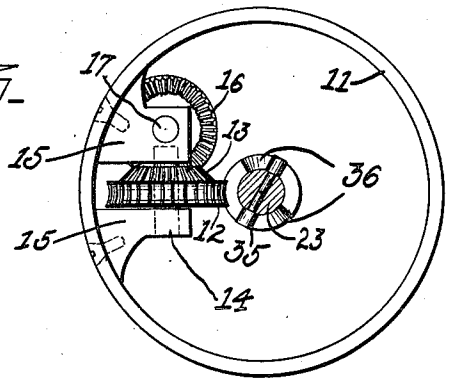


Fig. 4.

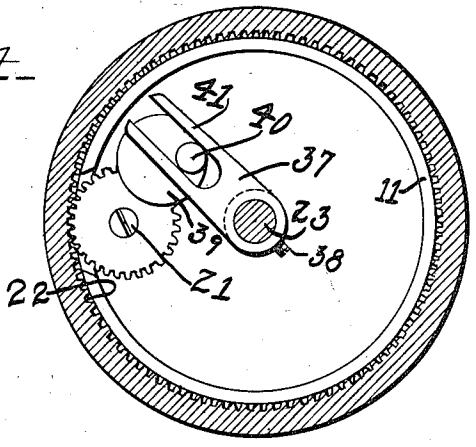
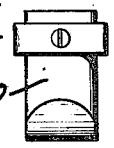


Fig. 5.



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UNITED STATES PATENT OFFICE.

GEORGE F. PETERSON, OF SALT LAKE CITY, UTAH.

VALVE-GRINDER.

1,122,998. Specification of Letters Patent. Patented Dec. 29, 1914.

Application filed August 26, 1914. Serial No. 858,611.

To all whom it may concern:

Be it known that I, GEORGE F. PETERSON, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Valve-Grinders, of which the following is a specification.

The present invention relates to improvements in valve grinders of the portable, power driven type, especially adapted for use in grinding valves of internal combustion engines, but of course applicable for use in connection with other types of valves.

The primary object of the invention is the provision of a portable, compactly arranged valve grinder which will grind the valve while in its seat leaving it in a smooth condition, free from scratches and rings, and this object is attained by combining and arranging the parts of the device so that when the device is operated the valve is forced to revolve in its seat, lifted while revolving, then seated and reversed in its movement a short distance, then lifted still revolving and then seated and again revolved a long distance ahead, the action being continued until the valve is smooth and free from all irregularities. Thus the action of the parts is that of revolving, oscillating, and reciprocating, as will be hereinafter more specifically described.

In the accompanying drawings I have illustrated one complete example of the physical embodiment of my invention, and a modified form of tool or attachment used with the device, constructed according to the best modes I have so far devised for the practical application of the principles of my invention.

Figure 1 is a sectional view showing the device involving my invention as applied to a portion of an internal combustion engine, in position to grind the valve. Fig. 2 is a view of a rotary member or carrier with parts broken away for convenience of illustration. Fig. 3 is a top plan view of the rotary carrier of Fig. 2. Fig. 4 is a transverse sectional view looking upwardly on line 4—4 of Fig. 1. Fig. 5 shows an additional form of attachable tool, in the form of a screw driver.

In the preferred embodiment of my invention as illustrated in the drawings, the grinder is inclosed and carried by the three sections as the base 1, the lower housing 2 and the upper housing 3, and these sections are jointed by means of the threads 4 and 5.

A motor 6, which as illustrated is a conventional form of electric motor, is carried by the upper portion of the housing 3, and it will be understood that these elements, the base, housings and motor, are rigidly fixed with relation to each other, and stationary.

The upper housing 3 is in the form of a cylindrical open bottom shell and its partition 7 is perforated at its center to provide for a central bearing lug 8 of the motor in which the motor shaft 9 is journaled, and this shaft carries a worm gear 10, through which motion is imparted to the grinder.

Within the cylindrical housing 3 an open top cylindrical cup 11 is adapted to revolve, and it is horizontally rotated from the worm gear 10, through the medium of worm wheel 12, bevel gear 13 and counter shaft 14, the latter journaled in bearing brackets 15 secured to the wall of the cup; and bevel pinion 16, crank shaft 17 supported in the bottom 18 of the cup, small pinion 19 on the crank shaft and idler pinion 20 journaled on a stud shaft or screw 21 in the bottom 18 of the cup. The idler pinion 20, as clearly seen in Fig. 4, is in mesh with a rack ring 22 formed in the interior upper end of the housing 2, and as the cup 11 revolves the idler and rack ring are at all times in engagement, and the rotary motion imparted to the idler causes this rotary motion of the cup in the upper housing.

The main shaft 23 is loose in the bottom 18 of the cup and is also free to revolve in bearings in the upper and lower housings.

A tension spring 24 which is inclosed by the two recesses 25 and 26 in the two housings, surrounds the shaft 23 and has a thrust bearing 27, so that the spring tends to force the shaft downwardly in Fig. 1. This shaft carries a tool as 28 at its end, which in this instance is forked to engage holes in the top of the disk 29 forming the valve in seat 30, and the valve has a spring 31 about its stem 32 tending to lift the valve from its seat.

The upper end of the main shaft projects through a hub 33 formed centrally of the cup bottom 18, and a transversely extending pin 34 in the shaft has a pair of rollers 35 one at each side of the shaft. These rollers are adapted to ride over two cam faces 36 36 on the hub 33, and in doing so they cause the main shaft to reciprocate vertically (in Fig. 1) against the tension of spring 24.

From this construction it will be understood that the main shaft revolves free of the cup 11, but the shaft however is revolved indirectly from the cup.

A forked oscillating arm 37, fixed on the shaft by means of the set screw 38, receives motion from the crank disk 39 on the shaft 17, the pin 40 traveling between the forked arms 41 of the arm 37 as the arm is oscillated. Thus it will be seen that as the cup revolves the shaft 23 also revolves with it, but in addition to this revolving motion, the crank motion and oscillating arm cause the main shaft to revolve or oscillate in the hub of the cup, and the cams provide for a reciprocatory motion of the main shaft which is aided by the spring 24.

In use the valve grinder is set directly over the valve with the base 1 resting on the engine cylinder or valve cage 42, and with the valve tool 28 engaging the valve 29 as described. The valve tool 28 is so adjusted on the lower end of the main shaft as to compress the spring 24 and cause a downward tension of the spring to keep the tool 28 engaged with the valve.

Although the rollers 35 may be lifted from the lower part of the hub edge, they are still in position to ride over the cams on the hub and lift the main shaft. When the main shaft is thus lifted, the spring 31 raises the valve disk from its seat, and the oscillating arm 37 is so timed in its movement that the main shaft is oscillated while in lifted position to turn the valve disk. By this mechanism operated from the motor through the described gearing and the rotating cup, the desired movement is imparted to the disk so that its edge is ground smooth to make a perfect fit on its seat. In some instances the tool 50 in Fig. 5 may be used, this tool performing the function of a screw driver, and being substituted for the forked tool 28 of Fig. 1.

From the above described mechanism taken in connection with my drawings it will be seen that the whole action of the grinder forces the valve disk to revolve a long distance ahead on its seat, then lift still revolving, then seat and revolve backward or reversely for a short distance, then lift still revolving, then seat again and revolve a long distance ahead, thus repeating the actions until the disk is sufficiently ground.

Having thus fully described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a valve grinder, the combination with a base, a cylindrical housing coupled to the base and a motor supported in the housing, of a cup rotatable within the housing and connections from the motor for rotating said cup, a main shaft loosely journaled in the cup and provided with valve engaging means, means between the cup and main shaft for revolving the latter, and means for reciprocating said shaft.

2. The combination with a rotary driving cup, of a main shaft journaled in a portion of the cup reciprocable therein, means for revolving the cup, means for revolving the shaft from the cup, means on the cup for reciprocating the shaft and means actuated by the cup for oscillating the shaft.

3. The combination in a valve grinder of a rotatable driving cup and a rotary shaft reciprocable therein, a hub on the cup having cams, and a spring resiliently supporting the shaft, and rollers supported on the shaft adapted to ride over said cams to lift the shaft.

4. The combination with a rotary driving cup a rotary main shaft reciprocably journaled therein, means carried by the cup for lifting said shaft to permit the valve to rise from its seat, and means for returning the shaft and valve to lowered position.

5. In a valve grinder, the combination with its housing and base and motor, of a main driving shaft, a rotary cup supported in a housing, a crank shaft journaled in the cup and gears from the motor for driving the same, a pinion on the crank shaft, a rack ring formed on the housing and an idler between the rack ring and pinion, and an oscillating lever on the main shaft connected to the crank shaft whereby the main shaft is rotated and oscillated.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE F. PETERSON.

Witnesses:
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A. C. REES.