M. F. PARSONS.

GRINDING TOOL.

APPLICATION FILED DEC. 3, 1909.

956,822. Patented May 3, 1910.

2 SHEETS—SHEET 1.

Fig. 3.

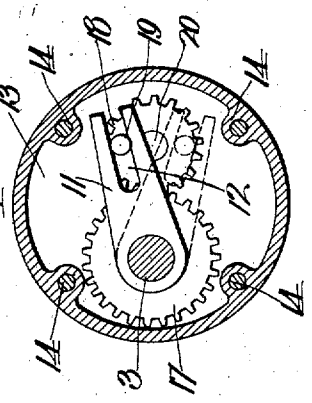


Fig. 4.

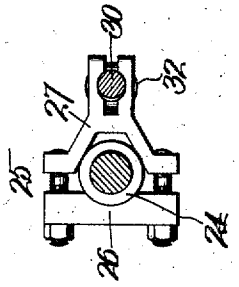


Fig. 2.

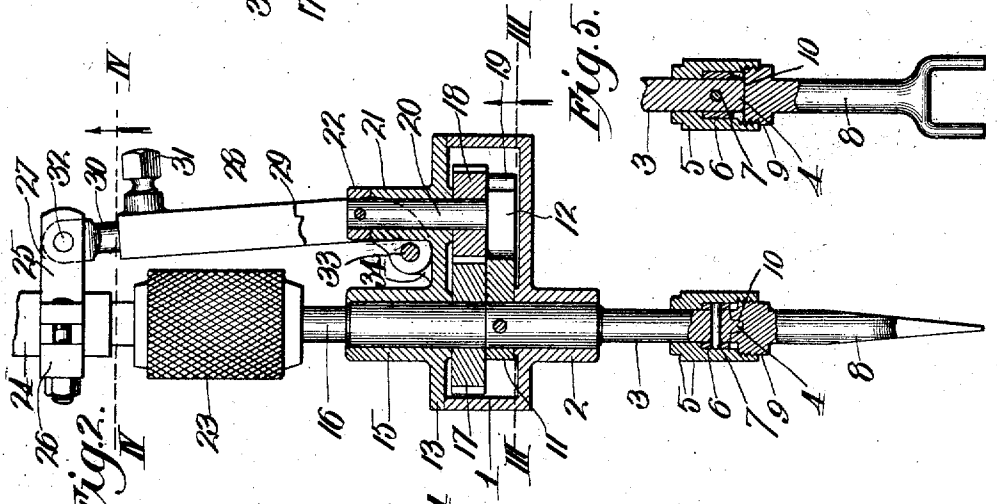
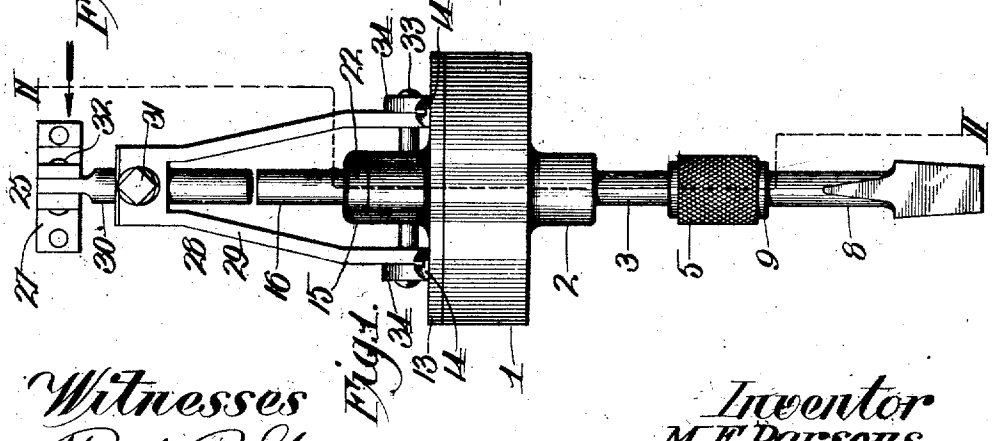


Fig. 5.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 7.

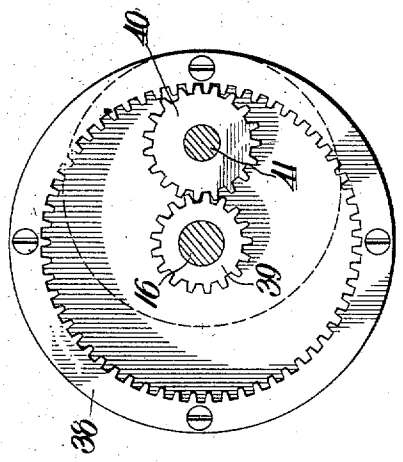
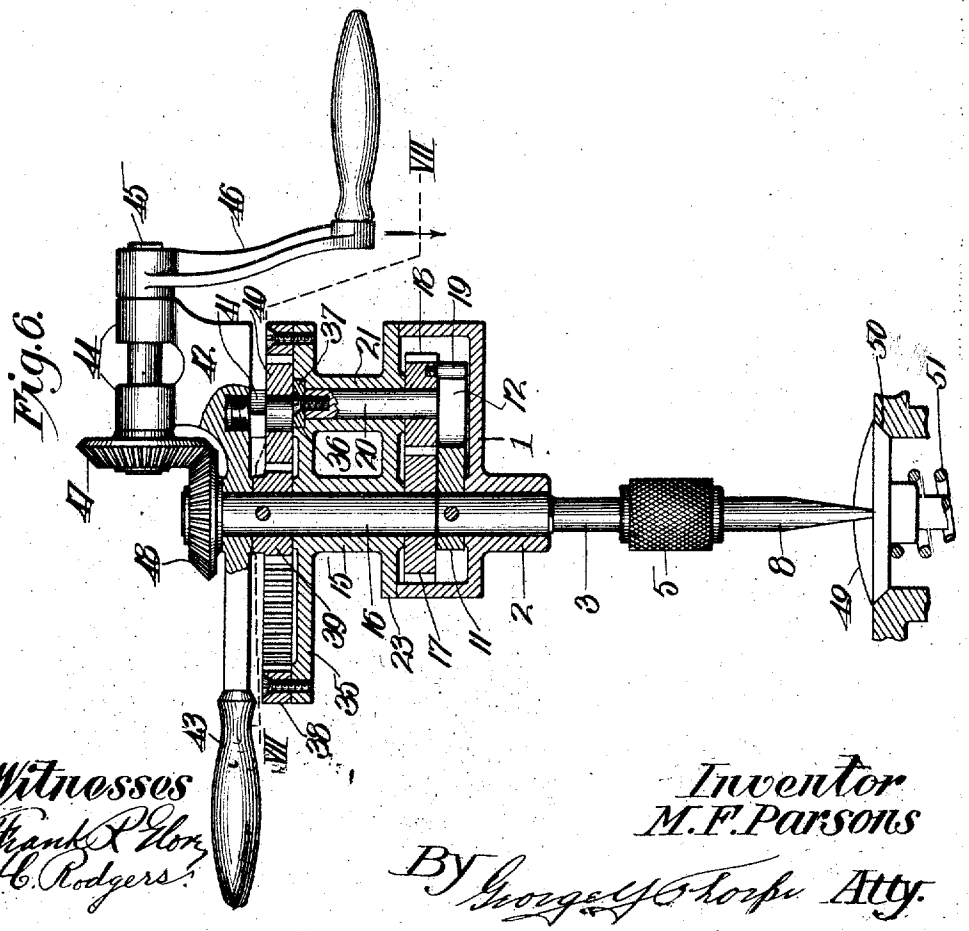


Fig. 6.



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UNITED STATES PATENT OFFICE.

MILLARD F. PARSONS, OF KANSAS CITY, KANSAS.

GRINDING-TOOL.

956,822. Specification of Letters Patent. Patented May 3, 1910.

Application filed December 3, 1909. Serial No. 531,233.

To all whom it may concern:

Be it known that I, MILLARD F. PARSONS, a citizen of the United States, residing at Kansas City, in the county of Wyandotte and State of Kansas, have invented certain new and useful Improvements in Grinding-Tools, of which the following is a specification.

This invention relates to grinding tools and is designed especially for use in grinding the puppet valves and valve seats of gasolene automobile engines, though adapted for use in other connections, and my object is to produce a tool of this character which can be easily and efficiently operated by an unskilled person.

A further object is to produce a grinding tool which will impart an oscillatory motion to the valve similar to that produced in grinding by hand.

A still further object is to produce a tool by which a valve may be oscillated and also caused to continuously turn around its axis at a much slower speed than and without interfering with its oscillatory movement and thus adapt the tool to complete the grinding of a valve and its seat without shifting the tool by hand during such operation.

With these general objects in view and others as hereinafter appear, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which;

Figure 1, is an elevation of a grinding tool embodying my invention. Fig. 2, is a section on the line II—II of Fig. 1, and also shows a part of a breast-drill for operating the tool. Fig. 3, is a section on the line III—III of Fig. 2. Fig. 4, is a section on the line IV—IV of Fig. 2. Fig. 5, is a vertical section of the lower end of the oscillatory shaft of the tool and of the upper end of a spanner for engagement with certain kinds of valves. Fig. 6, is a central vertical section of a tool equipped with means whereby the valve is given a continuous rotary movement and at the same time an oscillatory movement. Fig. 7, is a section on the line VII—VII of Fig. 6.

In the said drawings, where like reference characters identify corresponding parts in all of the figures, 1 indicates a cylindrical casing provided eccentrically with a depending bearing-boss 2 for a vertical shaft 3 provided at its lower end with a tongue 4.

5 is an internally-threaded knurled nut fitting loosely on the shaft 3, and 6 is a collar secured by a pin 7 on said shaft and underlying a part of the knurled nut to prevent the same slipping off the end of the shaft.

8 is a bit, in the form of a screw driver or spanner, provided with a threaded head 9 having a socket or recess 10, the latter being adapted to receive the tongue 4, after which the nut is screwed upon the threaded head to hold the bit in fixed relation to the shaft, and secured rigidly on the upper end of the said shaft within the casing, is an arm 11 provided with a radial bifurcation or slot 12.

13 is a cap for and secured by bolts 14 to the casing 1, and projecting upward from said cap is a bearing-boss 15 for a vertical shaft 16 arranged vertically above and extending in alinement with shaft 3, and secured on the lower end of shaft 16 within the casing is a gear-wheel 17 meshing with a similar gear-wheel 18 provided with a pin 19 engaging the bifurcation or slot 12 of arm 11. The gear-wheel 18 is secured upon the lower end of a short shaft or stem 20 journaled in the bearing-boss 21 projecting vertically upward from the cap, and resting upon the boss and secured to the upper end of said shaft or stem, is a collar 22.

From the foregoing it will be apparent that rotary movement imparted to shaft 16 will result in oscillatory movement of the bifurcated arm and hence produce similar movement of the bit or spanner.

In the construction shown by Sheet 1, the means for imparting movement to the shaft 16 is a common breast-drill of which 23 forms the chuck for engagement with the shaft and 24 the casing for the stem or mandrel of the chuck, and to hold the breast-drill in proper relation to the tool, I provide a clamp 25, the same consisting of members 26 and 27 bolted together and upon the casing of the breast-drill, and said clamp is connected by a link 28 with the cap 13, said link consisting of a pivoted frame 29 and a rod 30 slidable therein and adapted to be secured in fixed relation thereto by a set-screw 31. The upper end of the link is pivoted at 32 to member 27 of the clamp and the lower end of the link is pivotally mount-

ed on a rod 33 carried by ears 34 projecting upward from the cap. To place the drill in or remove it from position it is necessary to disconnect member 26 of the clamp, as will be apparent.

Where it is desired to impart a continuous progressive rotary movement to the valve without interfering with its oscillatory movement, the gear-wheel 18 is caused to travel as a planet gear around gear-wheel 17 as the sun gear, the said result being effected from shaft 16. My preferred construction for effecting this progressive circular movement of the gear-wheel 18 and hence of the casing and oscillatory shaft 3, is as follows: 35 is a circular flange at the upper ends of bearing-bosses 15 and 21, the margin of said flange being concentric with respect to bearing-boss 15, and said flange is provided with a recess 36 receiving a cap 37 secured to the upper end of shaft 20 to properly support the latter, this cap corresponding in function to collar 22, of Figs. 1 and 2. 38 is an internal gear-wheel secured to flange 35, and 39 is a gear-pinion secured upon shaft 16 and connected through the idler gear-wheel 40 with said internal gear-wheel, the arrangement being such that movement imparted to the shaft 16 shall result in rotary movement of gear-wheel 38 and hence cause the casing to rotate around shaft 16 and gear-wheel 18 to be not only rotated by gear-wheel 17 but also to travel as a planet around the periphery of the same, the parts being so proportioned that the last-named action results in a slow progressive rotary movement of shaft 3 without interfering with its comparatively rapid oscillations. The idler gear-wheel 40 is journaled on the lower end of a stub-shaft 41 secured to and depending from a part 42 journaled on shaft 16, and said part is provided with a handle 43 by which it may be held immovable. It is also provided at the opposite side of shaft 16 from said handle with bearing-arms 44 for a short drive-shaft 45 equipped with a crank handle 46 at its outer end and at its inner end with a bevel gear 47 meshing with a bevel gear 48 on the upper end of shaft 16. It will thus be seen that by grasping handle 43 and holding the part 42 stationary, the operator may turn the crank handle and thus impart to the shaft 3 the movements above traced.

The common method of grinding a puppet valve, such as valve 49, is to raise it slightly from its seat 50 and introduce an abrasive substance, such as emery, between it and its seat, and then by means of a screw driver or a spanner, impart oscillatory movement to the valve, and at intervals turn the screw driver so that the grinding of both the valve and its seat shall be uniform, which method is slow and tedious. With my device an expansive spring 51 is first arranged under the valve to yieldingly hold the latter slightly above its seat. The tool is then engaged with the nick or slot commonly found in the top of the valve or with the two holes which are sometimes found in the valve instead of the nick or slot. In the first case a bit like that shown in Figs. 1, 2 and 6 is employed; in the second case a spanner as shown in Fig. 5. With the tool of the type shown by Figs. 1 and 2, a movement of the valve is produced precisely like that which is accomplished by the hand manipulation referred to, the tool at intervals being turned for the same reason that the screw driver or spanner is turned by hand, that is to insure uniform grinding of the valve and its seat. With the construction shown by Fig. 6, that is where the gear-wheel 18 is caused to revolve as a planet around the gear-wheel 17 as the sun, a constant progressive rotary movement is imparted to the valve automatically so as to obviate the necessity of turning the tool at intervals as is necessary with the construction shown by Figs. 1 and 2, it being immaterial whether the shaft 16 is driven through the instrumentality of a breast-drill, a crank handle as in Fig. 6, or in any other manner.

It will be apparent of course that the use of the spring 51 under the valve is not absolutely indispensable but that it is preferred to use it with either type of the tool and that a slight downward pressure imposed upon the latter will be sufficient to cause said spring to yield and thus insure the grinding operation, in fact the weight of the tool may be sufficient to hold the valve upon its seat with sufficient pressure for the grinding operation to be performed, the tool being raised at intervals to permit the spring to elevate the valve sufficiently for the insertion of additional abrasive material between it and its seat. Where the spring is not employed it is necessary to raise the valve by hand.

From the above description it will be apparent that I have produced a grinding tool embodying the features of advantage enumerated as desirable in the statement of the object of the invention and which is susceptible of modification in various particulars without departing from the spirit and scope or sacrificing any of the advantages of the appended claims.

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

1. A grinding tool, comprising an oscillatory shaft, a shaft in line with the oscillatory shaft, a shaft out of alinement with the first-named shafts, means for rotating the shaft in alinement with the oscillatory shaft, means whereby the rotation of said alined shaft shall cause the said third shaft to travel

in a circle around the axis of said alined shaft, means whereby said alined shaft shall impart rotation to said third shaft without interfering with its circular travel, and means whereby said third shaft shall impart oscillatory movement to the oscillatory shaft.

2. A grinding tool, comprising an oscillatory shaft, an arm projecting therefrom, a rotary wheel disposed with its axis out of alinement with that of said shaft, means whereby the rotation of said wheel shall effect oscillatory movement of said shaft, a shaft alined with the oscillatory shaft and provided with a gear-wheel meshing with the first-named gear-wheel, means for imparting movement to the said alined shaft, and means for causing the gear-wheel through which oscillatory motion is imparted to the oscillatory shaft, to travel as a planet around the gear-wheel on the said alined shaft without interfering with the rotation of each around its own axis.

3. A grinding tool, comprising an oscillatory shaft, an arm projecting therefrom, a rotary wheel disposed with its axis out of alinement with that of said shaft, means whereby the rotation of said wheel shall effect oscillatory movement of said shaft, a shaft alined with the oscillatory shaft and provided with a gear-wheel meshing with the first-named gear-wheel, means for imparting movement to the said alined shaft, a gear-wheel arranged concentrically with respect to the axis of said alined shaft, means whereby the rotation of the last-named shaft shall impart rotation to the last-named gear-wheel, and means whereby the rotation of said last-named gear-wheel shall cause the gear-wheel connected to impart oscillatory movement to said oscillatory shaft, to travel as a planet-gear around the gear-wheel intermeshing with and driving the same.

4. A grinding tool, comprising a casing provided with a pair of vertically alined bearings and a third bearing eccentrically of the first-named bearings, shafts journaled in said alined bearings and projecting into the casing at their adjacent ends, a parallel shaft journaled in the third bearing, gear-wheels mounted upon one of the first-named shafts and the third shaft and meshing together, a pin projecting from the gear-wheel on the third shaft parallel with the latter, an arm rigidly mounted on the first-named shaft not provided with a gear-wheel and provided with a longitudinal slot receiving said pin, a gear-wheel bearing a fixed relation to the casing and arranged concentrically around one of the said first-named shafts, a gear-pinion mounted on the first-named shaft surrounding the said gear-wheel, a frame journaled on the shaft provided with the gear-pinion, an idler gear-wheel meshing with the said gear-pinion and said surrounding gear-wheel, a part journaled upon the shaft provided with the pinion and provided with a stub-shaft forming a journal for said idler gear-wheel, a shaft journaled in said part and provided with a crank handle at one end and a miter gear at the other, and a miter gear secured upon the upper end of the shaft provided with a gear-pinion and meshing with the first-named miter gear.

5. A grinding tool, comprising a casing provided with a pair of vertically alined bearings and a third bearing eccentrically of the first-named bearings, shafts journaled in said alined bearings and projecting into the casing at their adjacent ends, a parallel shaft journaled in the third bearing, gear-wheels mounted upon one of the first-named shafts and the third shaft and meshing together, a pin projecting from the gear-wheel on the third shaft parallel with the latter, an arm rigidly mounted on the first-named shaft not provided with a gear-wheel and provided with a longitudinal slot for receiving said pin, a gear-wheel bearing a fixed relation to the casing and arranged concentrically around one of the said first-named shafts, a gear-pinion mounted on the first-named shaft surrounding the said gear-wheel, a frame journaled on the shaft provided with the gear-pinion, an idler gear-wheel meshing with the said gear-pinion and said surrounding gear-wheel, a part journaled upon the shaft provided with the pinion and provided with a stub-shaft forming a journal for said idler gear-wheel, a shaft journaled in said part and provided with a crank handle at one end and a miter gear at the other, a miter gear secured upon the upper end of the shaft provided with a gear-pinion and meshing with the first-named miter gear, and a bit carried by and in longitudinal alinement with the shaft equipped with the slotted arm.

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

MILLARD F. PARSONS.

Witnesses:
G. Y. Thorpe,
Helen C. Rodgers.