E. WESTMAN.

VALVE GRINDING DEVICE.

APPLICATION FILED MAR. 26, 1914.

1,158,758.

Patented Nov. 2, 1915.

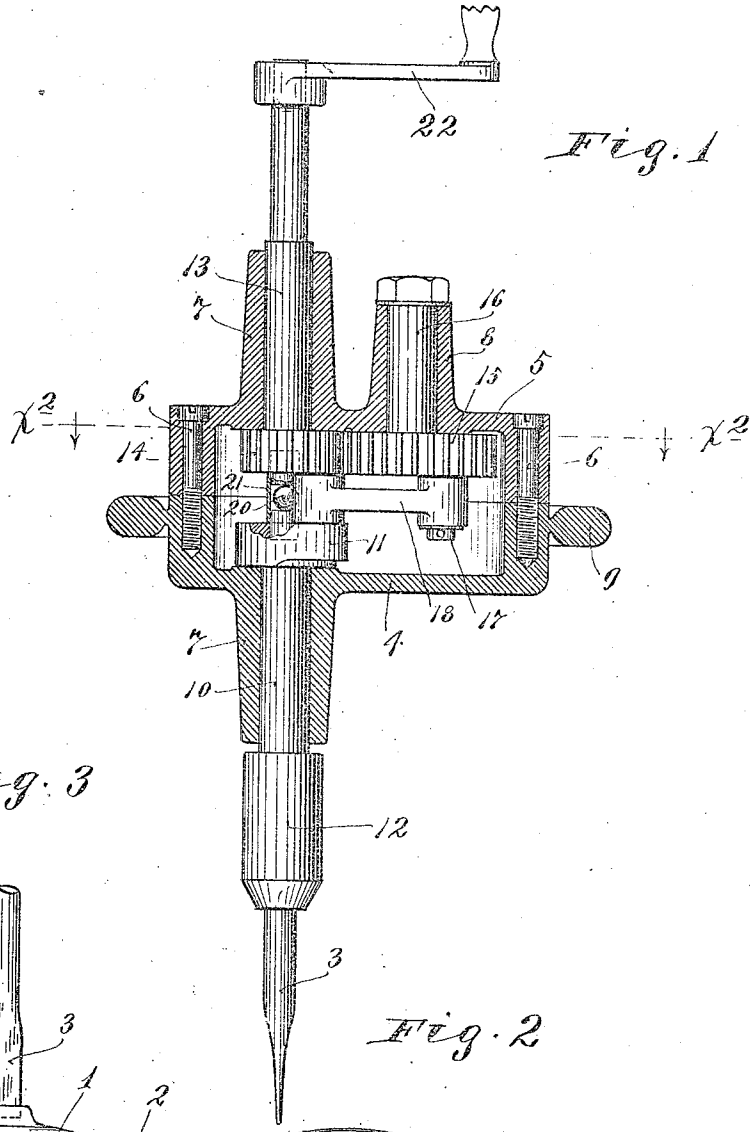


Fig. 1

Fig. 3

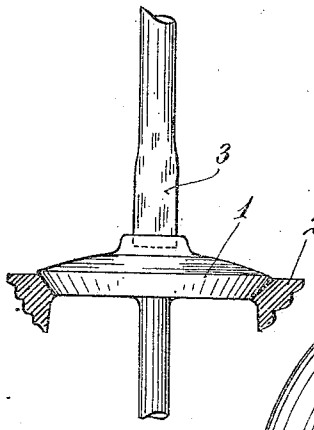
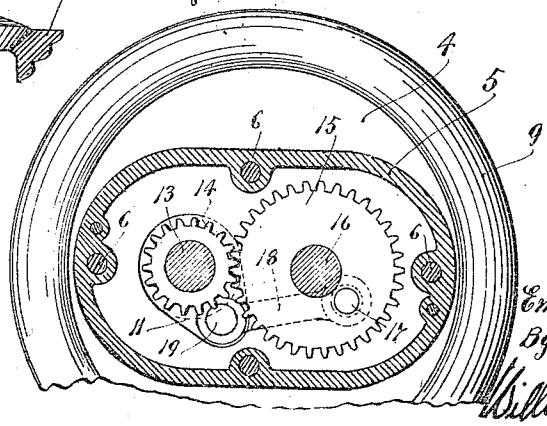


Fig. 2



Witnesses.
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UNITED STATES PATENT OFFICE.

EMIL WESTMAN, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR OF ONE-HALF TO THOMSON S. AMIDON, OF MINNEAPOLIS, MINNESOTA.

VALVE-GRINDING DEVICE.

1,158,758. Specification of Letters Patent. Patented Nov. 2, 1915.

Application filed March 26, 1914. Serial No. 827,320.

To all whom it may concern:

Be it known that I, EMIL WESTMAN, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Valve-Grinding Devices; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved valve grinding device, and to such ends, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

As is well known the proper movement to impart to a valve in grinding the same to its seat is an oscillatory movement back and forth, of about one-fourth rotation. Usually, this movement has been accomplished by hand, and the oscillation under such hand movement is not constant, but variable. The best grinding action requires a repetition of oscillations of constant throw, progressively shifted so that the valve, while being oscillated, is slowly rotated in one direction.

My invention provides an extremely simple and efficient device for accomplishing the above result.

In the accompanying drawings which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view chiefly in vertical section, but with some parts in full, showing my improved valve grinding device; Fig. 2 is a horizontal section taken on the line x^2 x^2 on Fig. 1; and Fig. 3 is a view partly in section and partly in elevation, and with some parts broken away, showing a valve in its seat to which the improved grinding device is adapted to be applied.

The numeral 1 indicates a valve which may be assumed to be the admission or exhaust valve of an explosive engine, and the numeral 2 indicates its coöperating seat against which it is to be ground and seated. Valves of this type, while being ground, are usually spring-pressed upward, so that when the downward pressure thereon is relieved, they will raise from their seat, but the spring for this purpose is not illustrated, because the action is well understood. Also, valves of this type are usually provided in their outer hubs with slots to which a tool 3 of the screw driving type, may be detachably applied for the purpose of oscillating the valve and grinding.

The improved grinding device comprises a casing which is preferably made in two sections 4 and 5, detachably connected by machine screws 6. The sections of this casing are provided with axially alined sleeve-like hubs 7, and the upper case section 5 is provided with an offset sleeve-like hub 8. A suitable hand piece, preferably in the form of a wheel rim 9 is applied to the casing and, as shown, is cast integral with the lower case section 4. Extended through and journaled in the lower hub 7 is an oscillatory shaft 10 provided at its upper end within the casing, with a short crank arm 11, and provided at its lower end with a clutch head 12 adapted to detachably hold a screw drive 3.

Extended through and journaled in the upper hub 7 is an operating shaft 13 provided at its lower end, within the casing with a spur pinion 14 that meshes with a spur gear 15 secured to a short upright shaft 16, journaled in a hub 8. This gear 15 carries an eccentrically located wrist pin 17 that is connected by a short pitman or connecting rod 18, and a wrist pin 19 on the end of the crank arm 11. The ends of the shafts 10 and 13 are reduced and project toward each other, as shown, in Fig. 1, and an anti-friction bearing ball 20 is interposed between the said reduced shaft ends. This ball 20 is held in position by a sleeve 21 telescoped over the reduced ends of said shafts 10 and 13. The ball is thus caged in working position, so that it transmits the end thrust from the shaft 10 to the shaft 13 by contact at the axis of the said shafts, and hence, offers but slight friction.

Rotary movement may be imparted to the driving shaft 13 either by power, such as would be afforded by an electric motor, for example, or it may be imparted by hand applied to an operating crank 22 secured to the upper end of the said shaft.

When the pinion 14 is rotated by means of the crank 22, the gear 15 and its wrist pin 17 will be rotated at a relatively slow speed, and the throw of the wrist pin or crank 17 is such that the crank arm 11 and

shaft 10 will be oscillated back and forth through approximately ninety degrees, or one-fourth rotation. This, as is evident, gives the desired movement required for proper grinding of the valve. The operator may hold the tool in one hand by taking hold of the wheel rim 9, and operate the tool by taking hold of the crank 22 with his other hand; and by slowly rotating the tool, while the crank shaft is being rotated, may slowly rotate the valve while it is being given its back and forth oscillatory movement.

In actual practice, this improved valve grinding tool has been found highly efficient for the purposes had in view, and it has been found that by the use of the same, not only is the labor and time required to grind valves, very greatly reduced, but better work can be done.

What I claim is:

1. In a valve grinding device, the combination with a casing, of a driving shaft and a tool-equipped driven shaft journaled to said casing in axial alinement, the former having a spur gear at its inner end, and a crank directly applied to its outer end, and said tool-equipped shaft having a crank directly secured to its inner end and provided with a wrist pin, and a second gear within said casing journaled thereto, and meshing with said first noted gear and provided with a crank pin, and a crank rod directly connected to said wrist pin and crank pin and working within said casing.

2. In a valve grinding device, the combination with a casing, of a driving shaft and a tool-equipped shaft journaled to said casing and axially alined with each other, a gear on said driving shaft, a crank arm on said tool-equipped shaft, a second gear-journaled to said casing, meshing with said first gear, and provided with a wrist pin, a crank rod connecting said wrist pin to said crank arm whereby said tool-equipped shaft will be oscillated when said driving shaft is rotated, a sleeve telescoped onto projecting adjacent ends of said two shafts, and a bearing ball within said sleeve interposed between the adjacent ends of the said two shafts.

3. In a valve grinding device, the combination with a casing and a driving shaft and a tool-equipped shaft, of a gear on the former, a crank on the latter, a crank gear meshing with the first gear, and a crank rod connecting said crank gear to said crank, whereby said tool-equipped shaft will be oscillated when said driving shaft is rotated, the said casing having a projecting wheel flange affording a hand piece.

4. In a valve grinding device, the combination with a casing and a driving shaft and a tool-equipped shaft, of a gear on the former, a crank on the latter, a crank gear meshing with the first gear, and a crank rod connecting said crank gear to said crank, whereby said tool-equipped shaft will be oscillated when said driving shaft is rotated, the said casing being made in two sections separable to afford access to the interior thereof, but normally rigidly connected together, one of the sections of said casing having a projecting wheel flange affording a hand piece.

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

EMIL WESTMAN.

Witnesses:
B. G. WHEELER,
HARRY D. KILGORE.