E. COLBURN.

VALVE GRINDING IMPLEMENT.

APPLICATION FILED NOV. 11, 1910.

998.957.

Patented July 25, 1911.

Fig. 1.

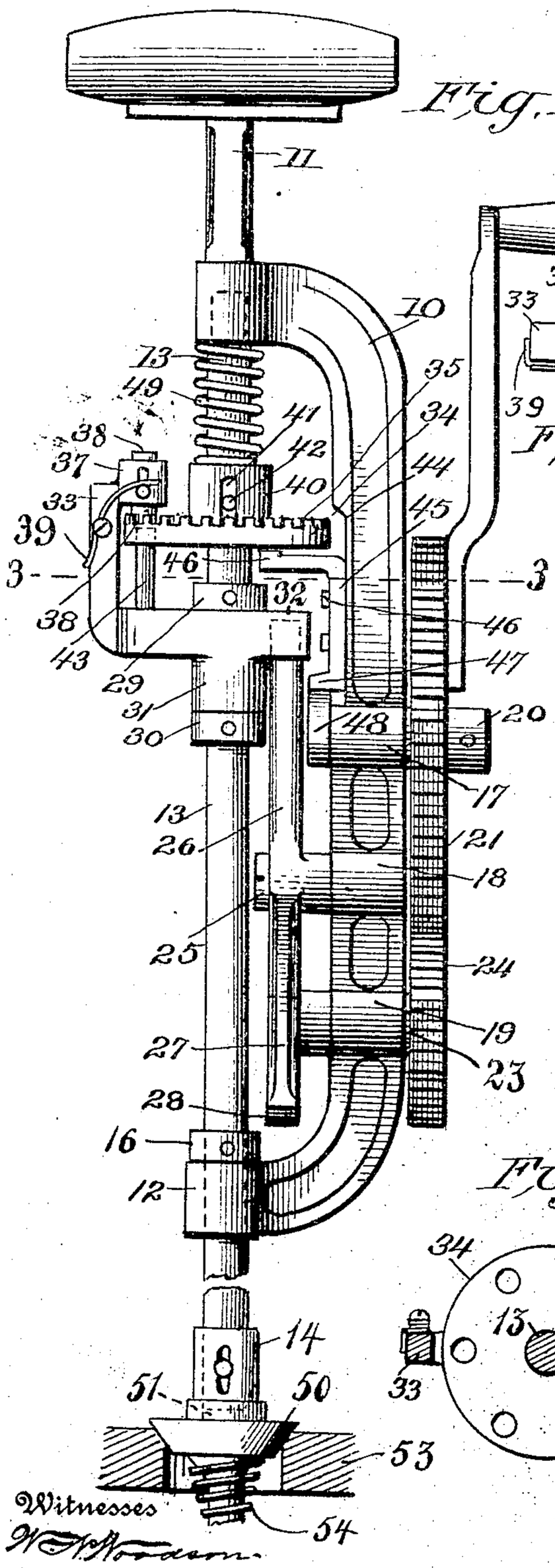


Fig. 2.

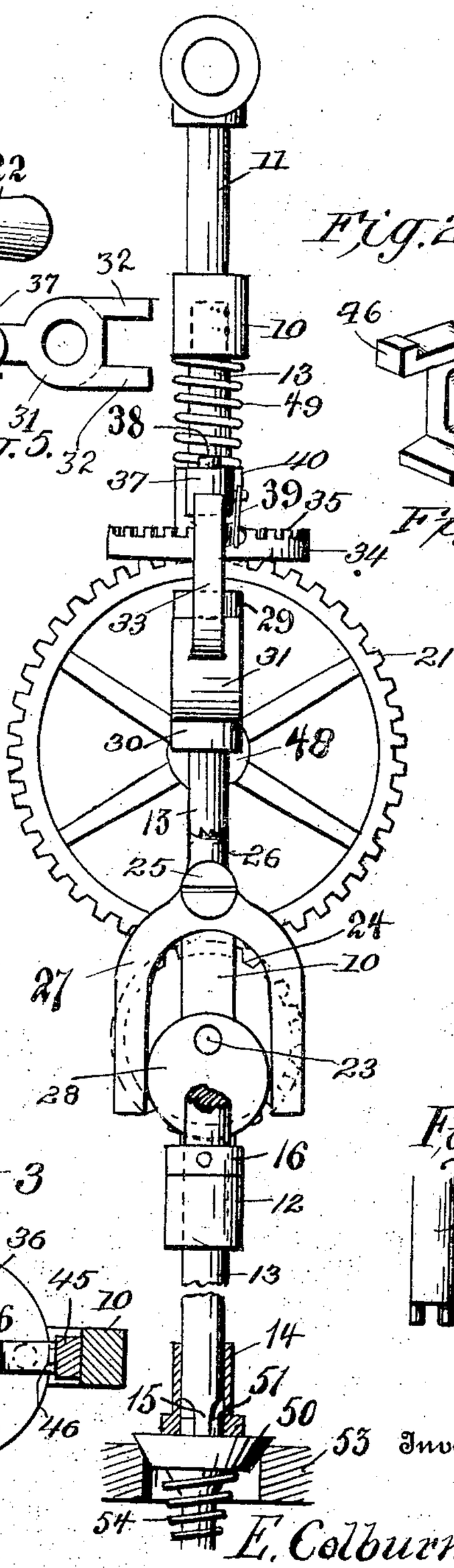


Fig. 5.

Fig. 6.

Fig. 3

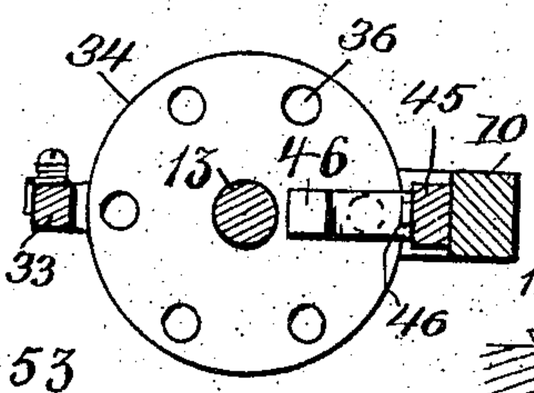
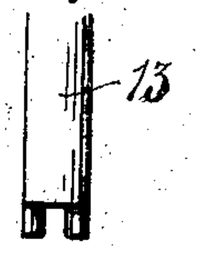


Fig. 4



Witnesses

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VALVE-GRINDING IMPLEMENT.

998,957. Specification of Letters Patent. Patented July 25, 1911.

Application filed November 11, 1910. Serial No. 591,902.

To all whom it may concern:

Be it known that I, EUGENE COLBURN, citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Valve-Grinding Implements, of which the following is a specification.

This invention relates to implements employed for grinding valve seats, and more particularly to devices of this character employed for grinding the valves of engines in automobiles, gas engines and the like, and has for one of its objects to provide a simply constructed device which is efficient in action, easily operated, and which may be applied in otherwise inaccessible localities.

Another object of the invention is to provide a simply constructed device whereby the valve is moved into a new position at each stroke or series of strokes in the operating mechanism, and thus insure uniformity in the action and results.

With these and other objects in view the invention consists in certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims; and, in the drawings illustrative of the preferred embodiment of the invention, Figure 1 is a side elevation of the improved implement; Fig. 2 is a front elevation of the same, partly in section; Fig. 3 is a bottom plan view of the ratchet wheel detached, together with the frame and pawl arm in section on the line 3—3 of Fig. 1; Fig. 4 is a view of a portion of the spindle, illustrating a modification in the construction. Fig. 5 is a plan view of the vibrating member. Fig. 6 is a perspective view of the movable bearing member, detached.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The improved implement may be arranged for operation by hand power or mechanical power without material structural changes, but for the purpose of illustration is shown arranged for hand power, and comprises a supporting frame 10 having a handle 11 at one end and a bearing 12 at the other end. The handle 11 is provided with an internal bore to receive the upper end of a spindle 13, the spindle being arranged for rotation through the bearing 12.

The valves to be ground by the improved implement, one of which is represented at 50, are sometimes provided with a circular lug 51, as shown in Figs. 1 and 2, and provided with a transverse cavity to receive a screw driver or like implement by which the valve is oscillated to produce the requisite grinding motion, and sometimes these valves are provided with two or more recesses spaced apart and into which a two-pointed screw driver or like implement is inserted for the same purpose. In thus grinding the valves the operator oscillates the valve back and forth a number of times and then moves it into a new position and operates it again for a number of times, and so on around, thus securing a uniform surface and grinding operation, and the principal object of the present invention is to produce mechanically this same step by step movement. When the implement is employed for grinding the valve having the lug 51 with its screw driver slot, the lower end of the spindle 13 is reduced, as shown at 15, to enter the slot of the lug, and likewise provided with a sleeve 14 slidable upon the spindle and fitting over the circular lug, as shown in Figs. 1 and 2. By this means the spindle is effectually coupled to the valve and when actuated transmits its motion to the valve, and at the same time maintains the valve in its proper position relative to the seat, represented at 53. When the improved implement is applied to a valve having the spaced recesses, the lower end of the spindle will be modified accordingly, or in the form represented in Fig. 4. These modifications do not constitute a departure from the principle of the invention, as it is not desired to limit the invention for use upon any specific form of valve or valve coupling.

The bore of the handle 11 forms an upper bearing for the spindle, as shown. The spindle 13 is provided with a stop collar 16 to limit its downward movement, while the bore of the handle 11 limits the upward movement. The frame 10 is also provided with intermediate bearings 17, 18 and 19, the bearing 17 carrying a stub shaft, indicated at 20, to receive a gear wheel 21, the latter having an operating handle 22. The bearing 19 supports a shaft, indicated at 23, with a gear pinion 24 upon one end, the latter engaging with the gear wheel 21. The bearing 18 supports a stub shaft, indicated at 25, and mounted for oscillation upon this stub shaft is an arm 26, the lower

end of the arm being forked, as shown at 27, to receive a cam 28 mounted upon the pinion shaft 23. The spindle 13 is provided with spaced stop collars 29—30, and mounted for oscillation upon the spindle between the stop collars is a sleeve 31. Projecting from one side of the sleeve are spaced ears 32 between which the upper end of the arm 26 extends. Projecting from the opposite side of the sleeve 31 is a vertical standard 33. Slidably mounted upon the stem 13 above the stop collar 29 is a disk 34 having ratchet teeth 35 in its upper face and with a plurality of sockets 36 in its lower face. Formed upon the standard 33 is a vertical guide 37 in which a pawl 38 is mounted for vertical movement and in position to engage one at a time in the teeth 35 of the ratchet disk. The pawl 38 is spring supported, as shown at 39, so that it is retained in yieldable engagement with the teeth. The hub 40 of the disk 34 is slotted, as shown at 41, to receive a pin 42 extending therethrough from the spindle. By this means the disk 34 is rotative with the spindle, while at the same time movable longitudinal thereon to an extent equal to the length of the slot 41. Rising from the standard 33 is a pin 43 which is designed to engage one at a time in the sockets 36 of the disk 34. The sockets 36 are arranged in a circle, as shown in Fig. 3, so that the pin 43 will engage in the sockets as the sleeve 31 is oscillated, or the spindle rotated.

The frame 10 is provided with a recess 44, and connected within this recess is a bearing 45 having a longitudinal slot to receive holding pins 46, the member 45 being thus mounted for vertical movement upon the member 10 within the range of the slot on the pins. At its upper end the member 45 is directed inwardly and terminates in a bearing 46 adapted to bear against the lower face of the ratchet disk 34. At its lower end the member 45 is provided with another inwardly directed terminal 47 with which a cam 48 on the stub shaft 20 engages as the wheel 21 is rotated, to impart vertical movement to the member 45, as hereafter explained. A spring 49 surrounds the stem between the sleeve 40 and the handle portion 11 of the frame and operates to maintain the ratchet disk 34 yieldably in its lower position. By this arrangement it will be obvious that a valve when connected to the member 13 will be caused to operate through a relatively small arc of a circle for a predetermined number of times and then the disk automatically adjusted so that the valve operates through another arc of a circle, and so on consecutively. By this means all danger of uneven grinding is prevented, as the grinding element is engaged consecutively with the whole surface of the valve.

The valve when being ground by the improved implement moves through an arc of a circle forwardly and backwardly once and is then moved automatically into position to move through another arc of a circle, and so on around the whole circumference of the valve step by step. By this means the grinding is uniform and the seat is ground to a correspondingly uniform degree. By this means the valve is rotated step by step around its seat, while the motion of the operating crank is continuous. The implement thus operates without requiring any attention from the operator other than to see that the parts are maintained in proper relation.

It will be noted that when the cam 48 throws the ratchet disk 34 upwardly it disconnects it from the pin 43 in the vibrating arm 33 and connects the disk with the pawl 38, the vibrating arm then moving the ratchet disk forwardly to another arc of the circle as the cam passes the foot 47. The spring 49 forces the disk 34 downwardly and releases the pawl 38 and connects the pin 43 with one of the sockets 36 in the disk and thus transmits the grinding motion again. The efficiency of the operation is materially increased when grinding by inserting a spring beneath the valve to lift the same off from its seat when the pressure is removed, and in Figs. 1 and 2 of the drawings a spring of this character is represented at 54. After the grinding is completed this spring will be removed, as it is not required when the valve is operating in the engine.

Having thus described my invention, what is claimed as new is:

1. An implement of the class described comprising a spindle having means for coupling a valve thereto, means operating to oscillate said spindle through an arc of a circle, a ratchet carried by said spindle, a pawl carried by said oscillating means, and a friction device operating to engage said ratchet at stated intervals to cause the spindle to operate through consecutive arcs.

2. An implement of the class described comprising a supporting frame, a spindle having means for coupling a valve thereto and mounted for rotation on said frame, an oscillating member, means for actuating said oscillating member, a disk carried by said spindle, means carried by said oscillating member for positively engaging said disk at one side, means carried by said oscillating member for yieldably engaging said disk at the other side, and means for moving said disk upon said spindle to cause the same to be alternately engaged by the positive and yieldable engaging means.

3. An implement of the character described comprising a supporting frame, a spindle having means for coupling a valve

thereto and mounted for rotation on said frame, a disk slidable upon said spindle and partaking of its motion and having ratchet teeth and a plurality of sockets, an arm mounted for oscillation, a pawl and a stop pin carried by said arm for alternate engagement with said ratchet and sockets, means for vibrating said arm, and means for periodically elevating said disk to release the same from the pin.

4. An implement of the character described comprising a supporting frame, a spindle having means for coupling a valve thereto and mounted for rotation on said frame, a disk slidable upon said spindle and partaking of its motion and having ratchet teeth and a plurality of sockets, an arm mounted for oscillation, a pawl and a stop pin carried by said arm for alternate engagement with said ratchet and sockets, a bar movably mounted upon said frame and operating to vibrate said arm, a trip member movable upon said frame and extending into the path of said disk, means for actuating said bar, and means for actuating said trip.

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

EUGENE COLBURN. [L. S.]

Witnesses:

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