C. H. FIELD.

VALVE GRINDING DEVICE.

APPLICATION FILED JAN. 7, 1910.

978,442. Patented Dec. 13, 1910.

Fig. 1.

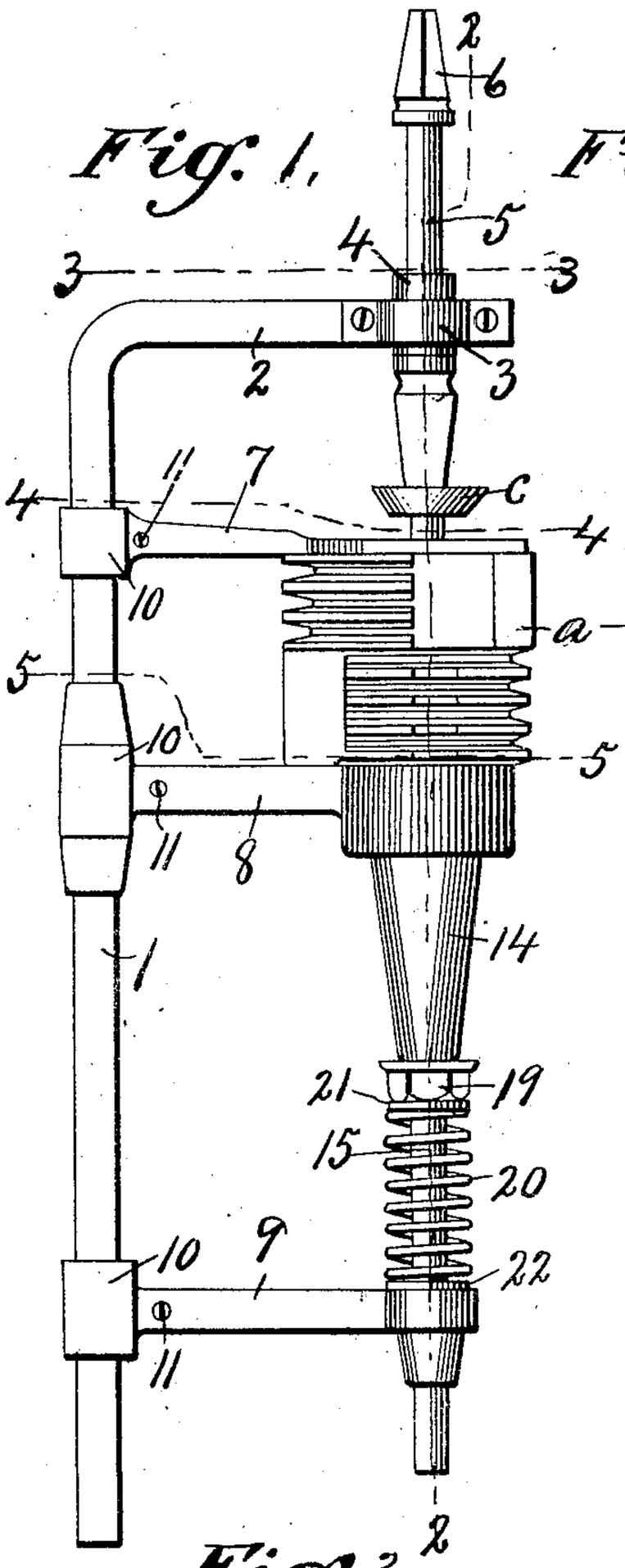



Fig. 2.

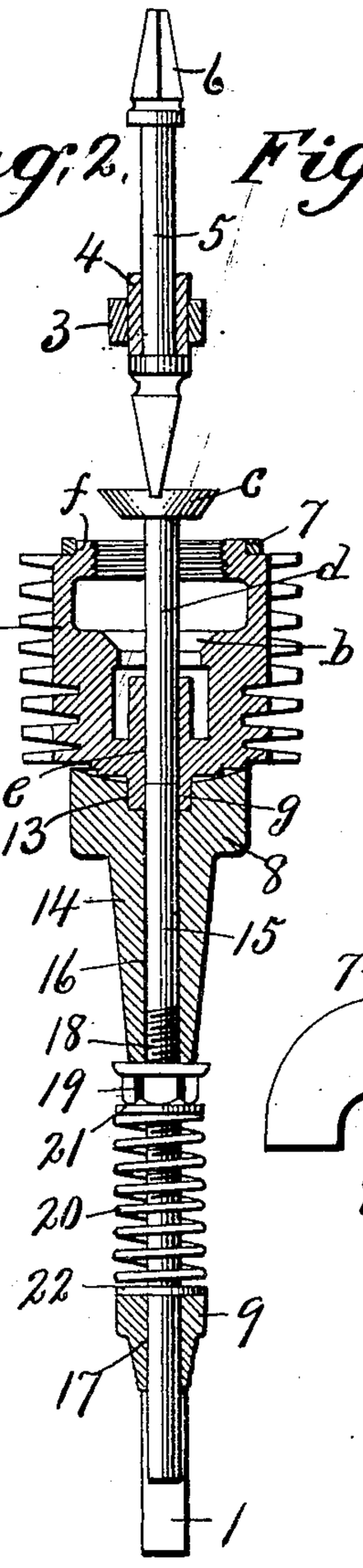



Fig. 6.

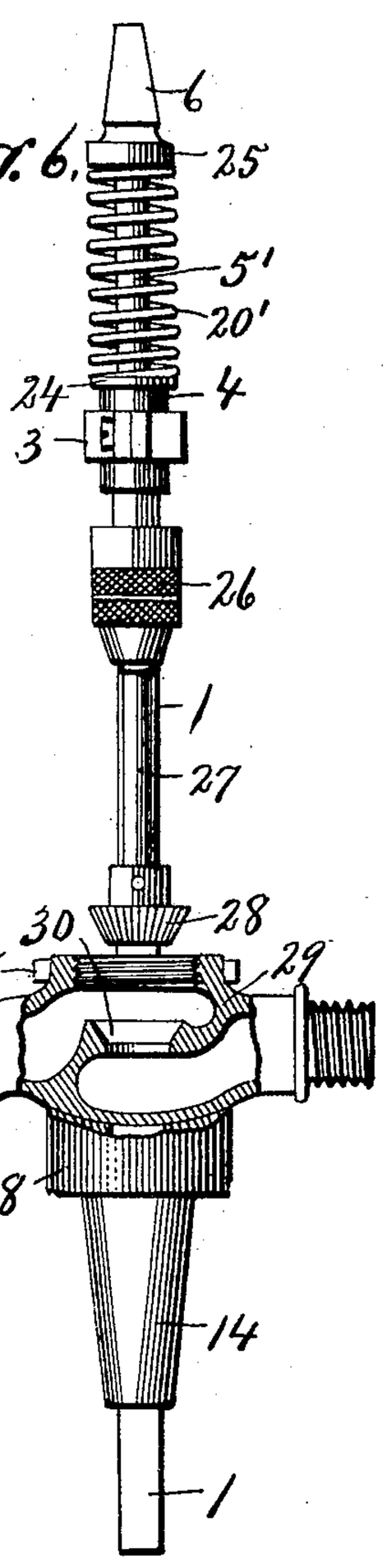



Fig. 3.

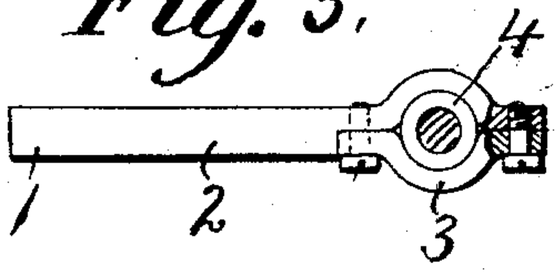



Fig. 5.

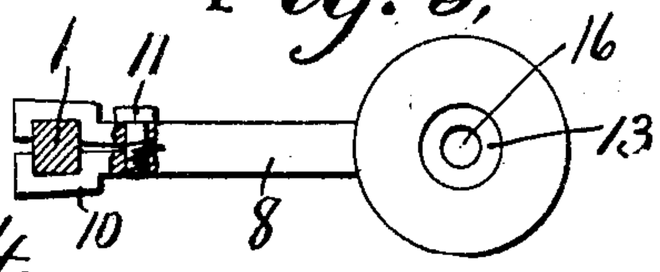
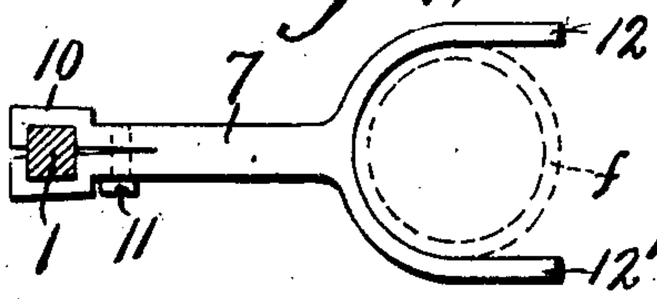



Fig. 4.

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CHARLES H. FIELD, OF SYRACUSE, NEW YORK.

## VALVE-GRINDING DEVICE.

978,442. Specification of Letters Patent. **Patented Dec. 13, 1910.**

Application filed January 7, 1910. Serial No. 536,815.

*To all whom it may concern:*

Be it known that I, CHARLES H. FIELD, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Valve-Grinding Devices, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in valve grinding and reseating devices and is particularly useful in grinding the valves of gas engines. These valves are usually provided with a stem guided in the valve casing and with a slotted head for the reception of a screw driver or other tool whereby the valve may be rotated against its seat.

My object is to provide a simple and effective means for gripping and holding the valve casing and guiding the rotary actuating means by which the valve or other grinding or cutting tool may be accurately centered to its seat.

Another object is to equip this device with additional means whereby the valve or other cutting tool is normally forced away from the valve seat and into view to permit the inspection of the valve or valve seat as the work of grinding progresses.

Other objects and uses relating to specific parts of the mechanism will be brought out in the following description.

In the drawings: Figure 1 is a side elevation of a valve grinding mechanism showing the valve as moved away from its seat and out of the casing to permit inspection of such valve and the valve seat, the parts being in their normal position for grinding. Fig. 2 is a vertical sectional view taken on line 2—2, Fig. 1. Figs. 3, 4 and 5 are horizontal sectional views taken respectively on lines 3—3, 4—4 and 5—5, Fig. 1, omitting the valve casing and valve in Figs. 4 and 5. Fig. 6 is a front face view of a modified form of valve reseating device showing a different form of valve, partly in section, as mounted therein.

In carrying out the objects stated, I provide an upright supporting arm or bracket —1— preferably angular in cross section and adapted to be clamped in a vise or equivalent gripping device, not shown, to hold it at the desired height convenient for operation, the upper end of the bracket having a laterally offset arm —2— terminating in a split hub or clamp —3— for receiving and retaining a guide bushing —4—. A screw driver spindle —5— is rotatingly mounted in the bushing —4— and also movable axially therein and is provided with an angular head —6— adapted to be engaged by any ordinary bit-stock for rotating the same.

Adjustably mounted upon and movable lengthwise of the upright portion of the bracket —1—, are a series of, in this instance three, laterally projecting arms 7, 8 and 9 disposed one above the other in substantially horizontal planes, each arm terminating in a split hub —10— fitting upon the angular bracket —1— and adapted to be frictionally clamped thereto by clamping screws —11—, the hub of the arm —9— although not shown in top plan, being of substantially the same form as that shown in Figs. 4 and 5.

The valve casing, as —*a*—, containing a valve seat —*b*— and a valve —*c*— to be ground or fitted, is clamped between and held in place by the outer ends of the arms —7— and —8—, so as to prevent endwise movement of the casing and at the same time affording means for centering the casing with its valve seat and valve coaxial with the axis of the valve rotating spindle —5—.

In the particular device shown in Figs. 1 and 2, the valve —*c*— is provided with a stem —*d*— which is guided in a suitable opening —*e*— in the base of the casing —*a*— just below the seat —*b*—. The open end of the valve casing through which the valve is inserted and removed and to which a cap is usually fitted, is generally provided with an annular projection, as —*f*—, concentric with the axis of the valve, the lower end of the valve casing being also provided with a similar annular hub or shoulder —*g*— also concentric with the axis of the valve and in order that the casing may be properly centered in the grinding apparatus, the free end of the arm —7— is forked forming diverging arms —12— spaced apart a distance corresponding to the diameter of the flanged portion —*f*— and having the base portions thereof concentric with said flange, so as to fit around the same and thereby center and hold the upper end of the valve casing in a fixed position with its valve seat coaxial with the axis of the valve actuating spindle —5—. For the same purpose, the free end of the underlying arm —8— is formed with a socket —13— receiving and

fitting around the annular hub —*g*— while the upper surface of the free end of said arm which is enlarged is concave to further facilitate the centering of said valve casing with reference to the actuating spindle —5—. The outer end of the arm —8— is provided with a pendent hub —14— of sufficient length to properly guide an axially movable stem or spindle —15— which is mounted in a central opening —16— therein. This stem —15— is preferably of the same diameter as that of the valve stem —*d*— so as to enable it to move readily and easily in the guide opening —*e*— in the valve casing for a purpose hereinafter described. The free end of the lower arm —9— is also provided with a guide opening —17— for receiving and guiding the lower end of the vertically movable stem —15—. The intermediate portion of this spindle —15— is threaded at —18— and receives an adjustable nut or limiting stop —19—, said spindle —15— being normally elevated until limited by the engagement of the nut —19— against the lower end of the hub —14— by a coil spring —20— which encircles the portion of the spindle —15— between the nut —19— and upper face of the arm —9—, the ends of the spring butting against washers —21— and —22— respectively to prevent turning of the spring when the nut —19— is adjusted. In placing this device for operating upon the valve, the valve casing —*a*— is properly seated upon the outer end of the arm —8—, in the manner described, after which the arm —17— is adjusted to properly engage and center the upper end of the valve casing for firmly holding the latter in its adjusted position. When this is done, the valve —*c*— is adjusted in the casing —*a*— and the nut —19— is then adjusted in such manner as to allow the spindle —15— to be forced upwardly by the spring —20— sufficiently to normally elevate the valve —*c*— from its seat and out of the casing to permit the inspection of both the valve and its seat without removing the valve from the valve casing. The arm —9— is then adjusted to produce just sufficient tension upon the spring —20— to automatically raise the spindle —15—, valve —*c*— and driving spindle —5— when the downward pressure upon the latter is relieved.

Now when the parts are adjusted in the manner just described, the operator applies the bit-stock or equivalent means to the screw driver spindle —5— for pressing the latter downwardly and thereby depressing the valve —*c*— to its seat and similarly pressing the spindle —15— against the action of the spring —20—, under which conditions the valve may be rotated back and forth against its seat and its position changed rotarially at any time, the spring —20— serving to elevate the valve from its seat for inspection, as before described, by merely releasing the downward pressure upon the spindle —5—.

During the operation of fitting the valve to its seat, a suitable grinding paste may be applied at intervals to the valve when forced to its position for inspection, such paste in conjunction with the rotation of the valve upon its seat serving to effect a close fit between the two parts.

It is now evident from the foregoing description that when the valve is centered and manipulated by the mechanism described, any skilled or unskilled operator may establish a perfect fit between the valve and its seat without any more care or painstaking than merely depressing and rotating the valve against such seat.

In Fig. 6 I have shown a rotary axially movable spindle —5′— as journaled in the bushing —4— on the arm —2— and normally elevated by a coil spring —20′— which encircles the spindle and is interposed between the washer —24— on the bushing —4— and a shoulder —25— on the head —6—. The lower end of this spindle is provided with a drill chuck —26— for receiving and holding a grinding tool spindle —27— carrying the cutter —28—. Upon the arm —8— is supported a valve casing —29— having a valve seat —30—, said valve casing being held in place between the arms —7— and —8— in substantially the same manner as previously described for the valve casing —*a*—. In this modification, the spring —20′— is adjusted so as to normally elevate the cutter —28— away from the valve seat —30— and out of the casing —29— sufficiently to permit an inspection of the valve seat without removing the valve casing from the holding device.

In operation, the head —6— is engaged by a bit-stock or similar device whereby the operator may depress and rotate the cutter —28— against the action of the spring —20′— which when the pressure is relieved operates to automatically lift the cutter from the valve in the manner previously mentioned. It is apparent from this latter description that the cutter —28— may be operated against the valve seat —30— in substantially the same manner as the valve —*c*—, the only difference being in the device shown in Figs. 1 and 2 the valve and its seat are ground to fit each other while in Fig. 6, the valve seat alone is ground to the desired form and degree of perfection.

What I claim is:

1. In a valve grinding device, a main supporting bracket, a pair of arms mounted on the bracket one above the other for receiving and clamping between them a valve casing, the upper arm being adjustable toward and from the other arm and provided with

a vertical opening therethrough, coaxial valve operating spindles alined with said opening and movable axially, and means including a coil spring surrounding one of the valve operating spindles for moving such spindle axially in one direction.

2. In a valve grinding device, an upright bracket, clamping arms mounted upon said bracket one above the other, the upper clamping arm being adjustable vertically and provided with a vertical opening therethrough larger than the valve to be ground, means for clamping the adjustable arm in its adjusted position, coaxial valve operating spindles alined with said opening and movable axially, and a spring operatively connected to one of the valve operating spindles for moving it axially in one direction.

3. In a valve grinding device, an upright bracket having a lateral offset, a rotary axially movable spindle mounted in said offset, laterally projecting arms mounted upon and adjustable relatively to the bracket toward and from each other for receiving and clamping between them a valve casing, an additional spindle movable endwise in one of said arms and having a threaded intermediate portion, a nut engaging said portion and adjustable thereon, an additional arm adjustable on the bracket below said nut and provided with a guide opening for the additional spindle, and a spring between the last named arm and nut for elevating the additional spindle and thereby raising the valve from its seat.

4. In a valve reseating device, an upright supporting bracket, a pair of arms mounted upon and adjustable lengthwise of the bracket for clamping between them a valve casing, an additional arm also mounted upon and adjustable lengthwise of the bracket, a vertically movable spindle guided in one of the first named arms and in said additional arm and normally spring pressed upwardly, an adjustable stop shoulder on said spindle for engaging one of said arms and limiting the upward movement of the spindle, a spring interposed between the stop shoulder and said additional arm for forcing the spindle upward, and a rotary vertically movable valve operating member guided on the bracket and coaxial with said spindle.

5. In a valve reseating device, an upright bracket, an arm projecting laterally from the upper end of the bracket, a rotary valve operating member movable vertically in said arm, a forked arm adjustably mounted upon the bracket below the first named arm, an additional arm adjustably mounted on the bracket below the forked arm, a vertically movable spindle guided in the additional arm, an adjustable stop on said spindle engaging the under side of the additional arm, a spring for elevating the spindle, and adjustable means for varying the tension of the spring.

In witness whereof I have hereunto set my hand on this 27th day of December 1909.

CHARLES H. FIELD.

Witnesses:
H. E. CHASE,
A. L. HUMPHREY.