Nov. 25, 1924. 1,517,176

H. M. SHEPHERD

DEVICE FOR TRUING VALVES

Filed July 15, 1922

Fig. 1.

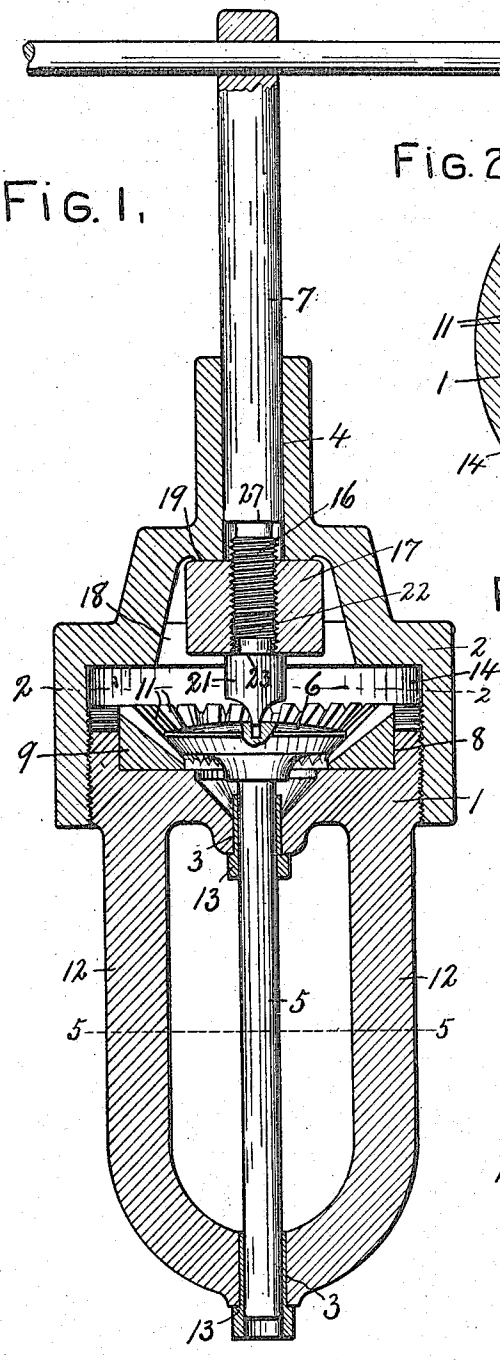


Fig. 2.

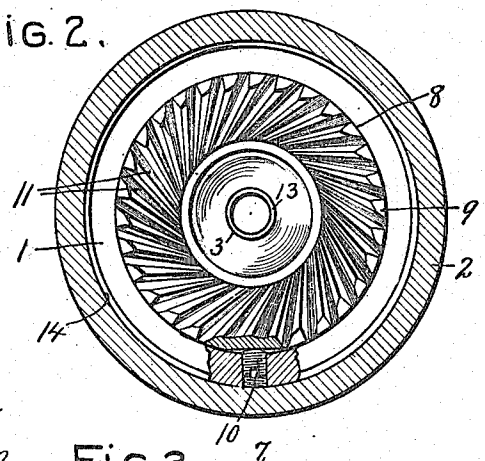


Fig. 3.

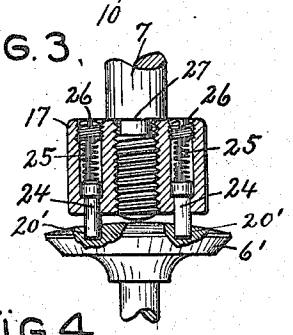


Fig. 4.

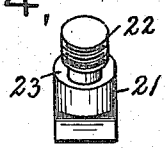
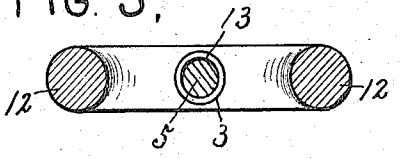


Fig. 5.



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UNITED STATES PATENT OFFICE.

HARRY M. SHEPHERD, OF SENECA FALLS, NEW YORK.

DEVICE FOR TRUING VALVES.

Application filed July 15, 1922. Serial No. 575,400.

To all whom it may concern:

Be it known that I, HARRY M. SHEPHERD, a citizen of the United States, and resident of Seneca Falls, in the county of Seneca in the State of New York, have invented new and useful Improvements in Devices for Truing Valves, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to a device for truing poppet valves, as commonly used in the intake and exhaust ports of internal combustion engines, although it is evident that it may be used for truing other objects of similar form.

These valves are usually provided with an elongated cylindrical stem of uniform diameter from end to end to cooperate in suitable guides on the engine, to cause the head of the valve to move rectilinearly relative to its seat for opening and closing the intake or exhaust ports of the internal combustion engine or other use to which the valve may be put.

The contact faces of the valve and seat are usually conical, to assure positive closing of the valve against leakage when seated, but it sometimes happens that these valves become warped, or excessively pitted by heating and accumulated carbon, to such an extent as to require regrinding or recutting of the valve.

The main object of my invention is to provide a more convenient and expeditious means for truing these worn or warped valves so as to close more effectively upon their seats.

Furthermore, some of these valves are provided with diametrically extending slots or grooves in their outer end faces for receiving a screw driver or similar instrument, while other valves are provided with sockets or holes at diametrically opposite sides of the center, for receiving a spanner wrench, thus permitting the valves to be rotated or ground to their seats either by the application of screw driver or spanner wrench thereto, according to the structure of the valve.

One of the specifc objects is to provide one end of the truing device with a handle by which it may be held in the hand or in a suitable vise during the truing operation, while the other end of the same device constitutes means for guiding the screw driver or spanner wrench and also for adjusting the valve toward the cutter as may be required for producing the desired truing effect.

Another object is to provide means for holding the valve turning means against endwise movement while the valve is being rotated against the cutter.

Other objects and uses will be brought out in the following description.

In the drawings:

Figure 1 is a longitudinal vertical sectional view of a truing device embodying the various features of my invention.

Figure 2 is a transverse sectional view taken on line 2—2 of Figure 1, omitting the valve driver.

Figure 3 is a detail sectional view of the coupling for connecting the driving shaft to the valve driver, a portion of the drive shaft being shown as secured to the coupling.

Figure 4 is a perspective view of the detached valve driver shown in Figure 1.

Figure 5 is a transverse sectional view taken on line 5—5 of Figure 1.

As illustrated, this valve truing device comprises two coaxial telescope sections, —1— and —2—, screwing one within the other and provided with coaxial, lengthwise guide openings, —3— and —4—, for receiving respectively a stem —5— of a valve —6— and a drive shaft —7—, so that the valve and its driving shaft may be rotated about the same axis.

That is, the valve supporting member —1— is provided with a cylindrical head, having preferably a left hand external thread, while the shaft-guiding member —2—, is also provided with a cylindrical head somewhat larger than the head of the part —1— and having an internal left hand thead engaged with the threaded head of the part —1—, whereby the two parts may be adjusted coaxially one upon the other for producing a corresponding adjustment of the valve and its driving means, the object of the left hand thread being to prevent tightening of the shaft supporting member —2— on the member —1— during the truing operation, or rather to prevent excessive feed of the valve against the cutter, as will be hereinafter more fully described.

The end of the valve supporting member —1—, adjacent the shaft supporting member —2—, is provided with a cylindrical socket —8—, for receiving a cylindrical cutter

—9—, which is held in place by a clamping screw —10— but may be removed and replaced by other cutters by simply loosening the clamping screw.

The cutting tool —9— is provided with a conical cutting face, having a series of tangentially disposed teeth —11— against which the similarly formed conical side of the valve —6— is rotated to the right, or clockwise, by means of the shaft —7—, for truing purposes.

The other end of the valve supporting member —1— is provided with an axially elongated handle, consisting of diametrically opposite lengthwise bars —12— which are integrally united at one end to the threaded head of the valve supporting member, at equal distances from and at opposite sides of its axis, while the other ends of the bars —12— are integrally united some distance from the head, thereby forming what may be termed a handle to support the device in one hand while the shaft —7— is rotated by the other hand, or the bars —12— may be clamped in a suitable vise during the turning of the shaft —7— and valve —6— operated thereby.

The length of the valve supporting member —1— including its handle bars —2—, is substantially equal to the length of the valve —6—, including its stem —5—, and in order that the valve may be properly supported coaxially with the member —1—, the said member is provided with suitable bushings —13— in the openings —3— and capable of being removed and replaced when worn, or substituted by bushings having different sized bores for receiving valve stems of corresponding sizes, said bushings being tightly fitted in their respective openings to prevent displacement during the truing operation.

The central portion of the head of the valve supporting member —1—, adjacent the base of the socket —8—, is counter-bored to a sufficient size to permit the entrance of the hub of the valve —6— thereinto and thereby to assure close contact of the conical face of the valve with the teeth —11— of the cutter —9—.

The enlarged cylindrical portion of the shaft supporting member —2— is provided with a socket —14— for receiving the adjacent end of the valve supporting member —1—, and is of sufficient length to permit those members to be adjusted endwise one upon the other by relative turning movement for varying the pressure of the valve and cutter against each other during the truing operation as may be required to give the best results in the shortest possible time.

The shaft —7— is rotatably mounted in the guide opening —4— in the member —2— and has its outer end provided with a suitable handle —15— by which it may be rotated, the inner end of said shaft being reduced and threaded at —16— for receiving an internally threaded coupling member or nut —17—, which is screwed upon the inner threaded end of the shaft to turn therewith.

The socket —14— in the member —2— is provided with a reduced extension socket —18— at some distance beyond the cutting face of the cutter —9—, for receiving the coupling nut —17— and permitting the latter to turn therein against an end thrust bearing —19— at the outer end of the reduced socket —18—.

When the valve to be cut is provided with a diametrically extending slot, as —20—, it is turned by a driver —21— having a corresponding edge adapted to fit in the slot and its opposite end reduced and threaded at —22— to engage in the threaded opening in the adjacent end of the coupling nut —17—, in which case the shaft —7— is backed off from the end a sufficient distance to allow the threaded portion —22— of the driver —21— to be tightly screwed therein until its shoulder, as —23— engages the inner face of the coupling nut, after which the shaft may be turned to cause its threaded end to engage the adjacent threaded end —22— of the driver —21— to lock the shaft and driver against relative turning movement.

In some instances the valve, as —6—, is provided with sockets —20′— in the outer face thereof at opposite sides of its axis and in order that it may be rotated against the cutter —9—, the coupling nut —17— is provided with a pair of pins —24— yieldingly mounted thereon at corresponding distances from its axis and projecting from the inner face thereof for entrance into the sockets —20′— said pins being yieldingly held in their operative position by light coil springs —25—, which in turn are held in place by adjusting screws —26— in the opposite end of the coupling nut as shown in Figure 3. When the valve —6′— is to be trued, the driver —21— is removed from the coupling nut —17— and the latter is screwed tightly against the shoulder, as —27—, on the shaft —7—.

On the other hand, when the driver —21— is used, it is sufficiently long to project beyond the pins —24—, thus permitting the latter to remain in place ready for use in turning the valve —6′—.

Operation.

In the operation of truing a valve, the members —1— and —2— are first detached one from the other by unscrewing them, after which the valve to be trued is inserted in the guide bushings —13— until the tapered side of the valve rests against the teeth of the cutter whereupon the parts —1— and —2— are reassembled by screwing them one

upon the other until the driver —21—, or pins, as —24—, engage in the slot —20— or sockets —20'— in the valve. The shaft —7— is then rotated by means of a handle —15— to rotate the valve —6— against the teeth of the cutter, during which the members —1— and —2— may be relatively adjusted axially by turning movement to exert more or less pressure of the valve against the cutter as may be required to produce the desired truing of the valve. After the valve has been properly trued, the parts —1— and —2— may be again separated and the valve removed from the member —1— by endwise displacement.

When the driver —21— is employed, the coupling nut —17— is partially unscrewed from the threaded portion —16— of the shaft —7—, sufficient to allow the screwing of the driver —21— in the nut. On the other hand, if the pins —24— are to be used as the driving means for rotating the valve, the driver —21— is removed from the nut —17—, which is then screwed against the shoulder, as —27—, on the shaft, it being understood that the pins —24— always remain in the nut, even when the driver —21— is used.

What I claim is:

1. In a valve truing device of the character described, coaxial sections screwing one upon the other for relative axial adjustment, cutting teeth on one of the sections around the axis thereof, a valve guide on the last named section coaxial with the cutter, a shaft rotatable in the other section, a coupling nut screwed upon the shaft and a driver for rotating the valve, screwed into the coupling nut.

2. In a valve truing device of the character described, a combination of coaxial sections adjustable axially one upon the other, cutting teeth on one of the sections around the axis thereof, means for supporting a valve against said teeth, a rotary driving shaft mounted on the other section, a coupling nut having yielding driving pins thereon for engaging and rotating the valve, said coupling having additional means for receiving and supporting a different valve driver.

In witness whereof I have hereunto set my hand this 12th day of July, 1922.

HARRY M. SHEPHERD.

Witness:

H. E. CHASE.