Nov. 13, 1923. 1,474,078

W. F. HARRINGTON

VALVE ADJUSTING MECHANISM

Filed Feb. 10, 1919

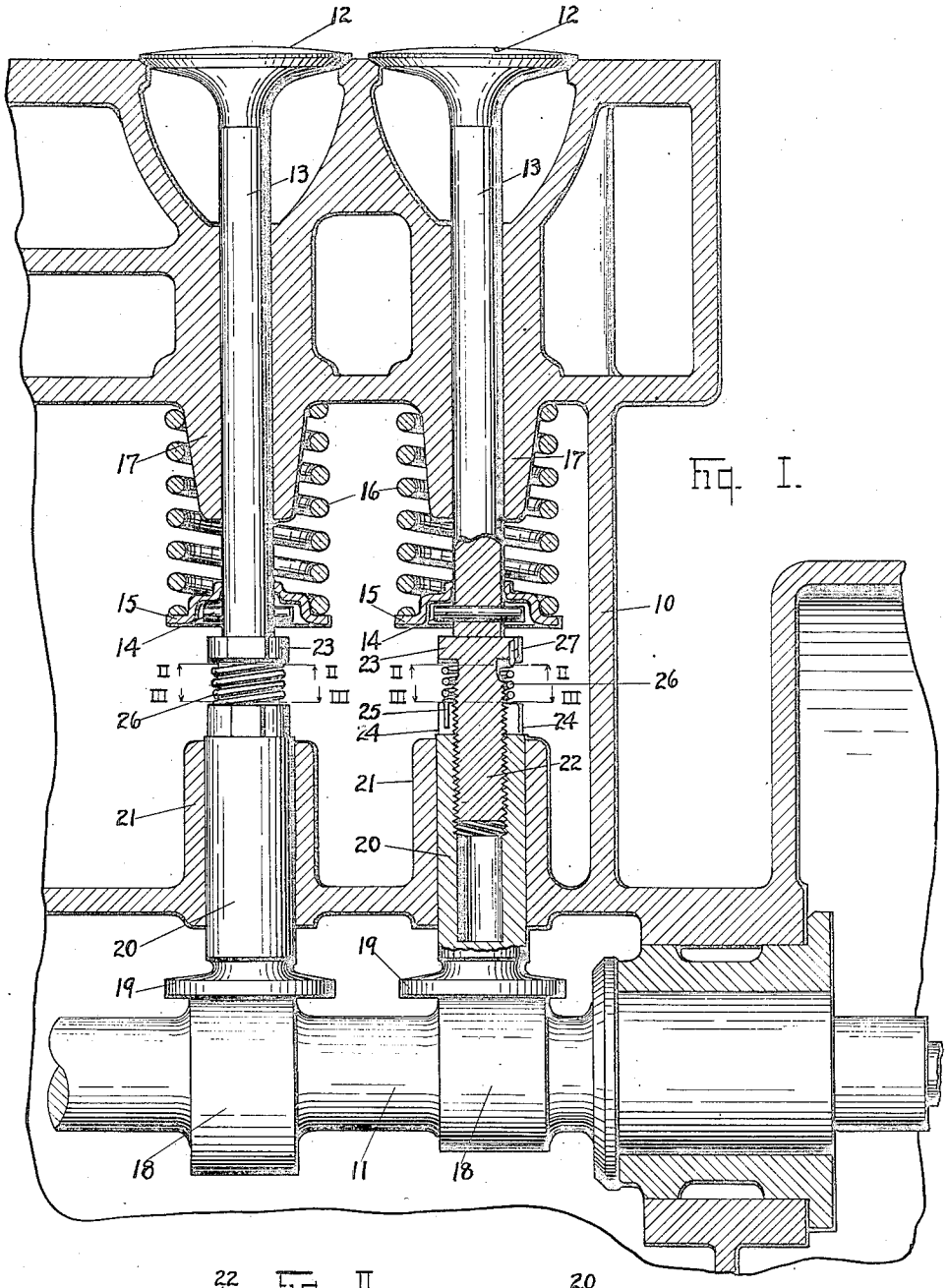



Fig. I.

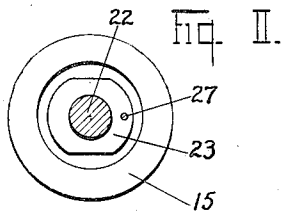



Fig. II.

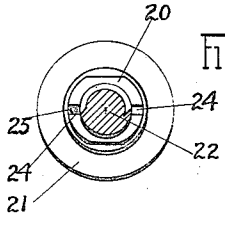



Fig. III.

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Patented Nov. 13, 1923. 1,474,078

# UNITED STATES PATENT OFFICE.

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## VALVE-ADJUSTING MECHANISM.

Application filed February 10, 1919. Serial No. 276,118.

*To all whom it may concern:*

Be it known that I, WILLIAM F. HARRINGTON, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Valve-Adjusting Mechanism, of which I declare the following to be a full, clear, and exact description.

My invention relates to a valve adjusting mechanism, and more particularly to means for adjusting the valves of an internal combustion engine. One of the objects of the invention is to provide improved means for automatically compensating for the wear between the operating parts of the valves as well as to take care of the gradual lifting of the valve and stem caused by the accumulation of carbon upon the valve and valve seat.

Another object of the invention is to provide, between the valve stem and push rod therefor, a longitudinally and automatically adjusted member, adjustment of which is effected only by rotation of said member which is mounted in such a manner as to preclude the possibility of the shifting of its axis, whereby a more satisfactory valve operating and adjusting mechanism is afforded.

Still another object of the invention is to provide a simple and inexpensive valve adjusting mechanism of few parts which can be quickly assembled and adjusted to the desired position.

With these and other objects in view, the invention comprises certain novel features of construction and arrangement of parts as will be hereinafter more fully described and claimed, it being understood that the device may be changed or modified, within certain limits, without departing from the spirit of the invention as expressed in the claims.

A structure constituting one embodiment of my invention is illustrated in the accompanying drawing forming a part of this specification in which:

Fig. I is a fragmentary sectional elevation illustrating the application of my invention to the valves of an internal combustion engine.

Fig. II is a sectional plan taken on the line II—II of Fig. I.

Fig. III is a sectional plan taken on the line III—III of Fig. I.

Similar reference numerals refer to similar parts throughout the several views of the drawings.

In providing adjusting means for the valves of automobiles or other internal combustion engines, it is essential that such means will operate to automatically take up or compensate for the difference in distances occurring from time to time between the valve stem and cam shaft or other operating member provided for actuating the valves. These distances are constantly changing, within certain limits, by reason of the wear of the valve operating parts and by the accumulation of carbon upon the valve and valve seats, as is well understood. Where there is no proper automatic valve adjusting means the valves become noisy from time to time by reason of the play or lost motion between the parts and under such conditions the mechanism is not as efficient as when kept properly adjusted. It is also essential that the valve stem operating parts, such as those which lie between the valve stem and cam shaft, be constructed in such a manner that one of the parts will not rock upon the other or shift laterally of the valve stem, which occurs in cases where the axis of the adjustable part is free to shift by reason of the loose mounting of said part upon the push rod. In the present construction this objection is overcome, as the adjustable member is mounted in such a way that its axis cannot shift and it is at all times maintained in proper alignment so that no lateral movement or shifting of any of the operating parts of the valve is permitted. Furthermore, the adjustable member can be moved longitudinally of the push rod only by rotation, there being no lost motion between these two parts whatever, which would permit of a slight lateral or longitudinal shifting of one of the parts relatively to the other.

Referring to the drawings, 10 represents a portion of the cylinder block of an internal combustion engine and 11 the cam shaft of the engine. The valves 12 are provided with the usual valve stems 13, through the lower ends of which are extended the pins 14 for supporting the spring seats 15 carrying the lower ends of the valve closing springs 16, the upper ends of said springs

being held by the valve stem bearings 17, which are preferably cast integral with the cylinder block. Seated upon the cams 18 of the cam shaft 11 are the heads 19 of the push rods 20 which are reciprocally mounted in the guides or bearings 21 of the engine frame or block 10. The automatic valve adjusting means which forms or comprises a part of the push rod consists of the screw 22 which is threaded for a considerable distance into the member 20, said screw being provided with V-shaped threads capable of maintaining said screw in proper alignment under all conditions of service, so that its longitudinal axis can not be shifted. The screw 22 is provided with a head 23 forming a seat upon which the lower end of the valve stem rests. The push rod 20 is preferably slightly reduced at its upper end and slotted or recessed at 24 as shown in Figs. I and III to receive the lower end 25 of the spring 26, the upper end 27 of said spring being projected into a recess formed in the head 23 of the screw. The spring 26 is coiled around the screw and is sufficiently tensioned to rotate said screw so that it will be automatically adjusted longitudinally of the valve stem to compensate for the wear of the valve operating parts or to take up any lost motion which may be produced between the same, it being understood that the capacity of the spring is sufficient to overcome the frictional resistance offered by the turning of the screw within the push rod. By providing a relatively large number of V-shaped threads upon the screw at the point where it extends into the push rod any shifting of the longitudinal axis of said screw is prevented and consequently the head of the screw forming the seat for the valve stem is at all times maintained in a horizontal position, thereby insuring a more perfect seating of the valve under all conditions of operation.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. In a valve adjusting mechanism, the combination of a valve provided with a stem, a driven shaft for actuating said valve and stem, a reciprocably mounted member between said shaft and said valve stem, a screw forming a seat for said valve stem, said screw being threaded into said reciprocably mounted member in a manner to prevent the possible displacement of its axis, a coiled spring surrounding said screw and connecting said screw and said reciprocably mounted member exteriorly of the latter whereby the screw is automatically adjusted to compensate for increasing distances between the valve stem and shaft, and means serving to yieldingly hold said stem in engagement with said screw.

2. In a valve adjusting mechanism, the combination of a valve provided with a stem, a cam shaft, a push rod adapted to be actuated by said cam shaft, a screw forming a seat for said valve stem, said screw being threaded within said push rod in a manner to prevent the possible displacement of its axis, a torsioned spring surrounding the screw above the push rod and having one end anchored upon said push rod and the other upon said screw, said spring serving to automatically adjust said screw for the purpose of compensating for varying distances between said parts, and a second spring serving to hold said stem in engagement with said screw.

3. In a valve adjusting mechanism, the combination with a valve provided with a stem, a cam shaft, a push rod adapted to be actuated by said cam shaft, a screw mounted for longitudinal adjustment upon said push rod in a manner to prevent displacement of its axis, said screw having a head forming a seat for the free end of said stem, a spring wound upon said screw exteriorly of the push rod and having one end extending into a recess formed in the push rod, said spring being torsioned to automatically adjust said screw longitudinally of the push rod for the purpose of compensating for the wear between said parts, and a second spring adapted to hold said stem in yielding engagement with said screw.

4. The combination of an internal combustion engine, valves therefor provided with stems, a cam shaft, bearings adjacent the cam shaft and in alinement with the valve stems, push rods carried by said bearings and adapted to be actuated by said cam shaft, a screw interposed between the stem of each valve and the corresponding push rod, said screw being threaded into the push rod to prevent longitudinal movement of the screw without rotation, a spring surrounding said screw above the push rod and connected to said screw and push rod respectively for automatically rotating said screw to compensate for varying distances between the parts, and yieldable means for holding said stems in engagement with said screws.

5. The combination of an internal combustion engine, valves therefor provided with stems, a cam shaft, bearings located adjacent the cam shaft and in alignment with the valve stems, push rods carried by said bearings and adapted to be actuated by said cam shaft, an adjustable member interposed between the stem of each valve and the corresponding push rod in a manner to prevent longitudinal movement of the member upon the push rod without rotation, a spring surrounding the member above the push rod and having its ends anchored in the member and push rod respectively said

spring being torsioned to automatically adjust said member to compensate for varying distances between the parts, and yieldable means for holding said stems in engagement with said members.

6. In a valve adjusting mechanism, the combination of a valve provided with a stem, a push rod, a bearing below the valve stem in which the push rod is adapted to slide, a screw threaded into the upper end of the push rod and forming a seat for the valve stem, and a torsion spring surrounding the screw above the push rod and having one end anchored upon said push rod and the other upon said screw, said spring serving to automatically adjust said screw in a direction to compensate for wear between the parts, said push rod and screw and said spring being removable as a unit downwardly through said bearing.

7. In a valve adjusting mechanism, the combination of a valve provided with a stem, a push rod, a bearing in which the push rod is adapted to slide, means upon the upper end of the push rod forming a seat for the valve stem, and a torsion spring surrounding said means above the push rod and having one end anchored upon said push rod and the other upon said means, said means serving to automatically compensate for wear between the parts, said means and spring being removable with the push rod as a unit downwardly through said bearing.

In testimony whereof, I affix my signature.

WILLIAM F. HARRINGTON.