Feb. 16, 1926. 1,573,773

O. MAURER

VALVE LIFTER

Filed April 4, 1925

Fig. 1.

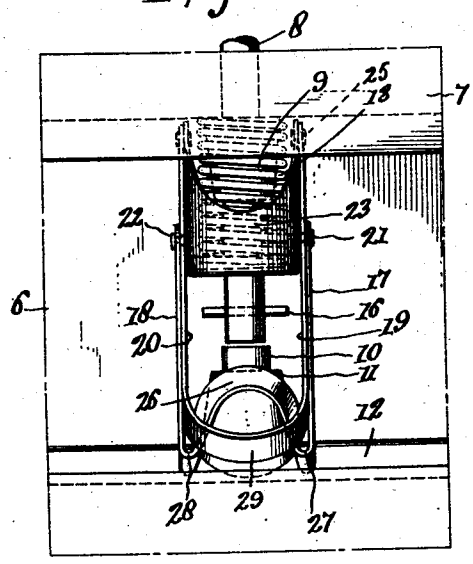


Fig. 2.

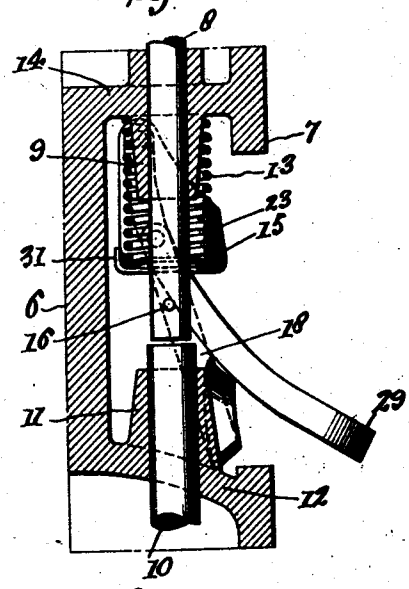


Fig. 3

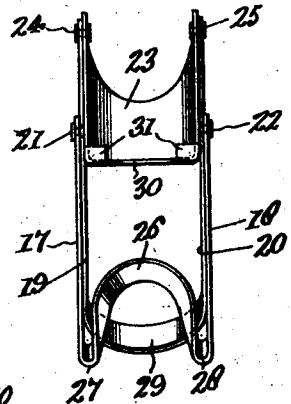


Fig. 5.

Fig. 6.

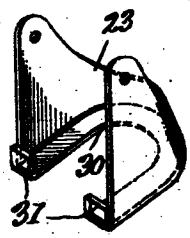


Fig. 4.

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UNITED STATES PATENT OFFICE.

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VALVE LIFTER.

Application filed April 4, 1925. Serial No. 20,799.

To all whom it may concern:

Be it known that I, OTTO MAURER, a citizen of the United States, residing at Great Falls, in the county of Cascade and State of Montana, have invented certain new and useful Improvements in Valve Lifters; 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.

The present invention relates to improvements in valve lifters, and it relates more particularly to a device for removing and replacing valve springs in connection with internal combustion engines as when the valves are to be ground.

An object of the invention is to provide a device, which will act to compress the spring in the valve case, whereby to admit of its removal and replacement, and to so arrange and construct the device that the spring may be compressed with facility and with the application of but little pressure by the user of the device.

Another object of the invention resides in providing a device shaped and constructed peculiarly to agree and coact with portions of the valve case, the push rod bushing and the spring seat whereby the implement may be enabled to gain a more advantageous position for its activity in the respects above referred to.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claim appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a side elevation of a portion of a valve case showing the improved implement in the act of compressing the valve spring.

Figure 2 is a vertical section taken through the valve case with the improved implement in the same position.

Figure 3 is a front view of the improved implement.

Figure 4 is a top view thereof,

Figure 5 is a section similar to Figure 2 but with the implement shown in the initial position for restoring the valve spring to position, and

Fig. 6 is a detail perspective view of the spring carrier.

Referring more particularly to the drawings 6 designates the cylinder block of an internal combustion engine and 7 the valve case, through which the valve stems 8 engage, being guided in the bushings 9. The valve stems engage at their lower end the push rods 10 projecting up from the crank case and being guided by the push rod bushings 11 which project up from the bottom wall 12 of said valve case. Coil springs 13 are wound about the lower portions of the valve stems 8 and about the valve stem bushings 9, abutting at their upper ends against the upper wall 14 of the valve case. The lower ends of the spring are received in the spring seats or cup-shaped washers, which slidably fit over the valve stems 8 and in the normal position rest against the transverse pins 16 fitted through the lower end portions of the valve stems. The springs 13 normally act to hold the valves upon their seats and yield upwardly when the cams lift the push rods and incidentally the valve stems 8.

Now when the valves are to be ground, the springs 13 must be removed and for this purpose I provide the improved implement, which consists of the supporting legs 17 and 18, lever arms 19 and 20 pivoted to the upper ends of the legs, as indicated at 21 and 22, and swinging bucket or carrier 23 pivoted, as indicated at 24 and 25, in the upper ends of the lever arms 19 and 20. The legs 17 and 18 will be of suitable height to extend well above the upper ends of the push rod bushings 11, while the lower ends of the legs are joined by the connecting bar 26. In fact the legs 17 and 18 and the connecting bar 26 are preferably all made from one piece of heavy metal susceptible of being bent whereby the connecting bar 26 is looped upwardly for a distance in parallel relation to the lower portions of the legs, whereby relatively broad and curved feet 27 and 28 are provided upon which the implement may be amply supported, yet may rock laterally and longitudinally in the act of accommodating itself to the valve spring. The upper arched portion of the connecting bar 26 is gradually bent, so that its edge at the crest of the top part is disposed diagonally to the vertical. This enables the device to be placed closer to the push rod bushing

11 particularly when the device is used to restore the spring to position, as indicated in Figure 5.

The lever arms 19 and 20 are curved as shown in Figure 5, and they are pivoted intermediate their ends with the handle portion being longer than the working end of the lever. The working end carries the bucket 23 and the handle end is coupled by the curved cross bar 29. The legs and the lever are disposed edgewise in the vertical as the application of force and strain on the device is developed in this direction.

Te bucket 23 is provided with the lower substantially rounded body portion to agree with the shape of the lower part of the valve spring 13, and its spring seat 15 and a ledge 30 projects inwardly from the lower part of this body portion to engage beneath the spring seat 15 and the spring for the purpose of supporting the same. The body portion is open at its outer side to permit of its introduction about the spring seat and spring as indicated in Figures 1, 2 and 3 and at the open ends of the ledge 30 are the up turned lips 31 to confine the spring and spring seat in the bucket and grasp the spring seat, as shown in Figure 5.

In the use of the device the feet 27 and 28 are engaged upon the bottom 12 of the valve case and with the lever arms 19 and 20 in raised position, the bucket 23 is inserted beneath the spring seat 15 and the spring 13. Pressure is then put upon the lever and it is swung down to the position shown in Figures 1 and 2, acting to lift the bucket and compress the spring as shown. The pin 16 may be thereupon withdrawn and the valve and valve stem 8 lifted upwardly. This spring is then swung outwardly from the lower bushing 11, while the bucket is lowered, so as to disengage the spring from the valve case entirely. The action of grinding the valve may then be carried out in well known manner.

To restore the spring 13 to its customary position, the legs 17 and 18 of the device are initially placed in the position, indicated in Figure 5, the curved and lowered character of the cross bar 26 admitting of this, and the feet 27 and 28 permitting of rocking of the device as the bucket is lifted. The cross piece 26 will strike on the bushing 11 and cause the feet 27 and 28 to glide along the bottom wall 12 of the valve case to the right as the spring is lifted and the legs 17 and 18 are made to assume the upright position. The valve stem 8 is then inserted down through the spring and having replaced the pin 16, the device may be removed.

It will be noted that the double leg structure 17 and 18 is pivoted to the outside faces of the lever arms 19 and 20, thus giving great freedom of action to the swinging bucket, and the bucket itself is of a diameter to admit of its swinging between the legs 17 and 18 and the latter are long enough to enable the carrier to swing clear of the connecting bar 26 at all times.

The present device will effectually lift the valve spring and spring seat off the push rod and push rod bushing 11 and conversely will restore the spring to its initial position.

It is obvious that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claim.

What is claimed is:—

An improved valve lifter comprising a single flat strip bent to provide a pair of substantially parallel spaced legs with their flat sides facing each other and having an intermediate portion of the strip arched backwardly between the legs to provide a connecting bar to engage about a push rod bushing, the flat connecting bar being bent into semi-frusto-conical form and being curved in an edgewise direction downwardly to conform to the configuration of the bushing and to provide upper and lower spaced pivot points for the legs, lever arms pivoted to the upper ends of the legs, and a swinging carrier pivoted to said lever arms and adapted to engage the spring and spring seat.

OTTO MAURER.