C. M. AXELTON.

VALVE REMOVER.

APPLICATION FILED MAR. 29, 1920.

1,370,397. **Patented Mar. 1, 1921.**

Fig. 1.

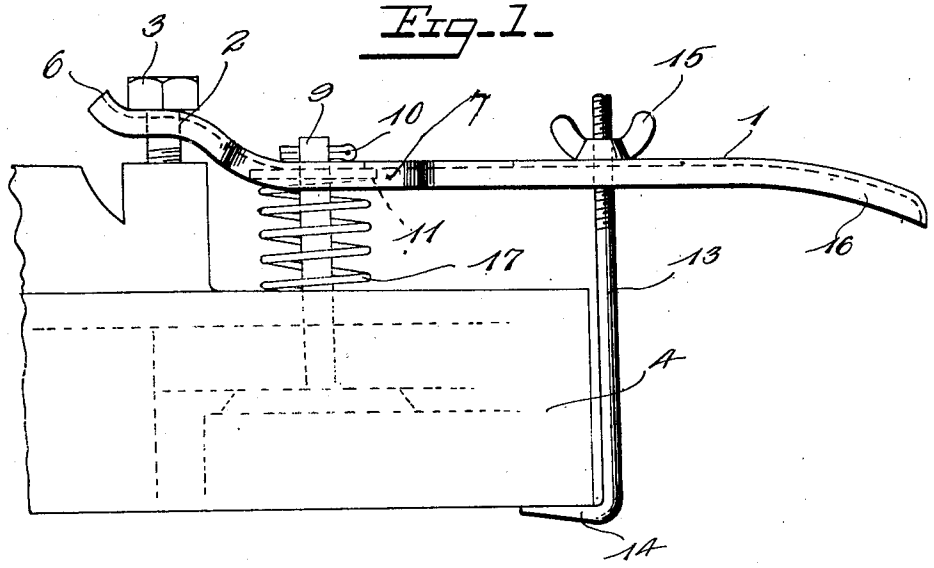
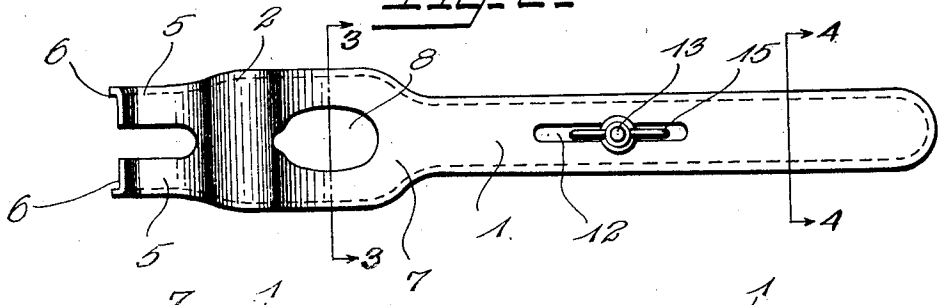


Fig. 2.



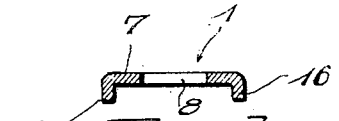


Fig. 3.

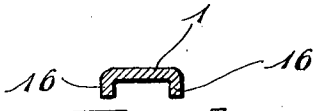
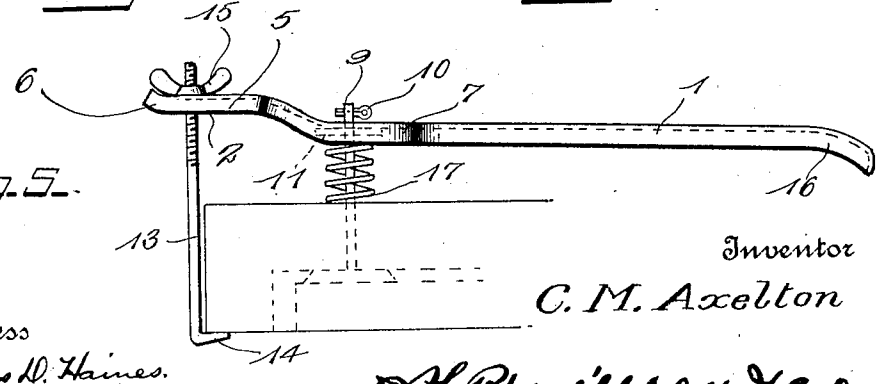


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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VALVE-REMOVER.

1,370,397. Specification of Letters Patent. Patented Mar. 1, 1921.

Application filed March 29, 1920. Serial No. 369,582.

To all whom it may concern:

Be it known that I, CLARENCE M. AXELTON, a citizen of the United States, residing at Graettinger, in the county of Palo Alto and State of Iowa, have invented certain new and useful Improvements in Valve-Removers; and I do 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.

My invention relates to devices commonly known as valve lifters, although their purpose is to contract valve springs and permit removal of their holding pins from the valve stems. Numerous devices for this use have been provided, but at best are very cumbersome and hard to manipulate on engines having overhead valves, due principally to difficulty of obtaining an effective fulcrum for the spring compressing lever. My invention, however, aims to overcome this principal difficulty by providing a device whose fulcrum is formed by a cap screw temporarily threaded into the cylinder head, the threaded holes and cap screws previously used for mounting the valve operating shaft and rockers, being utilized.

Another object is to provide a spring compressor of simple and inexpensive, yet highly efficient and durable construction, and one which may be advantageously manufactured from pressed metal.

With the foregoing and minor objects in view, the invention resides in the novel construction and association of parts hereinafter described and claimed, the descriptive matter being supplemented by the accompanying drawings.

Figure 1 is a side elevation of a spring compressor constructed in accordance with my invention, showing its application to use.

Fig. 2 is a top plan view.

Figs. 3 and 4 are transverse sections on the planes indicated by lines 3—3 and 4—4, respectively, of Fig. 2.

Fig. 5 is a view similar to Fig. 1, but showing a different manner in which the device may be used.

In carrying out my invention, I prefer to employ the several details of construction hereinafter described, although certain modifications might well be made.

In the preferred form of construction, I stamp a lever 1 out of suitable gage sheet metal, the front end of said lever being offset upwardly as indicated at 2, and forked to straddle a cap screw 3 temporarily screwed into the cylinder head 4. The furcations of the fork, designated by the numeral 5, are preferably turned upwardly at their front ends as shown at 6, for anti-slipping engagement with the head of the screw 3. Immediately in rear of the forked front end of the lever 1, said lever is widened as shown at 7 and is provided in such widened portion with an opening 8 of a size to receive the valve stem 9 and to pass freely over the pin 10 which forms an abutment against which the spring holding washer 11 normally rests. A suitable distance in rear of the opening 8, I prefer to provide the handle 1 with a longitudinal slot 12 receiving the shank 13 of a hook 14, a thumb nut 15 being adjustably threaded on said shank to retain it in the slot. This hook may or may not be used, but it is often of advantage in case difficulty is encountered in removing the pin 10, since under such conditions the lever 1 may be anchored in spring compressing position, so that both hands may be used in extracting said pin.

The side edges of the lever 1 and preferably its rear end are stamped downwardly to provide reinforcing flanges 16 which extend from one end of the lever to the other. These flanges also form means for centering the washer 11 as will be clear from the drawing.

In using the device, the cylinder head is removed, and the valve operating shaft and rockers are detached. By now screwing one of the cap screws 3 into the opening into which it or a similar screw was previously received, an effective fulcrum is provided for the lever 1. The forked front end of the lever straddles the screw 3 and the valve stem 9 and pin 10 are received in the opening 8. When now the lever 1 is forced downwardly at its rear end, the washer 11 is depressed against the tension of the valve spring 17, so that the pin 10 can be removed. If difficulty is encountered in removing this pin and both hands are needed for the operation, the hook 13—14 may be used to hold the lever 1 in depressed position. This hook, by means of the thumb nut 15, is adjustable and consequently may be used to equal advantage on different forms of engines or when the lever 1 is depressed to a greater or less extent. Furthermore, it will

be observed that the opening 8 and the forked front end of the lever are elongated, this being done to permit the use of the tool on engines on which there is a variance in distance between the valve stem and the point at which the cap screw 13 must be used.

When working on several types of motors, cap screws and the like are inaccessible for engagement with the fork furcations 5. When such conditions are encountered, the rod 13 may be removed from the slot 12 and hooked under the cylinder head, in exhaust or intake valve ports or on any other appropriate parts, and the nut 15 may then be engaged by the furcations 5. This arrangement is illustrated in Fig. 5 and the tool is operated in the same manner as above described for compressing the spring 17 in order that the pin 10 may be removed.

From the foregoing, taken in connection with the accompanying drawing, it will be seen that although my invention is of extremely simple and inexpensive nature and may be manufactured advantageously from pressed metal, it will be highly efficient and in every way desirable, particular attention being laid upon the fact that a cap screw may be temporarily threaded into the cylinder head to form a fulcrum for the lever, such fulcrum being much more advantageous than those heretofore used.

Since probably the best result may be obtained from the several details shown and described, such details may well be employed, but within the scope of the invention as claimed, numerous minor changes may well be made.

I claim:

1. A spring compressor for overhead engine valves comprising a spring compressing lever having means at its front end for co-action with a cap screw temporarily screwed in the cylinder head to provide a fulcrum for said lever.

2. A spring compressor for overhead engine valves comprising a spring compressing lever, and a cap screw for temporarily screwing into the cylinder head, said lever having means co-acting with said cap screw to provide a fulcrum for said lever.

3. A spring compressor for overhead engine valves comprising a lever forked at its front end to straddle a cap screw temporarily screwed in the cylinder head and to bear against the screw head as a fulcrum, said lever having a valve stem and pin receiving opening in rear of said offset end.

4. A spring compressor for overhead engine valves comprising a lever forked at its front end to straddle a cap screw temporarily screwed in the cylinder head, said lever having a valve stem and pin receiving opening in rear of said offset end, and a longitudinal slot in rear of said opening, a hook having a shank received loosely in said slot, and a thumb nut for adjustably holding said shank in said slot.

5. A spring compressor for overhead engine valves comprising a lever offset upwardly and forked at its front end to straddle a fixed part, said lever being increased in width in rear of its offset end for contact with the spring holding washer of the valve stem and having an opening in said widened portion to receive the stem and its washer holding pin, the edges of said lever having longitudinal flanges to reinforce them and to form means for centering the above mentioned washer.

In testimony whereof I have hereunto set my hand.

CLARENCE M. AXELTON.