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J. M. SEAWELL

VALVE SPRING LIFTER

Filed July 21, 1924

Fig. 1

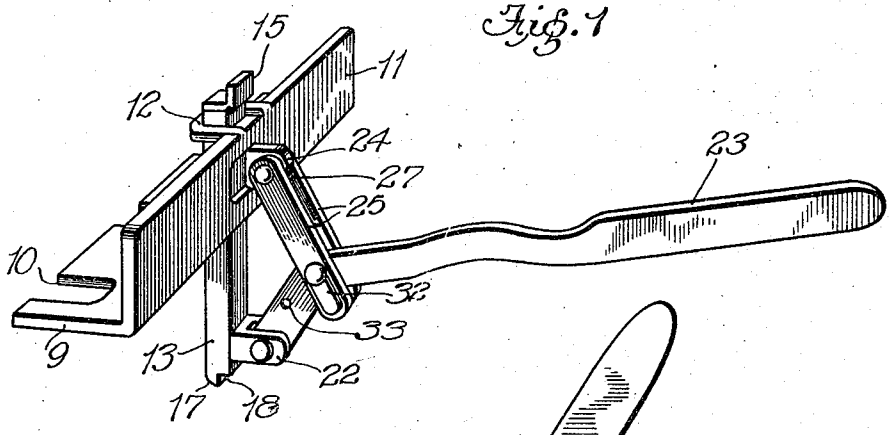


Fig. 2

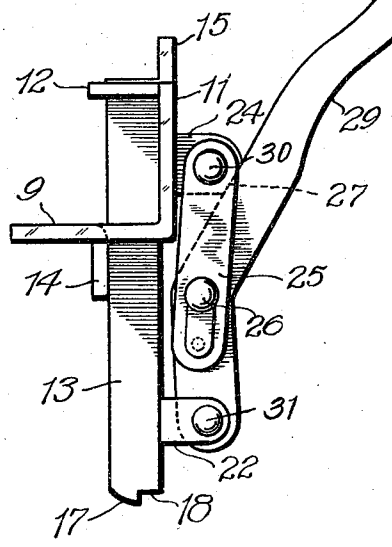
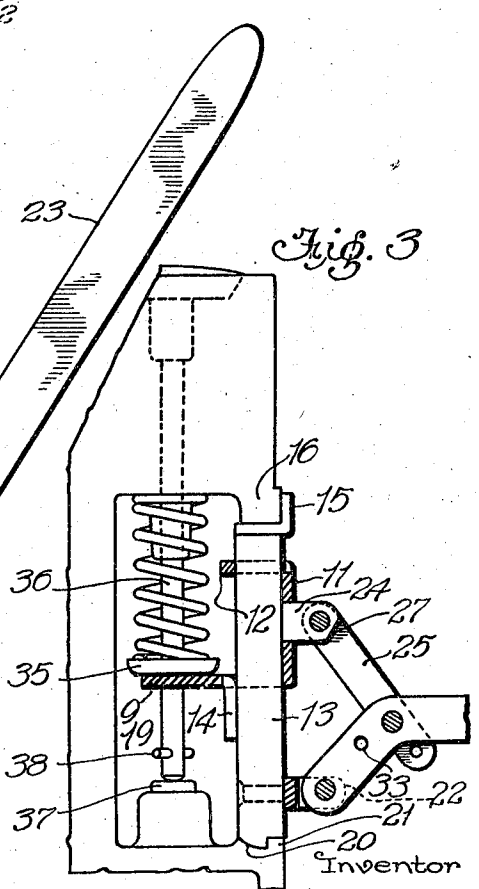


Fig. 3



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VALVE-SPRING LIFTER.

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The present invention relates to the poppet valves of internal combustion engines, and more particularly to devices for lifting the valve springs, for example, to permit the removal or repair of associated parts or for other purposes.

An object of the invention is to provide a device for this purpose which shall be simple in construction and which can be easily placed in position and quickly operated.

Another object of the invention is to provide such a device which does not require the use of a wrench or other tool to effect its operation.

A further object of the invention is to provide a valve spring lifter which, when it has lifted the springs, does not obstruct access to the push rods and other parts associated with the valve stem.

A still further object is to provide such a device which is strong, durable, self-aligning and which is adapted to maintain the valve springs fixed in lifted position when desired.

Other objects and advantages of the invention will appear from the following description, taken in connection with the accompanying drawings, which illustrate, by way of example, a preferred embodiment of the invention and in which:

Fig. 1 is a perspective view of a preferred form of valve spring lifter embodying the present invention;

Fig. 2 is a side elevation of said lifter showing the lifting lever arm in fully raised position; and

Fig. 3 is a side elevation of said lifter, partly broken away and partly in section, showing the lifting lever arm in intermediate raised position, and showing the application of the lifter to the valve spring of an internal combustion engine.

Referring in detail to the drawings, in which like reference numerals indicate like parts throughout, the valve spring lifter here illustrated is shown as including a valve spring seat engaging plate member 9, which may be provided with one or more slots 10 designed to receive the valve stems, the spring seats resting on the upper surface of the seat engaging plate 9.

The spring seat engaging plate 9 preferably comprises a right angularly bent metal member, having a vertical portion 11 and a top horizontal part 12 bent over forwardly therefrom and punched with a preferably square hole to form an upper guide bearing for the pin 13, which is preferably square in cross section and has sliding contact with the inside of the vertical portion 11 of the lifter. The horizontal spring lifting plate 9 has a preferably square flap 14 punched out thereof and bent downwardly to form a lower guide and sliding bearing for the pin 13. The lifting plate 9 is thus adapted to slide upwardly and downwardly on the guide pin 13.

The guide pin 13 is preferably formed or provided at its top with a shoulder 15 having a flat face adapted to rest against a portion of the engine casing 16, for the purpose of steadying the lifter in operation and aligning the valve spring lifter with respect to the springs to be lifted. At its lower end said pin is preferably formed with a curved offset 17 and a flat shoulder or other suitable means 18 for resting said pin on the lower outer edge of the valve spring chamber 19, which is usually provided with a groove 20 or bead 21 or both, the formation of the bottom of the guide pin holding it in engagement with the casing during the operation of the lifter.

Near its lower end the pin 13 has passing therethrough and preferably riveted therein a lower pivot bearing member 22, which is preferably forked to receive one end of a lifting lever 23 which is pivotally attached thereto. The vertical portion 11 of the lifter has extending rearwardly therefrom an upper pivot lug 24, which is preferably formed by punching out a portion of the back of said lifter and bending said portion at right angles thereto as shown in Fig. 1. A pair of parallel links 25 are pivoted to the lug 24, one on each side thereof, and receive between them near their lower ends an intermediate portion of the lifting lever 23, which is pivoted to said links by a pin 26. The lug 24 is preferably provided with a flat beveled or cut away portion 27, with which the upper edge of the lifting lever 23 comes in contact in its raised position, the cut away portion increasing the lift of the lever.

Beyond the pivot pin 26 the lifting lever 23 is bent downwardly as shown in the drawings, and is provided with the upper and lower cut away portions 28 and 29 for clearance purposes, in order that the intake and exhaust manifolds may not prevent the lift-

ing lever from being raised and lowered to extreme position.

It will be observed that when the lifting lever 23 is raised to its highest position, the pivot pin 26 has passed beyond the line of the upper and lower pivots 30 and 31, as shown in Fig. 2, and that when the lifter is in this position it is locked against downward movement by the pressure of the valve spring or springs. In practice, however, the lifting lever is likely to be jarred while the work is being carried on, and as a precaution against dropping of the lever to its lowered position, with a consequent lowering of the valve springs, a catch 32 may be provided on one of the links 25, having a pin extending through said link and into a registering opening or hole 33 provided in the lifting lever. Or holes may be drilled straight through the lever and links, to register in the raised position of said lever, and through which a pin or nail may be inserted to fasten the lifter against downward movement.

In operation, when the valve spring or springs are to be raised, the lifter is advanced to position and the lower end of the pin 13 is set on the lower edge of the valve spring chamber 19, and the upper shoulder 15 of said pin is advanced to abut the upper outer face 16 of the valve spring chamber. It will be understood that the lever 23 is lowered when the lifter is thus placed in position, and that the valve spring seat engaging plate 9 is directly under the spring seat 35, the valve stem or stems standing in the opening or openings 10. If now the lever 23 be raised to its upper position, it will raise the plate 9 by means of the links 25, and the plate 9 will carry upwardly with it the valve springs and spring seats, after which the lifting lever may be locked in position. The valve stem 36 may now be raised and the push rod 37 removed, or the valve stem pin 38 may be removed and the valve taken out, or other parts removed or repaired.

It will be observed that when the lifter embodying the present invention is in raised position, the only part below the plate 9 near the valve stems is the pin 13, which, being arranged between the slots 10 leaves the chamber 19 entirely open for the full length of the lifter on each side of said pin, and there is thus a maximum space provided for the insertion of tools with a clear open space in which the work can be done.

It is also to be noted that the lifter is raised by a single, quickly effected, upward movement of the lever arm, which is locked in position at its uppermost point, and, also, that the cut away portions in the lever and the beveled portion of the upper pivot lug 24 permit the lever to be raised as high as possible, where it will be out of the way.

It will also be seen that the lifter is self aligning, without the use of plates or other parts extending across the chamber 19, which leaves the chamber unobstructed for observation and working.

It will be further observed that the lifter, while strongly made, is simply constructed of relatively few parts, and that the lifter is quickly operable without the application of wrenches, pliers or other tools and without the loss of time incurred by a lifter of the screw type.

The length of the lifting lever and its formation, and the construction of links, give a sufficient leverage to enable the lifter to be raised quickly and easily through a maximum distance by a single movement and by the application of a relatively small force.

What is claimed is:

1. A valve spring lifter comprising a plate having a vertical portion and a horizontal portion, said horizontal portion having valve stem receiving openings therein, said vertical portion having a guide pin flap provided with a guide pin opening, said horizontal portion having a vertical punched out guide bearing and a guide pin opening adjacent said bearing, a guide pin passing through said guide pin openings and having aligning portions at its top and bottom, a lower pivot lug fixed to said pin, an upper pivot lug punched out of said vertical portion, a lifting lever pivoted to said lower lug, and a pair of links pivoted to said upper lug and to said lever, said lever having upper and lower cut away clearance portions.

2. A valve spring lifter comprising a vertically movable plate having valve stem receiving openings therein, a vertical pin passing loosely through said plate adapted to guide said plate in its vertical movement, a lifting lever having cut away clearance portions in its upper and lower edges, a pivot fixed to said pin and securing said lever thereto, and a link connection pivoted to said plate and to said lever.

3. A valve spring lifter comprising a plate having valve stem receiving openings therein and having a vertical portion, said vertical portion having a bent over guide pin bearing, said plate having a flap punched out forming a guide pin bearing, a pin having a smooth surface passing loosely through said bearings, a lever pivoted to said pin, and a link connection pivoted to said lever and to said plate.

4. A valve spring lifter comprising a plate having a vertical portion and a horizontal portion, said vertical portion having a bent out pivot lug and a guide pin bearing, said horizontal portion having valve stem receiving openings therein and a guide pin bearing, a guide pin passing through said

bearings, a lifting lever, a fixed pivot connecting said lever to said pin, and a connection pivoted to said bent out pivot lug and to said lever.

5. A valve spring lifter comprising a plate having a vertical portion and a horizontal portion, said vertical portion having a bent out pivot lug and a guide pin bearing, said horizontal portion having valve stem receiving openings therein and a guide pin bearing, a guide pin passing through said bearings, a lifting lever, a fixed pivot connecting said lever to said pin, and a connection pivoted to said bent out pivot lug and to said lever, said bent out pivot lug having a beveled portion and said lever adapted to contact therewith.

In testimony whereof I affix my signature.

JOSEPH M. SEAWELL.