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W. F. HOBBS

COMPOUND LEVER VALVE SPRING LIFTER

Filed Sept. 24, 1926

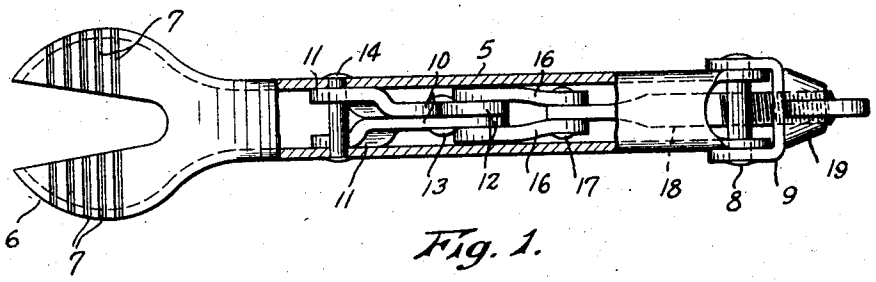


Fig. 1.

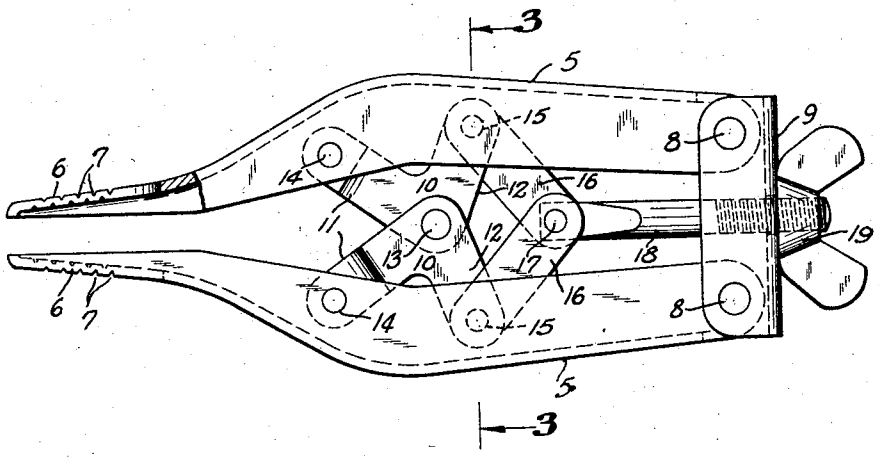


Fig. 2.

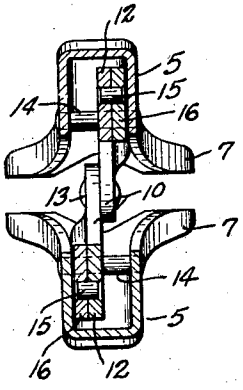


Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIS F. HOBBS, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO THE BRIDGEPORT HARDWARE MANUFACTURING CORPORATION, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

COMPOUND-LEVER VALVE-SPRING LIFTER.

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This invention relates to a valve lifting tool for lifting the springs of valves of internal combustion engines to assist in removing the valve, and has for an object to provide a tool of this character which is very simple in construction and so may be manufactured and sold at low cost, and which will be simple and easy to operate.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. In this drawing,

Fig. 1 is a top plan view of the device with a portion of the upper main lever member broken away to more clearly show the construction.

Fig. 2 is a side elevation of the device with one of the jaws shown in section, and

Fig. 3 is a vertical section substantially on line 3—3 of Fig. 2.

My improved valve lifter comprises a pair of opposed main lever members 5 each carrying a forked jaw 6 adapted to embrace the valve stem, and they are also preferably grooved transversely, as shown at 7, so as not to easily slip from engagement with the end of a spring or its abutment. The lever members 5 are preferably made of fairly heavy sheet metal bent to substantially U-shape in cross section as shown, and they are pivoted at 8 to a cross bar 9 forming a support. This cross bar is also preferably of U-shape in cross section, and the sides are spaced sufficiently to receive the ends of the levers 5 between them as indicated. By making the levers and the cross bar of this cross sectional shape I am able to secure great strength and stiffness in proportion to the amount of metal used.

My improved operating device for swinging the jaws to compress the spring includes a pair of bell crank levers 10, each lever having two arms 11 and 12 extending at an angle to each other, and the two levers are pivoted together at the junction of these arms, as indicated at 13. The arms 11 extend between the sides of the lever members 5 and are pivoted respectively to these members as indicated at 14. The other arms 12 of the bell crank levers are pivoted at 15 to links 16, one to each link, and these links are both pivoted at their opposite ends, as shown at 17, to a screw 18 which extends through an opening in the cross bar 9 and intermediate the two lever members 5. At the outer side of the cross bar is an adjusting nut 19 threaded on this screw and abutting against the outer surface of the cross bar. This nut may be of any suitable form, but is preferably a wing nut, as shown, so that it may be operated by the thumb and fingers.

The bell crank levers 10 are so shaped that when the jaws 6 are together the arms 12 are substantially in a straight line and extend in opposite directions from the pivot 13. In operation these jaws are placed between the ends of the spring and its abutment, and then by turning the nut 19 the screw 18 is drawn outwardly, or to the right, as viewed in Figs. 1 and 2. This movement will, of course, draw the arms 12 of the bell crank levers downwardly to the right, as viewed in these figures, and will separate the arms 11, and as these latter arms are pivoted to the lever members 5 it will be apparent that these levers will be swung in opposite directions about their pivots 8 and will separate the jaws to compress the spring. It will be obvious that, as the arms 12 of the bell crank extend in opposite directions away from the pivot 13 and in substantially a straight line, the pull of the links 16 on these arms is substantially at right angles to the line joining the centers of the pivots 8 and 15, and therefore, these links pull on these arms with the maximum leverage. Therefore, the screw is very easily operated as it has a large leverage on the operating levers, which, of course, is increased as the pivots 14 from the other arms of the bell cranks to the lever members 5 are a considerable distance from the pivots 8 for these lever members to the cross bar 9. This device is, therefore, easy to operate and, of course, from the construction requires no means for locking the jaws in adjusted position as the screw construction will securely hold them in any position to which they are adjusted.

Having thus set forth the nature of my invention, what I claim is:

1. In a valve lifting tool, a pair of opposed members having jaws, a cross bar to which the members are pivoted, a pair of bell crank levers pivoted together intermediate their lengths and each having an arm pivoted to one of said members, links pivoted to the other arms, a screw having pivotal con-

nection with the links and extending through the cross bar, and a nut on the screw for adjusting it.

2. In a valve lifting tool, a pair of opposed members having jaws, a cross bar to which the members are pivoted, a pair of levers each having arms extending at an angle to each other and one of the arms of each pivoted to said members, a pivot connecting said levers at the junction between the arms, a screw connected to the other arms of the levers and extending through the cross bar, and an adjusting nut on the screw.

3. In a valve lifting tool, a pair of opposed members having jaws, a cross bar to which the members are pivoted, a pair of bell crank levers pivoted together and each having an arm pivoted to one of said members, a screw connected to the other arms of the levers and extending through said cross bar, and an adjusting nut on the screw on the outer side of the bar.

4. In a valve lifting tool, a pair of members substantially U-shape in cross section carrying jaws, a cross bar to which said members are pivoted with their open sides opposed, a pair of levers pivoted together intermediate their lengths and each having one end extending between the sides of one of said members and pivoted thereto, a screw connected to the other arms of the levers and extending through the cross bar, and an adjusting nut on said screw.

5. In a valve lifting tool, a pair of members substantially U-shape in cross section carrying jaws, a cross bar to which said members are pivoted with their open sides opposed, a pair of bell crank levers between said members each having arms extending at an angle to each other, said levers being pivoted together adjacent the junction of said arms, one arm of each lever extending between the sides of one of said members and pivoted thereto, links pivoted to the other arms of the levers, a screw pivoted to the links and extending through the cross bar, and an adjusting nut on said screw.

6. In a valve lifting tool, a pair of lever members carrying jaws, a support to which the lever members are pivoted, a pair of bell crank levers between the lever members and pivoted together, one arm of each bell crank being pivoted respectively to the lever members at a distance from their pivots to the support, and means for swinging the bell cranks about their common pivot to operate the lever members.

In testimony whereof I affix my signature.

WILLIS F. HOBBS.