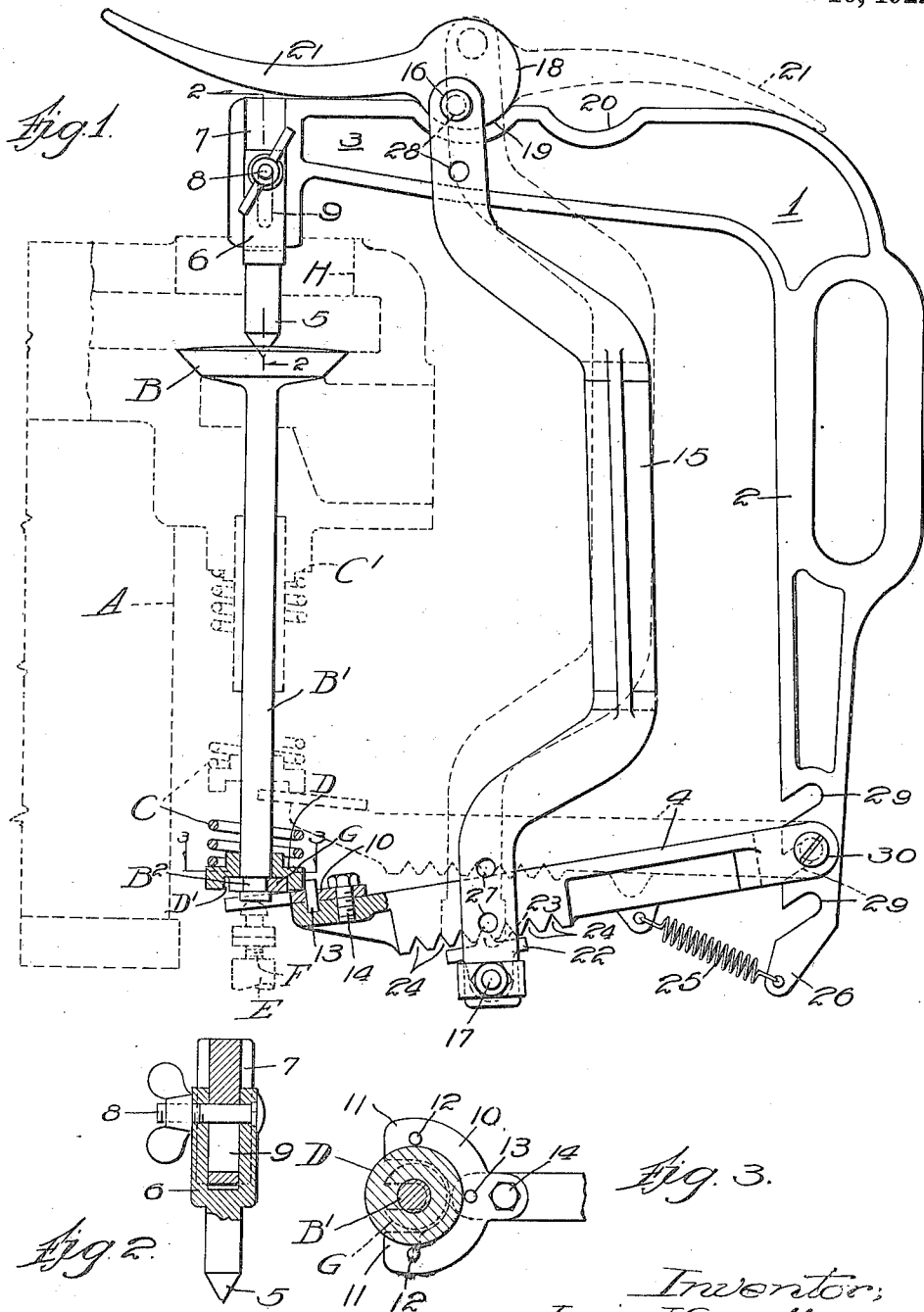


L. J. GENETT.
VALVE SPRING LIFTER.
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UNITED STATES PATENT OFFICE.

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VALVE SPRING LIFTER.

Application filed March 31, 1919. Serial No. 286,330.

To all whom it may concern:

Be it known that I, LOUIS J. GENETT, a citizen of the United States, residing at Marquette, in the county of Marquette and the State of Michigan, have invented certain new and useful Improvements in Valve Spring Lifters, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide a tool or appliance to facilitate the removal of the poppet valves from an internal combustion engine. It consists in the elements and features of construction and their combination hereinafter described and shown in the drawings and as indicated by the claims.

In the drawings:

Figure 1 is a side elevation with certain parts in section illustrating a device embodying this invention.

Figure 2 is a detail section taken as indicated at line 2—2 on Figure 1.

Figure 3 is a detail plan section taken as indicated at line 3—3 on Figure 1.

Figure 1 shows in dotted outline a portion of the cylinder and valve chamber of an internal combustion engine or similar machine, indicated at A, and associated therewith a poppet valve, B, and its stem B¹, shown in full line. Ordinarily each of said valves is provided with a spring, C, reacting between a seat as at C¹, on the cylinder casting, and a flange or collar, D, associated with the end of the valve stem, B¹, distant from its head, B, such spring tending to hold the valve closed, or to return it to closed position after its actuation by the usual cam mechanism, not shown. The valve actuating mechanism usually includes a tappet member of which a fragment is shown at E, together with an adjusting screw, F, through which movement is transmitted from the tappet, E, to the valve stem, B¹. The collar, D, is stopped on the valve stem, B¹, by a C-shaped retainer, G, which is merely a disc having a central aperture and a radial slot or notch leading therefrom to engage a groove, B², in the valve stem, the disc, G, being dimensioned to fit in counterbored recess, D¹, in the lower side of the collar, D, so as not to be removable from the valve stem except by raising the collar, D, out of engagement with said disc, G.

It is something of a problem to accomplish this disengagement of the parts while they are under stress of the spring, C, and for this purpose the device embodying this invention is provided. It consists of a rigid frame member, 1, preferably formed with a handle or hand hold at 2, and including a rigid arm, 3, extending approximately at right angles to the portion having the hand hold, 2, and continuous with the upper end of said portion while, at the lower end thereof, there is pivoted an arm, 4, extending substantially in the plane of the arm, 3, with its free end movable toward and from the extended end of said arm, 3. The arms, 3 and 4, are fitted with jaws, that provided on the arm, 3, being in the form of a conically pointed member, 5, having a bifurcated shank, 6, which is slidably carried on a slotted guideway, 7, formed on the end of the arm, 3,—a clamp screw, 8, extending through the slot, 9, for adjustably securing it. The adjustment thus provided is toward and from the opposite jaw carried by the arm, 4, said jaw being in the form of a bifurcated plate, 10, with its two arms, 11, spaced apart to extend under the collar, D, in contact therewith outside of its counterbored recess, D¹, and therefore out of engagement with the disc, G, therein. Pins, 12, may be provided in the upper face of each arm, 11, at points to engage opposite sides of the collar, D, for centering the latter with respect to the opening between the arms, 11, and a third pin, 13, similarly serves to locate the collar, D, longitudinally of the said opening between arms, 11. This pin, 13, may also project downwardly into a hole in the material of the arm, 4, for positioning the plate, 10, thereon, a screw, 14, being provided for detachably securing the plate, so that if desired it may be readily replaced with a similar plate of slightly modified dimensions and with different spacing of the pins, 12 and 13, to fit a collar, D, of different size.

For forcing the arm, 4, toward the arm, 3, to compress the spring, C, when the pointed jaw member, 5, and the bifurcated jaw member, 10, are adjusted as shown in Figure 1, there is provided a link, 15, preferably bifurcated at its upper and lower ends, and there provided with pivots, 16 and 17, respectively. At the upper end, the pivot, 16, engages in an eccentric hole, in a circularly formed cam, 18, which is rotatively engaged

in a circular notch or cradle, 19, in the upper edge of the arm, 3, some distance back from its end to which the cone point, 5, is secured. A second and similar cradle or notch, 20, may be provided still farther back on said arm, 3, for receiving the cam, 18, if it is desired to alter the initial spacing of the parts in adjusting the device to various designs of engines. The cam, 18, is provided with an operating handle, 21, which is stopped against the edge of the arm, 3, at either limit of rotation of said cam, 18; said arm or handle, 21, being so formed as to limit such rotation to approximately 180°, so that this movement will carry the pivot, 16, from its lower position shown in full lines on Figure 1, to an upper position indicated in dotted lines, at which the line of the stress in the link member, 15, passes the center of the cam member, 18, at the side of said center from which the handle, 21, then extends in engagement with the rigid frame member, this eccentric relation of the parts serving to lock them in this position.

The pivotal connection of the lower end of the link, 15, to the pivoted arm, 4, is preferably made by means of a block, 22, which constitutes the lower pivot bearing, said block being formed with a tooth, 23, adapted to engage any one of a series of notches, 24, provided in the lower edge of the arm, 4, so that the block, 22, and with it the pivot, 17, may be longitudinally adjusted along said arm, 4, to vary the initial distance between the jaw members, 5 and 10. The tooth, 23, of block, 22, is yieldingly held in engagement with such notch, 24, of the arm by means of a spring, 25, stretched between said arm and an extension, 26, on the lower end of the frame member, 1.

Further adjustment of the effective length of the link, 15, may be had by providing a series of pivot apertures, 27, for the pivot, 17, at the lower end of the link, and a like series of apertures, 28, for the upper pivot, 16; and further, by forming in the lower end of the frame member, 1, a series of notches, 29, to receive the fulcrum pivot, 30, of the arm, 4, this point may be made quickly adjustable to adapt the device to a wide variety of engine dimensions.

From the foregoing description, it will be clear that the device is operative by first applying the cone member, 5, to the head of the valve, B, which is usually already provided with a slight conical recess,—or, if no such recess exists, the point, 5, being suitably hardened and tempered, will form such a recess upon being lightly tapped with a hammer, and will thus be secured against slipping out of position. The arms, 11, of the jaw, 10, are then placed under the collar, D, with their opening clearing the disc, G, and the cam member, 18, is rotated by its handle, 21, to the position shown

in dotted line, whereby the arm, 4, is swung upward about its fulcrum pivot, 30, to position also illustrated in dotted line, thus compressing the spring, C, and carrying the collar, D, away from the disc, G. Said disc may then be removed from its engagement with the valve stem groove, B², whereupon the cam, 18, is rotated back to its initial position, lowering the arm, 4, slackening the spring, C, permitting the arms, 11, on the jaw, 10, to be slidably withdrawn from the collar, D, and the cone point, 5, to be removed from the head of the valve, so that the valve may be lifted out through the opening, H, in the valve chamber. After the desired work has been done upon the valve, or its seat, the parts may be replaced, the spring, C, being slightly compressed by hand in order to lift the collar, D, sufficiently for insertion of the bifurcated jaw, 10, under it, and the spring being further compressed by actuation of the cam, 18, to permit replacement of the retaining disc, G, in the groove, B², in the valve stem.

I claim:—

1. A valve-spring lifter comprising a frame member, a pair of arms substantially parallel to each other, each arm having at its termination a jaw removably secured thereto, one arm rigid with the frame, said frame extending downwardly from said rigid arm, the other arm adjustably connected directly to the frame at the lower end thereof, said connected arm, which is arranged to extend under the valve spring, having contractile means connected thereto for drawing the jaws toward each other to compress the spring.

2. In a valve spring lifter as set out in claim 1, said contractile means comprising a link connected to the adjustable arm and a cam fulcrumed on the frame engaging said link.

3. A valve spring lifter comprising a frame member with a rigid arm extending transversely therefrom, an arm pivotally carried on said frame and extending transversely therefrom substantially in the plane of the rigid arm, said two arms carrying relatively opposed jaws; a link pivotally engaged with the pivotally carried arm, and an eccentric member journaled on said link and bearing on the rigid arm for contracting the jaws by its rotation.

4. In a valve spring lifter as set out in claim 3, a plurality of seats for said eccentric on the rigid arm at different distances from its jaw.

5. In a valve spring lifter as set out in claim 3, the pivotal engagement of the link with the arm being effected by means adjustable toward and from the jaw of said arm.

6. In a valve spring lifter as set out in claim 1, the frame having near its lower end

a plurality of open slots and the adjustable arm having a rigid pin adapted for selectively engaging said slots.

7. A valve spring lifter comprising a frame member having a rigid arm extending transversely therefrom; an arm hinged to said frame member extending transversely therefrom substantially in the plane of the rigid arm, said two arms carrying relatively opposed jaws, means connecting the two arms intermediate the hinge pivot and the jaw of one arm, said means including a pivoted eccentric member bearing on a seat provided on one of the arms, and means for rocking the eccentric on its pivot, the other arm being pivotally engaged with the connecting means by a member which is adjustable along said arm, and means for retaining said adjustable member against displacement therealong.

8. In the construction defined in claim 7, the arm which engages the eccentric member having a plurality of seats therefor at different distances along the arm from its jaw.

9. In a valve spring lifter as set out in claim 1, a spring reacting between the adjustable arm and the frame for yieldingly holding the jaws apart.

10. In a valve spring lifter as set out in claim 1, said contractile means comprising a link with a toothed member pivoted on one end, the adjustable arm being hinged to the frame and having a series of notches along its edge to selectively engage the tooth

of said member for adjusting the point of connection of the link along said arm.

11. A valve spring lifter comprising a frame member and a rigid arm extending transversely therefrom; an arm pivotally carried on said frame and extending transversely therefrom substantially in the plane of the rigid arm, said two arms carrying relatively opposed jaws with a link pivotally connected to said arms and a cam interposed at one of the pivotal connections with means for adjusting said cam to vary the effective length of the link.

12. In a valve spring lifter as set out in claim 4, said frame having a series of notches at different distances from the jaw which is carried by the frame, and each adapted to receive the pivot of said pivoted arm, to permit varying the initial distance between the jaws.

13. In a valve spring lifter as set out in claim 4, said frame having a series of notches at different distances from the jaw which is carried by the frame, and each adapted to receive the pivot of said pivoted arm to permit varying the initial distance between the jaws, together with a spring tensioned between the frame and said pivoted arm for yieldingly holding such pivot in one of said notches.

In testimony whereof, I have hereunto set my hand at Chicago, Illinois, this 26th day of March, 1919.

LOUIS J. GENETT.