Feb. 9, 1926.

1,572,402

A. L. MATHWIG

VALVE LIFTER

Filed May 28, 1923

2 Sheets-Sheet 1

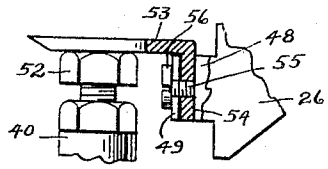


FIG. 6

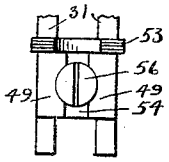


FIG. 7

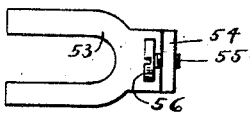


FIG. 8

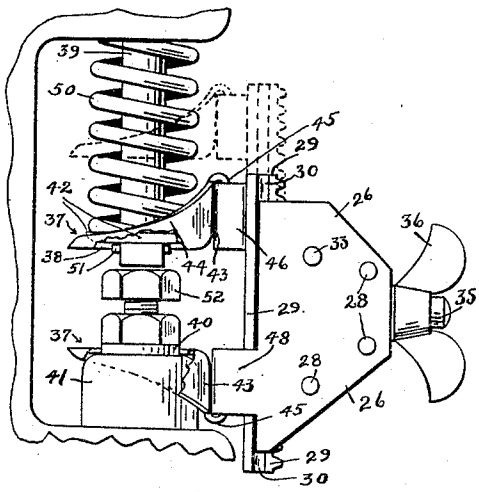


FIG. 1

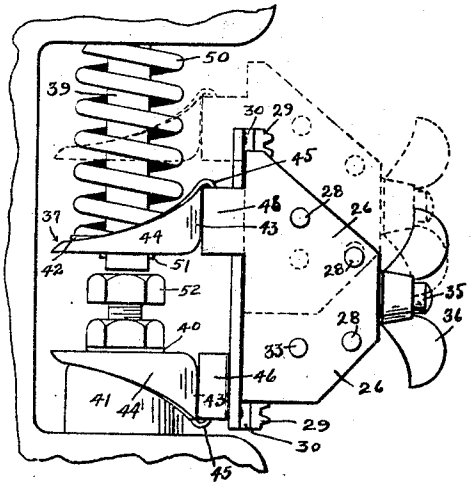
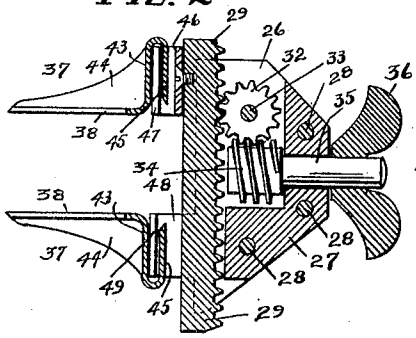


FIG. 5

FIG. 2



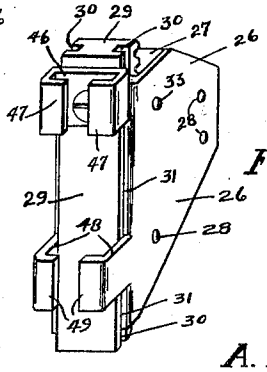


FIG. 4

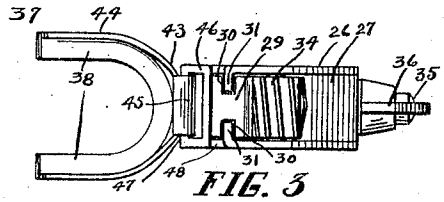


FIG. 3

INVENTOR.
A. L. Mathwig,
BY
Milton S. Crandall,
ATTORNEY.

Feb. 9, 1926.

1,572,402

A. L. MATHWIG

VALVE LIFTER

Filed May 28. 1923

2 Sheets-Sheet 2

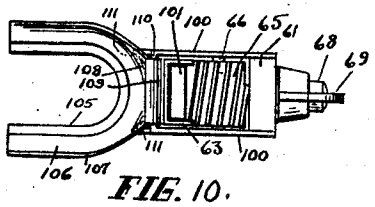
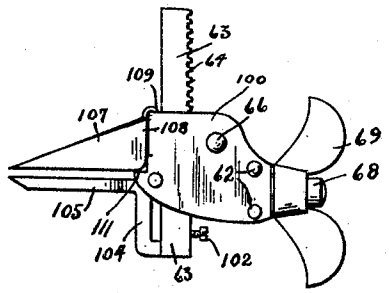


FIG. 10.

FIG. 9.



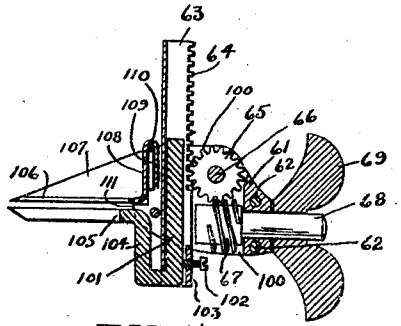


FIG. 11.

FIG. 12.

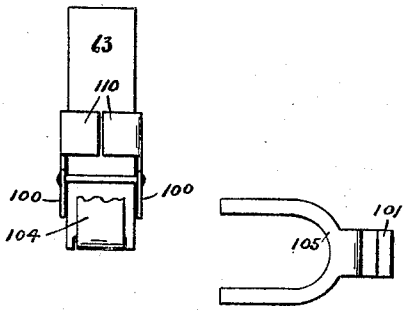


FIG. 13.

INVENTOR.
A. L. Mathwig,
BY Milton S. Crandall
ATTORNEY.

Patented Feb. 9, 1926. 1,572,402

UNITED STATES PATENT OFFICE.

ALBERT L. MATHWIG, OF SOUTH SIOUX CITY, NEBRASKA.

VALVE LIFTER.

Application filed May 28, 1923. Serial No. 641,857.

To all whom it may concern:

Be it known that I, ALBERT L. MATHWIG, a citizen of the United States, and a resident of South Sioux City, in the county of Dakota and State of Nebraska, have invented certain new and useful Improvements in Valve Lifters, of which the following is a specification.

My invention has for its primary object the production of an improved device for lifting the valve springs of internal combustion engines to facilitate the removal of the valves.

Another object of the invention is the production of a device of this class which requires a minimum amount of power in its operation.

Furthermore, the invention contemplates a valve spring lifter which lifts the valve spring to any desired height and holds it securely against retrograde movement while the valve spring seat stop is being removed from the valve stem.

Still another object of the invention is the production of a device of this class embodying detachable and interchangeable supporting elements.

The invention further contemplates a valve spring lifter which is vertically reversible to suit different conditions of work.

A still further object is the production of a device of this class which, although stable and thoroughly efficient and dependable in operation, is simple and comparatively inexpensive in construction.

The above and other objects and advantages I successfully attain in the embodiments hereinafter described, defined in the appended claims and illustrated in the accompanying drawings which form a part of this application and in which like characters of reference indicate corresponding parts throughout the several views, of which,—

Fig. 1 is a fragmentary elevation of a familiar type of valve mechanism with the preferred embodiment of my invention applied thereto, parts being cut away.

Fig. 2 is a vertical section of the preferred form of the device.

Fig. 3 is a plan thereof.

Fig. 4 is an isometric, perspective view of the body and power transmission post.

Fig. 5 is an elevation of the valve mechanism with the device of my invention applied thereto in reversed or inverted position with respect to Fig. 1.

Fig. 6 is a fragmentary elevation of the body having a modified form of supporting foot secured thereto and shown in section.

Fig. 7 is a rear elevation of the same.

Fig. 8 is an inverted plan of the modified form of the supporting foot.

Fig. 9 is a side elevation of a modification of the invention.

Fig. 10 is a plan of the same.

Fig. 11 is a vertical section of the same.

Fig. 12 is a fragmentary rear elevation of the same.

Fig. 13 is a plan of the supporting foot.

Broadly, my valve spring lifter is embodied in a device embodying a body member and a power transmission post, as a rack or threaded shaft, one of said members being supported by the other for vertical movement, and said members are provided with laterally-projecting parts which serve as a supporting seat for the valve spring, and the other as a foot to rest upon a fixed part of the valve mechanism below the valve stem. The body member is provided with a suitable power transmission to coact with the body member and post member to lift the one of said members which carries the valve spring support and hold it against retrograde movement, all of which will presently be made more clear.

Referring, now, to Sheet 1 of the drawings, the body member preferably consists of spaced side plates, 26, held in mutually spaced relation by an intermediate block, 27, to which the plates, 26, are riveted or otherwise secured, as at 28. Between the rear portions of the plates, 26, is freely mounted the power transmission post, which in the preferred form is a rack, 29, having in its opposite sides vertical grooves, 30, which freely receive flanges, 31, on the rear edges of the plates, 26. It will now be clear that either the body member or rack member is supported by the other for vertical movement. The rack, 29, is intermeshed with a worm-wheel or pinion, 32, rotatably supported, as at 33, between the plates, 26, and driven by a worm, 34, on a shaft, 35, journaled in the block, 27, and provided with suitable operating means which may be a thumb and finger grip, 36, fixed on the shaft, 35. Opposite ends of the post and body members are provided with horizontal

laterally-projecting supports, either of which is adapted to serve as a supporting seat for the valve spring or as a fixed support to rest upon a fixed part of the valve mechanism below the valve stem. Such construction is exemplified in the preferred form by the laterally-extending supporting elements represented generally at 37, and preferably consisting of a base, 38, bifurcated to receive either the valve stem, 39, or valve stem pushrods, 40, and either rest on the valve stem pushrod guides, 41, or support the valve spring seat or washer, 42. The said supports, 37, are provided with front walls, 43, and side walls, 44, which decline from the front walls to the rear ends of the supports. The free edges of the front walls, 43, are formed with ears, 45, which are bent forwardly and vertically in spaced relation to the walls, 43. One of the above-described lateral supports is removably secured to the end portion of the post member, 29, as by securing on the rack member, 29, a socket on which the associated supporting member, 37, may be hooked as by providing a U-shaped plate, 46, having its web secured to the rack, 29, and its free end portions bent toward each other as at 47, whereby the ear, 45, of the associated support, 37, may be removably hooked over the parts, 47, whereby the rear wall. 43, rests against the parts, 47.

The opposite supporting element, 37, is secured to the opposite end of the body member by means of rearwardly-extending socket portions, 48, on the lower end portions of the plates, 26, the end portions of said parts, 48, being bent toward each other, as at 49, and over these parts, 49, the ear, 45, of the adjacent support, 37, is removably hooked, as clearly shown in Fig. 2, in which position the wall, 43, of the support rests against the part, 49.

It will now be clear that with the device applied as shown in Fig. 1 and power applied to the thumb grip, 36, in the appropriate direction, the rack member with the attached lateral support will be raised to the position shown in dotted lines, thereby compressing the valve spring, 50, to permit removal of the pin, 51, or other element from the valve stem, 39, which supports the valve spring seat, 42. In some instances it is desirable to have a flat supporting element or foot adapted to rest on the adjusting head, 52, of the pushrod, 40. There may be provided therefor, as shown in Figs. 6–8, a flat supporting element, 53, bifurcated to receive the end of the valve stem, 39, and rest upon the head, 52, of the pushrod. The front end of the support, 53, is provided with a vertical ear, 54, adapted to be interposed between the supporting flange, 49, and the rack member, 29, and clamped to said member, 49, by means of a screw, 55, projecting between the members, 49, and threaded into the ear, 54, the head, 56, of the said screw being engageable with the rear faces of the members, 49. There are some types of motors where it is necessary or desirable to apply the device in reversed or inverted position from that shown in Fig. 1, as in Fig. 5.

In Figs. 9 to 13 inclusive are shown a modified form of my invention, which is provided with a channel rack, 63, its flanges being provided with rack teeth, 64, intermeshed with the worm-wheel, 65, journaled, as at 66, between suitable side plates, 100, the worm-wheel being driven by the worm, 67, carried by the shaft, 68, journaled in the spacing block, 61, riveted or otherwise secured as at 62 between the side plates. The shaft, 68, is actuated by means of the thumb and finger grip, 69. In this form the foot consists of the bar, 101, removably inserted in the channel rack, 63, and secured therein by a set-screw, 102, threaded through the cross member, 103, of the channel rack, the lower end portion of the bar, 101, being bent rearwardly and upwardly, as at 104, and then formed with a rearwardly extended bifurcated portion, 105, adapted to rest upon the pushrod adjusting element, 52. This type of foot is particularly desirable for some styles of motors. The upper or spring support consists, preferably, of a suitable seat, 106, for the valve spring, bifurcated to receive the valve stem and having inclined side walls, 107, and a front wall, 108, formed with a downwardly and forwardly extending yoke, 109, adapted to be removably hooked over transverse flanges, 110, spaced from the rack, 63, and formed on the rear edges of the plates, 100, the plates being provided with rearwardly extending projections, 111, which serve as a seat for the valve spring support above-described.

I would not be understood as being limited to the specific structures shown, for it will be understood that numerous other modifications and alterations may be made in the details of construction and arrangements of parts, without departing from the spirit and scope of the invention as defined in the following claims, to-wit:

1. A valve spring lifter comprising two members slidably mounted relative to each other, socket members on the respective slidably mounted members, lateral supporting members removably mounted in the sockets, and operating means for moving the said slidably mounted members relative to each other.

2. A valve spring lifter comprising a power transmission post and a body member, a socket member on the body member, lateral supporting members mounted on the post and body member respectively, one of said lateral supporting members being removably mounted in the socket on the body

member, and operating means for moving the post and body member relative to each other.

3. In a valve-spring lifter, two members slidably mounted relative to each other, one of said members having a socket, lateral supporting members on the respective slidably mounted members, one of said lateral supporting members being removably mounted in the socket, and operating means for moving the slidably mounted members relative to each other.

4. In a valve lifter, a body recessed on one side, and having fixed thereto, two side plates enclosing the recess, a rack slidably mounted between the side plates and having rack teeth facing the recess, a stub shaft mounted in the body perpendicular to the plane of the rack teeth, and projecting into the recess, a worm on the stub shaft substantially extending from the body to the rack, within the recess, a pinion mounted on a shaft fixed in the side plates and substantially filling the remainder of the recess above the worm, said pinion being in mesh with the worm and the rack teeth.

5. A valve-spring lifter comprising a power transmission post member and a body member, socket members on the respective body member and post, lateral supporting members removably mounted in the sockets, and operating means for moving the body member and post relative to each other.

6. A valve-spring lifter comprising a power transmission post member and a body member, socket members on the respective body member and post, lateral supporting members removably mounted in the sockets, each supporting member comprising a U-shaped yoke having a hook adapted to be received by a socket, and operating means for moving the body member and post relative to each other.

7. A valve-spring lifter embodying a body member including side plates, a post between the plates having longitudinal grooves in its sides, projections on the plates within the grooves, whereby the post is slidably supported, lateral supporting elements carried, respectively, by the body member and post, and operating means carried by the body member for raising and lowering the post.

8. A valve-spring lifter embodying a body member including side plates, an upright rack therebetween having longitudinal side grooves, flanges on the plates within the grooves, whereby the rack is slidably supported, lateral supporting elements carried, respectively, by body member and rack, a pinion rotatably supported by the body member and intermeshed with the rack, and means for driving the pinion.

In testimony whereof, I have hereunto set my hand this 23rd day of May, 1923.

ALBERT L. MATHWIG.