Oct. 12, 1954 R. V. STEARNS 2,691,209

VALVE LIFTER

Filed Nov. 7, 1951 2 Sheets-Sheet 1

Fig. 1

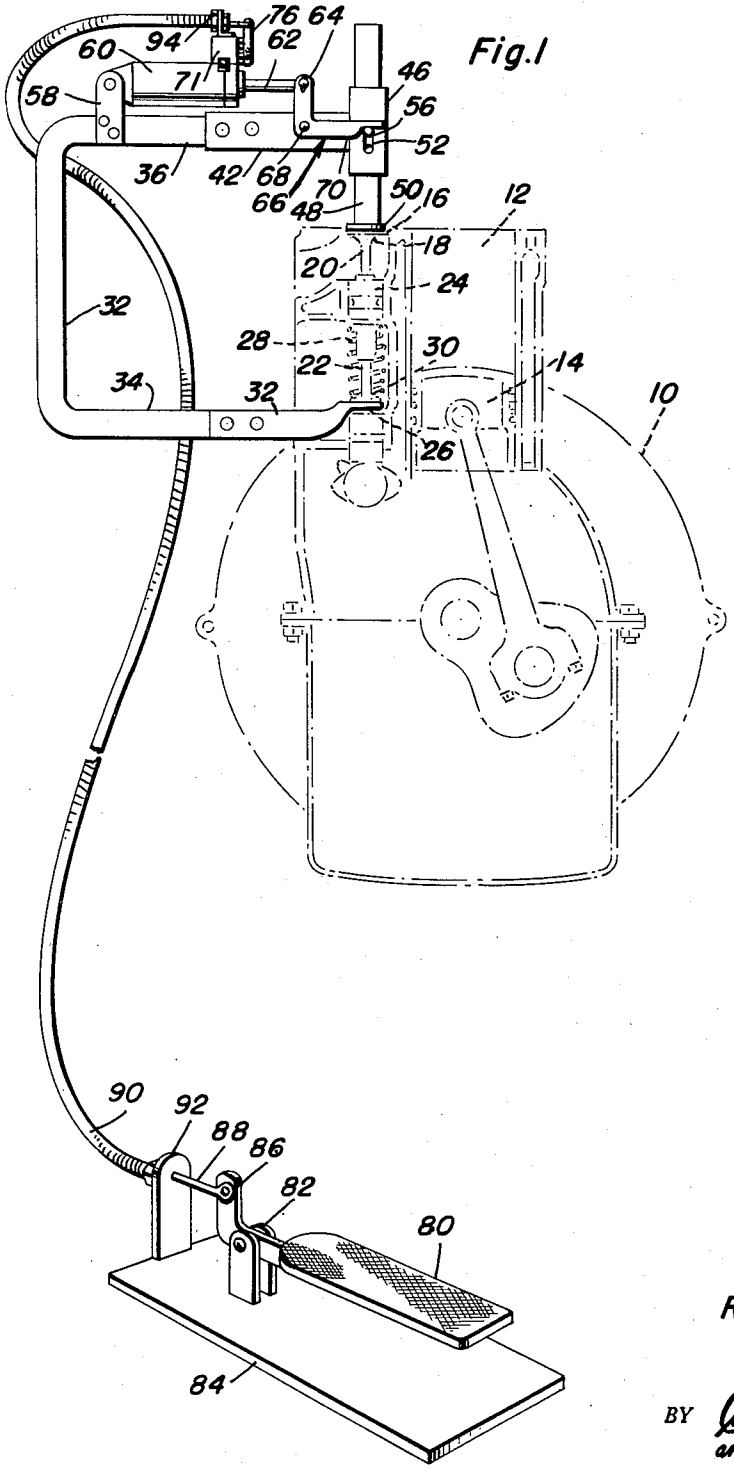
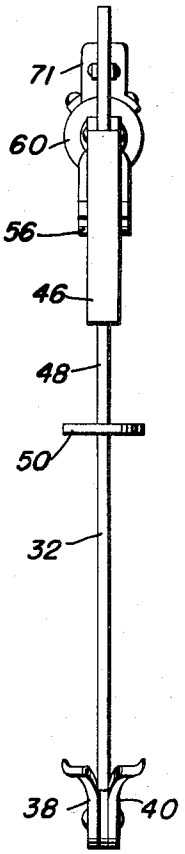


Fig. 4



Raymond V. Stearns

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

Oct. 12, 1954 R. V. STEARNS 2,691,209

VALVE LIFTER

Filed Nov. 7, 1951 2 Sheets-Sheet 2

Fig. 2

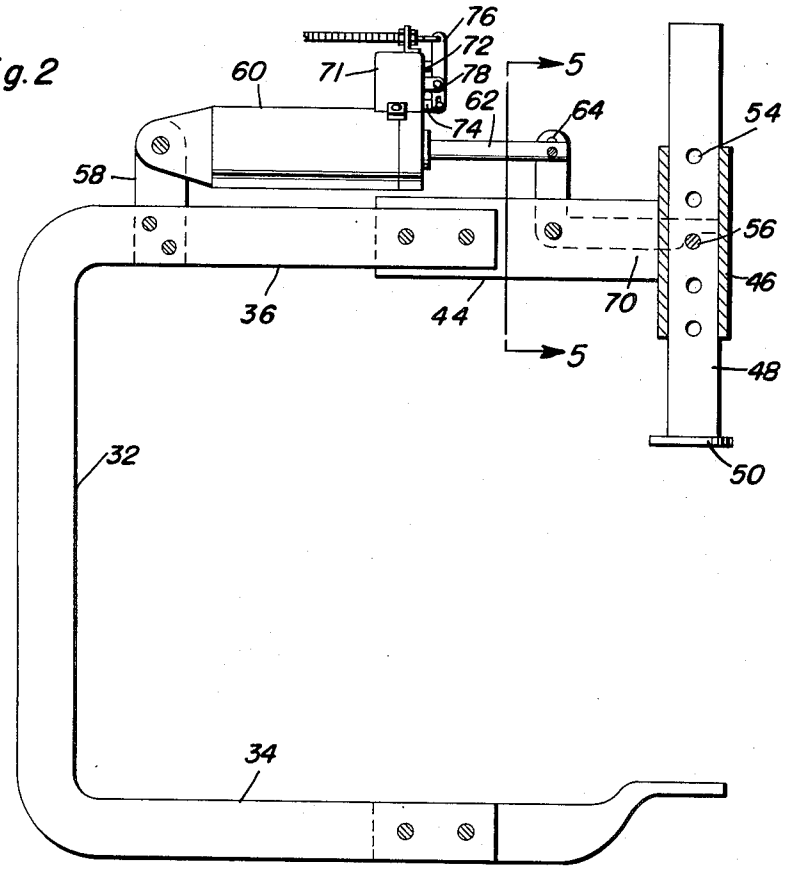


Fig. 3

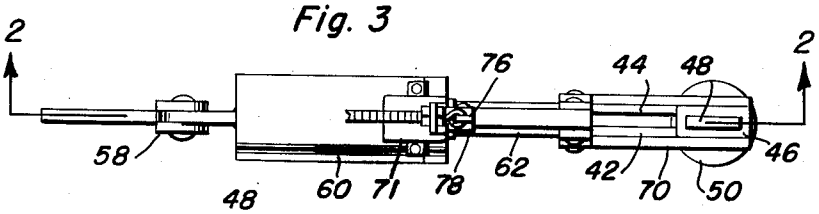
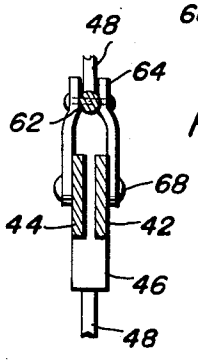


Fig. 5



Raymond V. Stearns
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

Patented Oct. 12, 1954

2,691,209

UNITED STATES PATENT OFFICE

2,691,209

VALVE LIFTER

Raymond V. Stearns, Superior, Wis.

Application November 7, 1951, Serial No. 255,249

6 Claims. (Cl. 29—215)

1

This invention relates to a valve lifter and particularly to a fluid operated valve lifter having a foot controlled means.

It is well known that in the operation of removing the valve spring from a valve to remove the same for operating thereon it is extremely awkward and inconvenient to remove the pin from the holes of the valve spring seat on a valve stem. Various tools have been arranged for compressing the spring and sliding it on the valve stem so that the pins or clips can be readily removed from the lower end of the valve stem. Such devices are extremely awkward to handle and since one hand must be used to maintain the tool in position it is very awkward to remove the pin or the clip with one hand.

The present invention provides a valve lifting tool having a fluid cylinder for applying the compressing pressure and a foot controlled pedal for pumping the fluid into the cylinder. This arrangement leaves both hands free to remove the pin or clip and do other operations on the valve such as guiding or directing the spring with a minimum of danger to the operator.

It is accordingly an object of this invention to provied an improved valve lifter.

It is a further object of this invention to provide a valve lifter having a fluid cylinder for applying the compression pressure.

It is a further object of this invention to provide a fluid cylinder valve lifter having a foot controlled means for controlling the pump.

Other objects and many of the attendant advantages of this invention will be apparent from the following detailed description taken in conjunction with the accompanying drawings, in which:

Figure 1 is an elevational view of the improved valve lifter applied to a valve of an automobile shown in phantom;

Figure 2 is an enlarged detail sectional elevation taken substantially on the plane indicated by the line 2—2 of Figure 3 and showing the construction of the valve lifter;

Figure 3 is a top plan view of the valve lifter showing the details of construction;

Figure 4 is a front elevation of the valve lifter showing the arrangement of the parts; and

Figure 5 is an enlarged detail of the mounting of the bellcrank and taken substantially on the plane indicated by the line 5—5 of Figure 2.

2

In the exemplary embodiment of the invention 10 indicates generally an engine having a cylinder 12 with a piston 14 slidable therein. A valve head 18 acts with a valve seat 16 so that the valve 20 having a stem 22 may operate to admit fluid or other gases into the cylinder. The valve stem 22 projects downwardly through a guide sleeve 24 to contact with a valve tappet 26. A valve spring 28 engages the lower end of the guide sleeve 24 and is supported on a valve spring seat 30 which is connected to the stem 22 by a pin or a clip which is concealed under the valve spring seat 30.

The valve spring lifter of the present invention comprises a C-frame 32 having a lower arm 34 and an upper arm 36. Rigidly mounted on the lower arm 34 are a pair of jaws 38 and 40 which are arranged in spaced relation so that the jaws will pass on opposite sides of the valve stem 22 and support the valve seat 30. A pair of extensions 42 and 44 provide a bifurcated terminal to the upper arm 36 and mounted in a bifurcated terminal is a guide sleeve 46. Slidably mounted in the sleeve 46 is a plunger 48 having a head 50 adapted to contact and rest on the valve head 18. The sleeve 46 is provided with a transverse longitudinally extending slot 52 while the plunger 48 is provided with a plurality of transverse openings 54 with a pin 56 selectively placed in the openings 54 so that the head 50 may contact the valve head 18 while the pin 56 slides in the slot 52.

A pin driving mechanism comprises a pair of upstanding brackets 58 mounted on the upper arm 36 preferably adjacent to the frame web 32. Pivotally mounted on the bracket 58 is a fluid cylinder 60. A piston 62 having a head slidable in the cylinder 60 is pivotally connected to one end 64 of a bellcrank 66 having the angle portion thereof mounted on the bifurcated heads 42 and 44 by means of pin 68. A horizontal arm 70 of the bellcrank 66 contacts the pin 56 to provide driving connection between the piston 50 and the slidable plunger 48. A pump 71 is mounted on the cylinder 60 and is operative to transfer fluid between the ends of the cylinder 60 so that the piston 62 may be moved in either direction within the cylinder 60. Pump 71 is provided with a pair of operative plungers 72 and 74 connected by a walking beam 76 mounted on a bracket 78 so that oscillation of the walk-

ing beam 76 pushes in the plungers 72 and 74. The walking beam 76 is controlled by a foot lever 80 mounted in a bracket 82 on a base 84, the foot pedal 80 being provided with an upstanding lever 86. A cable 88 is slidably contained in a flexible casing 90 which is connected to an upstanding lug 92 and a bracket 94 mounted on the pump casing 71. Pressing the foot pedal 80 draws the cable 84 through the casing 90 to operate the walking beam 76 to operate the plungers 72 and 74 to pump fluid from one to the other of the cylinder 60.

In the operation of the device the plunger 48 is adjusted into contact with the top of the valve 20 while the jaws 38 and 40 are slidably arranged under the valve seat 30. The pin 56 is then inserted in the proper hole so as to be freely slidable in slot 52 and the pump is arranged so that operation of the foot pedal transfers fluid from the front to the rear of the cylinder 60 to push the piston 62 forward to cause rotation of the bellcrank 66 about the pin 68 to push down on the pin 56 with sufficient pressure to compress the spring 28 between the jaws 38 and 40 and the valve guide 24. Since the compression of the spring 28 is completely controlled by foot action both hands of the operator are free to remove the pin or clip from the end of the valve stem 22 or to perform any other operation in connection with removing the clip from the valve stem and adjusting or positioning the valve or the spring 28 with respect to the valve.

While for the purpose of exemplification a particular embodiment of the invention has been shown and described according to the best present understanding thereof it will be apparent to those skilled in the art, that many changes and modifications may be made therein without departing from the true spirit of the invention.

Having described the invention, what is claimed as new is:

1. In a valve lifter having a C-shaped frame with a pair of spaced apart jaws rigidly secured on the end of the lower arm of said frame adapted to engage the seat of a valve spring and a guide sleeve rigidly mounted on the upper arm of said frame, in alignment with said pair of jaws, an actuating mechanism comprising a plunger slidably received in said sleeve, an upstanding bracket rigidly mounted on the upper arm of said frame, a fluid cylinder pivotally mounted on the bracket and extending in substantially parallel relation to the upper arm of said frame, a piston in said cylinder, a bellcrank pivotally mounted on the upper arm of said frame intermediate the bracket and said plunger, said piston being pivotally attached to one end of said crank, the other end of said crank being operatively connected to said plunger, and pump means for applying fluid pressure in said cylinder.

2. In a valve lifter of the type having a C-shaped frame with a pair of spaced apart jaws rigidly secured on the end of the lower arm to engage the seat of a valve spring and a guide sleeve rigidly mounted on the upper arm of said frame in alignment with said pair of jaws, an operative mechanism comprising a plunger slidably received in said sleeve, an upstanding bracket rigidly mounted on the upper arm of said frame, a fluid cylinder pivotally mounted on said bracket and extending substantially parallel to the upper arm of said frame, a piston in said cylinder, a bellcrank pivotally mounted on the upper arm of said frame between said bracket and said sleeve, said piston being pivotally attached to one

end of said crank, the other end of said crank being operatively connected to said plunger, and a fluid pump mounted on said cylinder for transferring fluid from one end to the other of said cylinder.

3. A valve lifter comprising a C-shaped frame, a pair of spaced apart jaws rigidly secured on the end of the lower arm of said frame, said jaws adapted to engage the seat of a valve spring, a guide sleeve rigidly mounted on the upper arm of said frame, said sleeve being aligned with said pair of jaws, a plunger slidably received in said sleeve, an upstanding bracket rigidly mounted on the upper arm of said frame, a fluid cylinder pivotally mounted on said bracket, a piston in said cylinder, a bellcrank pivotally mounted on said frame between said bracket and said sleeve, said piston being pivotally attached to one end of said crank, the other end of said crank being operatively connected to said plunger, a fluid pump mounted on said cylinder for transferring fluid from one end to the other of said cylinder, and a foot pedal operatively connected to said pump.

4. A valve lifter comprising a C-shaped frame, a pair of spaced apart jaws rigidly secured on the end of the lower arm of said frame, said jaws adapted to engage the seat of a valve spring, a guide sleeve rigidly mounted on the upper arm of said frame, said sleeve being aligned with said pair of jaws, a plunger slidably received in said sleeve, a transverse slot in said sleeve, a pin mounted in said plunger and sliding in said slot, an upstanding bracket mounted on the upper arm of said frame, a fluid cylinder pivotally mounted on said bracket and extending substantially parallel to the upper arm of said frame, a piston in said cylinder, a bellcrank pivotally mounted on said frame, said piston being pivotally attached to one end of said crank, the other end of said crank being operatively connected to said pin mounted in said plunger, and pump means for applying fluid pressure in said cylinder.

5. A valve lifter comprising a C-shaped frame, a pair of spaced apart jaws rigidly secured on the end of the lower arm of said frame, said jaws adapted to engage the lower spring seat of a valve spring, a bifurcated end on the end of the upper arm of said frame, a sleeve mounted in said bifurcated end, said sleeve being transverse to said arm, a plunger slidably mounted in said sleeve, a head on said plunger adapted to contact a valve head, a longitudinally extending slot in said sleeve, a plurality of transverse holes in said plunger, a pin selectively engageable with said holes, said pin slidable in said slot, an upstanding bracket on the upper arm of said frame, a fluid cylinder pivotally mounted on said bracket, a piston in said cylinder, a bellcrank mounted on said frame, said piston pivotally connected to one end of said bellcrank, the other end of said bellcrank contacting said pin, a fluid pump mounted on said cylinder for transferring fluid between the ends of said cylinder.

6. A valve lifter comprising a C-shaped frame, a pair of spaced apart jaws rigidly secured on the end of the lower arm of said frame, said jaws adapted to engage the lower spring seat of a valve spring, a bifurcated end on the end of the upper arm of said frame, a sleeve mounted in said bifurcated end, said sleeve being transverse to said arm, a plunger slidably mounted in said sleeve, a head on said plunger adapted to contact a valve head, a longitudinally extending slot in said sleeve, a plurality of transverse holes in said

plunger, a pin selectively engageable with said holes, said pin slidable in said slot, an upstanding bracket on the upper arm of said frame, a fluid cylinder pivotally mounted on said bracket, a piston in said cylinder, a bellcrank mounted on said frame, said piston pivotally connected to one end of said bellcrank, the other end of said bellcrank contacting said pin, a fluid pump mounted on said cylinder for transferring fluid between the ends of said cylinder, a foot pedal operatively connected to said pump.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,324,099	Barr	Dec. 9, 1919
1,530,302	Cook	Mar. 17, 1925
1,535,976	Wilson	Apr. 28, 1925
1,621,820	Allen	Mar. 22, 1927
1,855,508	Berck	Apr. 26, 1932
2,049,484	Worrall	Aug. 4, 1936
2,509,516	Murphy	May 30, 1950
2,617,181	D'Haem	Nov. 11, 1952