

April 26, 1932.

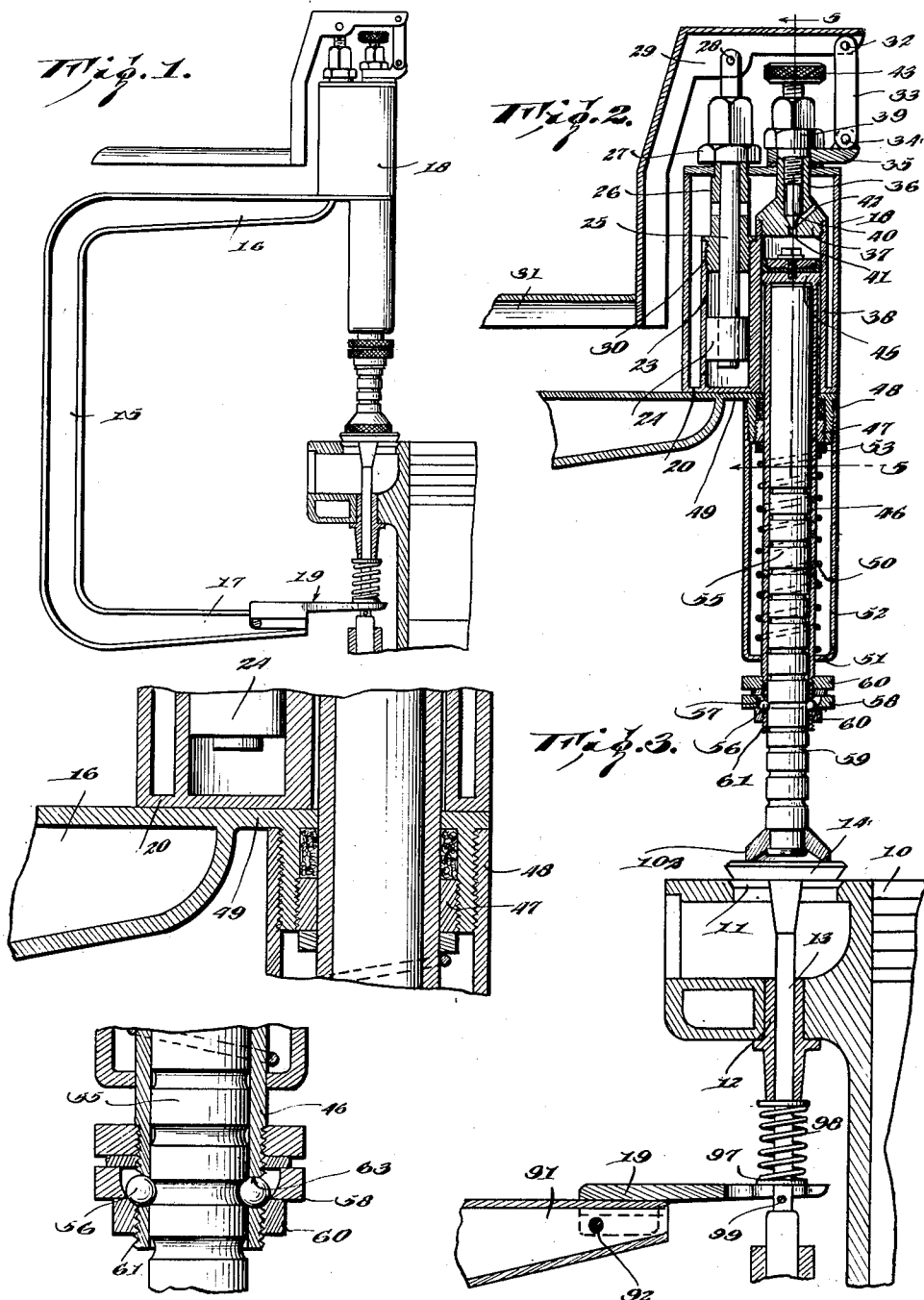
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1,855,508

HYDRAULIC VALVE LIFTER

Filed April 4, 1930

2 Sheets-Sheet 1



WITNESS
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Fig. 4.

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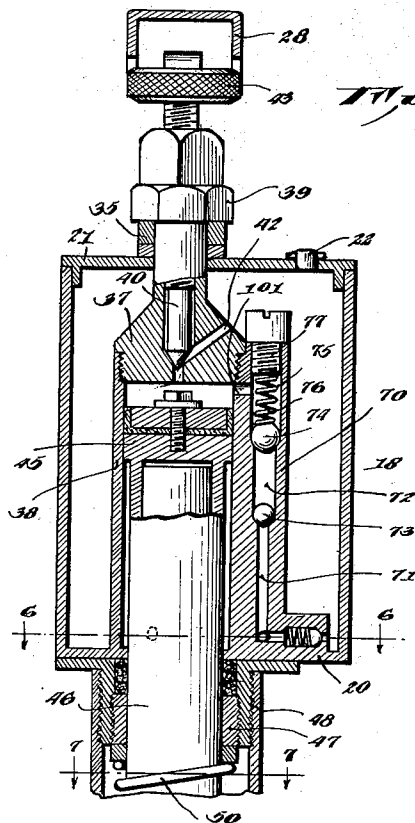


Fig. 5.

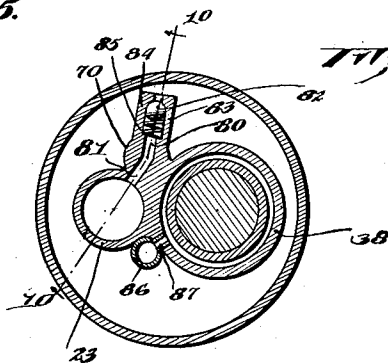


Fig. 6.

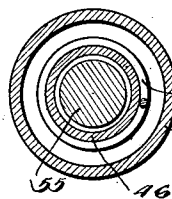


Fig. 7.

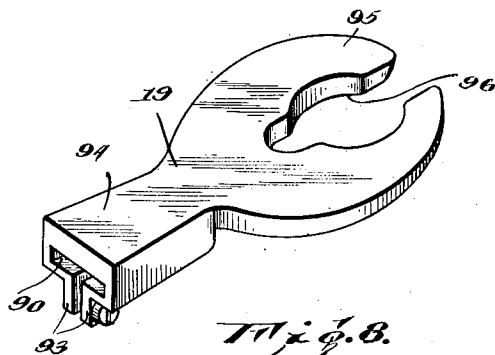


Fig. 8.

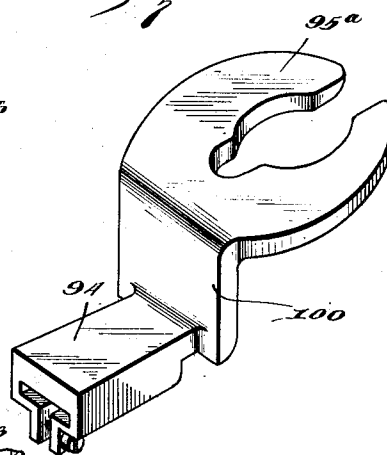
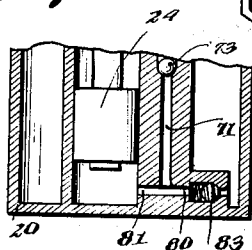


Fig. 9.



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HYDRAULIC VALVE LIFTER

Application filed April 4, 1930. Serial No. 441,571.

This invention relates to hydraulic valve lifters for internal combustion engines.

An object of the invention is the provision of a valve lifter which is operated hydraulically by a hand actuated pump that forces fluid under pressure into a cylinder, a piston being operative in the cylinder and having a projecting end for engagement with the head of a valve for retaining the valve against movement while an arm connected with the cylinder is movable towards the projecting end of the piston for compressing the valve spring.

A further object of the invention is the provision of a hand operated mechanism for placing the fluid under a predetermined pressure for controlling the operative position of a piston that engages a valve head of an internal combustion engine while providing for the movement of an arm towards the free end of the piston for placing the usual valve spring under compression whereby it will be possible to remove the valve when desired.

This invention will be best understood from a consideration of the following detailed description in view of the accompanying drawings forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications which shall define no material departure from the salient features of the invention as expressed in the appended claim.

In the drawings:

Figure 1 is a view in elevation and partly in section of a valve spring compressor constructed in accordance with my invention.

Figure 2 is a vertical section of the valve spring compressor,

Figure 3 is a fragmentary enlarged vertical section showing the packing for the removable piston,

Figure 4 is a fragmentary vertical section of a means for adjusting the valve holder in the piston,

Figure 5 is a vertical section taken along the line 5—5 of Figure 2,

Figure 6 is a horizontal section taken along the line 6—6 of Figure 5, and

Figure 7 is a horizontal section taken along the line 7—7 of Figure 5,

Figure 8 is a view in perspective of one form of spring-engaging means of the compressor,

Figure 9 is a view in perspective of a modified form of the spring-engaging means, and

Figure 10 is a vertical section taken along the line 10—10 of Figure 6.

Referring more particularly to the drawings, 10 designates the cylinder of an internal combustion engine having a valve seat 11 and a bearing 12 for the valve stem 13 of a valve 14.

A U-shaped bracket 15 includes a pair of arms 16 and 17 with the outer end of the arm 16 rigidly connected with a casing 18. The outer free end of the arm 17 provides means for pivotally mounting a spring-engaging member 19.

The casing 18 may be of any suitable shape in cross section and has an integrally formed bottom 20 and a removable cover plate 21. This casing is adapted to be supplied with a suitable oil through a removable plug 22.

A cylinder 23 is formed integrally with the bottom 20 of the casing 18 in which is slidably mounted a plunger 24. This plunger is operated by a stem 25 passing through a gland 26 secured by means of a nut 27 to the top 21 of the casing 18. The stem extends outwardly of the casing and is pivotally connected, at 28, with an arm 29. It will be noted that the gland or trunk 26 is threaded at 30 into the top of the cylinder 23.

The arm 29 has a handle 31 which is adapted to be rocked for reciprocating the plunger 24. An end of the arm 29 is pivotally mounted at 32 on a link 33 which in turn is pivotally mounted at 34 upon a block 35 which is perforated to receive a reduced portion 36 of a head 37 threaded into a cylinder 38. A nut 39 secures the reduced portion 36 and the block 35 to the top 21 of the casing 18.

The reduced portion 36 is provided with an axial passage in which is mounted a valve stem 40 which controls a passage 41 in communication with the interior of the cylinder

38 and passage 42 places the passage 41 in communication with the interior of the casing 18. This valve is operated by a knurled member 43 secured upon that portion of the stem which extends beyond the reduced portion 36 of the head 37. It will be noted that the stem 40 is threaded into the passage within the reduced portion 36.

A piston 45 is mounted for reciprocation within the cylinder 38 and is provided with an elongated apron 46 extended through a packing 47 formed in a box 48 carried by a projection 49 at the outer free end of the arm 16. A spring 50 engages the lower closed end 51 of a sleeve 52 which is threaded onto the box 48 while the other end of the spring engages a collar 53 secured to the apron 46 so that the spring will tend to move the apron and the piston inwardly of the cylinder 38.

A valve engaging rod 55 is slidably mounted within the apron 46 and is held within the apron and adjustable outwardly of the apron by means of balls 56 located within pockets 57 in a collar 58 embracing the rod 55, the outer end of the rod is provided with a plurality of annular grooves 59 at intervals along the length of the rod to receive the balls so that when a pair of lock nuts or washers 60 are threaded onto the portion 61 of the apron 46, the rod 55 will be locked in a predetermined position relative to the apron 46. It will also be noted that the balls 56 project through passages 63 formed in the apron 46.

It will be noted by this construction that when the nut 60 is released from the threaded portion 61 of the apron 46, that the collar 58 may be moved to a position to permit the balls 56 to be released from the passages 63 in the apron 46 and the rod 55 may be moved outwardly of the apron and the balls 56 again reset within the groove 59 in a rod for securing the rod against movement after it has been adjusted outwardly of the apron 46.

The cylinder 38 has cast integrally therewith an extension 70 provided with a reduced vertical passage 71 and an enlarged vertical passage 72 in communication with the passage 71. A check valve 73 is located in the passage 72 where the said passage joins the passage 71. A spring-pressed check valve 74 is located in a passage 75 where said passage joins the passage 72 and a spring 76 held in place by a plug 77 maintains the ball 74 in position. The enlargement or extension 70 connects the cylinder 23 with the cylinder 38 and at its lower end is provided with a pair of passages 80 and 81 which are in communication with each other and with the passage 71. A check valve 82 is located within a pocket 83 in a lateral extension 84 of the enlargement 70 and is maintained in position by a spring 85 which will permit the valve to open when fluid enters the pocket 83 from the interior of the casing 18 whence

it is drawn through the passage 81 to the cylinder 23 upon the suction stroke of the piston 24.

A tubular member 86 is vertically disposed adjacent the cylinder 38 and is in communication with said cylinder at its lower end by means of a passage 87. The lower end of the tubular member 86 is closed while the upper end is open to the interior of the casing 18. The tubular member is of sufficient height to permit the fluid which has entered the cylinder 38 to be discharged into the casing 18 upon the outward stroke of the piston 45.

The spring-engaging member 19, as shown in Fig. 8, is provided with a slot 90 which receives the free end 91 of the arm 19 and a pin 92 passing through perforations in flanges 93 projecting downwardly from the shank 94 of the member 19 also passes through a perforation in the arm for pivotally mounting the member 19.

The expanded portion 95 of the member 19 is provided with a fork 96 which is adapted to embrace the lower end of the valve stem 13 and to engage a washer 97 which normally supports the lower end of a valve spring 98. A pin 99 carried by the lower end of the valve stem retains the washer 97 in position.

A modified form of the spring-engaging member is shown in Figure 9 in which the spring-engaging member 95^a is offset from the plane of the shank 94 by means of a right angularly disposed member 100. This type of spring-engaging member is especially adapted for certain types of engines.

It will be seen by this construction that the bracket member 15 extends a considerable distance outwardly of the cylinder block of the engine so that the finger-engaging member 19 may be received beneath the washer 97 so that when the piston 45 is moved outwardly of its cylinder it will cause the bracket to be moved in the opposite direction and thereby compress the spring 98.

The piston 45 is moved outwardly of its cylinder by reason of the manual operation of the handle 29 which causes the plunger 24 to place the liquid drawn into the cylinder 23 under pressure which is forced through the passages 71, 72 and 75 and 101 to the cylinder 38 above the piston 45. The fluid under pressure will force the piston outwardly of its cylinder and likewise the rod 55 so that the member 102 will engage the valve 14 when the bracket is moving towards the piston.

The valve 40 may be released from its seat on the passage 41 and permit the oil to escape from the cylinder 38 to the interior of the casing 18. At that time the spring 50 will cause the apron 46 in the piston 45 to be moved inwardly of the cylinder 38.

I claim:

A hydraulic valve lifter comprising a frame, a casing mounted on the frame adapt-

ed to be partially filled with a liquid, a cylinder in the casing having a portion projecting from the casing, a plunger in the cylinder, a second cylinder within the casing, a piston in said cylinder, means for manually reciprocating the plunger, a conduit placing the first-mentioned cylinder in communication with the casing at a point below the plunger, the second-mentioned cylinder being provided with a head having a passage placing said cylinder in communication with the casing, a conduit connecting the first-mentioned cylinder with the second-mentioned cylinder above the head of the piston so that when the plunger is reciprocated liquid from the casing will be forced into the first-mentioned cylinder and against the piston for forcing the same outwardly of its respective cylinder, a spring tending to return the piston within the second cylinder, a valve engaging means on the outer projecting end of the piston, a valve in the head of the second-mentioned cylinder adapted to normally close the passage between the second cylinder and the casing, said frame having a portion engaging the valve stem and spaced from the valve engaging means on the piston.

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