

May 16, 1950

G. B. GAINES
PNEUMATIC JACK

2,507,628

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2 Sheets-Sheet 1

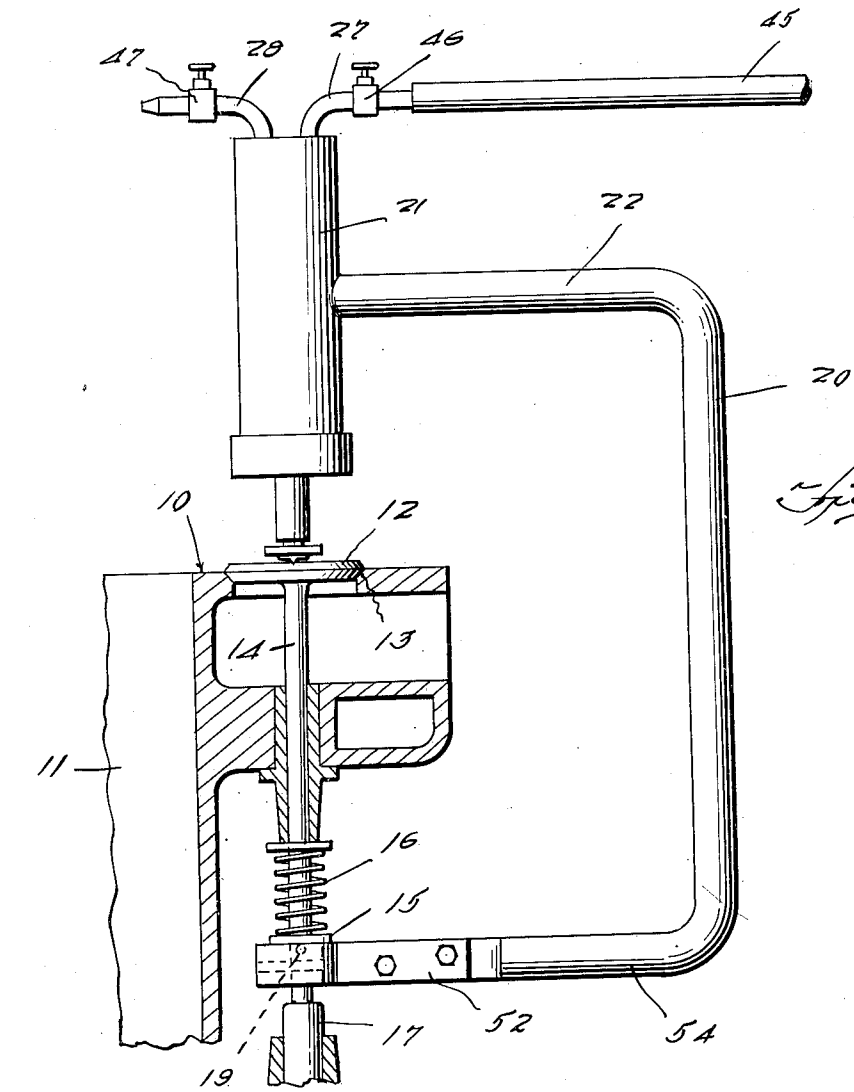
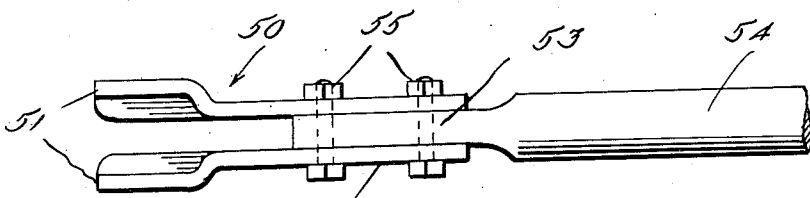


Fig. 1.



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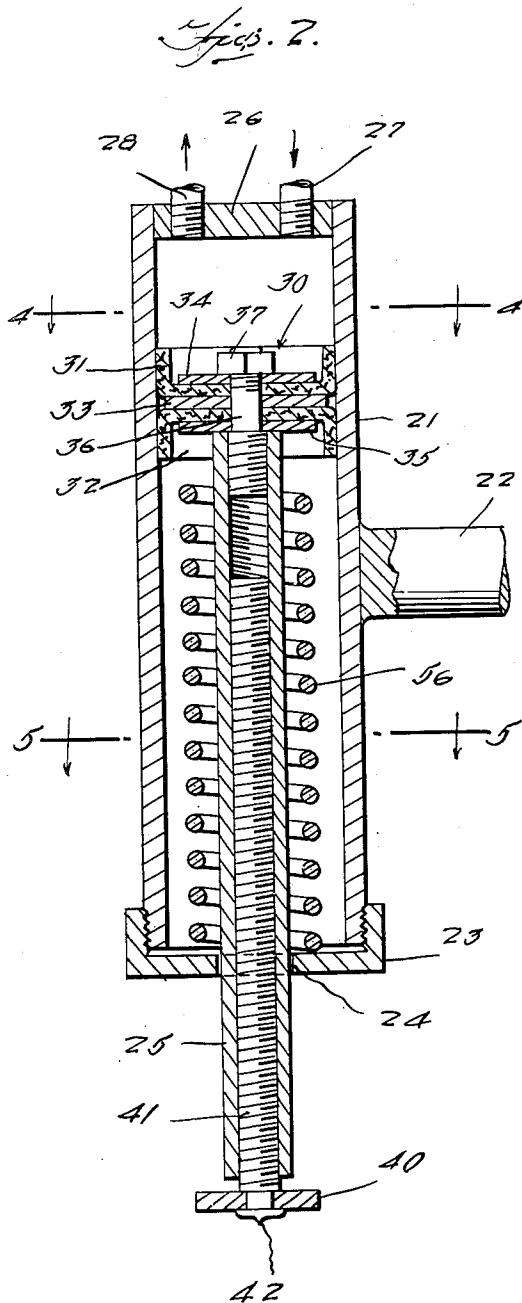
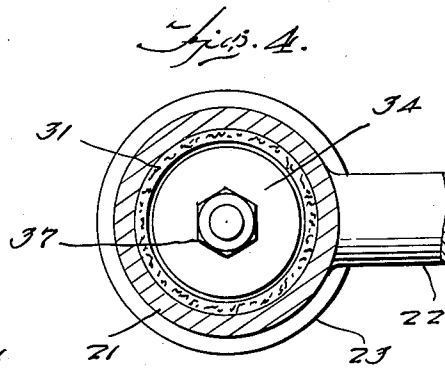
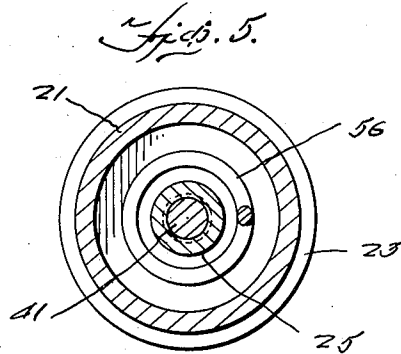
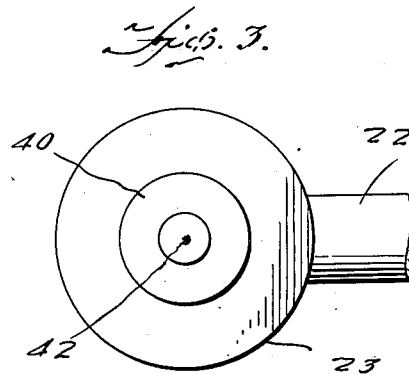
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PNEUMATIC JACK

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1 Claim. (Cl. 121—46)

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This invention relates to valve lifters.

An object of the invention is the provision of a valve lifter which is operated pneumatically and which may be employed in connection with engines of the valve-in-head type or with the L head type. The lifter being of simple construction with few parts so that it may be manufactured readily and marketed at a reasonable price.

Another object of the invention is the provision of a simple and efficient lifter in which a U-shaped arm carries a cylinder at one end and a spring-retainer engaging portion at the other end, a piston in the cylinder being operated by air pressure in one direction and provided with a valve head engaging member located exteriorly of the cylinder and movable vertically for insuring precision adjustment with a minimum of time and effort, a spring returning the piston after the air in the cylinder has been released.

A further object of the invention is the provision of a valve lifter operated by air pressure at the will of the mechanic in which a piston formed of a pair of opposed cups bolted to the inner end of a hollow piston rod having one end projecting through the bottom of a cylinder in which the piston slides, a valve engaging member provided with a stem threaded into the projecting end of the rod to permit adjustment of the engaging member for accommodating said member readily to various types of valves, said piston moving the member into operative engagement with the valve by air pressure with a spring returning the piston when the air pressure is released.

The invention is best understood from a consideration of the following detailed description in connection with the accompanying drawings forming part of the specification, nevertheless, it is to be understood that the invention is not confined to the disclosure but is susceptible of such changes and modifications as 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 side view in elevation of my compressed air lifter with parts of the engine block in section,

Figures 2 is an enlarged vertical section of a cylinder, piston and valve engaging member operated by compressed air in one direction,

Figure 3 is a fragmentary bottom plan view of the cylinder and valve engaging means,

Figure 4 is a transverse horizontal section taken along the line 4—4 of Figure 2,

Figure 5 is a transverse horizontal section taken along the line 5—5 of Figure 2, and

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Figure 6 is a fragmentary top plan view showing the lower part of a U-shaped member to which is attached a spring-retainer engaging means.

Referring more particularly to the drawings 10 designates an engine block from which the usual head has been removed. The block includes at least one cylinder 11 and a valve 12 mounted on its seat 13 with a stem 14 having a spring-retainer 15 on the lower end thereof for retaining a spring 16 in place when a tappet 17 engages the valve stem. A pin 19 received by a passage in the stem retains the washer or spring-retaining member 15 in position.

A U-shaped arm 20 provides a supporting means for my valve lifter. A cylinder 21 is connected rigidly with the outer end of the upper leg 22 of said arm. The cylinder as shown in Figure 2, is disposed vertically and at right angles to said leg and a lower open threaded end upon which is screwed a closure 23. The closure has a central opening 24 through which reciprocates a hollow piston rod 25. The upper closed end 26 of said cylinder is in communication with a pipe 27 for supplying compressed air to the cylinder. A pipe 28 forms an outlet for the air.

A piston generally designated by the numeral 30 consists of a pair of opposed cups 31 and 32 separated by a disk 33 and washers 34 and 35 received by the respective cups. A bolt 36 passes through central perforations in the washers disk and cups and is threaded into the upper end of the rod 25 for securing the piston to said rod. The washer 35 is seated on the inner end of the rod while a head 37 on the bolt engages the washer 34.

A head or disk 40 is mounted on the lower end of an adjustment rod 41 which is threaded into the hollow piston rod 25 for rapid precision adjustment of the lower pointed end 42 of the rod 41 below the disk 40. Said end is adapted to engage the engine valves. The adjustment of the valve engaging member 42 accommodates the lifter to various types and sizes of engines.

A rubber tube 45 is connected between the free end of the pipe 27 and a source of supply of compressed air. A valve 46 is incorporated in said pipe for controlling the admission of air to the top of the cylinder 21 above the piston 30. A valve 47 is included in the pipe 28 for controlling the exhaust of the compressed air from said cylinder.

A fork generally designated by the numeral 50 is formed of a pair of tines 51 each being provided with a shank 52 that are spaced from each other by a flattened portion 53 on the outer free

end of the other leg 54 of the U-shaped arm 20. The shanks are secured to opposite sides of the flattened end 53 by bolts 55 so that the tines may be removed and replaced by other tines more suitable for particular types of spring retainers. The tines are spaced apart to receive the valve stem 14.

A coil spring 56 is mounted longitudinally of the cylinder 21 and below the cup-shaped member 32. The lower end of said spring rests on the closure 23 while the upper end is engaged by the washer 35 which when the cylinder is raised by compressed air acts to compress the spring so that when the air is released from the cylinder, said spring will return the cylinder.

The operation of my device is as follows—The legs of the U-shaped member 21 are sufficiently long that the pointed element 42 may engage a valve and the tines 51 may straddle the stem of the valve operated on. Thus, the valve lifter may be employed on various types of engines. The tines, having been selected for the particular kind of spring retainer are disposed beneath the retainer 15 and the device is ready.

The valve 46 is opened while the valve 47 is closed. This operation can be carried out with one hand of the operator while the other hand is holding the U-shaped member. The air pressure acting on the piston 30 in the cylinder 21 tends to force said piston downwardly. Since the piston cannot move in that direction, the cylinder is raised thereby raising the fork 50 against the tension of the coil spring 56 in the cylinder 21 and the valve spring 16 (Figure 1).

When the washer 15 is raised the pin 19 may be removed. The valve 46 is closed and the valve 47 is opened to release the compressed air in the cylinder 21 when the spring 56 will return the cylinder 21 to its lower position. At this time, the fork 50 is lowered, thereby releasing the retainer 15 and the spring 16. When the lifter has been removed from its operative position, the valve 12 and its stem 14 are withdrawn.

The valve may be ground on its seat or a new valve may be substituted when necessary and ground to fit. The lifter is returned to an operative position with the fork 50 straddling the stem 14 and supporting the washer 15 and spring 16. Compressed air is returned to the cylinder 21 until the washer clears the passage in the stem and the pin 19 is returned.

It will be noted that the cup-shaped members 31 and 32 of the piston 30 are oppositely disposed. The washers 34 and 35 in connection with the disk 33 provides sufficient rigidity for retaining the cups in sealing relation with the inner wall of the cylinder 21 to prevent the escape of air to the lower portion of said cylinder. Said piston

and the contents of the cylinder may be removed readily from said cylinder by unscrewing the closure from the bottom of said cylinder when necessary for repairs.

What I claim is:

In a pneumatic jack, an elongated cylinder provided in one end with inlet and exhaust openings for fluid under pressure and in its opposite end with a central opening, an elongated tube mounted within the cylinder for reciprocation and operating through the central opening and being internally screw threaded throughout its entire length, a short screw threaded rod section mounted within the inner end of the tube and having a reduced axial extension projecting longitudinally beyond the inner end of the tube and having a diameter smaller than the inside diameter of the tube, a first substantially rigid flat washer mounted upon the reduced axial extension and engaging against the inner end of the tube, a plunger mounted upon the reduced axial extension beyond said first washer and engaging such washer and slidably engaging within the bore of the cylinder, a second substantially rigid flat washer mounted upon the reduced axial extension beyond the plunger and engaging the plunger and spaced axially beyond the first washer, the end of said reduced axial extension being screw threaded, a nut mounted upon the screw threaded end of the reduced axial extension and engaging the second substantially rigid washer for clamping the plunger between the first and second washers, an expansible coil spring mounted within the cylinder between the plunger and end of the cylinder having the central opening and surrounding the tube and having one end engaging the plunger and its opposite end engaging the end of the cylinder having the central opening, and a long screw threaded rod section adjacently mounted within the outer end of the tube and having its inner end spaced from the short rod section, the long rod section extending through the major portion of the length of the tube.

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