Feb. 20, 1923. 1,445,708.

E. PEDERQUIST.

VALVE SPRING LIFTER.

FILED MAY 10, 1921.

Fig. 1.

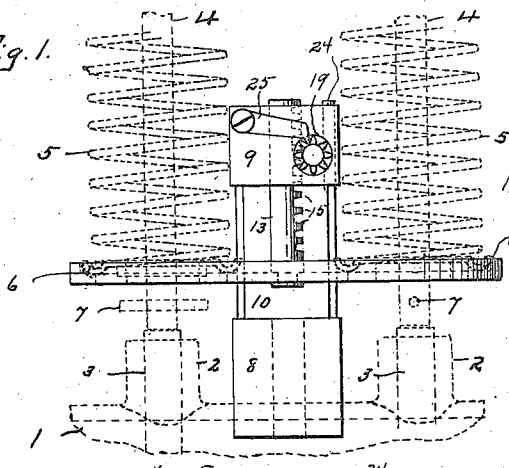


Fig. 2.

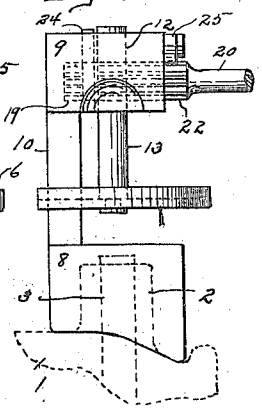


Fig. 3

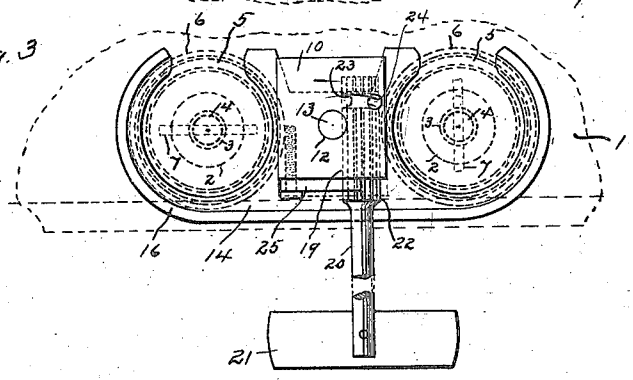


Fig. 4.

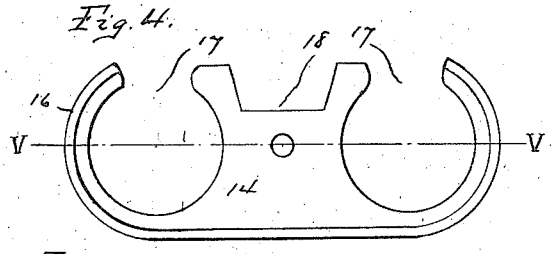
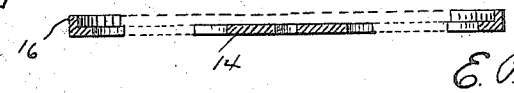


Fig. 5.



E. Pederquist.
INVENTOR.

BY

Louis M. Sanders
ATTORNEY.

Patented Feb. 20, 1923. 1,445,708

UNITED STATES PATENT OFFICE.

ERNEST PEDERQUIST, OF NEWARK, NEW JERSEY.

VALVE-SPRING LIFTER.

Application filed May 10, 1921. Serial No. 468,328.

To all whom it may concern:

Be it known that I, ERNEST PEDERQUIST, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Valve-Spring Lifters, of which the following is a specification.

My invention relates to devices for lifting or compressing the springs which seat the valves of internal combustion engines, so that the valves may be disconnected from the engine. Many different kinds of devices for the purpose have been proposed, but in a majority if not all of such devices, the parts are designed to release but a single valve at a time; this requires that the lifter must be reset for each valve, while one hand of the operator is occupied with holding the device and the other hand is free to manipulate the valve, with an attendant expenditure of much time and patience. With my improved lifter, when set in place upon the engine frame, the turning of the pinion shaft will compress a pair of springs to the desired degree to make the valve retaining pins accessible, and there remain locked, while both of the operator's hands are free to manipulate the valve and its parts, the entire operation of completely detaching a pair of valves occupying less than one minute.

In the accompanying drawing, I have shown the improved lifter as designed particularly for the well-known Ford engine; only a slight change in the dimensions of the parts is necessary, however to adapt the lifter to other makes of engines, without in any way changing the mode or principle of operation.

In the drawing,

Fig. 1 is a front elevation of the lifter, with the engine parts shown in dotted lines.

Fig. 2 is a side elevation of the same.

Fig. 3 is a plan view.

Fig. 4 is a detached plan view of the lifting plate.

Fig. 5 is a section on line V—V of Fig. 4.

In nearly all of the modern forms of internal combustion engines, particularly those used in automobiles, the fuel and exhaust valves are arranged in pairs, with one pair for each engine cylinder. This makes it the more convenient for the use of my improved valve lifter. In the accompanying drawing, I have shown only so much of the engine frame in dotted lines as may be necessary to understand the operation of the device.

The crank case of the engine 1 has the nipples 2 projecting upwardly therefrom, with the cam pins 3 extending from within the case to a short distance above said nipples. Poppet valves are located directly above and in line with said pins with their stems 4 in position to be forced upwardly by the rise and fall of said pins. Springs 5 surround said stems and are supported upon spring cups 6, which in turn rest upon the retaining pins 7, the latter being inserted in apertures in said stems. The upper ends of the springs are confined beneath an overhanging part of the engine frame (not shown), so as to be under considerable compression to normally hold the valves upon their seats. When it is desired to remove the valves for repair, it is necessary to compress said springs so as to remove the pins 7, in order that the valves may be withdrawn upwardly.

My improved lifter consists of the metal frame made up of the foot 8, head 9 and integral connecting standard 10, of convenient width to place between a pair of the valve springs 5, with the foot 8 resting upon the crank case. The head 9 has the vertical hole drilled through it as at 12; in said hole, the stem or rack 13 of the lifting plate 14 is inserted and by which it is guided in its vertical movement. The stem 13 is provided with rack teeth 15 in one side as shown. The lifting plate is of the general contour shown in Fig. 4, having a marginal flange 16 upon it which serves not only to give it additional strength, but also to form a means for properly locating the spring cups 6. The plate is cut out as at 17, 17, so that no matter what position the retaining pins 7 may assume, they will not be interfered with by the plate when it is elevated. The back side of the lifting plate is cut out as at 18 to slidingly fit against the standard 10, which serves as a guide for the up and down movement of the plate. The plate 14 is rigidly connected to the lower end of the rack 13. A horizontal aperture is drilled into the head at 19, into which a section of pinion rod is inserted to mesh with the rack teeth 15. The projecting end of the pinion rod is turned down as at 20 and is of sufficient length to extend beyond the adjacent

parts of the engine, so that the wings 21 of the rod will not interfere therewith when turned. The inner end of the pinion rod 22 is circumferentially grooved as at 23, and the retaining pin 24 is inserted through an aperture in the head 9 to register with said groove and thus hold the rod 22 in place. A gravity pawl 25 is pivoted upon the front of the head 9, in position for its point to engage the teeth of the pinion rod and hold the same against reverse movement.

The bottom of the foot 8 is shaped to fit the crank case with the forward lower edge of said foot engaging the usual flange upon the case. The aperture 19 is of a diameter to receive the pinion rod 22 and form a bearing for the points of the pinion teeth.

In operation, the lifter is placed upon the crank case of the engine with the foot 8 between a pair of nipples 2, and the plate beneath the corresponding pair of spring cups 6. The rod 22 may then be turned by means of the wings 21, whereupon the rack 13 will be elevated and with it the plate 14 to compress the springs 5 sufficiently to permit access to and the removal of the retaining pins 7. The pawl 25 engaging the teeth of the rod 22, will hold the springs compressed without further attention, and the valves may now be removed for inspection and repair, or the valve seats re-ground as desired. Upon restoration of the valves and the insertion of the pins 7 into the stems 4, the pawl 25 may be lifted from engagement with the teeth of the pinion rod 22, and the rod again turned to relieve the compression of the springs, and finally the device may be removed.

It will be noted that the pressure exerted by the springs 5 upon the lifting plate 14 is equalized upon the ends thereof, so that there is no binding of the rack or stem 13 in the hole 12; it slides vertically without undue friction, and the device operates quickly and effectively. It is self-contained, easily operated and has few parts which are not liable to become disarranged or out of order.

I claim:—

1. In a valve spring lifter, the combination of a frame comprising a supporting foot, a standard rising from said foot and a head having a vertical aperture therethrough, with a lifting plate having a rack fitted to slide in said aperture, and a pinion journaled in said head for engaging said rack to elevate said plate.

2. In a valve spring lifter, the combination of a frame having a supporting foot or base with a standard rising therefrom and a head secured to the upper end of said standard and having a vertical aperture therethrough, a spring-lifting plate having a centrally secured rack thereon, said rack being vertically guided in said aperture, and a pinion journaled in said head for engagement with said rack to elevate said plate and thereby compress a pair of valve actuating springs supported upon the ends thereof.

3. In a valve spring lifter, the combination of a frame comprising a supporting foot, a standard rising from said foot and a head having a vertical aperture therethrough, with a lifting plate having a rack fitted to slide in and be guided by said aperture, a pinion journalled in said head for engagement with said rack to elevate said plate, and means for locking said pinion to secure said plate in any adjusted elevated position.

4. In a valve spring lifter, the combination of a frame, comprising a foot or base, a standard rising therefrom, and a head secured to the upper end of said standard, said head having a vertical aperture therethrough, a spring lifting plate, having a centrally secured rack thereon, said rack being vertically guided in said aperture, and a pinion journalled in said head for engagement with said rack to elevate said plate, and a locking pawl pivotally mounted upon said head for engagement with the teeth of said pinion to lock said rack and plate in any desired elevated position.

5. In a valve spring lifter, the combination of a frame, comprising a supporting foot, a standard rising from said foot, and a head upon the upper end of said standard, said head having a vertical aperture therethrough, with a lifting plate provided with a pair of annular spring seats at each end thereof, and a central rack rigidly secured thereto, and fitted to slide in said vertical aperture, a pinion journalled in said head for engaging said rack to elevate said plate and a locking pawl pivoted upon said head in position to engage the teeth of said pinion whereby said rack and plate may be locked in any one of several adjusted positions.

ERNEST PEDERQUIST.