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B. J. THOMAS

SELF ADJUSTING VALVE LIFTER

Filed Sept. 19, 1925

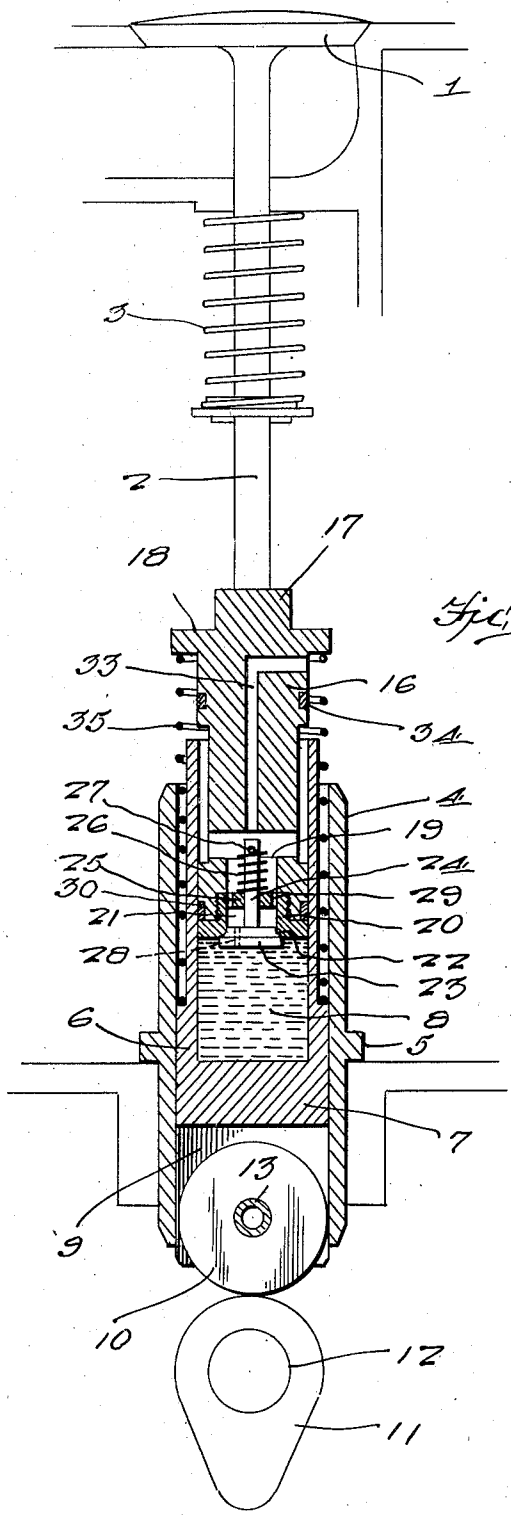
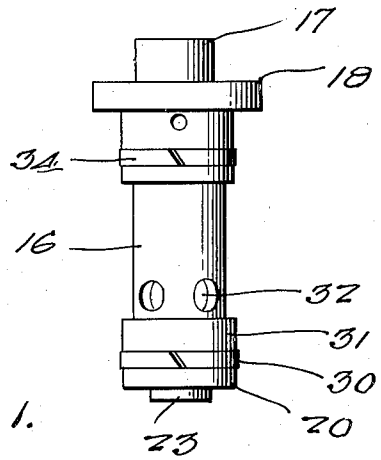


Fig. 1.

Fig. 2.



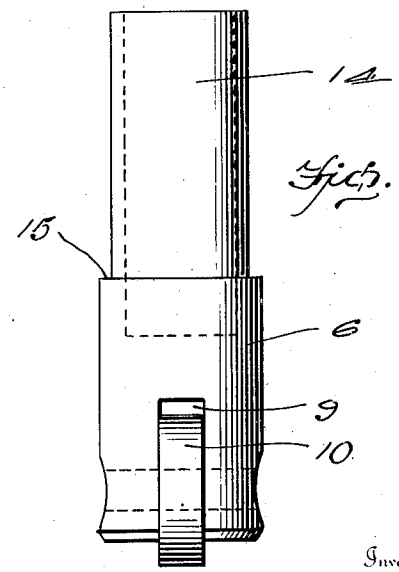


Fig. 3.

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UNITED STATES PATENT OFFICE.

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SELF-ADJUSTING VALVE LIFTER.

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This invention relates to improvements in valve actuating mechanism for internal combustion engines, and has for its principal object to provide a highly novel and simple means for eliminating the usual clicking noises and slack incidental to internal combustion engines.

Another important object of the invention is to provide a valve actuating mechanism which will be self adjustable and which will further eliminate any clearance between the lower end of the stem of a reciprocating valve and the push rod or tappet which is interposed between the lower end of the valve stem and the cam for actuating the same which is mounted on the usual cam shaft.

A further object is to provide a self adjusting valve lifter which will at all times be positive and efficient in its operation, the same being further of such construction as to permit the same to be readily assembled.

A further object is to provide a self adjusting valve lifter wherein the same includes a cylinder having its lower end closed to provide a liquid receiving magazine, a plunger being adapted for reciprocatory movement in the upper portion of the cylinder, the plunger including a piston for cooperation with a fluid in the cylinder, resilient means being associated with the cylinder and the plunger for holding the upper end of the plunger in engagement with the lower end of the valve stem at all times so that clearance between the lower end of the stem and the plunger will not occur and thus render the operation of the valve actuating mechanism noiseless.

A still further object is to provide a device of the above mentioned character which is simple in construction, inexpensive, and furthermore adapted to the purposes for which the same is designed.

Other objects and advantages of this invention will become apparent during the course of the following description.

In the accompanying drawing forming part of this specification and in which like numerals are employed to designate like parts throughout the same:

Figure 1 is a vertical sectional view of the self adjusting valve lifter embodying my invention showing the manner in which the same is associated with the valve stem, and the actuating cam mounted on the usual cam shaft.

Fig. 2 is a detail front elevation of the plunger, and

Fig. 3 is a similar view of the reciprocating cylinder.

In the drawing, wherein for the purpose of illustration is shown the preferred embodiment of my invention, the numeral 1 designates one of the valves which are associated with an internal combustion engine of any well known type, the stem for said valve being illustrated at 2. The usual coiled spring which encircles the valve stem for normally holding the valve in a seated or closed position is illustrated at 3.

Extending vertically through a suitable opening provided therefor in the top wall of the crank case of the internal combustion engine is the guide sleeve 4. An annular flange 5 is formed on the outer face of the lower portion of the guide sleeve and this flange is adapted to rest on the top wall of the crank case in a manner as clearly illustrated in Fig. 1.

Adapted for reciprocatory movement within the guide sleeve 4 is the cylinder designated generally by the numeral 6. A lower portion of the cylinder is closed as indicated at 7, whereby a liquid receiving chamber is provided in the upper portion of the cylinder and its purpose will be hereinafter more fully described. The lower closed end of the cylinder is bifurcated as illustrated at 9 and rotatably supported in this bifurcation is the roller 10, the same being adapted for engagement with the cam 11 which is secured on the usual cam shaft 12 in the manner well known in the art. The shaft which supports the roller 10 is illustrated at 13 and this shaft extends transversely through the bifurcated lower portion of the cylinder 6 at such a point as to cause a portion of the roller 10 to be disposed below the lower end of the cylinder.

The upper portion of the cylinder 6 is reduced as indicated at 14 and the shoulder formed by the reduced portion of the cylinder is indicated at 15. The valve lifter or tappet further includes the plunger 16, the same being adapted for reciprocatory movement in the open upper reduced portion 14 of the cylinder 6. The upper end of the plunger 16 is reduced as at 17 and provides a head for engagement with the lower end of the valve stem 2. A collar flange 18 is formed on the upper portion of the plunger 16 adjacent the reduced portion or head 17. The

lower portion of the plunger 16 is hollow as indicated at 19 and the lower end of the plunger is provided with an enlarged internally threaded bore for receiving the flanged nut 20, the latter being provided with a central bore 21.

The lower end of the bore 21 provides a valve seat 22 for cooperation with the valve 23, the valve stem 24 thereof extending upwardly through the bore 21 of the nut 20 and through a suitable guide 25 provided therefor in the upper portion of the bore of the nut. The upper end of the valve stem 24 extends into the bore 19 of the plunger 16 and for the purpose of normally holding the valve 23 seated against the valve seat 22, a coiled spring 26 encircles the upper portion of the valve stem and is disposed between the top of the guide 25 and a suitable pin 27 which extends transversely through the upper end of the valve stem. This is more clearly illustrated in Fig. 1 of the drawing.

The valve 23 is provided with a bleed opening 28 and the guide 25 provided for the valve stem 24 is also provided with openings 29 whereby communication between the bore 19 and the bore 21 with the chamber 8 is provided. By connecting the nut 20 with the lower end of the plunger 16 in the manner as heretofore described, the same may be readily attached or detached without any difficulty.

A piston ring 30 is carried by the lower portion of the plunger 16 and the flanged nut 20 cooperates with the enlargement 31 in securing the piston ring 30 in position on the lower portion of the plunger, this piston ring being adapted for engagement with the inner wall of the chamber or reduced portion of the cylinder. The plunger 16 is further provided with liquid outlet openings 32 in the lower portion thereof at a point above the enlargement 31 and the purpose thereof will be presently apparent.

These openings communicate with the bore or passage 19 as shown in Fig. 1. The plunger is further provided with an air passage 33 which passage extends from the side of the upper portion of the plunger and communicates with the bore 19. An additional packing ring 34 may be carried by the upper portion of the plunger, in the manner as clearly shown in Figs. 1 and 2.

A coiled spring 35 encircles the reduced portion 14 of the cylinder 6, the lower end of the coiled spring engaging the shoulder 15 while the upper end of the spring is in engagement with the collar or shoulder 18 formed on the upper portion of the plunger 16. The coiled spring is further adapted to engage the inner wall of the upper portion of the guide sleeve 4. This coiled spring is provided for normally holding the plunger in its uppermost position so that the head 17 formed on the upper end of the plunger will at all times be in engagement with the lower end of the valve stem 2.

The chamber 8 is adapted to be filled with glycerine or any other suitable liquid.

In operation, as the cam shaft 12 rotates, and the cam 11 strikes the roller 10, the cylinder 6 will be caused to move upwardly in the guide sleeve 4 and simultaneously effecting the upward movement of the plunger 16 so that the head 17 which is in engagement with the lower end of the valve stem 2 will raise the latter so as to open or unseat the valve 1. During the upward sliding movement of the cylinder and the plunger, a quantity of the liquid in the chamber 8 will escape out through the bleed opening 28 in the valve 23 and through the openings 29 provided in the guide 25 into the bore 19 and into the upper portion of the cylinder through the medium of the outlet openings 32.

As the valve 1 returns to its closed or seated position, the plunger 16 will also move downwardly against the pressure of the coiled spring 35 and the cylinder 6 will also move downwardly in the guide sleeve 4. During the downward sliding movement of the plunger and cylinder, the suction created in the bottom of the chamber will effect the opening of the valve 23 so that the glycerine or other liquid used will return to the chamber from the upper portion of the cylinder. The packing rings 30 and 34 will prevent any leakage of the liquid from the cylinder or chamber.

It will thus be seen from the foregoing description, that a valve actuating mechanism has been provided which will at all times be positive and efficient as well as self adjustable and will thereby eliminate the usual clicking noise between the lower end of the valve stem and the tappet such as occurs with the tappet now generally in use upon internal combustion engines.

After a self adjusting valve lifter of the character embodied in my invention has been installed, further attention to the valve actuating mechanism will be unnecessary and the valve will be opened and closed silently. The simplicity in which my improved device is constructed enables the same to be readily and easily assembled or disassembled.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit or sacrificing any of the advantages of the appended claim.

Having thus described my invention, what I claim as new is:—

In combination, in a self-adjusting valve lifter with a spring pressed valve and its

stem, and an actuating means, of a reciprocating cylinder interposed between the stem and said actuating means, a guide sleeve therefor, the lower portion of the cylinder being closed and providing a liquid receiving chamber, a reciprocatory plunger arranged in the upper portion of the cylinder, the upper end of the plunger having a head formed thereon adapted for engagement with the lower end of the valve stem, the lower portion of the plunger extending downwardly into the liquid contained in the chamber, said plunger having a vertical bore, the lower end thereof communicating with the chamber, the lower portion of said bore being enlarged and internally threaded, a flanged nut threaded in the threaded portion of said bore, said nut being provided with a central bore adapted for registry with the aforementioned bore, and the lower portion of the bore formed in said nut providing a valve seat, a valve cooperating with said bores, means for normally maintaining the valve in a closed position in engagement with said seat, the lower portion of the plunger being provided with openings in the sides thereof which communicate with the bore and a coil spring encircling the cylinder and the plunger, the upper end of the coil spring cooperating with the head formed on the upper end of the plunger for holding the latter in engagement with the lower end of the valve stem at all times.

In testimony whereof I affix my signature.

BENJAMIN J. THOMAS.