July 3, 1934. W. R. VITALINI 1,965,517

HYDRAULIC VALVE TAPPET

Filed July 30, 1932

Fig. 1.

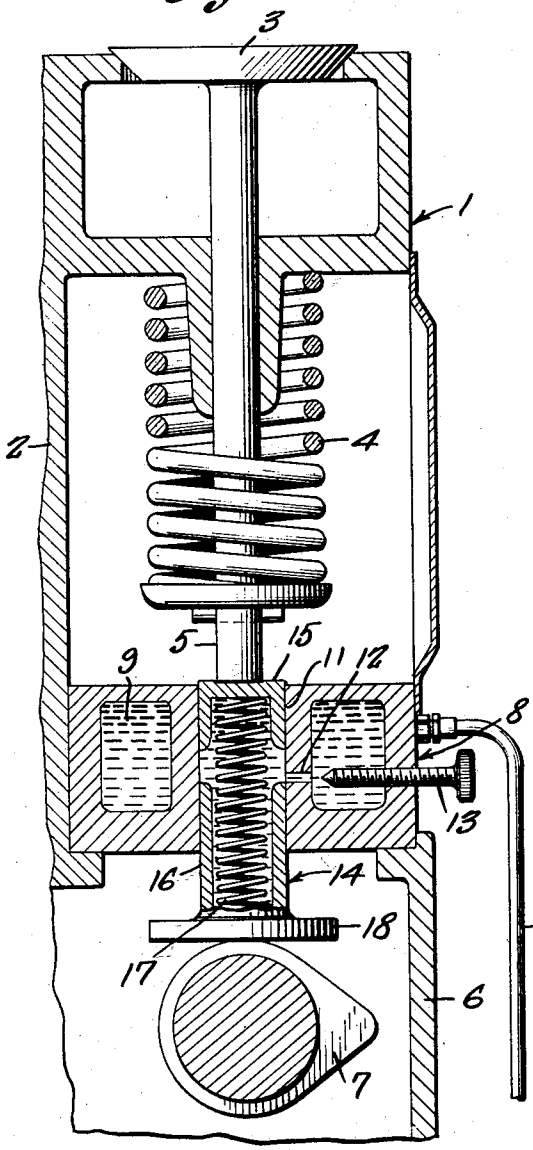


Fig. 3.

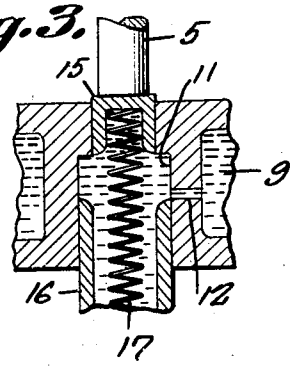
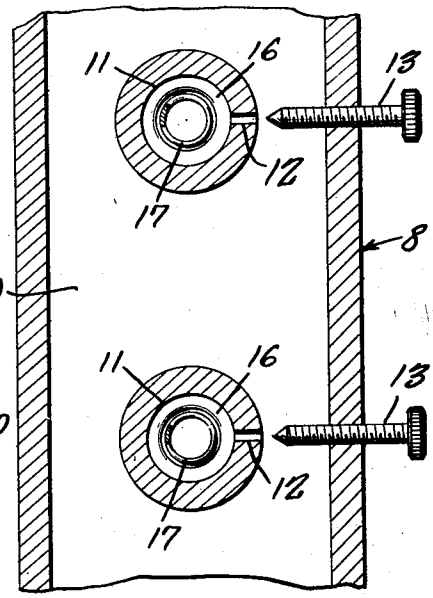


Fig. 2.



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WITNESS:

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HYDRAULIC VALVE TAPPET

Walter R. Vitalini, Milford, Mass.

Application July 30, 1932, Serial No. 626,709

1 Claim. (Cl. 123—90)

This invention relates to hydraulic valve tappets for internal combustion engines, and has for the primary object, the provision of a device of the above stated character which will reduce the valve action noise to a minimum and automatically compensate for changes in motor temperatures and valve wear.

With this and other objects in view, this invention consists in certain novel features of construction, combination and arrangement of parts to be hereinafter more fully described and claimed.

For a complete understanding of my invention, reference is to be had to the following description and accompanying drawing, in which

Figure 1 is a fragmentary vertical sectional view illustrating a hydraulic valve tappet constructed in accordance with my invention and associated with the valve of an engine.

Figure 2 is a fragmentary longitudinal sectional view illustrating control valves for the hydraulic valve tappets.

Figure 3 is a fragmentary sectional view illustrating a modification of my invention.

Referring in detail to the drawing, the numeral 1 indicates a fragmentary portion of an internal combustion engine including a cylinder 2 with a valve 3 associated therewith and normally held in a seated position by a spring 4 mounted on the stem 5 thereof. The base of the engine is indicated at 6 with the cam 7 operating the valve 3. Mounted in the engine above the cam 7 is a tappet unit 8 forming the subject-matter of the present invention. The unit 8 has formed therein a fluid chamber 9 connected to the lubricant system of the engine or preferably to the lubricant circulating pump of the engine by a pipe 10 so that lubricant will be forced into the chamber 9. A cylinder 11 is formed in the unit 8 in direct alignment with the stem of the valve 3 and has communication with the chamber 9 by a port 12 capable of being regulated by a needle valve 13.

A piston 14 is slidably mounted in the cylinder 11 and has a tight fit therewith to prevent the escape of the fluid or lubricant by the piston, and the latter engages the stem 5 of the valve at its upper end while its lower end rides upon the cam 7. The piston 14 includes upper and lower sections 15 and 16 of tubular formation and they have their adjacent ends communicative with each other and spaced by an expansion coiled spring 17 interposed between the sections. The lower section 16 carries a mushroom shaped head 18 to engage the cam 7. When the piston 14 is in its lowermost position, the upper edge of the section 16 is slightly below the port 12 permitting the liquid or lubricant to enter between the sections and form a hydraulic cushion therebetween. As the section 16 is raised by the cam 7 it closes the port 12 and the fluid trapped between said sections causes the upper section 15 to rise lifting the valve 3 into an opened position. The action of the piston on the valve is comparatively noiseless due to the fluid cushion between the sections 15 and 16 and as said sections move downwardly, the pressure of the fluid between the sections may equalize with the pressure of fluid in the chamber 9 due to the port 12 being uncovered by the section 16. As shown in Figure 3, the section 15 may be smaller than the section 16 so that the section 16 will displace a greater amount of fluid causing a greater rise of the section 15, thereby increasing the throw of the valve 3.

When the engine is running at a slow rate of speed, the section 16 of the piston can rise a small distance before the section 15 is forced to act, consequently permitting a more complete usage of the energy of the hot gases in the engine before exhaust takes place, however, when the engine runs at a rapid or high rate of speed, the resistance to the flow of fluid between the chamber 9 and the cylinder by the opening 12 and the valve causes the sections 15 to act almost instantly with the section 16 of the piston.

As the temperature of the engine increases and the valve stem expands, the fluid permits the piston or the section 15 thereof to assume a position slightly nearer the section 16 automatically taking care of the expansion, due to the high temperature by allowing the excess liquid to return to the reservoir 9.

While I have shown and described the preferred embodiment of my invention, it will be understood that minor changes in construction, combination and arrangement of parts may be made without departing from the spirit and scope of my invention, as claimed.

Having thus described my invention, what I claim is:

A hydraulic valve tappet comprising a hydraulically cushioned piston engaging a valve and the operating means for the latter, a cylinder guiding the piston, said piston including axially aligned sections cooperating with the cylinder in forming a chamber between the sections, an expansion spring between and housed by the sections, said cylinder having a port in its side, a reservoir around the cylinder, means for connecting the reservoir to the lubricant circulating pump of an engine, and a needle valve mounted in the wall of the reservoir and aligned with the port in the cylinder for regulating the flow of fluid between the reservoir and the chamber of the piston.

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