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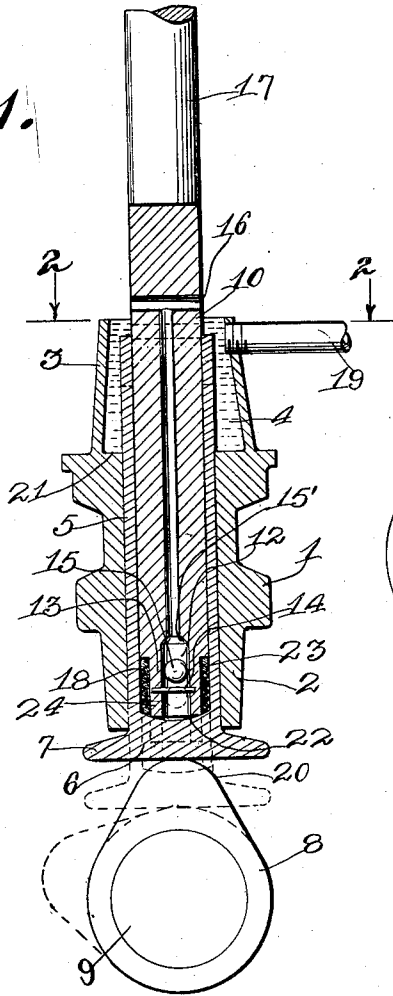
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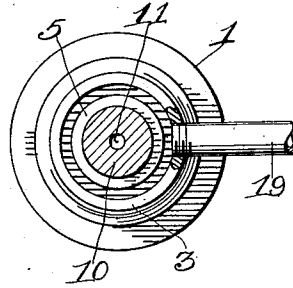
SELF ADJUSTING VALVE LIFTER OR TAPPET

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*Fig. 1.*



*Fig. 2.*



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# UNITED STATES PATENT OFFICE

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SELF-ADJUSTING VALVE LIFTER, OR TAPPET

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This invention relates to improvements in self-adjusting valve lifters, or tappets.

One of the objects of the present invention is the provision of a self-adjusting valve lifter or tappet which positively eliminates clearance between the lower end of the stem of a reciprocating valve, or push rod, and is positioned between the valve stem or push rod and the actuating cam for the same.

Another object of the present invention is the provision of a valve lifter of the above type which is maintained in an adjusted position at all times, through the action of a suitable fluid which will automatically take up any looseness in the mechanism, so that the usual valve will be operated at the proper time through engagement of the lifter with the usual cam for actuating the valve, thus eliminating the necessity of adjusting the valve lifters at various intervals.

A further object of the present invention is the provision of a self-adjusting valve lifter which is supplied with a suitable fluid from the regular lubricating lines of the engine, so that the supply of fluid to the valve lifter will be maintained constant at all times to assure the proper working of the lifter.

With the above and other objects in view, the invention consists in the novel features of construction, the combination and arrangement of parts hereinafter more fully set forth, pointed out in the claim and shown in the accompanying drawing wherein:

Figure 1 is a vertical sectional view through a valve lifter constructed in accordance with our invention, with adjacent parts thereof in elevation; and,

Figure 2 is a transverse section on the line 2—2 of Figure 1.

Referring to the drawing, 1 indicates a guide sleeve of the valve lifter, provided with a reduced end portion 2 adapted to be fitted within a suitable opening in the top of the crank case. The upper end of the guide is provided with an upstanding tubular portion 3 which forms a receptacle for fluid as indicated at 4.

Slidably mounted within the guide 1 is a cylinder member 5, the lower end of which is provided with a closed head 6 having an annular flange 7. The head 6 normally engages the cam 8 on the cam shaft 9.

The upper end of the cylindrical member 5 extends up into the receptacle 3 to a point adjacent the upper end 21 of guide sleeve when valve of engine is on its seat, and slidably mounted within the cylinder 5 is a plunger 10 provided with a longitudinal bore 11 opening into an enlarged chamber 12 at the lower end. The major portion of the enlarged chamber 12 is formed within a reduced part 13, supporting a transverse pin 14 which retains the ball valve 15 in place.

The upper end of the bore 11 opens into a transverse bore 16, while the lower end opens into the chamber 12. Normally engaging the upper end of the plunger 10 is the lower end of the valve stem or push rod 17, which is connected to the usual poppet valve, and engaging the lower end of the plunger 10, is a coil spring 18 which embraces the reduced part 13, as shown, while the lower end of the coil spring rests on the closed bottom 22 of the cylinder 5. A chamber 23 is thus formed between the lower end 24 of plunger 10 and closed bottom 22 of cylinder 5.

The guide sleeve 1 can be supported in the crank case or on cylinder block of engine in any suitable manner and communicating with the interior of the receptacle 3 is a conduit 19, which is preferably connected with the oil pump of the engine, so that this receptacle will be normally filled with fluid.

In the operation of the device, after the valve tappet has been assembled and the motor of the vehicle has started to rotate the cam shaft, the high point 20 of the cam 8 will engage the head 6 of the cylinder 5, raising the cylinder and compressing spring 18 therein. At the same time, the air in the chamber 23 in the lower end of cylinder 5 will be forced out through the clearance between the plunger 10 and the cylinder 5.

As the cam continues to rotate, the closed

bottom 22 of the cylinder 5 engages the lower end 24 of the plunger 10 which in turn engages the lower end of valve stem or push rod 17, as shown in Figure 1, this amount of movement opening valve of engine.

As the cam continues to rotate, moving the high point 20 away from the head 6 of cylinder 5, the valve of the engine will return to its seat, due to the tension of the usual poppet valve spring, and the tension of the spring 18 will hold the plunger 10 stationary in contact with the lower end of the valve stem or push rod 17, forcing the cylinder 5 downwardly with the head 6, following the cam to its lowest point. This movement will create a partial vacuum in the chamber 23 of the cylinder 5, whereby the oil or other fluid in the receptacle 3 will be forced into this chamber, through atmospheric pressure, the fluid entering the transverse bore 16 of the plunger 10, passing downwardly through the bore 11 and the enlarged chamber 12 and into the chamber 23 of the cylinder 5.

Previous to the above operation, it will be apparent that the receptacle 3 has been filled with oil when assembled, and the oil in this receptacle is maintained at a constant level by connecting the conduit 19 with the usual oil pumps of an engine. After the head has reached the low point of the cam, the chamber in the bottom of the cylinder 5 will be filled with a non-compressible fluid, and as the high point of the cam again engages the head 6, the cylinder 5 and the plunger 10 will be raised as a unit, due to the fact that the ball valve 15 will automatically engage the seat 15' to prevent any escape of the oil up through the bore 11.

If any clearance, or slack, in the mechanism begins, due to a slight leakage of oil from the chamber in the lower end of the cylinder 5 between the plunger and the cylinder, the device will readily adjust itself to its proper length to open and close the valve of the engine at the proper time, by taking in the proper amount of oil at each downward stroke of the cylinder 5, so that the chamber 23 in the lower end of the cylinder 5 will be entirely filled with oil at all times.

We wish to call attention to the fact that a slight leakage as above described is desirable as the tappet is obviously shortened and this shortening allows for expansion of the various parts of the valve mechanism due to heat, as oil in the chamber 23 at the lower end of cylinder 5 will not be replenished until proper action between the plunger and cylinder occurs. Any surplus oil discharged into the receptacle 3 will overflow into the crank case, lubricating the cam shaft, the cams and other parts adjacent thereto.

In the accompanying drawing, we have illustrated a single valve mechanism. However, these devices may be used as a single unit, or a group assembly.

It will be apparent from the foregoing that we have provided a very simple and inexpensive valve lifter wherein the device is self-adjusting at all times and the leakage takes care of any expansion of parts due to heat, and assures the positive opening and closing of the valves at the proper time. The device is very simple in construction, comprising few parts and can be manufactured and placed on the market at a very low cost.

We claim:

In a device of the character described, a guide having an oil reservoir on the upper end thereof, a cylinder slidably mounted in the guide having its lower end provided with a head and its upper end open and extending into the oil reservoir, a cam for engaging said head and operating said cylinder, a plunger slidably mounted in the cylinder having a longitudinal bore and a chamber opening out of its lower end and communicating with the bore, said plunger also having lateral ports adapted to extend into the oil reservoir at certain times, the chamber defining a valve seat at its upper end, a valve in the chamber, the lower end of the plunger being reduced to define a shoulder, and an expansion coil spring fitted around the reduced portion of the plunger and confined between the shoulder and the head of the cylinder.

In testimony that we claim the foregoing we have hereunto set our hands at Madison, in the county of Dane and State of Wisconsin.

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