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2,795,217

ANTI-FRICTION CAP FOR VALVE LIFTERS

Filed Nov. 1, 1954

2 Sheets-Sheet 1

Fig. 1.

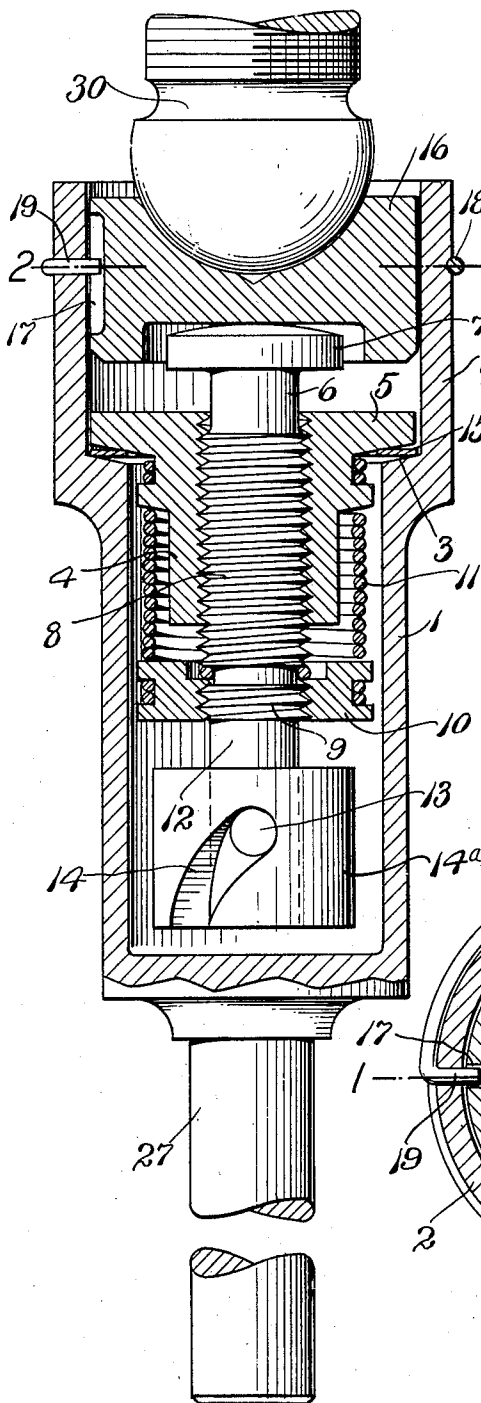
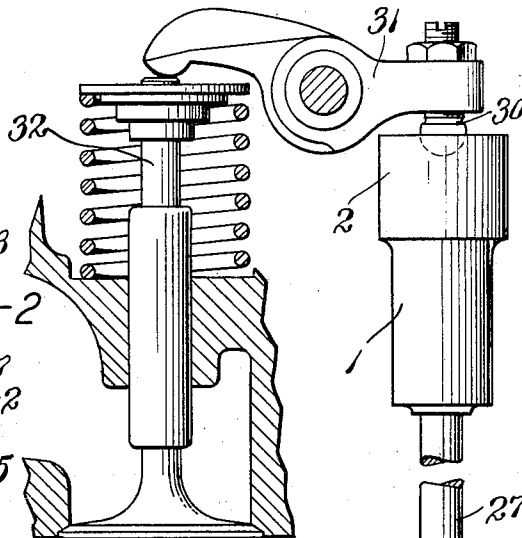


Fig. 3.

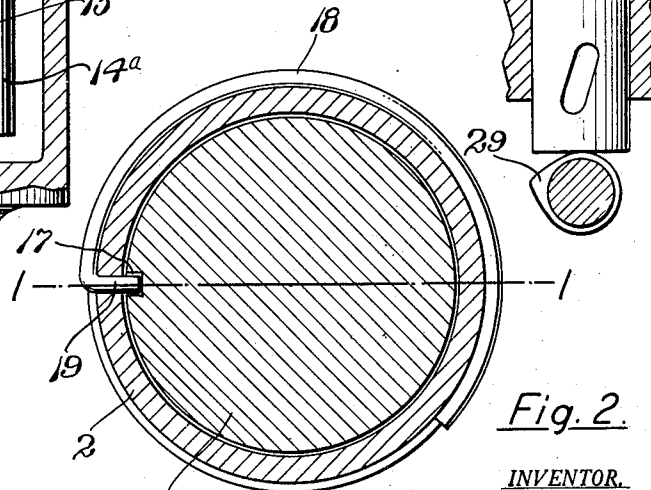


Fig. 2.

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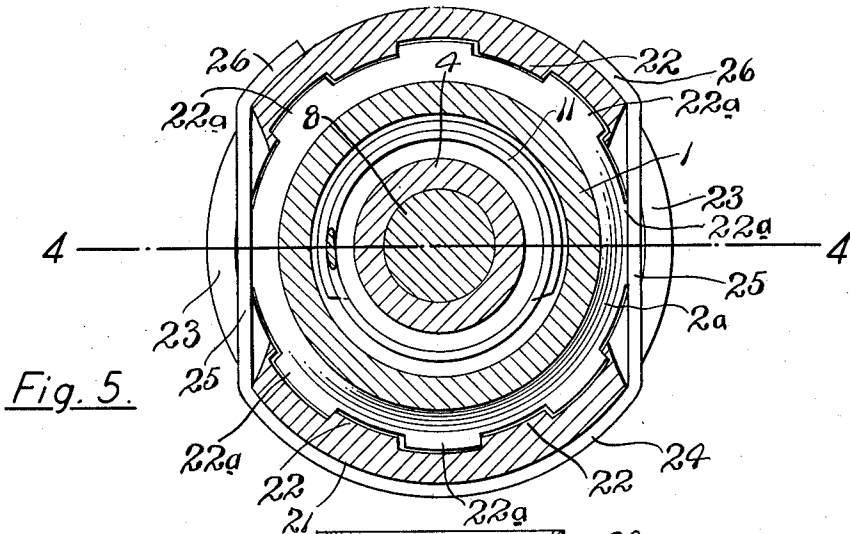
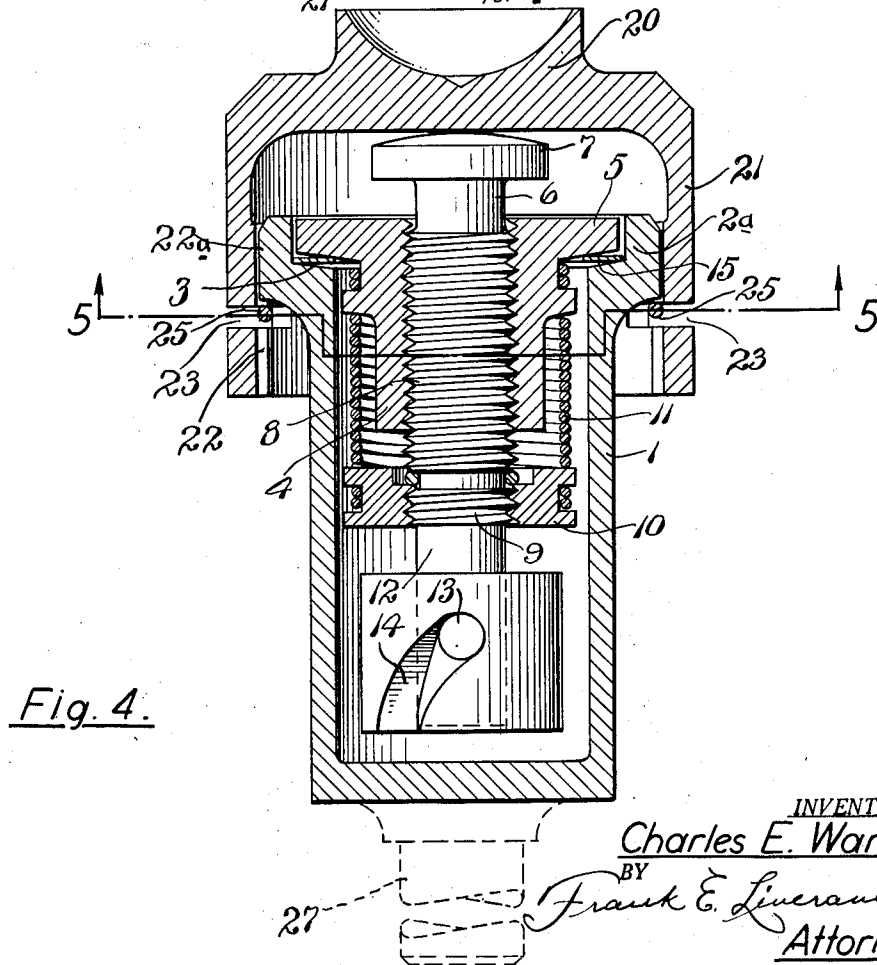
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ANTI-FRICTION CAP FOR VALVE LIFTERS

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Application November 1, 1954, Serial No. 465,926

7 Claims. (Cl. 123—90)

This invention relates to an anti-friction cap for an automatic mechanical valve lifter or tappet.

The environment in connection with which my invention is applied is shown and disclosed in an application for patent having Serial No. 189,695, filed October 12, 1950, now Patent No. 2,751,896, June 26, 1956, by Robert C. Moser and entitled Mechanical Valve Tappet. Such valve lifter is workable without detriment to its functioning in some internal combustion engines made for motor vehicles, but there are others in which the lifter has a tendency to turn or "spin" to either the right or left, depending upon the direction and amount of offset of the respective cam lobe from the lifter body. Such turning movement sets up a substantial friction between the head of the automatic adjustable screw of the lifter or tappet and a rocker arm adjusting screw on overhead valve engines, or between it and the valve stem on L-head engines. Such friction and the turn or "spin" caused thereby results in the adjusting screw of the tappet or lifter turning and getting an undesired adjusting downward or upward depending upon the rotation of the lifter or tappet with relation to the direction of its thread whether right or left.

It is an object and purpose of the present invention to remedy this defect and which will serve to prevent such malfunctioning in those engines in which it does occur, and which will not affect the functioning of those engines in which such mentioned mal-adjusting or functioning does not occur. Therefore, with my invention applied to such automatic mechanical tappet and installed in any of the motor vehicle internal combustion engines, an assurance of proper operation is attained.

An understanding of the invention and preferred embodiments thereof may be had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a central vertical section, substantially on the plane of line 1—1 of Fig. 2, of the automatic mechanical valve tappet or lifter supplied with one form of my invention.

Fig. 2 is a horizontal section substantially on the plane of line 2—2 of Fig. 3.

Fig. 3 is an elevation, partly in section, showing the assembly of a tappet supplied with my invention in conjunction with an overhead valve.

Fig. 4 is a central vertical section, similar to that shown in Fig. 1, substantially on the plane of line 4—4 of Fig. 5, of another somewhat different embodiment of my invention, and

Fig. 5 is a horizontal section substantially on the plane of line 5—5 of Fig. 4 looking upwardly.

Like reference characters refer to like parts in the different figures of the drawings.

My invention is adapted to be primarily used with an automatic self-adjusting mechanical tappet which will have a hollow vertical body 1 closed at its lower end, and at its upper end being enlarged in diameter to provide an upwardly extending annular flange 2 in the form

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shown in Fig. 1, a shorter flange 2a being shown in the second form in Fig. 4. There is an annular shoulder 3 interiorly at the upper end of the body 1 which preferably inclines downwardly and inwardly as shown.

Within the upper portion of the body 1 is an adjusting nut 4 which is a sleeve interiorly threaded, having an annular head 5 at its upper end of larger diameter which extends over the shoulder 3. A screw shank 6 having a head 7 is provided with an elongated exteriorly threaded intermediate section 8 which screws downwardly through the sleeve 4; and at its lower end with a short exteriorly threaded section 9 on which a nut 10 is mounted which is stopped in its upward movement by a stop ring, as shown, coming against the lower end of the intermediate section 8. A torsion spring 11 is secured at its lower end to the nut 10 and at its upper end to the upper portion of the sleeve 4 below the head 5 thereof.

The stem 6 is extended below the lower threaded section 9 in an extension 12 which has a radial pin 13 thereon projecting outwardly and received in an upwardly and inwardly inclined slot 14, closed at its upper end and open at its lower end, in a weighted member 14a shown as of cylindrical form through which the lower end portion 12 of the stem 6 freely passes. A flat spring ring 15 is between the head 5 and shoulder 3.

In the application which is above identified, the lower end of a valve stem in engines of the L-head type bears against the upper side of the head 7, while in overhead valve engines the lower end of an adjusting screw in a rocker arm bears thereagainst. The automatic operation of this valve need not be described as it is not my invention and is fully set forth in the previously identified application. It is to correct any tendency to turn or spin to the right or left previously mentioned to which my invention is directed, the valve structure as previously described providing the environment in which my invention is used.

With the form shown in Fig. 1, within the somewhat elongated upwardly extending wall 2 of the tappet body a cap 16 is located, recessed at its under side with a recess sufficiently larger than the head 7 that such head is received therein and bears against the cap 16 only at the under side thereof at the upper side of the head 7. Such cap at one side has a vertical slot 17. To maintain the cap 16 against rotation a spring, partial ring member 18 surrounds such wall 2 at its outer side for more than half of its circumference, at one end being bent to extend inwardly through said wall 2 into the vertical slot or guide-way 17. In the upper side of the cap 16 a concave recess of spherical form is made to receive the lower end of either a valve stem in an L-head engine or an adjusting screw on the rocker arm associated with the valve of an overhead valve engine.

In Fig. 4 an equivalent structure is shown wherein the cap 20 is an inverted cup having downwardly extending annular sides 21 which surround the upwardly extending wall or ledge 2a of the lifter body. At the inner side of such wall 21 a plurality of spaced vertical ribs 22 are formed with vertical grooves provided between adjacent ribs, while on the wall or ledge 2a, at its periphery, complementary ribs 22a are provided thus locking the cap from rotation with respect to the lifter body.

At opposite sides of the cap 20 in its wall 21 slots 23 are cut and in the ribs 22 corresponding slots in conjunction therewith are made. Or such slots in the ribs 22a may be made in all of them. The lock comprises a length of spring wire 24 having an arcuate middle portion adapted to embrace a side of the cap wall 21, two legs parallel to each other at 25 received in the slots 23 and the corresponding slots in the adjacent projections 22a, and terminating in fingers 26 bent toward each other to embrace and grip the opposite side of the wall 21.

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The width of the slot 23 is greater than the diameter of wire material from which such lock member is formed, thereby permitting a limited vertical adjustment of the cap with respect to the tappet body. Such relative vertical movement of the cap 16 in the first form is also permitted due to the reception of the end of the locking dog 19 in the groove 17.

The tappet body as shown in Fig. 3 may be at the upper end of a push rod 27 and form a part of the push rod which at its lower end is connected to a guide 28 of cylindrical form, the lower end of which bears against a cam 29 of the engine camshaft. An adjusting screw 30 with a rounded lower head to be received in the sphero-concave recess in the upper sides of the caps 16 or 20 is adjustably mounted at one end of a rocker arm 31, the opposite end bearing against the stem 32 of an overhead engine valve.

In Fig. 4 the lifter or tappet body while it has a dashed line indication of the push rod 27 at its lower side, is one which may ride directly at its lower end upon the cam of a camshaft while the lower end of a valve in a L-head engine will bear against the upper side of the cap 20 either with or without the spheroconcave recess therein. The same may be done with the first form shown in Figs. 1 and 2.

The structure described in operation has the effect of preventing rotation or "spin" tendency from reaching the self-adjusting mechanism of the tappet or lifter. Rotating influence of all degrees is eliminated so that if there should be any in any of such valve lifters or tappets in an internal combustion engine, the malfunctioning is cured. The invention is applicable to all tappets so that it will serve its purposes in any of them where such malfunctioning to turn or spin is present or liable to be.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. In an automatic mechanical valve lifter, having a body and a screw therewithin and means for automatically adjusting said screw longitudinally of and within said body to normally hold the outer end of the screw against an interposed member between it and an engine valve, the improvement comprising, a cap at the upper end of said body located against said outer end of the screw in telescoped relation to the body and between said screw and said member, and means for holding said cap against turning movement about the axis of said screw, but freely permitting body movement thereof with respect to said body in the direction of the length of the screw.

2. In an automatic mechanical valve lifter having a hollow body open at its upper end, a screw lengthwise of and within said body and means for mounting said screw longitudinally in said body to maintain contact of the valve end of said screw with a member interposed between said outer end of the screw and an engine valve, the improvement comprising a cap located against the outer end of said screw, at the outer end of and in telescopic relation with said body and means mounted on said body engaging said cap to hold it against rotative movement relative to said body, and permitting movement of said cap lengthwise of the body.

3. In an automatic valve lifter having a hollow body open at its upper end, a screw lengthwise of and within said body, and means for mounting said screw within

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the body for automatically adjusting it longitudinally within the body, the improvement comprising a cap at the open end portion of said body in telescopic relation thereto against which the outer end of the screw engages, and holding means between said body and cap for preventing rotation of the cap relative to the body, and permitting limited longitudinal movement of the cap relative to the body.

4. In an automatic valve lifter having a hollow body open at one end, a screw lengthwise of and within said body and means adjustably mounting the screw within the body for longitudinal adjustment of said screw, the improvement comprising, a cap located within the open end portion of said body and telescopically received therein bearing against the outer end of said screw, said cap having a guide slot in a side thereof located lengthwise of said body, and a rotation preventing holding means mounted on said body extending into said guide slot.

5. In an automatic valve lifter having a hollow body open at one end, a screw lengthwise of and within said body, and means within the body for adjustable mounting of said screw for longitudinal adjustment of the screw, the improvement comprising, a cap located within the open end portion of said body against the inner end of which the outer end of said screw engages, said cap at its outer side having a longitudinal guide slot, and a member at the outer side of said body grippingly engaging the body having an end portion extending through the body and into said guide slot.

6. In an automatic valve lifter having a hollow body, a screw lengthwise of and within said body, and means within the body for mounting said screw for longitudinal adjustment thereof, the improvement comprising a cap telescoping over an end of said body against the inner side of the top of which the outer end of said screw bears, and a holding means carried by said cap engageable with said body to hold the cap against rotative movement relative to the body and permitting longitudinal movement of the cap relative to said body.

7. In an automatic valve lifter having a hollow body open at one end, a screw lengthwise of and within said body, and means within said body for mounting said screw for longitudinal adjustment thereof, the improvement comprising a cup-like cap over the open end portion of said body having sides around and telescoping over the open end portion of said body, against the top of which the outer end of said screw is adapted to bear, cooperating rib and groove means on said cap and body for longitudinal movement of the cap relative to said body and holding them from rotation, and a member on said cap operatively associated with said body to limit the extent of said longitudinal movement.

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