

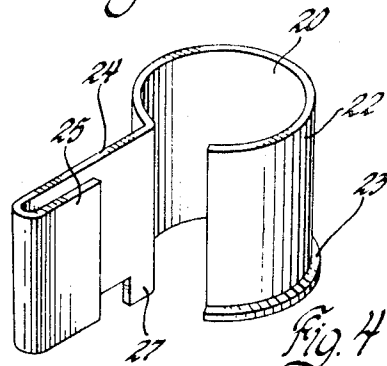
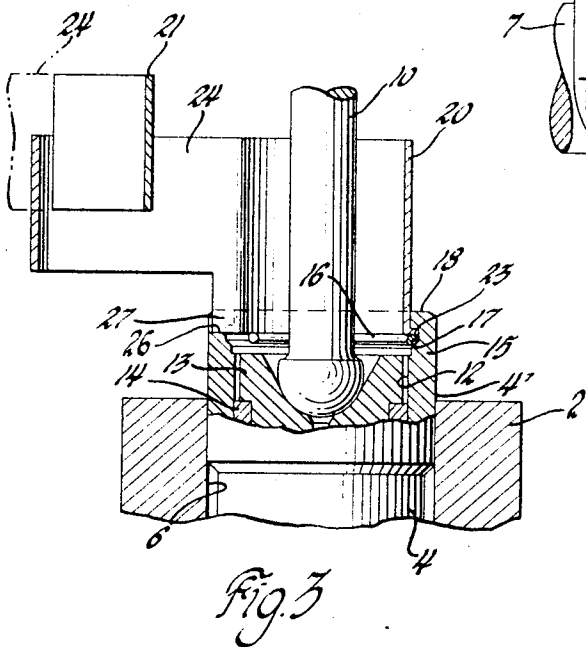
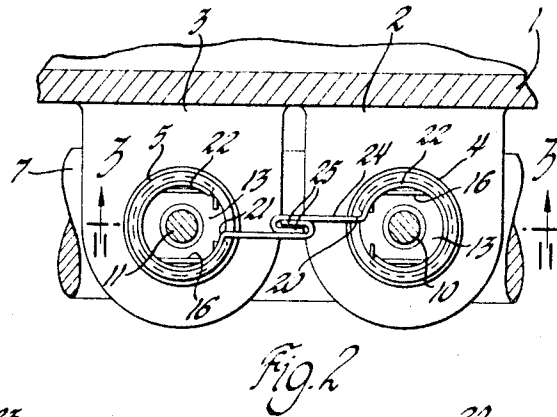
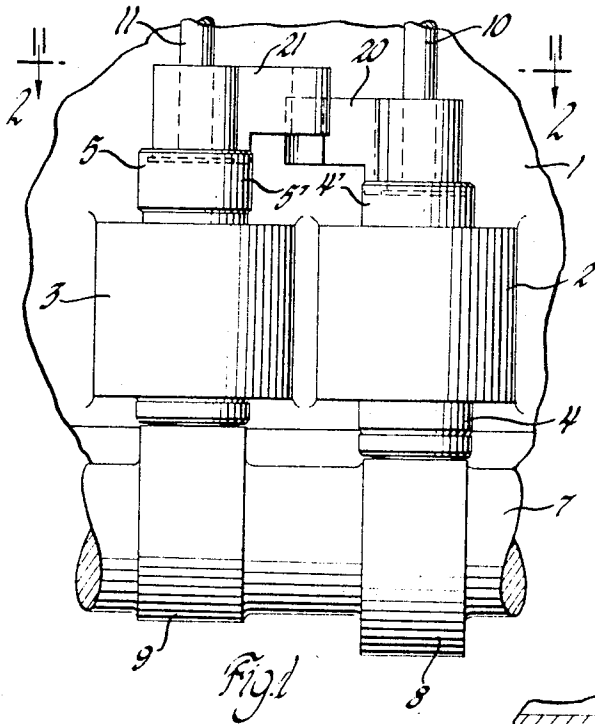
Aug. 23, 1966

D. E. WORTMAN

3,267,919

TAPPET ANTI-ROTATING DEVICE

Filed June 21, 1965



INVENTOR.
Donald E. Wortman

BY

S. C. Thorpe

1

2

3,267,919

TAPPET ANTI-ROTATING DEVICE

Donald E. Wortman, Grand Rapids, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed June 21, 1965, Ser. No. 465,436

4 Claims. (Cl. 125-90)

This invention relates to tappets such as are used, for example, in the valve operating trains of internal combustion engines and the like, and particularly to means for preventing axial rotation of such tappets during reciprocation.

More specifically, the invention is directed to improved means for preventing such rotation of tappets of conventional design having a cylindrical body slidably guided in a fixed bore which accommodates axial rotation of the tappet during its reciprocation by the driving cam or other actuating member, and which carry a removable push rod seat and a retaining snap ring therefor within the open end of the tappet oppositely of the cam. I provide, in accordance with my invention, a retainer which cooperates uniquely with such tappets through inter-engagement of a portion thereof with the aforementioned tappet groove, and having a second portion which projects perpendicularly to the tappet for slidable inter-engagement with a like retainer of an adjacent tappet. The two tappets are thereby restrained from axial rotation by cooperative inter-engagement of their respective retainers, each of which is of simple, economical design and easily installed, yet is fully secure against dislocation in use.

The nature of the invention will be better understood from the following description of one preferred embodiment thereof shown in the annexed drawing, wherein:

FIGURE 1 is a fragmentary elevational view of a portion of an engine employing two adjacent tappets with my improved anti-rotating means.

FIGURE 2 is a view taken in the direction of the arrows 2-2 of FIGURE 1, showing the tappet anti-rotation retainers in plan, with other parts broken away and in section.

FIGURE 3 is an enlarged fragmentary sectional view taken along the line 3-3 of FIGURE 2, showing the means by which each of the anti-rotation retainers is secured to its tappet.

FIGURE 4 is a perspective view of one of the retainers, per se.

Referring now in detail to the drawing, a portion of an engine cylinder block 1 is illustrated, from one side of which project integral bosses 2 and 3 provided with adjacent bores, which may be parallel, for guiding the cylindrical external surfaces 4' and 5' of adjacent tappets 4 and 5. Directly below these tappet bores, one of which is best shown at 6 in FIGURE 3, is the usual cam shaft 7 of the engine, having cam lobes 8 and 9 drivably engaging the bottom ends of the tappets. As shown, the respective tappets have their opposite ends in driving abutment with push rods 10 and 11 which suitably serve to actuate poppet valves or other elements (not shown) of the engine.

Each of the tappets 4, 5 is of generally conventional design, with its upper end 18 (FIGURE 3) formed with an open cavity 12 containing a seat member 13 for its push rod. In the particular design illustrated in FIGURE 3, the cylindrical side walls of the cavity 12 slidably supports a plunger 14 on which rests the seat member 13. However, for the purposes of this invention the seat member may simply rest on an internal shoulder of the cavity 12 instead of on the upper end of the plunger 14 as shown. To retain the seat member within the cavity (i.e. in assembly with the outer body 15 of the tappet prior to installation in the engine) there is shown the conventional

snap ring 16 and its annular internal seating groove 17 which is spaced inwardly of the cavity 12 a short distance from the open end 18 of the tappet body.

Each of the tappets is provided in accordance with my invention with an anti-rotation retainer, designated generally at 20 and 21, respectively. Each such retainer includes a part-cylindrical portion 22 which surrounds the push rod and extends into the cavity 12, and has an external flange 23 at its inward end which engages the groove 17. For this purpose, the groove 17 is made of sufficiently greater width than necessary to receive the snap ring 16, in order to accommodate reception of the flange 23 therein above the snap ring. However, if desired, the snap ring may be omitted and the flange 23 may then occupy the groove alone, thereby obviating the necessity of providing such a groove of increased width to accommodate both the snap ring and the flange of the anti-rotation retainer. Preferably each such retainer is made of hard, resilient material, such as spring steel, and its part-cylindrical portion 22 has a diameter such as to adapt it for normally retaining the flange 23 firmly seated in the groove 17. Extending integrally from the part-cylindrical portion 22 is an out-turned leg 24 which extends generally perpendicular to the longitudinal axis of the tappet and terminates at its extended end with a reverse-bent portion 25. Means must also be provided, as by a transversely extending recess in the tappet, such as shown in the form of a cross slot 26, for locating the retainers 20, 21 in fixed angular relation to their respective tappets. In the particular design, using such a recess 26 therefor, the lower portion 27 of the leg 24 engages such recess. The same result, however, may be obtained in various other ways, e.g., by forming such transverse recess in the bottom or one side wall of the groove 17 for reception of a tab-like projection of the flange 23, etc. As will be clear from FIGURES 1, 2 and 3, each of the retainer legs 24 is of sufficient length that its reverse-bent portion 25 slidably inter-engages the corresponding leg and reverse-bent portion of the retainer of the adjacent tappet. Also, as will be clear from FIGURE 1, each of these portions of the respective retainers is of sufficient extent longitudinally of the tappets so as to maintain an adequate area of sliding inter-engagement with the corresponding portions of the adjacent tappet retainer throughout the range of their reciprocal movement during operation of the tappets.

The invention thus provides for incorporating anti-rotation retainers with tappets of conventional design, requiring minimal modification of such tappets therefor, and wherein the retainer means may be quickly installed and removed for servicing without necessity of disturbing any other parts of the engine.

While the invention has been described and shown with respect to a single preferred embodiment for illustrative purposes, it is appreciated that various changes in the design and arrangement of the parts may be made without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. In combination, two tappets, guide means therefor accommodating their axial rotation and reciprocation, each said tappet having an open end provided with an internal annular groove spaced inwardly thereof, a slot extending transversely of said end and a snap ring seated in said groove, a pair of retainers adapted to reciprocate with said tappets and prevent their axial rotation, each of said retainers having a part-cylindrical portion with an external flange at one end engaging said tappet groove and an integral out-turned leg engaging said slot, each said leg having a reverse-bent portion slidably inter-engaging the reverse-bent portion of the leg of the retainer of the

3

other tappet throughout the range of relative reciprocal movement of the two tappets in operation.

2. In combination, a cylindrical tappet having an open cylindrical cavity in one end, an annular internal groove in said cavity, a transversely extending recess in said tappet adjacent said end, and a retainer for said tappet adapted to cooperate with a similar retainer of an adjacent tappet in preventing their axial rotation during reciprocation, said retainer having a part-cylindrical portion and an integral out-turned leg, said part-cylindrical portion having an external flange at one end engaging said groove, said leg having a portion engaging said recess and a reverse-bent portion for slidably receiving the reverse-bent portion of the retainer of the adjacent tappet.

3. In combination with a tappet having a reciprocably guided cylindrical external surface and an open cavity at one end with an annular internal groove therein, and a transversely extending recess adjacent said end, a retainer engaging said recess and having a part-cylindrical portion extending into said cavity and an out-turned leg extending generally perpendicularly from said tappet, said part-cylindrical portion having an external flange engaging said groove and said leg having a reverse-bent portion adapted to slidably inter-engage a similarly reverse-bent leg portion of a like retainer of an adjacent tappet for preventing axial rotation of both said tappets.

4

4. A retainer for preventing axial rotation of adjacent tappets of the type having a cylindrical body with an open cylindrical cavity in one end, an annular internal groove in said cavity and a transversely extending recess adjacent said end, said retainer having a part-cylindrical portion and an integral out-turned leg portion, one of said portions engaging said recess, said part-cylindrical portion having an external flange at one end engaging said groove, and said leg portion terminating outwardly with a reverse-bent portion for slidably receiving a similarly reverse-bent portion of a retainer on an adjacent tappet.

References Cited by the Examiner

UNITED STATES PATENTS

1,802,330	4/1931	Boland	123—90
2,846,988	8/1958	Iskenderian	123—90
2,935,878	5/1960	Wirsching	74—55
3,101,077	8/1963	Engle	123—90
3,108,580	10/1963	Crane	123—90
3,180,328	4/1965	Engle	123—90

MARK NEWMAN, *Primary Examiner.*

A. L. SMITH, *Assistant Examiner.*