Nov. 18, 1924. 1,515,758

G. S. SALZMAN

VALVE TAPPET

Filed Oct. 3, 1921

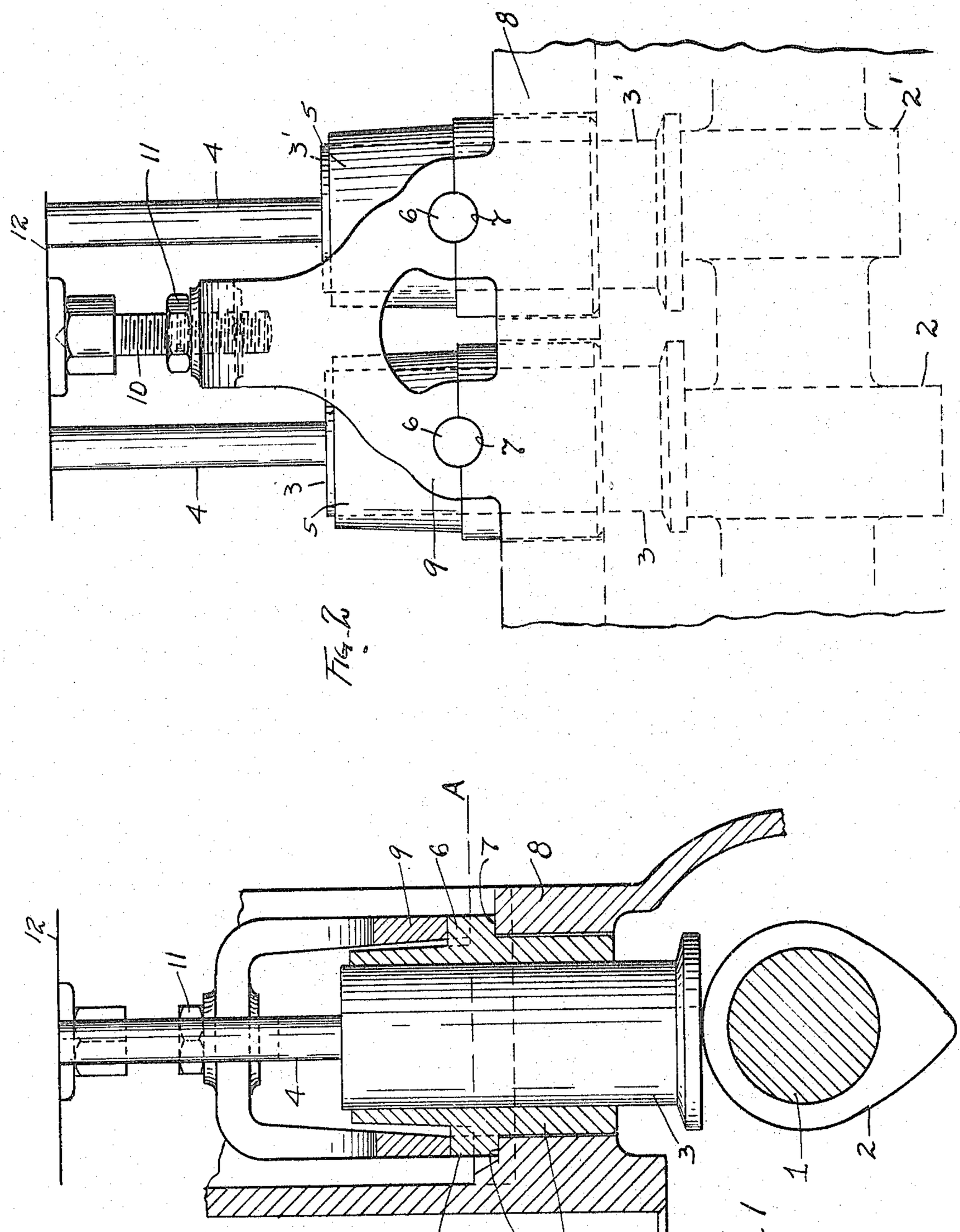

Fig. 2.

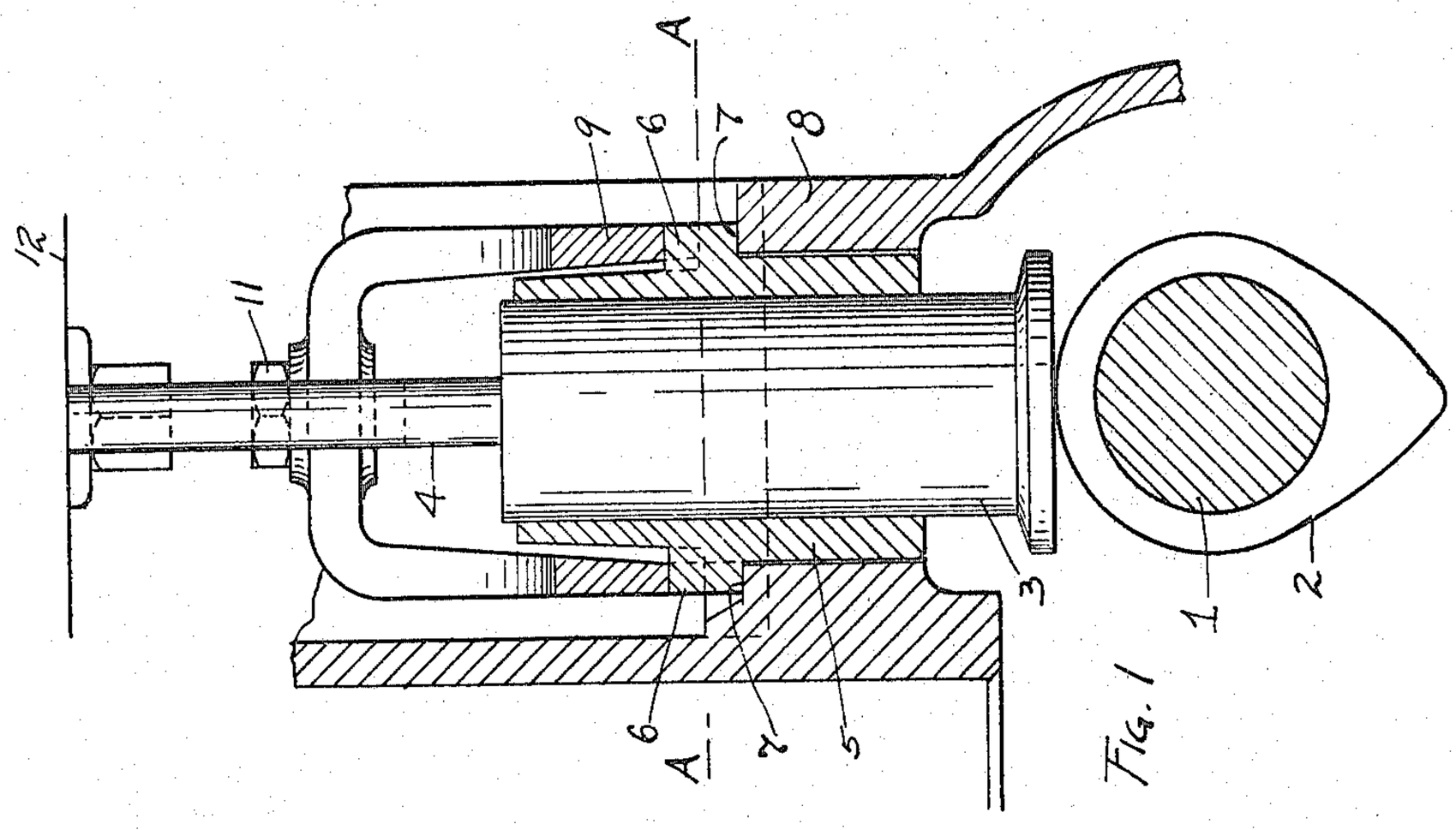

Fig. 1.

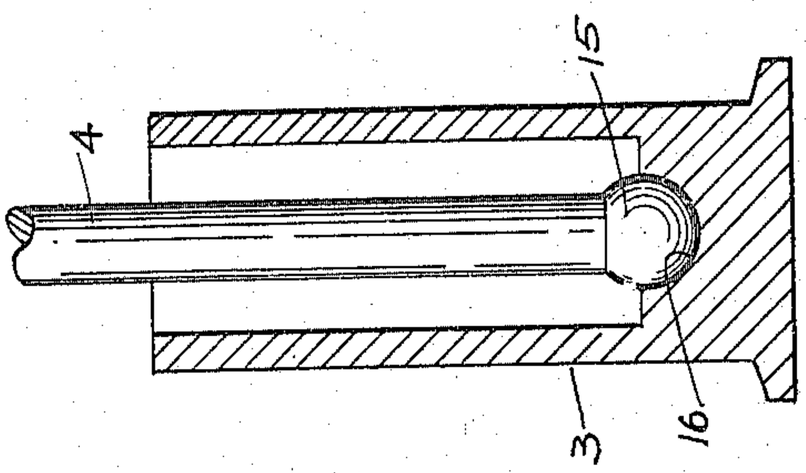

Fig. 3.

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UNITED STATES PATENT OFFICE.

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VALVE TAPPET.

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To all whom it may concern:

Be it known that I, GEORGE S. SALZMAN, a citizen of the United States, and a resident of Cleveland Heights, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Valve Tappets, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relating, as indicated to valve tappet, is more particularly directed to the provision of improved tappets and mounting or guide therefor which shall avoid the difficulties which have been met with in the construction of valve tappets of the various types now generally used in internal combustion engines. It has long been known that it is practically impossible to maintain all of the valve tappets used in internal combustion engines in proper alignment and in the desired position which is, of course, at exact right angles to the cam shaft. This difficulty is caused by the very slight tipping of the tappet with respect to the surface of the cam, which operates the follower portion of the tappet. This tipping or tilting of the tappet is due either to an initial improper fit between tappets and the guides therefor, or to wear on one or both of these parts. Even when the tappets and guides are held to the closest possible manufacturing limits, it is not always possible to maintain the tappets in the desired positions with the result that the followers ride on one edge of the cam, wearing down the cam and cutting into the follower.

The present invention is designed to eliminate this difficulty by providing means which serve to maintain a constant and automatic alignment of the tappet with the cam. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a transverse section through my improved guide and tappet construction showing also the cam and follower; Fig. 2 is a side elevation of the same; and Fig. 3 is a section through the tappet and push rod.

In Fig. 1 I have shown the cam shaft 1 of an internal combustion engine which is provided with cams 2 and 2′ of the usual construction. Operated by cams 2 and 2′ are valve tappets 3 and 3′. The two tappets shown in Fig. 2 are of the same construction and the description of one is sufficient. The tappet 3 actuates a push rod 4 which has a rounded or ball end 15 engaging in a socket 16 in the lower end of the tappet, (see Fig. 3) and is slidably as well as rotatably mounted in an enclosing guide or housing 5. This housing member 5 is provided with oppositely projecting studs or trunnions 6 which are received in suitable bearings 7 which may be conveniently formed half in the case 8 and half in a yoke member 9 which is mounted above the bearings and supported by means of a bolt 10, projecting from the motor housing 12 on which are adjusting nuts 11 which permit of convenient adjustment of the yoke member to take up the bearings for the trunnions 6. The specific construction and mounting of the bearings for the trunnions on the guide 5 may obviously be varied in numerous ways, and separate bearings may be provided in collars held on the motor 12 in some cases.

The present tappet is permitted to tilt or oscillate about the axis A—A extending through the center of the two trunnions 6. This axis is at right angles to the axis of the cam 2 so that if the tappet and follower become tilted with respect to the surface of the cam the pressure of the valve spring (not shown) rocks the tappet about the edge which is in contact with the cam until it rests in full flat engagement across the surface of the cam. The present invention may readily be used and incorporated in connection with tappets of various types, either of the mushroom type, as here shown, or of the crowned or roller tappets.

With the present construction it is unnecessary to work to the extremely close limits which have heretofore been maintained in the manufacture of the tappets, followers and guides in internal combustion engines for the reason that even though the guides are sufficiently loose to permit the followers and tappets to become slightly tilted from the exact line at right angles to the surface of the cams, still the present trunnion mounting of the tappets and followers permits

them to be self aligning and to be pressed automatically into a full line contact with the surface of the cam.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the character described, the combination of a cam shaft having a cam thereon, a valve tappet perpendicularly aligned with said cam, a push rod having a rounded end engaged in a socket provided in said valve tappet, and a guide for said tappet, said guide being pivotally mounted to permit angular adjustment of the tappet.

2. In mechanism of the character described, the combination of a cam shaft, two spaced cams thereon, a housing adjacent thereto, guides pivotally mounted in said housing about parallel axes at right angles to said shaft, tappets mounted in said guides and bearing against said cams, push rods engaging rounded sockets provided in said tappets, and a yoke engaging both of said guides and maintaining the same in said housing.

3. In mechanism of the character described, the combination of a cam shaft having a cam thereon, a valve tappet in alignment with said cam, and guiding means for said tappet adapted to permit automatic angular movement of said tappet, whereby said tappet may be kept in perpendicular alignment with the surface of said cam.

4. In mechanism of the character described, the combination of a cam shaft having a cam thereon, a push rod mounted perpendicularly to the axis of said shaft, and a valve tappet mounted between said push rod and said cam, said tappet being angularly adjustable with respect to both said rod and said cam.

5. In mechanism of the character described, the combination of a cam shaft having a cam thereon, a valve tappet aligned with said cam, a push rod actuated by said tappet, said tappet and said rod being angularly adjustable with respect to each other, and a pivotally mounted guide for said tappet adapted to permit angular movement of said tappet with respect to the longitudinal axis of said shaft.

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