This invention relates to valve tappets and is primarily concerned with an improvement whereby the tappet may be adjustable as to length and be self-locking in its action, eliminating the usual lock nut which is now universally used in mechanically adjusting tappets for the purpose of locking the two longitudinally adjustable parts of the tappet with respect to each other so that they will not loosen and change position after having once been adjusted.

It is essential in mechanically adjusting tappets of the type now almost universally used that an adjustment as to length of the tappet be made to adjust for the valves as the same may be worn or altered in service, the valve seats changed or altered from the hammering contact of the valve heads therewith, grinding or the like. Adjustment of valve tappets is a skilled operation and, because of the lengthening of the tappets under expansion, due to rise in temperature and, because the valve tappets are adjusted when the engine is cold or at a relatively low temperature, there must be a clearance or slight space between the upper end of the tappet and the lower end of the valve stem when the valve is on its seat, such that with the increase in temperature of the engine under working conditions the longitudinal expansion of the tappet will not lift the valve off its seat even a slight amount when the same should be tightly closed.

It is therefore usual to insert a thin feeler gauge between the upper end of the tappet and lower end of the valve stem and adjust the tappet with respect to such gauge, the thickness of which measures the amount of clearance there should be between the valve stem and tappet. But after this has been done, a lock nut has to be set to hold the two parts of the tappet against any movement with respect to each other; and tightening said lock nut is productive of strains which will alter the clearance distance even though accurately set in the first instance before the lock nut has been tightened.

Moreover, tappet adjustment is a difficult operation, requiring wrenches usually of a special character for reaching in and adjusting the tappet as it is located in an engine and it is practically impossible to hold the upper adjustable member of the tappet against possible rotation with the lock nut as the same has tightened and, at the same time, hold the lower part of the tappet against rotative movement. It is possible to use two wrenches readily but in the final act of completing tappet adjustment there should actually be three used, two for holding the two parts of the tappet and one for operating the lock nut. Even so, the distortion from setting the lock nut would take place.

With my invention the lock nut is completely eliminated. The tappet comprises two parts only, which may be adjusted by use of wrenches and, when once adjusted, retain their relative positions with respect to each other without change, and there is no danger of the adjustment being disturbed by reason of strains due to any lock nut tightening or the like. At the same time the construction of tappet which I have devised is of a very simple and economical form readily manufactured at as least as low cost if not lower than the mechanically adjusted tappet now universally used.

An understanding of the invention may be had from the following description, taken in connection with the accompanying drawing, in which:

Fig. 1 is a fragmentary section and elevation illustrating the use of a valve tappet between the stem of a valve and a cam shaft as commonly used on internal combustion engines, particularly for motor vehicles.

Fig. 2 is an enlarged elevation of the self-locking adjustable tappet of my invention.

Fig. 3 is a fragmentary vertical section taken centrally of the upper portion of the tappet construction shown in Fig. 2.

Fig. 4 is an elevation, partly in section at its lower end, of the upper member of the tappet.

Fig. 5 is a horizontal section on the plane of line 5—5 of Fig. 2 looking upwardly, and Fig. 6 is an end view of the lower end of the upper member of the tappet.

Fig. 7 is a fragmentary view taken at right angles to Fig. 3.

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

The valve tappet comprises a cylindrical body 1 of metal having a bearing head 2 with a hardened under surface to bear against a cam and interiorly bored from its upper end downwardly for a distance and interiorly threaded as indicated at 3 (Fig. 3). Near the upper end of the body 1 it is flattened on both sides, as indicated at 4, to permit the jaws of a wrench to engage therewith.

As shown, shoulders are formed below the flattened portions whereby the jaws of the wrench ride thereagainst and thus the stem or body of the wrench extends outwardly at substantially right angles to the tappet whereby it will abut against an adjacent stationary part of the engine during the adjusting rotative movement of the head 7. Thus, only a single wrench needs be manipulated during the actual rotative adjusting movement.

At one side of the upper end of the body 1 the metal is cut through to make a vertical slot 5 for a short distance, in practice substantially five-eighths of an inch, though this particular dimension is not in any sense essential and will vary in tappets of different sizes. At its lower end the slot 5 connects with a horizontal slot 6 cut through from one side of the body for a distance but...
terminating slightly before reaching the diameter as indicated in Fig. 5.

The upper member of the tappet has a head 7 shaped to receive the jaws of a wrench from which
5 starts so section 8 of a stem extends downwardly, integrally joining with which is a threaded section 9 at the lower end of and integral with which is a second threaded section 10. The threads at 10 are standard threads to engage with the standard threads of the interior 3 of the body.
10 The threads of section 9, however, are slightly larger. In practice I have made the same five thousandths of an inch larger in diameter but this dimension may be varied within reasonable limits so long as the threads for the sections 9 are of somewhat larger diameter than the internal threading of the body 1.

The lower end portion 10 of the upper member of the tappet described is vertically threaded preferably
15 across two diameters of the stud at right angles to each other as shown in Fig. 6 and as indicated at 11. The slots extend upwardly for a distance such as approximately one-half to three-fourths of an inch, which dimension also may be varied, and the quarters, indicated at 12, of the lower slotted end portion of the upper end of the tappet are spread apart in any suitable manner so that the lower end of the stem of the upper member flares outward slightly as shown in Fig. 4.

The upper member of the tappet thus described is threaded into the upper end of the body 1 of the lower member of the tappet. The slightly flared lower end portion of the upper tappet member will yield to enter the threaded opening 3 while of course by reason of the slots 5 and 6 the upper end portion of the body 1 has capacity for a slight spreading or enlargement. The upper member may be threaded downwardly into the threaded opening 3 and the lower flared out parts 12 upon entering below the slot 6 will be squeezed together but, having a tendency to flare outward, bear very snugly against the interior threads 3 of section 9, entering the upper end of the body 1, serves to spread such upper portion, which is permitted by reason of the slots 5 and 6, but the same will be gripped very tightly, the thickness of metal around the section 9 being sufficient that the larger threaded portion 9 is resisted with great force. The spreading of the upper end of the body 1 is likewise accompanied by a shifting of the same laterally in a direction toward the connecting portion of the body 1 as shown in Fig. 5.

In other words, the entry of the enlarged portion 9 into the body tills the upper portion thereof about the relatively small connecting portion and consequently a binding occurs between the body and its threaded member which securely maintains these two parts in their proper relative position.

The gripping force of the part of body 1 above the slot 6 on the enlarged portion 9 of the upper member of the tappet in itself is sufficient to insure that the tappet members will not change position with respect to each other after they have been once adjusted but that they will remain locked in any position to which adjusted until acted upon by much greater turning forces than will occur normally in any engine operation. But by applying wrenches to the part 7 and against the slot 8 and with the leverage which can be obtained by wrenches, the parts can be very readily assembled and after assembly adjusted to any particular or desired position. As shown in Fig.

20, the inner body is distorted and its resistance to this distortion securely holds the two sections in their particular adjusted position.

In Fig. 1 the regular use of tappets between cam shafts and valves is illustrated. The body 1 of the lower member is mounted for reciprocation in a vertical guide sleeve 13 and the bearing head 2 rides upon a cam 14 on the rotating cam shaft 15. The valve stem 16, which has a valve at its upper end, (not shown) is held against the head 7 of the upper member of the tappet by a valve spring 17 in the usual manner.

It is evident that the adjustment of the tappet with the parts assembled in this manner, is comparatively simple, that any lock nut to hold the parts against change of position is absent and that the grip of the upper part of the body 1 on the enlarged section 9, aided by the frictional bearing of the lower flared portion of the upper member against the internally threaded opening in the body 1 securely locks the parts against any danger of movement with respect to each other.

The invention has proven exceptionally practical and capable of withstanding the service to which it is subjected in practice.

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. A valve tappet comprising, a body having a threaded, opening lengthwise thereof for a distance at its upper portion, and a threaded upper member received in said opening, said threaded upper member having a lower threaded section and an upper threaded section of different diameters, the upper section being larger than the lower section and slightly larger than the threaded opening in the body, and means at the upper end of said body of the lower member permitting the upper portion thereof to enlarge laterally when the upper enlarged threaded portion of the upper member is inserted therein, said lateral expansion being resisted and the upper portion of said lower member very securely gripping the upper member of the tappet to retain the same in any position to which adjusted.

2. A device of the class described comprising, a body having a screw threaded hole therein, a portion of said body including a portion of said hole, being partially severed from the other portion of the body leaving an integral portion joining the two portions of the body adjacent to the side of the hole, a screw for the hole, said screw having a part of its portion near one end of enlarged diameter and said enlarged portion of the screw engaging with said partially severed portion of the body whereby the screw is moved out of axial alignment with the hole.

3. A device of the class described comprising, a body having a screw threaded hole therein, a portion of said body including a portion of said hole, being partially severed from the remaining portion of the body leaving an integral portion joining the two portions of the body and the partially severed portion being expansible whereby the hole therein may be enlarged and a screw for said threaded hole, said screw having a threaded portion near one end of enlarged diameter and said enlarged diameter portion of the screw engaging said partially severed portion of the body to expand the same and to engage the body adjacent the integral joining portion whereby the screw is moved out of alignment with the hole in the main portion of the body.

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