March 6, 1951 C. E. JOHNSON 2,544,022

HOLDING WRENCH FOR TAPPETS

Filed Nov. 13, 1945

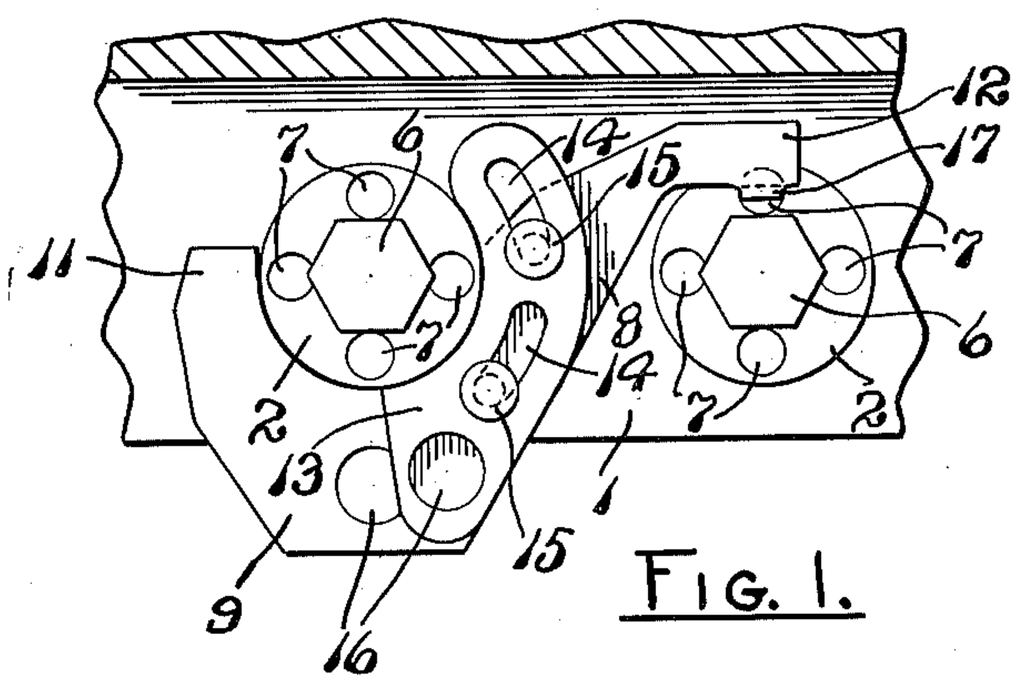

FIG. 1.

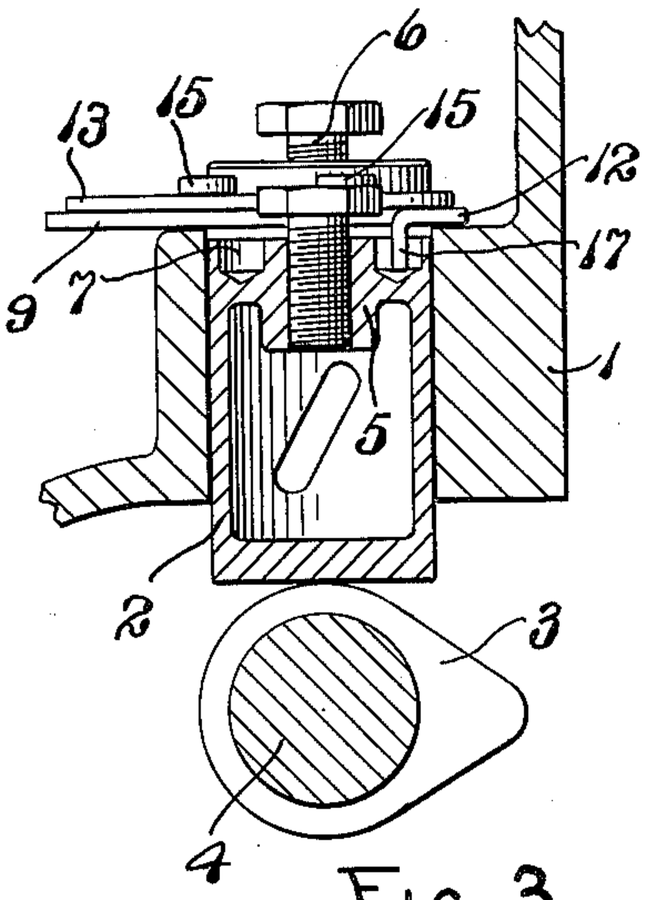

FIG. 3.

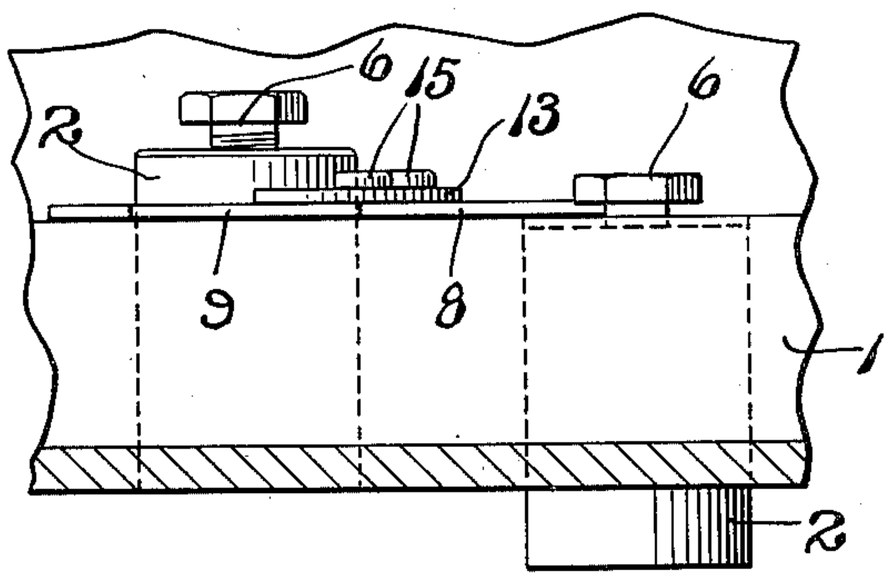

FIG. 2.

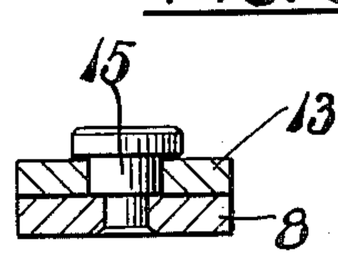

FIG. 4.

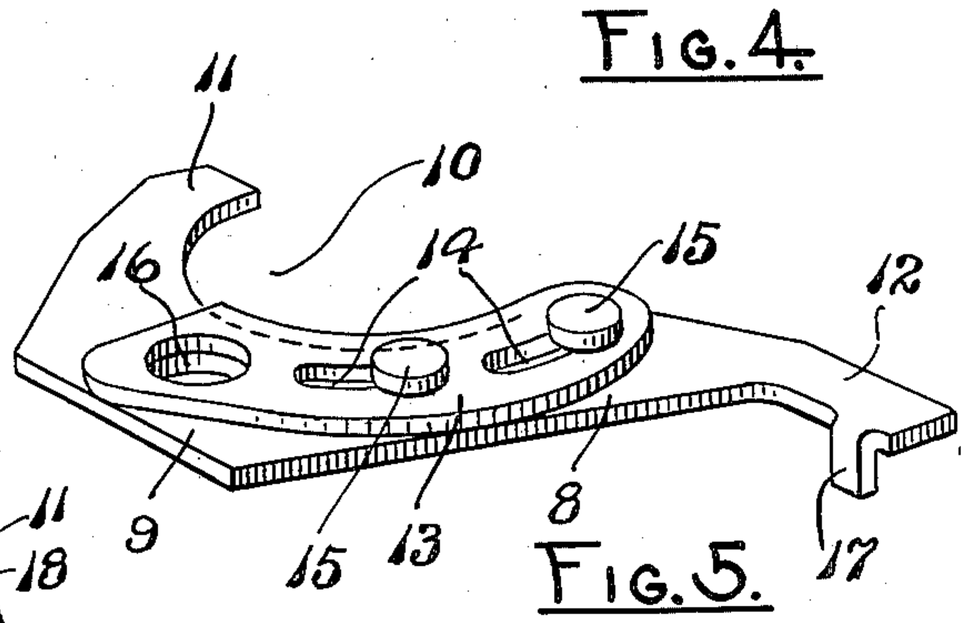

FIG. 5.

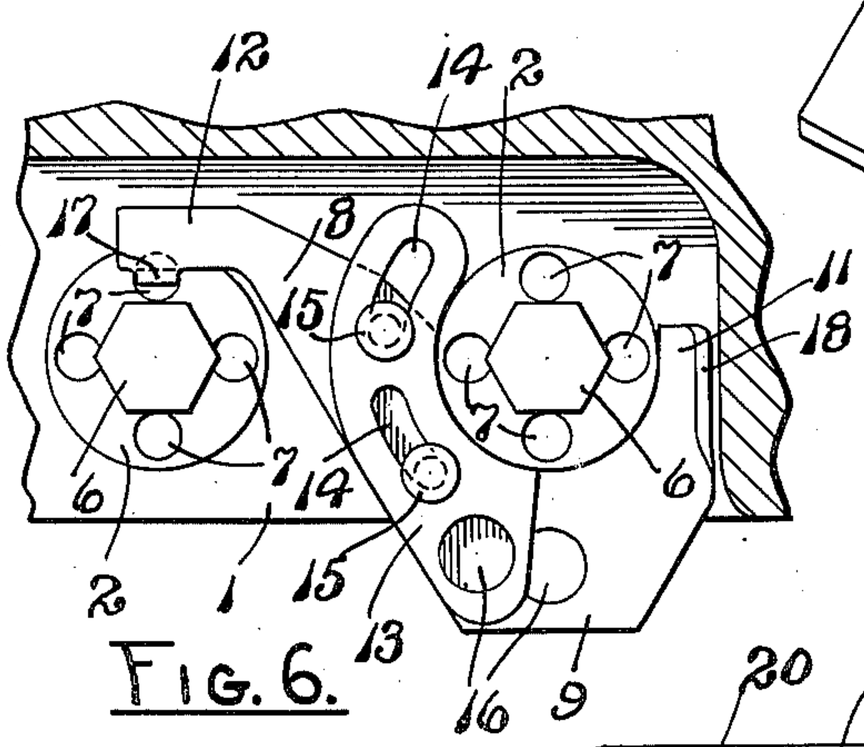

FIG. 6.

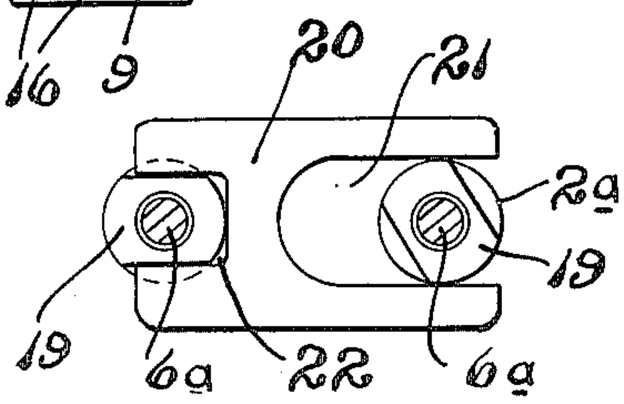

FIG. 7.

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HOLDING WRENCH FOR TAPPETS

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1 Claim. (Cl. 81—13)

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This invention relates to the adjustment of mechanical tappets and is concerned, among other things, with a novel holding wrench for tappets, and a method of securely holding a tappet which is to be adjusted from turning in connection with a next adjacent tappet by means of an intervening holding wrench, thereby eliminating the holding of the tappet through a wrench by one of the hands of the mechanic doing the adjusting and, accordingly freeing such hand. The usual adjustment of a mechanically adjusted tappet is a somewhat delicate and difficult operation, and if a mechanic had three hands instead of two it would be a far easier operation than at the present time. With my invention one of the hands which has been previously fully occupied is released and the adjustment is performed in a much easier and more satisfactory manner.

Furthermore, in some V8 engines, the tappets in the original engine are of solid non-adjustable type, have a prescribed length and this length cannot be changed. For replacement purposes I have devised a mechanically adjustable tappet for the non-adjustable tappets first installed, and which as to its body is shortened and of less length than the original tappet used in the engine in order to provide space for the adjustable screw which is screwed into the upper end of the tappet body, with the over-all length of the adjustable tappet substantially that of the non-adjustable tappet which it replaces. In such engines the space between the tappet guide and the valve mechanism is very limited, being of such short distance that it is impossible to provide a tappet body with the usual flat sides at its upper end for engagement with a wrench to hold it against turning around its receiving guide and at the same time utilize another wrench above to adjust the screw member of the tappet.

The present invention is directed to a novel holding wrench in conjunction with adjustable tappets for V8 engines specifically, and more broadly to holding wrenches in general which may be utilized with other tappets of a mechanically adjustable character to engage and hold the tappet which is being adjusted from turning by interengaging the opposite end of the holding member or wrench with the next adjacent tappet so as to thus free one hand of the mechanic as previously stated. In such adjustment of tappets, either in V8 engines or other engines of similar design and character, or in all internal combustion engines utilizing mechanical tappets, the tappet which is being adjusted is located at its

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lowermost position while the one next to it and with which the holding implement or wrench is engaged is elevated to a higher position, this being done by turning the crank and cam shafts of the engine to properly locate the two adjacent tappets, one of which is to be adjusted and the other to serve as an anchor for a wrench implement which is connected with the tappet being adjusted to maintain it from turning about its longitudinal axis.

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 substantially horizontal section through the upper part of a V8 engine and over the upper ends of the tappets and tappet guides and showing the wrench implement, which I have devised, connected at one end with the tappet to be adjusted, and at the other end with the next adjacent tappet.

Fig. 2 is a front elevation thereof.

Fig. 3 is a vertical section through the tappet which is to be adjusted and showing the holding wrench in connection therewith.

Fig. 4 is an enlarged transverse section through the wrench implement illustrating the means used to adjustably connect the two parts thereof.

Fig. 5 is a perspective view of the holding wrench.

Fig. 6 is a view similar to Fig. 1 showing a reversal in position of the wrench implement, and which implement is slightly modified in construction from that shown in Fig. 5, one being a "right" and the other a "left," and the one shown in Fig. 6 slightly modified for reception in the limited space which it must occupy, and

Fig. 7 is a fragmentary plan view partly in section showing a holding wrench for use in connection with two adjacent tappets of a type smaller in diameter than the barrel type illustrated in the previous figures.

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

In Figs. 1 to 6 inclusive, the engine block indicated fragmentarily at 1, is provided with the requisite number of substantially vertically positioned guides therethrough for the guiding of the tappet bodies 2 which are mounted for reciprocatory movement being actuated by cams 3 on a continuously rotating cam shaft 4 (Fig. 3) when the engine is in operation. The tappets are lifted by the cams and are removed downwardly and maintained in bearing engagement against the cams by the springs of the valves which are lifted. In V8 engines the tappets and tappet guides are

not in vertical position but are inclined outwardly at each side of the engine from the vertical longitudinal plane of such engine.

The tappet body 2, of relatively large diameter and of the well known barrel type is hollow for diminishing weight, closed at its lower end and hardened to bear against the associate cam 3, and at its upper end is integrally closed. It is provided with a longitudinal sleeve 5 interiorly threaded into which a tappet screw 6 is screwed. The screw 6 preferably is of the self-locking type illustrated in my Patent No. 2,361,107 issued October 24, 1944. With my invention the upper end of the tappet body around the sleeve 5 is provided with a plurality of downwardly extending holes or openings 7 drilled therein. Four are shown but such number is not in any way essential in itself in connection with the invention. The number of vertical holes 7 may be increased or diminished. There must be at least one of said holes and the number may be increased to as many as can be made in the space provided around the screw 6 at the upper end of the tappet body.

In the operation of the engine and with the rotation of the cam shaft 4 the tappets are reciprocated, being lifted and lowered and adjacent tappets will alternately be lifted and lowered. As shown in Fig. 2 one of the tappets is in its lifted or elevated position and the one next adjacent in its lower position. In such lower position the body of the tappet is below the upper end of its guide and the head 6 of the screw only lies above the upper end of the guide and is accessible for connection of a suitable wrench thereto to turn the screw 6 to adjust it and thereby vary the effective length of the tappet. The tappet next adjacent has its body 2 elevated above the upper end of the part of the engine block in which the tappet guides are made.

The wrench or holding implement which I have provided includes a member of flat metal having an intermediate section 8 (Fig. 5) at one end of which is a section 9. The section 9 at one side has a semi-circular recess 10 therein having an arcuate rim of not more than 180° so that at the end of the member being described there is a terminal finger 11. At the other end of the intermediate section 8 an arm or section 12 extends, being generally in parallelism to the section 9, with the intervening section 8 inclined at an angle to both.

At the upper side of the member described and over the sections 8 and 9 a curved locking member 13 of flat metal is located and is adjustably secured by means of arcuate slots 14 therein through which headed pins 15 pass and are permanently connected to the under section 8 as shown in Fig. 4. The slots 14 are shaped in an arc concentric with the center of the recess 10. The locking member 13 accordingly has a limited arcuate movement controlled by the slots 14 and the pins 15 and of an extent which is controlled by the length of said slots 14. Preferably through the section 9 of the under member and adjacent one end of the locking member 13 openings 16 are made which serve as finger clips to facilitate moving the locking member from one position to the other. Said openings are in conjunction when the locking member 13 is in its unlocked position. The arm 12 adjacent its free end is provided with a downturned lug 17 as shown.

With the tappet at the right in Figs. 1 and 2 at its lowermost position, and which is to be

adjusted by changing the position of the screw 6, and the next adjacent tappet at the left elevated, this wrench implement is inserted in place by bringing the arm or section 12 back of the screw 6 of the lowermost tappet and inserting the lug 17 into one of the openings 7 in the tappet body. The locking member 13 will be at its inoperative position as shown in Fig. 5, with the two openings 16 in vertical conjunction so that the section 9 may be located against the body 2 of the elevated tappet, said body extending into the recess at 10. Then by moving the locking member 13 in a counter-clockwise direction, or to the position shown in Fig. 1, more than half of the cylindrical distance around the elevated tappet body 2 will be embraced by the two members of the implement, this being shown in Fig. 1. The movement of the locking member 13 from the position in Fig. 5 to that shown in Fig. 1 is accomplished instantly by a mere lateral pressure exerted at the opening 16 in the member 13.

In such position the lowered or depressed tappet body 2 is securely held against rotation. The wrench holding implement is connected with both of the tappet bodies. A wrench applied to the head of the screw 6 of the lowermost tappet which is to be adjusted may have any requisite degree of force exerted on it to adjust the position of the screw 6 to any position which is needed. The wrench implement may be released by merely moving the locking member 13 back to its initial unlocked position, thereby releasing from the elevated tappet at one end, and then lifting the other end of the implement to disconnect the lug 17 from the hole or recess 7 in which it has been received.

In Fig. 6 the wrench construction is shown modified for a different condition and one which is met in practice. It may be described as a "left" type of wrench with the first described wrench being a "right"; that is, the locking member 13 in the first described wrench is disposed at the right hand side of the lifted tappet body with which it is connected, and the finger 11 at the left and with the arm 12 extending to the right to engage with the tappet which is to be adjusted. This is reversed in Fig. 6, the locking member 13 being at the left of the elevated tappet body with which it is connected, the finger 11 at the right thereof and the arm 12 extending to left and having the lug 17 turned downwardly to engage in an opening 7 of the tappet body 2 which is at the left of the elevated tappet, a reversal of what is shown in Fig. 1. Also because of limitations imposed by narrow space, the finger 11 at its edges is bent upwardly into a short flange 18 so that it may enter the space which is provided, and not be reduced in strength by reason of the reduction in width of the finger 11. The connection of the wrench implement to the tappet body is the same as before and the tappet which is to be adjusted is held from turning in the same manner.

In Fig. 7 two adjacent tappet bodies 2*a* of the type which was substantially universally used some years ago and which is still used is of smaller diameter than the barrel tappets, each at its upper end has an upper projection 19 flattened at opposed parallel sides for wrench connection. A tappet screw 6*a* is threaded into the upper ends thereof for the adjustment of the tappets. With such tappets the interposed holding wrench implement is of a modified form. It consists of a flat plate of metal 20 at one end

having a relatively wide elongated slot 21, the distance between the sides of which is slightly greater than the diameter 2*a* of a tappet. The length of said slot is appreciably greater than such diameter. At the other end a second narrower slot 22 is made, the width of which is but slightly greater than the distance between the opposite flat sides of the upper projection 19. This implement may be engaged with the cylindrical body of a tappet, the one at the right shown in Fig. 7 which is in an elevated position, the implement being moved so that the inner end or bottom of the slot 21 comes substantially to the body of the tappet. The implement is then alined with the tappet which is to be adjusted and with such tappet which is being adjusted turned about its axis to present the flat sides of the upper projection 19 properly so that the implement may be moved to the left and said projection 19 be received in the slot 22. This holds the tappet at the left from turning about its vertical axis on exerting force on the screw 6*a* which is being adjusted; while the engagement with the next adjacent higher elevated tappet body holds the implement from turning about the axis of the screw 6*a* which it would do if not restrained.

The constructions described and the method of tappet adjustment provide desirable advances in connection with the difficult operation of adjusting tappets; and further provide a very practical, useful and effective replacement of the non-adjustable tappets in certain engines, such as those of the V8 type.

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

I claim:

A tappet holding implement comprising a body, means on said body to non-rotatably engage a tappet, a semicircular recess in said body adapted to embrace another tappet through an arc of not more than 180° and means on said body adjacent said recess movable in an arc concentric with the center of said recess to engage said other tappet beyond said 180° limit.

CHARLES E. JOHNSON.

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