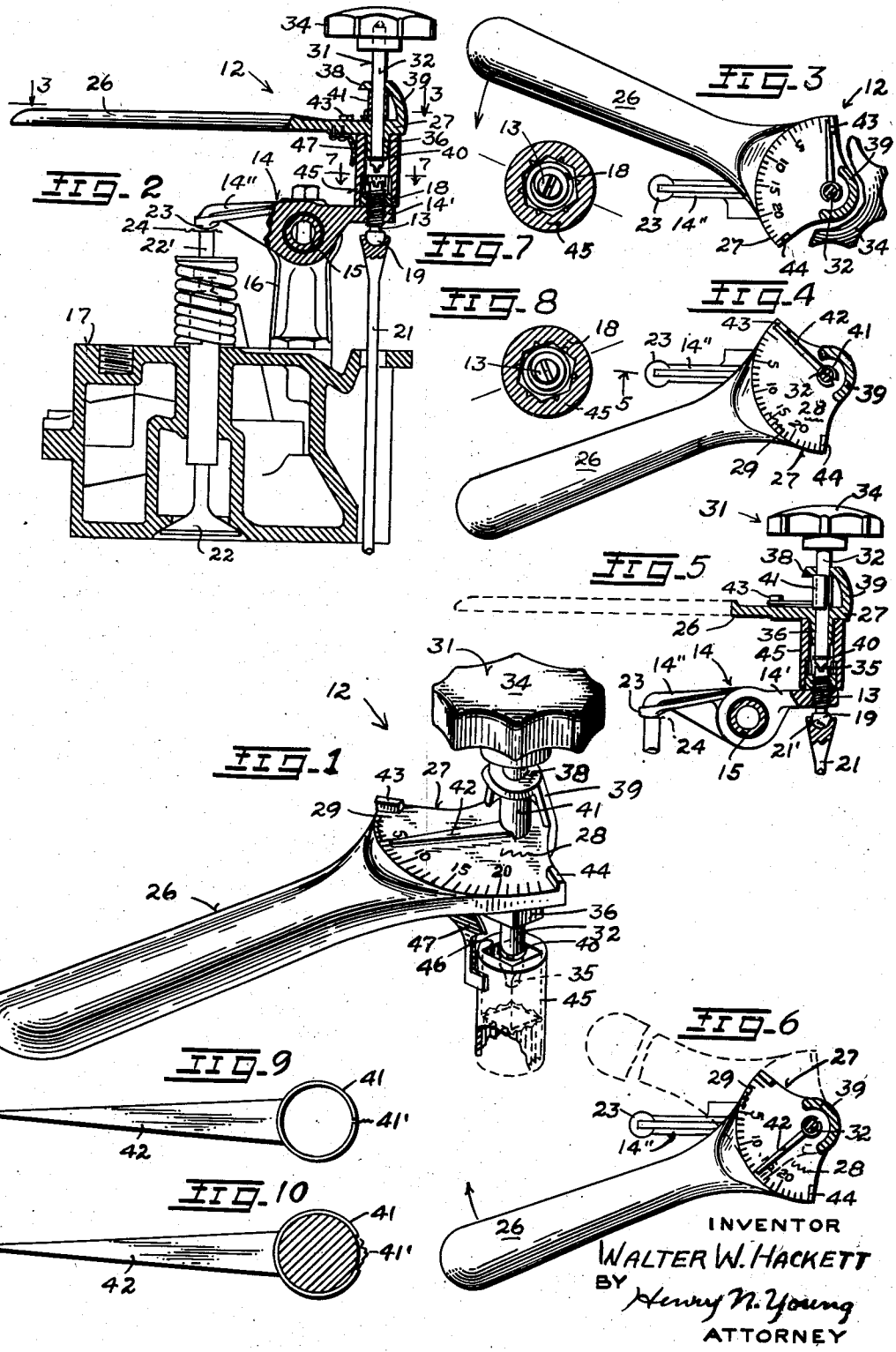
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SCREW-ADJUSTING TOOL

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SCREW-ADJUSTING TOOL

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4 Claims. (Cl. 81—3)

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The invention relates to a tool for adjustably turning a screw to a measured degree, and particularly a screw which adjustably controls the gap between mutually cooperative tappet members.

A general object is to provide a unitary screw-adjusting tool which directly gauges the effective adjustment of a screw therewith.

A more specific object is to provide a tool of the character described which is applicable to a screw which adjustably controls the gap between a tappet arm and a member engageable by the arm, whereby to eliminate any need for the application of a feeler blade of known thickness in the gap for determining the size of the gap.

Another object is to provide a unitary tool of the character described which may be applied and used in a particularly effective and speedy manner.

A further object is to provide a unitary screw-adjusting tool of the character described with means for releasing and resetting a locknut for a screw to be adjusted by the tool.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following description of a typical embodiment thereof, and in the accompanying drawings, in which,

Figure 1 is a perspective view of a tool embodying my invention.

Figure 2 is a generally sectional elevation showing the tool as applied for adjusting the valve tappet gap of a valve-in-head internal combustion engine.

Figure 3 is a partly sectional plan view taken at the plane of the line 3—3 in Figure 2, and showing the tool as initially applied to a tappet-adjustment screw and its locknut.

Figure 4 is a view similar to that of Figure 3 and shows the tool as disposed in readiness for effecting a measured gap adjustment therewith.

Figure 5 is a sectional view taken generally at the line 5—5 in Figure 4.

Figure 6 is a view showing the tool in corresponding position to that of Figure 4 after the gap adjustment has been effected.

Figures 7 and 8 are enlarged sectional views taken at the line 7—7 of Figure 2 when the tool and tappet screw are related as in Figures 3 and 4 respectively.

Figures 9 and 10 are enlarged plan views of a pointer member of the tool as dismounted and mounted respectively with respect to a screwdriver shank of the tool assembly.

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A tool 12 embodying the features of my invention is particularly shown as applied to an adjusting screw 13 threadedly engaged through the end of an arm 14' of a rocker 14 which is intermediately pivoted on a stub-shaft 15 carried by a standard 16 extending from the head-block 17 of an internal combustion engine (not shown), said screw being releasably held in set position by a locknut 18 mounted on it and normally engaging the top of the rocker arm 14'. The screw 13 extends transversely of the head-block 17 and its lower end (point) is provided with a ball 19 which is complementarily engaged in a terminal socket 21' provided by a valve-opening push-rod 21 which extends through and from the head-block 17. The head-block 17 carries a spring-seated tappet valve 22 having its stem 22' extending upwardly from the head-block for periodic engagement by an overlying contact head 23 provided at the end of the rocker arm 14'' which does not carry the screw 13. Except during an unseating of the valve 21, a usual gap 24 is provided between the contact 23 and the opposed end of the valve stem 22', and it is this gap which is to be set or adjusted to insure the best operation of the engine.

In its present form, the tool 12 essentially comprises an elongated body member having a handle portion 26 extending laterally and integrally from a wider head portion 27 in alignment therewith and rotatively mounting a screwdriver 31 transversely therethrough near its free end. A face 28 of the head portion 27 is flat and is provided with an arcuate angle scale 29 comprising a line of calibration marks radiating from the rotation axis of the screwdriver whereby the scale is concentric with said axis; the present tool would usually be applied with its face 28 disposed for viewing from above, and said face may therefore be conveniently referred to as the upper face of the head. Preferably, and as shown, the handle 26 and the center of the scale arc are at opposite sides of the scale with the midpoint of the scale in the handle line and the head generally sector-shaped to minimize its size.

The screwdriver element 31 is mounted on the head portion 27 with its shank 32 rotatably engaged in a bore provided through the head portion 27 in perpendicular relation to the upper head face 28 and the scale 29 thereon. The handle 34 of the screwdriver is disposed above the face 28, while the terminal bit portion 35 of the screwdriver shank 32 is disposed somewhat below the head portion 27; the present screwdriver bit 35 is formed as a blade to complementarily engage a usual screw-head slot, it being under-

stood, however, that other types of cooperative engagement might be provided between the screwdriver and a screw to be turnedly engaged by it. As particularly shown, the screwdriver shank 32 extends axially through an integral boss 36 depending from the head portion, and also extends through a bore portion provided through a guide member 38 which is fixedly positioned opposite the head face 28 at the end of an arm 39 extending transversely from the point of the head portion 27. A removable spring ring 40 normally engages a peripheral groove in the shank 32 adjacent the bit 35 to prevent a dismounting of the screwdriver.

Means are provided for frictionally retaining the shank 32 in adjusted position in the head 27, said means also providing a pointer for reference to the scale 29. As particularly shown, the under face of the member 38 is parallel to the opposed upper face 28 of the head, and the shank portion between said faces mounts a longitudinally slit spring sleeve 41 which must be circumferentially spread to receive the shank and therefore frictionally grips the same while permitting relative axial and/or rotative adjustments of the sleeve and shank.

A pointer arm 42 extends rigidly from the bottom of the sleeve 41 and at a point thereof opposite the slot 41' of the sleeve, the outer part of the arm extending opposite the scale 29 for reference thereto. Projections 43 and 44 extend upwardly from the sides of the head portion 27 at the ends of the scale 29 for engagement by the pointer 42 to limit its rotation as the screwdriver 31 is rotated while its bit engages the head of a screw to be turned, it being noted that the spring-grip engagement of the shank 32 in the sleeve 41 permits a continued rotation of the shank after the pointer has engaged the projection 43, yet provides for a swinging of the pointer by the rotating shank when the pointer is not held against turning with the shank.

While the now-described tool structure might be utilized alone for adjusting a tappet gap 24 in a manner hereinafter disclosed, means are preferably provided for turnably engaging a locknut 18 of a screw 13 to be adjusted. As particularly shown, the boss 36 is externally formed to complementarily fit in the handle-engaging end of a wrench socket 45 which is formed to have its other end complementarily receive a locknut 18; as is brought out in Figure 1, the handle-receiving bore portion 46 of the wrench socket 45 is of square cross-section, and the boss 36 is externally formed for complementary fitted engagement in the socket bore 46. As is generally usual, the lockout 18 is hexagonal, and the nut-receiving bore portion of the socket 45 is arranged to complementarily receive the same. The wrench socket 45 is preferably one of a set having like bore portions 46 whereby the tool may be applied to locknuts of different sizes by mounting an appropriate socket on the boss 36. Means are preferably provided for releasably securing a socket 45 in mounted relation on the boss 36; as particularly shown, such means comprises a leaf spring 47 having its base end fixed to and beneath the head 27 with its yielding end in such spaced opposition to the boss 36 that the outside of a mounted socket 45 may be frictionally engaged for releasably securing the socket to the head.

Having the appropriate wrench socket 45 mounted thereon, a present tool 12 is initially applied to an adjustment screw 13 and its locknut 18 carried by a rocker arm 14' in the relation shown in plan in Figure 3, with the socket receiving the nut for its turning therewith, and the screwdriver bit 35 engaged in the head slot of the screw. The screwdriver bit 35 is applied to the screw by sliding and turning the shank 32 to engage the bit in the screw slot, this being preferably accomplished while the pointer 42 is disposed at, or near, the zero end of the scale 29. The handle 26 of the operatively mounted tool is initially disposed for its nut-releasing swinging to then dispose it in the most convenient position for holding by a mechanic adjusting the screw; looking from above, the handle 26 would be swung in a counter-clockwise direction to the approximate position of Figure 4, for releasing the nut sufficiently to permit an adjustment turning of the screw 13. With the handle 26 fixedly held by the mechanic, the screwdriver 31 is turned (clockwise) until the gap 24 has been closed, the outer pointer end then engaging the head projection 43.

Having the gap closed and the pointer 42 engaging the stop projection 43, a return (counter-clockwise) rotation of the screwdriver to a desired indication of the scale 29 while the handle is held in the gap-closing position, will effect a reopening of the gap to a distance which is measured in accordance with the angle of turning of the pointer with the screwdriver over the scale. In the case of a particular engine, the scale 29 may indicate thousandths of an inch, or other gap measurements, as determined by the pitch of the adjustment screws 13 which are usually alike for engines of a given make. If however, it is desired to use the tool for adjusting screws of different or reverse pitch than that for which the scale 29 is calibrated, it will be understood that the calibration marks of a given tool may be referred to an appropriate table of true gap values in terms of the indications of the pointer along the arcuate scale. Also, the scale might indicate turn angles.

As particularly illustrated, the zero point of the scale 29 is spaced from the stop 43 by an arcuate distance which corresponds to the normal lost-motion engagement of the screwdriver bit 35 in the screw-head slot, thus providing for an increased accuracy of setting of the pointer 42 in terms of the gap. Because of the provision and use in the present tool of the flat scale 29 having a relatively large radius compared with the radius of the controlled screw, whereby the length of the pointer is at least nine times that of the radius of the screw 13, it will be understood that the making of the quickly effectable gap settings therewith is as fully accurate as may be needed in usual practice. It is also to be noted that the present relation of the scale 29 to the tool handle 26 provides for a particularly ready observation of pointer settings by the operator holding the handle as a positioning means for the tool, while making the tool equally usable by right-handed and left-handed operators.

It will be obvious that the present screw-adjusting tool may be used for its purposes without having a wrench socket 45 provided and utilized therewith; if an adjustment screw which is normally held set by a locknut is to be reset with the present tool, the locknut might be loosened by the application of a separate wrench thereto. It will also be understood that the present tool is usable generally for adjusting any screw which is arranged to directly provide a gap of desired size between an end and a refer-

ence object, or to be turned through a predetermined angle. It is to be particularly noted that the present tool assures accurate gap clearance adjustments of a screw 13 controlling the gap between a rocker arm 14 and the valve stem 22' controlled by the arm, independently of any worn or pitted condition of the opposed faces of the members which would appreciably affect the accuracy of use of a usual gauging feeler blade in lieu thereof.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the present screw-adjusting tool will be readily understood by those skilled in the art to which the invention appertains. While I have described the principle of operation, together with a form of my invention which I now consider to comprise a preferred embodiment thereof, I desire to have it understood that the showing is primarily illustrative, and that such changes and developments may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In a tool for turning a screw to a measured degree from a predetermined initial set position, an elongated handle member providing a transverse bore for rotatively receiving the shank of a screwdriver and having thereon an arcuate scale concentric with said bore, a screwdriver having its shank journalled in said bore and terminating in a screw-engaging means, a radial pointer carried by said shank in frictional engagement therewith for swinging adjustment thereabout and arranged for turn-measuring rotation therewith opposite said scale, and a stop fixed on the handle member operative at a scale end for engagement by the pointer to limit the pointer rotation with the shank to a zero setting of the pointer during an initial setting of a screw engaged by the screwdriver whereby a reverse rotation of the shank to reset the screw will be directly measured from the zero setting by the swinging movement of the frictionally held pointer over the scale.

2. In a tool for rotatively adjusting a screw which is normally held in set extending position in a supporting member by a locknut mounted on its extending portion in normal screw-locking engagement with the member, an elongated handle member providing a transverse bore and a wrench socket coaxial with said bore for complementarily receiving said locknut whereby the handle member may be rocked about the screw to release or to re-lock the locknut, a screwdriver

having its shank journalled and axially slidable in said bore and operatively engageable with the screw for turning it while said socket engages the released locknut against its turning, and a pointer member rotatably mounted on the shank in frictional engagement therewith for reference to a concentric scale provided by the handle member, said handle member providing a stop effectively operative at a zero point of the scale for engagement by the pointer to limit the rotation of the pointer with the shank to the zero-point setting of the pointer with respect to the scale during an initial reference setting of the screw.

3. In a tool for turning an installed screw to a measured degree from an initial set position thereof, a member providing an elongated handle portion extending from a head portion providing a transverse bore for rotatively receiving the shank of a screwdriver and having on a face thereof an arcuate scale concentric with said bore, a head portion comprising an extension of the first head portion and disposed opposite said face in fixed spaced relation thereto and providing a bore coaxial with the first bore, a screwdriver having its shank journalled in said bores and terminating in a screw-engaging means and having its handle end at the opposite side of the head extension from the head scale, a sleeve member retainedly mounted on the screwdriver shank between the head portions in frictional engagement therewith for its rotative adjustment about the shank, and a pointer member extending rigidly from the sleeve member for turn-measuring rotation opposite said scale.

4. A structure in accordance with claim 3 having the handle member providing a stop means for engagement by the pointer to limit the rotation of the pointer with the shank to a predetermined zero setting thereof with respect to the scale during an initial reference setting of the screw.

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