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TORQUE INDICATING WRENCH

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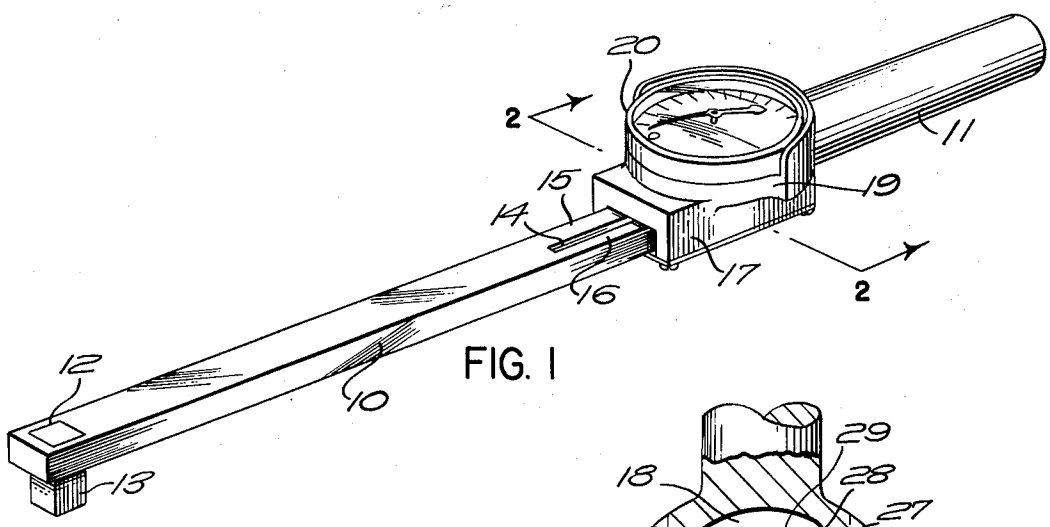


FIG. 1

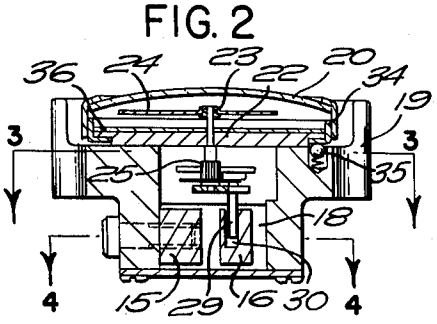


FIG. 2

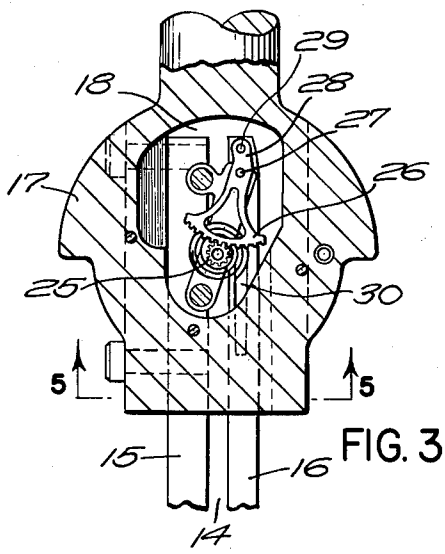


FIG. 3

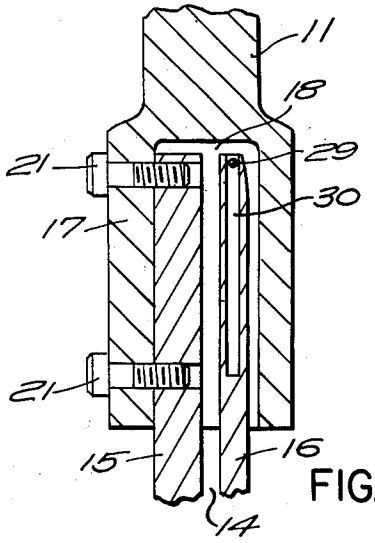


FIG. 4

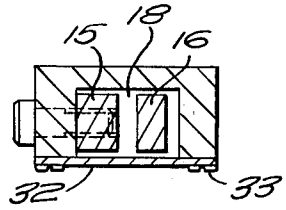


FIG. 5

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TORQUE INDICATING WRENCH

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This invention relates to a torque indicating wrench and more particularly to a plug- or nut-turning wrench embodying indicating means therewith to indicate the amount of force being applied to the plug or nut.

Various types of torque turning wrenches have been used in the past, but these have not proved to be too satisfactory, since their bulk compared to ordinary socket wrenches with an extension bar has been too great. There thus has been a long-felt need for a torque indicating tool that is simple, compact, and instantly indicates the desired torque applied to a nut or other fastening device.

One of the objects of the present invention, therefore, is to simplify the construction of a torque indicating wrench.

Another object is to provide a simple and compact torque indicating wrench that is dependable in operation.

A further object is to provide a torque wrench with a single bar construction having a small working end.

Still another object is to provide a single bar torque indicating wrench which is one solid piece for over one half of its length from the drive plug to the indicating mechanism.

Another object of this invention is to eliminate several parts which normally constitute a torque indicating wrench that may become loose due to wear, loose fits, broken rivets or screws.

Still a further object is to provide a wrench having a single elongated bar disposed longitudinally with two free legs at its far end, one of said legs being flexed by an operating handle and the displacement between the two legs being measured by an indicating instrument.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a perspective view of the wrench embodying the features of the present invention;

Figure 2 is a sectional view taken substantially along lines 2—2 of Figure 1;

Figure 3 is a section taken on lines 3—3 of Figure 2;

Figure 4 is a sectional view taken on lines 4—4 of Figure 2;

Figure 5 is a sectional view taken on lines 5—5 of Figure 3, showing specifically the free leg being housed in the handle body.

In proceeding with my invention, I may take an ordinary piece of cold rolled bar stock and suitably affix a nut-turning device at one end thereof. At the other end I then make a cut longitudinally of the bar to form two free legs. The distance of the cut is immaterial except insofar as it affects the calibration of the indicating instrument to be attached later, for it can readily be seen that the displacement of one of the two free legs with respect to the other varies proportionately as the distance from the end of the bar to the nut-turning device is to the length of the cut or slot therein. I additionally provide a suitable handle means which may be attached to one of the legs of the bar and which will leave the other leg free to move relative thereto. I further attach to this handle member an indicating device of the familiar rack-pinion type which has a connecting link coupled to the free leg of the bar.

The wrench shown in Figure 1 comprises a wrench bar portion 10 and a handle portion 11. The wrench bar portion 10 may be constructed from a single forged bar which may be suitably heat-treated to provide the necessary physical qualities. At one end thereof is mounted a work-engaging member which can take the form of a shank 13 of a suitable polygonal shape adapted to register with a correspondingly shaped and sided recess formed in a wrench socket or other turning implement as commercial practice may dictate for use therewith. It may also be possible to eliminate this shank 13 and utilize solely a nut-receiving aperture 12 as the work-engaging member. The other end of the wrench bar 10 may be suitably cut as shown by the slot 14 to form two legs 15 and 16. The handle portion 11 is provided with a generally enlarged housing 17 which is provided with a recess 18 and which supports a mounting platform and guard piece 19 for a dial indicator mechanism 20. The legs 15, 16 of the wrench bar 10 are disposed within the recess 18. The leg 15 is immovably fixed to the handle member housing 17 by screws 21 inserted through the side of the housing 17, and the leg 16 is spaced from the walls of the recess 18.

As will be apparent by referring to Figures 1 and 3 upon resistance to pressure applied to the work, the leg 15 will flex or be deflected in a lateral direction toward or from the leg 16 depending upon the direction in which the pressure is applied on the handle. Thus, as pressure is applied to the handle 11, the leg 15 attached thereto will deflect or bend in proportion to the amount of pressure applied, while the free leg 16 remains straight with the bar 10. This deflection is measured and indicated on the indicator 20.

The dial indicator 20 is provided with a circular base 22 through which passes a shaft 23 that supports an indicating pointer 24 and pinion 25 which engages a rack 26. The rack 26 is pivoted as at 27 and has an extension 28 which carries an engaging pin 29. Referring to Figures 3 and 4, it will be seen that the pin 29 engages a slot 30 which is provided in the leg 16 of the wrench bar 10. Upon deflection or bending of leg 15 under pressure applied on the handle 11, the pivotal axis 27 of the rack 26 is moved toward or from the leg 16 depending on the direction in which pressure is applied, which causes the pin 29 to move along slot 30. This movement of pin 29 will swing rack 26 about pivot 27 and rotate pinion 25 and shaft 23, moving pointer 24 over the dial of indicator 20. To complete the assembly, a cover plate 32 is secured by means of screws 33 to the open part of the recess 18 in the housing 17. Additionally, it is generally desired in an instrument of this type to zero the pointer associated with the dial mechanism, and therefore a bezel 34 is provided that is held in position by a spring-loaded ball 35 and which will rotate the graduated scale 36 as desired.

In operation the shank 13 is engaged with a suitable socket and the bezel 34 rotated to set the indicator needle 24 to zero on the graduated scale 36. A force may then be applied to the handle 11 to tighten either a right-handed or a left-handed nut or bolt, the indicator needle 24 moving to the right or left over the graduated scale divisions as the case may be. The operator then may watch the movement of the indicating needle 24 over the dial until it reaches the proper scale division showing the desired amount of tension being placed upon the bolt and nut that he is tightening.

I have therefore provided a wrench which is not only simple in construction but is inexpensive to manufacture and in which the only moving parts are the indicating mechanism.

I claim:

1. A torque indicating wrench comprising a bolt or nut cooperating means at one end, a bar having two integral legs extending from said means, a handle member having a recess at one end portion thereof, one of said legs extending into said recess and being attached to said handle, said other leg extending into said recess and spaced from the walls thereof, means affixed to said handle member and cooperating with the said other leg to indicate the relative transverse displacement between said legs under bending movement in the plane of said bar, said handle extending beyond the ends of said legs a substantial distance to provide a grip thereon.

2. A torque indicating wrench having a handle provided with a rectangular recess at one side thereof and a raised generally circular boss on the opposite side thereof provided with an opening therethrough to said recess, a single bar shank having a work-engaging member at one end and bifurcated at the other end portion providing first and second spaced leg portions, said leg portions being disposed in said recess with the said first leg portion attached to the walls of said recess and the said second leg portion being spaced from the said walls and having an elongated slot at a position thereon to be opposite the said opening through said boss, a rack and pinion indicator secured to said boss, said rack being pivotally mounted and having a working arm extending through said opening to be engaged with said slot, whereby upon relative movement between said legs the pivotal axis of said rack is moved to swing said rack to rotate said pinion.

3. A torque indicating wrench having a handle member with a recess at one end thereof, a work-engaging member, a single shank connected at one end to said work-engaging member and having two legs at the other end thereof, said legs being disposed in said recess, one of said legs being attached to the handle, the other being spaced from the walls of said recess and having an elongated slot therein in the portion thereof within the said recess, indicating means to measure the deflection between said legs under bending movement of said shank, said indicating means being attached to said handle and having an operating arm engaged in said slot.

4. A torque indicating wrench having a handle member with a recess at one end thereof, a work-engaging member, a single shank connected at one end to said work-engaging member and having two legs at the other end thereof, said legs being disposed in said recess, one of said legs being attached to the handle, the other being spaced from the walls of said recess and having an elongated slot therein in the portion thereof within the said recess, indicating means to measure the deflection between said legs under bending movement of said shank, said indicating means having a pinion and a pivoted rack provided with an operating arm extending to engage within said slot whereby upon relative movement between said legs the pivotal axis of said rack is moved to swing said rack to rotate said pinion.

References Cited in the file of this patent

UNITED STATES PATENTS

2,196,223	Montgomery	Apr. 9, 1940
2,225,420	Mandl	Dec. 17, 1940

FOREIGN PATENTS

680,236	Germany	Aug. 25, 1939