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TORQUE WRENCH

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2 SHEETS—SHEET 1

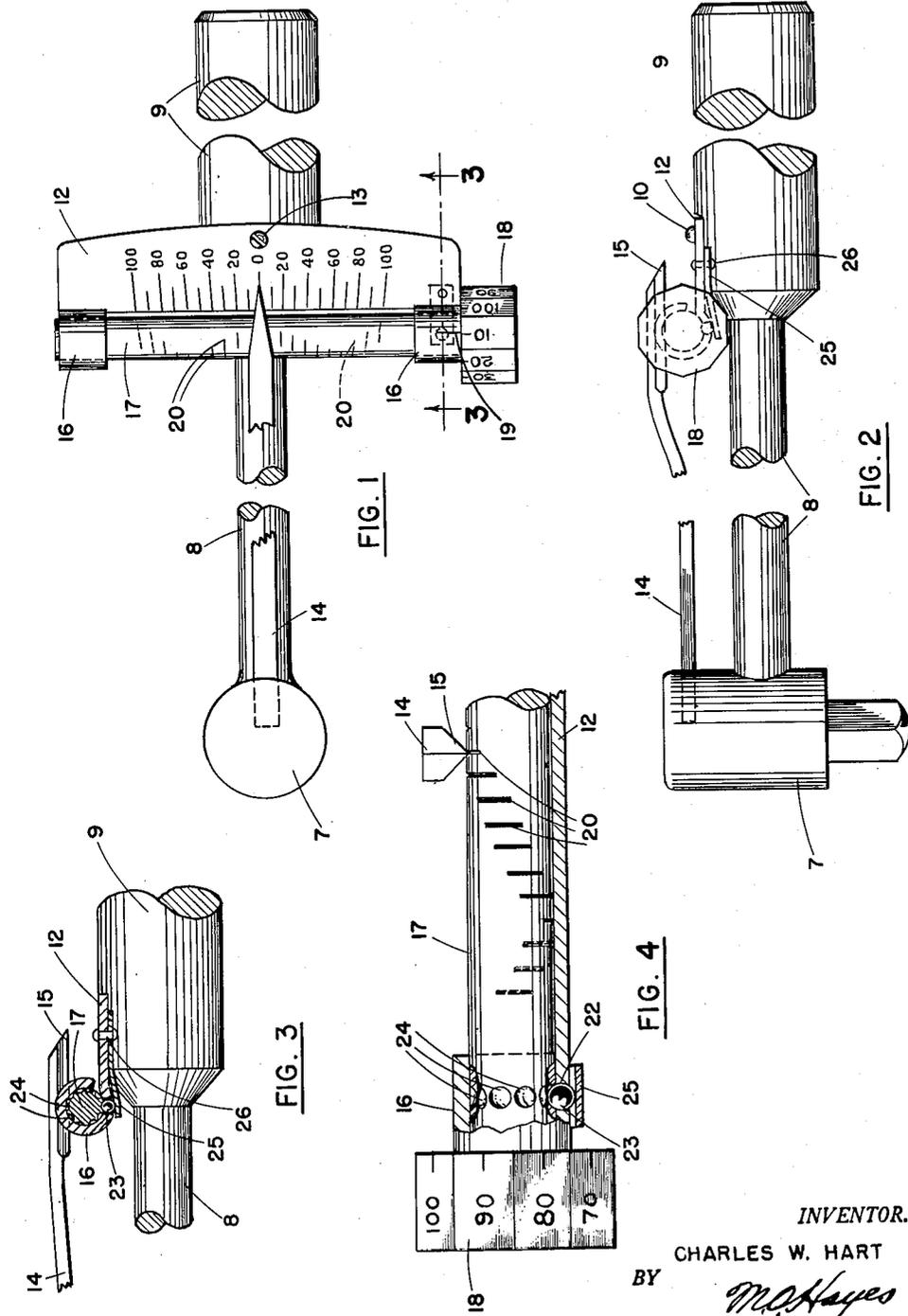


FIG. 1

FIG. 2

FIG. 3

FIG. 4

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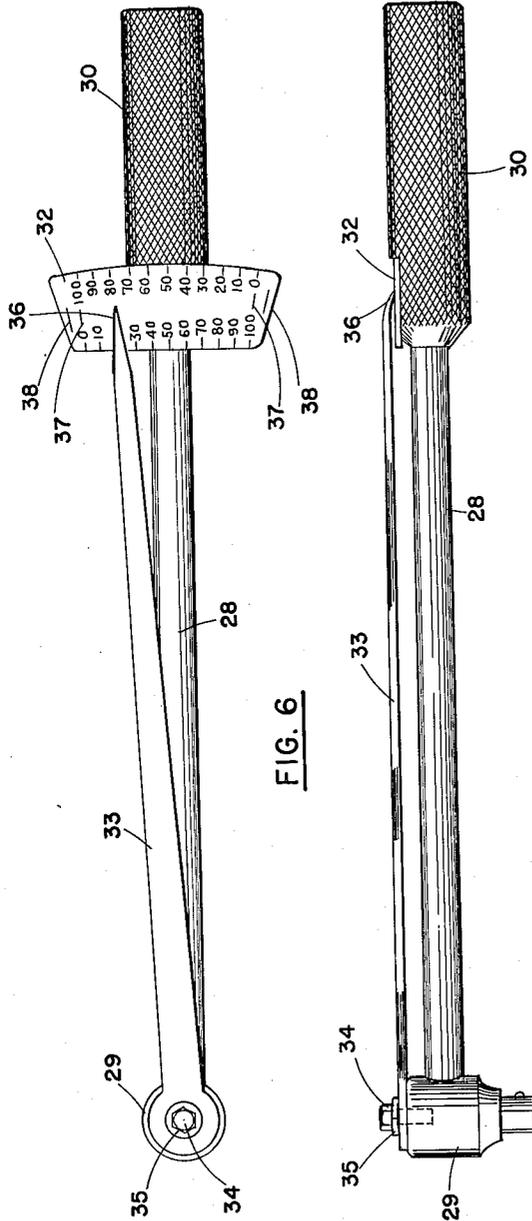


FIG. 6

FIG. 5

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# UNITED STATES PATENT OFFICE

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## TORQUE WRENCH

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4 Claims. (Cl. 73-139)

(Granted under Title 35, U. S. Code (1952),  
sec. 266)

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This invention relates to torque wrenches of the type designed to afford a visual or audible signal, or both, when the wrench is in use and preselected torque has been applied through the handle.

Preferably, the audible signal of the present invention is produced in such manner as to provide a simultaneous sensory warning to the operator by way of the handle.

It is the primary object of my invention to devise a wrench of this character which is compact and sturdy in construction, and accurate and reliable in operation.

One of the major objects of the invention is to equip a wrench with clicking means designed to afford a plurality (at least two) of clicks towards or at the end of each tightening operation; the first click serving to warn the operator not to exceed the torque measured by the second or last click.

Another major object of my invention resides in the provision of a wrench having a flexible shank in association with a stationary pointer and a clicking means that embodies a rotatably adjustable pin equipped with a spirally arranged set of notches for cooperation with said pointer.

A further object of my invention is to provide a wrench handle with a scale affording readings for both right and left hand torque application, and to anchor a cooperating pointer to the head of the wrench.

Still another important object is that of frictionally anchoring an adjustable pointer to a wrench head, and placing a scale means at the other or swinging end of a flexible shank.

The foregoing and other objects should clearly appear from a study of the following description when taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a face or top view of a preferred embodiment of the present invention, with portions broken out of the shank and the handle.

Fig. 2 is a side elevational view of the same wrench.

Fig. 3 represents an enlarged section taken along the plane of line 3-3, Fig. 1.

Fig. 4 is an enlarged fragmentary view, partially in section, showing the clicking means and the details of its adjustment.

Fig. 5 is a top view of a modified form of my invention.

Fig. 6 is a side elevational view of the wrench of Fig. 5.

With continued reference to the drawings, and particularly to Figs. 1 to 4 thereof, the preferred

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embodiment comprises a wrench head 7—here shown as of socket design—securely joined to one end of a slightly flexible, elongated shank 8. The other end of the shank has, integral therewith or secured thereto, a gripping handle 9. The shank normally is formed of metal, preferably a good grade of steel with a springlike characteristic.

The inner end of the handle is laterally reheved at 10 to form a flat-bottomed recess for snug reception of the intermediate portion of a plate 12, the latter being secured thereto by a screw 13 or in any other suitable manner such, for example, as by surface welding. The plate preferably is equipped with scale markings, as shown, to afford visual readings in both directions from zero to such torque application as, for example, 100 foot pounds. A pointer arm 14 is anchored at one end in the head 7, and its other end can rove freely over the scale.

For a purpose presently seen, the free end of the pointer is beveled to wedge shape at 15 to form substantially a knife edge, and its body is shaped so as to tend to urge the knife edge downwardly towards the plate.

At its ends the plate 12 is shaped and bent to form a pair of ring-shaped bands 16 which constitute bearings for a rotatable, cylindrical pin 17. The pin has an adjustment head 18 integral therewith or tightly fitted thereto, and, for cooperation with a mark 19 on one of the bands 16, the head has ten flat sides provided with scale markings from "10" to "100" to correspond with those at each end of the plate 12. Also, spirally arranged along the pin 17 there are transverse cuts or notches 20 corresponding in number to the total number of scale markings from end to end of the plate 12. A spiral arrangement of the notches extends from either side of an intermediate zero position. Each notch has sufficient depth to produce a clear clicking sound if it is engaged or passed by the wedge 15.

In the illustration the pointer is set at "zero," with numeral "10" appearing up on the head 18, which means that if the wrench is tightened in either direction a click will be heard upon application of ten foot-pounds. This also is true for the other torque values when the head is turned to register another figure, except the lengths of the scored lines 20 are such that a double click will occur as each value is approached and reached. This is due to the overlap or staggering of successive lines in a direction longitudinal of the pin, and the arrangement could be altered

to produce more than two clicks. As an example of a double click, in moving to "80," the pointer causes emission of a warning signal as it passes that line 20 which corresponds to a 70 foot-pound value, and then clicks again when it strikes the next line.

For yieldingly latching the knob 18 in any one of its numerous positions of adjustment there is provided a hole 22 in the plate 12; a ball 23 within the hole and capable of riding into and out of a series of ten cavities 24 formed peripherally of the pin 17; and a leaf spring, 25 riveted to the plate at 26 and bearing upwardly to urge the ball into any preselected one of the cavities.

The above running description of the wrenching tool is thought to make clear its useful functions and its general mode of operation.

The modified wrench of Figs. 5 and 6 comprises a flexible shank 28 having a head 29 and a handle 30; a scale plate 32 secured to the handle; and a pointer 33 adjustably connected to the head by a cap screw 34 and a spring washer 35. The washer frictionally holds the pointer in any selected position of adjustment, but of course it ordinarily is set initially at the desired scale marking (such as 20 or 80, as shown in Fig. 6) upon one or the other of the illustrated "0 to 100" substantially parallel coincidental scales, which are alike but reversed end for end. Torque is then applied in that direction which moves the handle and scale relative to the pointer until the pointer reaches the zero position on that scale on which the initial scale setting was made.

The pointer 33 has a sharpened free end 36 that engages one and then the other of a pair of score lines 37, 38 at the zero position at the scale ends to warn with a double click that the maximum torque is about to be exceeded.

Changes may be made within the spirit of my invention and are intended to be included whenever they fall within the scope of the appended claims.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental

purposes without the payment of any royalties thereon or therefor.

What is claimed is:

1. In combination in a wrenching device, a flexible shank having a handle, and a pointer interconnected therewith to produce relative swinging movement upon torque application, a selectively rotatable cylindrical member mounted transversely of one end of said shank, said member having a series of spaced recesses arranged spirally around the axis thereof, and said pointer having a portion engageable with said recesses to produce clearly audible noises during said relative swinging movement.

2. In combination defined in claim 1, means associated with said cylindrical member to provide a scale for adjustment thereof, and said recesses being arranged to provide at least one noise prior to the time that said pointer portion reaches a locus corresponding to the preselected scale unit.

3. In the combination defined in claim 1, said series of recesses forming a spiral around said member at each side of an intermediate zero position, whereby said device may be used to calculate both right and left hand torques.

4. In the combination defined in claim 1, yielding latching means comprising a set of spaced elements disposed circumferentially of said rotatable member, and means affording a scale at one end of said member with spaced value units corresponding in number to said elements of the latching means, and correlated with said recesses.

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