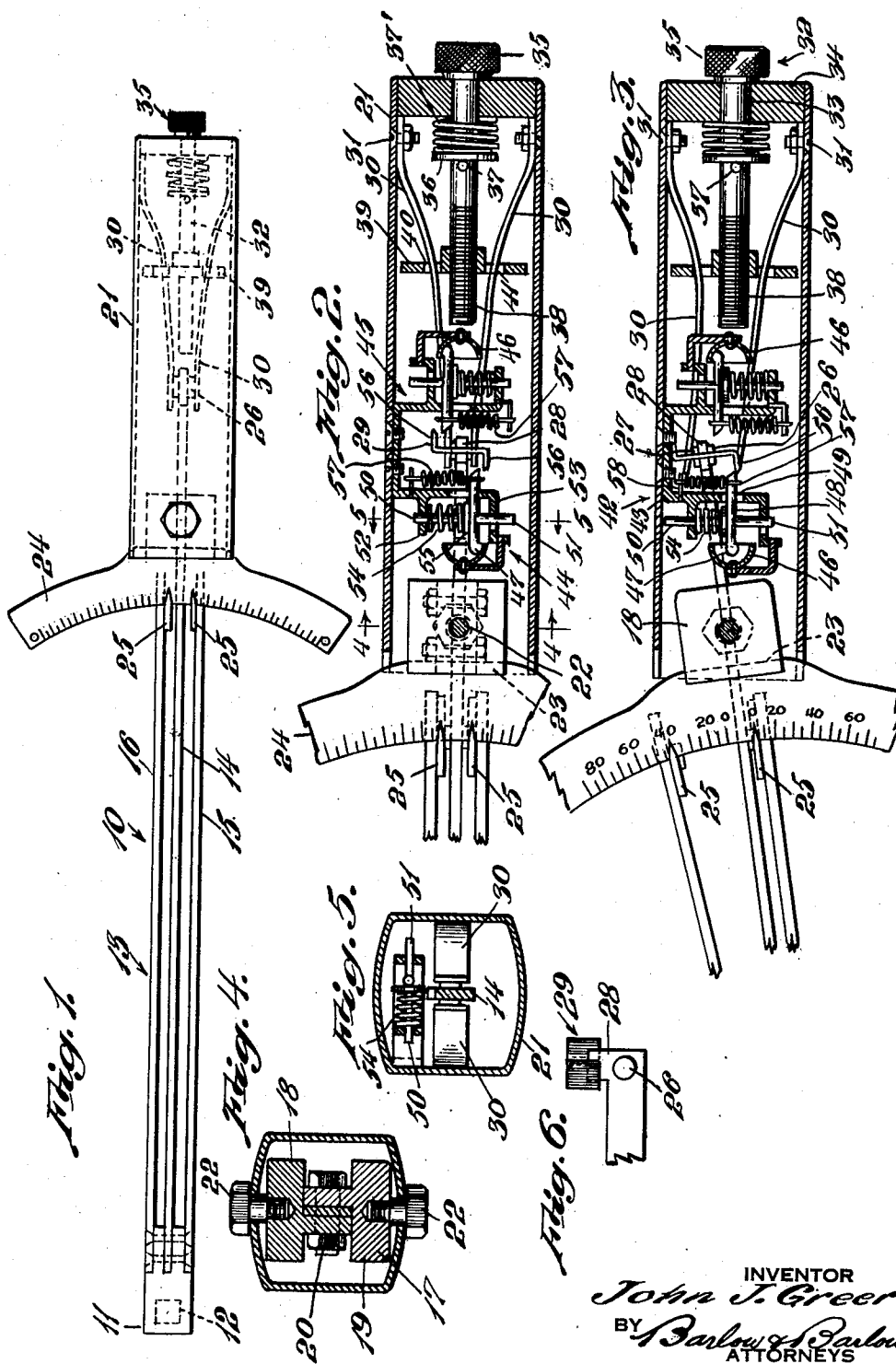


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TORQUE WRENCH WITH PREDETERMINED
TORQUE SIGNALING MEANS
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TORQUE WRENCH WITH PREDETERMINED
TORQUE SIGNALING MEANS

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3 Claims. (Cl. 81—52.5)

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This invention relates to wrenches or the like of the type which are capable of registering the torque applied to the work.

A device of this character comprises in general a head part which is provided with some means for engagement with the work, a flexible beam secured to the head and a handle at the other end of the beam for applying a turning force or torque to the work. The resistance of the work to the torque applied will cause a deflection in the beam. This deflection may be measured or indicated in terms of some particular unit of measure by means of a pointer secured to a part of the beam and relatively moving over the face of a properly graduated scale. Such indicating means are required to be in full view for careful observation by the operator.

An object of the invention is to provide an indication which will be conveyed to the operator even though he is not concentrating on his work.

Another object of the invention is to provide means by which the application of a preset torque is indicated to the operator through his tactil and hearing senses in addition to the usual indicator which requires the visual observation of the operator.

Another object of the invention is to provide means by which the application of a preset torque is indicated by means which will impart a physical sensation to the hand of the operator.

Another object of the invention is to provide means by which the application of a preset torque is indicated by an audible signal.

Another object of the invention is to provide means by which the application of a preset torque will impart a physical sensation to the hand of the operator and also will sound an audible signal.

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:

Fig. 1 is a top plan view of a torque measuring tool embodying my invention;

Fig. 2 is a view partly in section of a fragmental portion of the tool shown in Fig. 1 on an enlarged scale showing the signalling mechanism within the handle of the tool;

Fig. 3 is a view similar to that shown in Fig. 2

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but showing the elements thereof in different relative positions;

Fig. 4 is a sectional view taken substantially along line 4—4 of Fig. 2;

Fig. 5 is a sectional view taken substantially along line 5—5 of Fig. 2; and

Fig. 6 is a view of a fragmental portion of the shank of the tool.

Referring to the drawings, 10 designates generally a torque tool in the form of a wrench having a head 11 provided with a square projection 12 for the reception of a socketed work engaging member (not shown). To the head there is attached a flexible shank 13 comprising a central resilient beam 14 and side beams or bars 15 and 16 each of a length less than that of the beam 14. Near the free end portions of the beam 14 there is secured a bracket 17 formed of two substantially similar elements 18—19 bolted to the beam 14 as at 20, more clearly shown in Fig. 4.

A hollow handle 21 has one end pivotally attached to the bracket 17 by stud bolts 22 extending through the walls of the handle and threadingly engaging the bracket 17 (see Fig. 4). The bracket 17 is provided with a slot 23 to snugly receive a scale 24 in a position overlying the center beam 14 and also the free end portions of the bars 15, 16. The scale may be secured in the slot in any suitable manner, such as by welding.

Each bar 15 and 16 carries a pointer 25 extending over the graduated portion of the scale and has relative movement therewith so as to indicate the amount of deflection in the shank 13. The scale is graduated in a manner to express the deflection of the shank in terms of a unit of torque applied such as inch pounds.

The beam 14 extends a substantial distance within the handle and has formed at the extreme end portion thereof opposed tabs 26, 27 and a right angularly extending portion 28 to which there is secured in any approved manner a substantially Z-shape member 29 for a purpose to be hereinafter described.

In order to oppose relative pivotal movement between the handle and the beam 14, I provide resilient yielding flat springs 30 positioned one on either side of the beam 14. These springs 30 are bolted to the handle as at 31 in cantilever fashion and are formed so that their free ends

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engage the tabs 26, 27 and resiliently resist movement between the handle and beam. As a force is applied to the handle, the handle and beam 14 will move as a unit until the torque applied exceeds the opposing value of the force of the spring 30 with which the beam may be associated. The action may occur in either direction in which the torque is applied.

The springs 30 are adjustable so as to provide variable opposing values to the relative movement between handle and beam. This is accomplished by means of a member 32 in the form of a screw bolt having a shank 33 which is journaled in the rear wall 34 of the handle and is provided with a head 35 which forms a shoulder to engage the outer surface of the wall 34. A collar 36 surrounds a portion of the shank 33 within the handle and is locked on the shank by a pin 37 which extends through the shank providing an abutment engageable by the collar. A spring 37' encircles the shank with one end thereof abutting the rear wall and the other end the collar 36, thus resiliently opposing longitudinal movement of member 32. The threaded portion 38 of member 32 threadingly receives a disk 39 which has formed therein opposite slots 40, 41 through which the springs 30 pass. The member 32 may be rotated by means of the head 35 so as to move disk 39 along the threaded portion 38, so as to shorten or lengthen the effective length of the springs 30. As the disk is moved towards the free end of the springs the same will be stiffened and when moved towards the anchored end thereof more resiliency will be provided, thus presenting different opposing values against movement between the handle and the beam.

Within the handle is a signalling mechanism generally designated 42 which is mounted on a bracket 43 secured to a sidewall of the handle. The signalling mechanism comprises two substantially identical separate mechanisms 44, 45. The mechanism 44 being operable when the torque is applied in a clockwise direction and the mechanism 45 is operable when the torque is applied in a counter-clockwise direction. Each mechanism comprises bell 46 and a clapper 47 which is placed under tension by a relative movement of the handle and beam and which upon release will strike the bell to sound the same. The impact of the clapper on the bell will also be felt in the hand of the operator.

The clapper 47 has a shank 48 which passes through an elongated opening 49 in the bracket 43 and is provided with guides 50, 51 extending at right angles thereto and which are received in aligned openings in the arms 52, 53 of the bracket. A compression spring 54 encircles the guide 50 in the space between the arm 52 and shank 48 with one end thereof abutting the arm 52 and the other end abutting a washer 55 surrounding the guide 50 and resting on the shank 48. The free end of the shank 48 is beveled and positioned in the path of movement of one of the arms 56 of the Z-shape member 29 heretofore described.

In using the wrench the tension of the springs 30 are preset for providing the proper opposing value for the predetermined torque to be applied to the work. When the predetermined force has been reached in the application thereof to the work there will be a relative movement between the handle 21 and beam 14 which will move either one or the other of the arms of the member 29 into engagement with one or the other

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of the shanks 48 depending upon the direction in which the force is applied and will move the same in a direction to compress the spring 54. The direction of the movements of the shanks 48 are in a straight line, while that of the member 29 is on an arc. When the shank 48 has traveled a sufficient distance the same will slide off the end of arm 56 and permit a quick expansion of spring 54 to move the clapper 47 into contact with the bell. Upon release of the tension and the return of the parts to normal position, the end of the arm 56 will engage the bevel on the end of the shank 48 and move the same out of its path of movement. The opening in the arm 53 being elongated and the guide 50 having sufficient clearance with the opening in arm 52 to permit such movement of the shank. The shank is returned to normal position by means of a pull spring 57 secured at one end thereof and at the other end to a pin 58 carried by the bracket.

I claim:

1. In a torque applying tool, a resilient beam having work-engaging means at one end thereof, a handle for moving said beam for applying a torque to a work-piece, said handle and beam being secured to each other for relative movement, a pair of opposed leaf springs carried by said handle for engaging said beam on each side thereof for yieldingly opposing relative movement between said handle and said beam, means slidable along said leaf spring to preset the opposing value thereof, a signalling means, an abutment carried by said beam and movable into engagement with said signalling means to actuate the same upon sufficient relative movement between said handle and said beam predetermined by the opposing value of the preset leaf springs.

2. In a torque applying tool, a resilient beam having means at one end thereof for engaging a work-piece, a handle for moving said beam for applying a torque to the work-piece through said beam, said handle and beam being secured to each other for relative movement, resilient means carried by said handle and engaging said beam on each side thereof for yieldingly opposing relative movement between the handle and said beam in either a clockwise or counter-clockwise direction, an abutment carried by said beam, a signalling means including a spring-pressed, movably mounted clapper secured to said handle and having a portion thereof initially positioned in the path of movement of said abutment to be engaged thereby and moved upon relative movement between said handle and said beam in a direction to increase the spring pressure thereon.

3. In a torque applying tool, a resilient beam having means at one end thereof for engaging a work-piece, a handle for moving said beam for applying a torque to the work-piece through said beam, said handle and beam being secured to each other for relative movement, resilient means carried by said handle and engaging said beam on each side thereof for yieldingly opposing relative movement between the handle and said beam in either a clockwise or counter-clockwise direction, an abutment carried by said beam, a signalling means including a spring-pressed, movably mounted clapper secured to said handle and having a portion thereof initially positioned in the path of movement of said abutment to be engaged thereby and moved upon relative movement between said handle and said beam in a direction to increase the spring pressure thereon, said clapper being mounted for movement in a

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straight path whereby said clapper will be dis-
engaged from said abutment upon sufficient rela-
tive movement between said handle and said
beam to permit said clapper to be moved under
spring pressure in the opposite direction.

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