United States Patent [19]

Green

[11] **3,763,724**

[45] **Oct. 9, 1973**

[54] **AUTOMATIC TORQUE RELEASE WRENCH OF THE PRESET TYPE**

[75] Inventor: **Talmage O. Green**, Schaumberg, Ill.

[73] Assignee: **Snap-On Tools Corporation**, Kenosha, Wis.

[22] Filed: **July 26, 1971**

[21] Appl. No.: **166,003**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 826,578, May 21, 1969.

[52] **U.S. Cl.** ..... **81/52.4 R**

[51] **Int. Cl.** **B25b**

[58] **Field of Search** 81/52.4, 52.5

[56] **References Cited**

UNITED STATES PATENTS

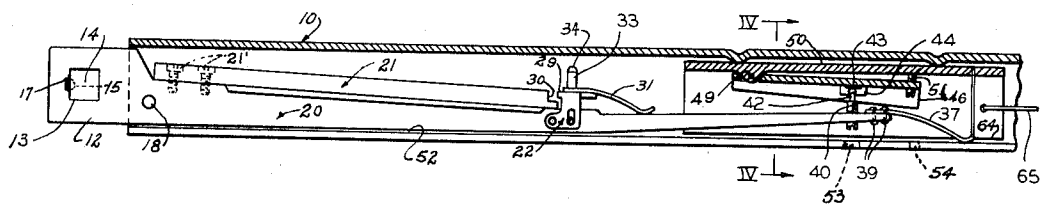
3,608,403 9/1971 Green 81/52.4

Primary Examiner—James L. Jones, Jr.
Attorney—Harry C. Alberts

[57] **ABSTRACT**

The structure embodies an elongated tubular handle member with a work engaging member projecting therefrom at one end thereof to provide a transverse shank to which detachable sockets of various standard sizes are applied to turn fasteners to a predetermined torque load. Confronting primary and secondary flex beams are disposed in the tubular handle member for engagement with each other and the work engaging member. A spring urged trigger release is movably mounted on one flex beam to cooperate with the other flex beam in the region of its maximum flex responsive to resisting the torque load, and this trigger release is in the path of the other flex beam end to normally engage therewith until the trigger moves with the flex of both beams to engage the internal wall of the tubular handle member, thereby mechanically releasing its connection therewith so that the load in the primary beam momentarily equals the combined bending load originally sustained by both primary and secondary beams. A calibrated multiple scale slide fitted with a pivotal ramp cooperates with the spring urged primary beam end to preset the release of the secondary beam relative to the trigger latch connection therebetween at any applied turning load within the capacity range of the torque wrench as preset on any scale of the calibrated slide which is viewed through openings on both sides of the tubular handle member serving also as a housing for the instrumentalities. When the applied load equals the preset value on the calibrated scale, the trigger latch engages the inside wall of the housing, thereby releasing the secondary beam which causes an audible signal and also a sudden relaxation of part of the applied force or torque to create a momentary interruption which effects a mild vaibratory shock and an audible click due to the trigger latch disconnect between the beams to notify the user that the preset load has been reached. The user then stops applying any further turning load, and this momentary release will permit the spring urged trigger latch and the primary beam to re-connect the parts for further application of the wrench to another fastener.

10 Claims, 8 Drawing Figures



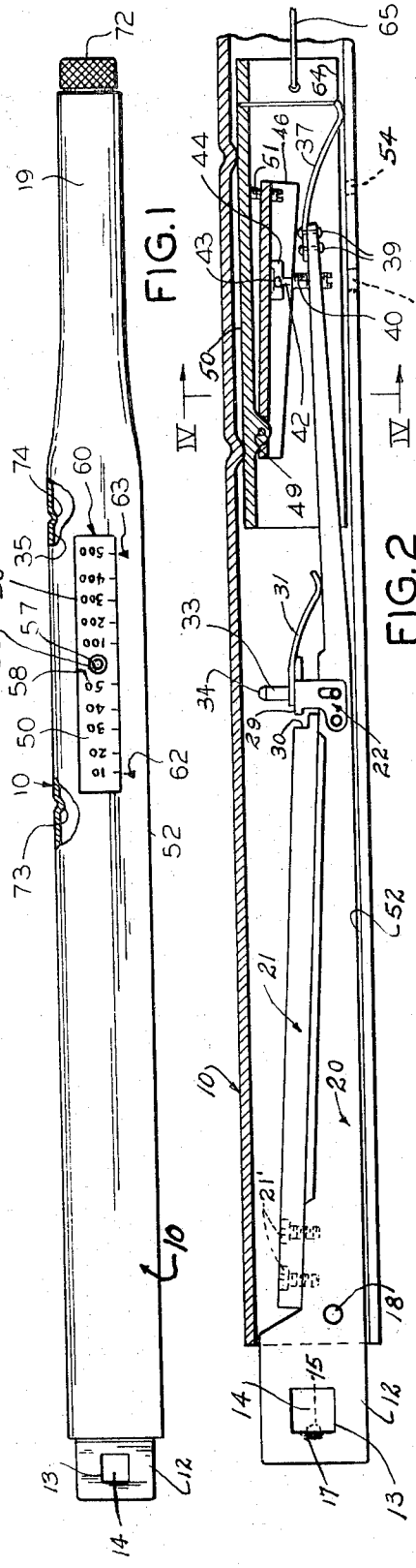


FIG. 1

FIG. 2

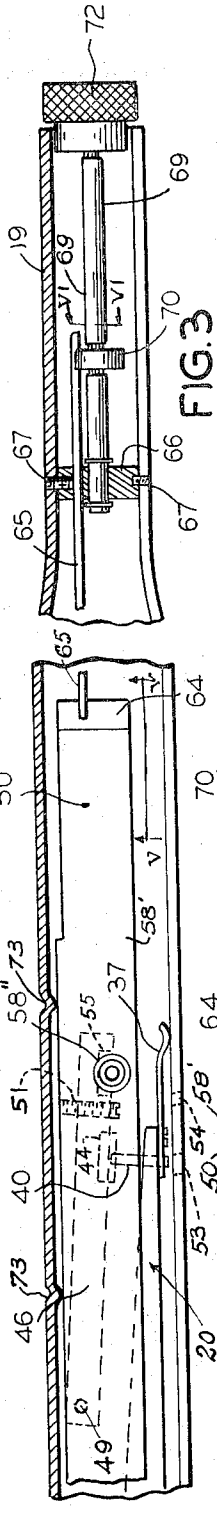


FIG. 3

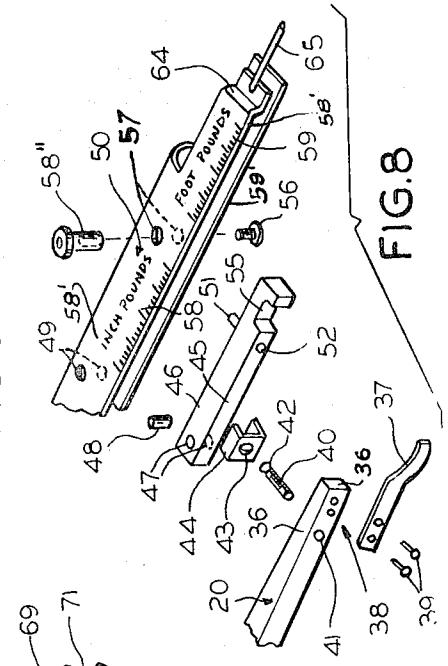


FIG. 8

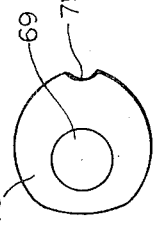


FIG. 6

FIG. 5

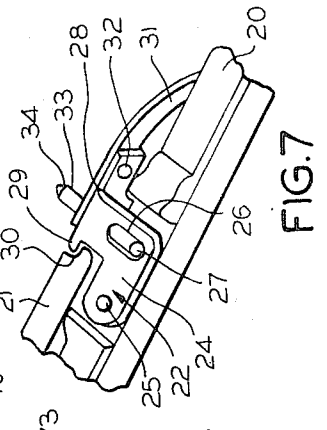


FIG. 7

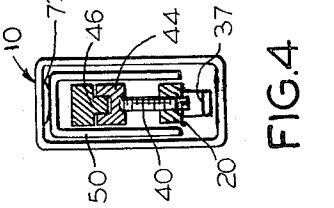


FIG. 4

INVENTOR
TALMAGE O. GREEN
BY Harry C. Hebets
ATTORNEY

AUTOMATIC TORQUE RELEASE WRENCH OF THE PRESET TYPE

This application is a continuation-in-part of my U.S. Pat. application Ser. No. 826,578 filed May 21, 1969.

This invention relates to turning devices and more particularly to preset torque measuring wrenches of the type illustrated and described in U.S. Letters No. 2,682,796 issued July 6, 1954, although certain features thereof may be employed with equal advantage for other purposes.

It contemplates more especially the provision of a simple, dependable, accurate and compact torque meansuring wrench that accurately designates and signals the preset force to be applied and upon reaching this torque load will release and momentarily interrupt any further nut turning and similar turning movements.

Most torque wrenches measure the flex in a beam or the torsional twist in a shank which resists the turning force of a wrench in order to determine the amount of torque or force applied in nut turning and similar operations. Both types of torque wrenches have been adapted to commercial wrench structures of the conventional handle or lever arm type as evidenced by letters patents Nos. 2,312,104 and 2,367,224; however, it is deemed more effective for some production and repair operations, to preset wrenches of both types so that the desired nut or other fastening load will be indicated and mechanically released during use to preclude or indicate ceasing any further tightening application of force with immediate automatic resetting for repeat operation on other fasteners.

The desirability of utilizing the degree of twist in the shank or shaft or the flex beam principle as the measuring expedient in nut turning and similar operations, has been resorted to with success from the standpoint of measuring the applied turning load in relation to a calibrated meter that requires constant observations to reduce the human error factor to a minimum as illustrated in the above referred to letters patents; however, it is now known that predetermining tightening loads imparted to fasteners by incorporating presetting control instrumentalities to preclude variations in fastener turning applied loads without jarring the sensitive measuring elements thereof and, further, without relying upon the over-reaction or under-reaction of the user whose responses are not always uniform nor the same over extended tightening operations.

The importance of accuracy in torque wrenches cannot be over-emphasized, and the degree of accuracy depending largely upon the elimination of or substantial reduction in friction, lag and free-play between relatively moving parts. This is also important in torque wrenches that embody the principle of flexing a torque resisting beam to provide the desired reading; however, a mechanical release at the point of reaching the applied preset load, lends itself to torque wrenches of the beam flexing type with the teaching of the present invention.

In accordance with the teachings of the present invention, the applied preset torque measuring principle has been embodied in the conventional type lever arm flex-beam wrench with minimum friction, lag, free play, and maximum translation of the relative twist of the load carrying member. This has been accomplished in conjunction with presetting torque load indicator instrumentalities which preclude errors and variations in reading and interpreting the usual indicators in or

under all conditions of use. Torque measurements are possible, therefore, with a negligible error factor and nut turning operations are accurately measured under all conditions and capacities irrespective of human error and the position of applied force along the lever arm for effecting the turning operation.

It has been found in actual use of the dial indicating instrumentalities, especially in repetitive production line operations as well as in engine repair work, that the attendant may not be too observant of an indicator dial or he may be working under tiring or difficult conditions to be sufficiently observant thereof or in such an obscure or inconvenient position for the purpose of nut turning with difficulty in normally inaccessible places. Thus, there is little opportunity to read the dial and, therefore, the user of a torque wrench may not be in the position to determine with any great measure of accuracy the torque load that is being applied. Furthermore, human error may render otherwise accurate torque measuring instrumentalities ineffectual so that the present invention contemplates the elimination of human error and the other noted difficulties by providing simple automatic mechanical disconnect control features that will convey to the user the knowledge that the applied torque has reached the predetermined value at which the measuring instrumentalities have been preset prior to the application of the device to a fastener for tightening purposes. To this end, it has been found desirable to provide simple disconnect and connect instrumentalities that render it mechanically impossible for the user to apply more torque load to a fastener than is initially intended without any overt act.

The physical indicator preferably takes the form of a trigger release mechanism operating responsive to a flex beam which will provide an automatic disconnect at the preset load so that the handle **10** will be momentarily ineffectual to apply more force for the further application thereof in nut turning operations. This construction provides partial releasing and momentary disconnect between the primary and secondary beams **20–21**, since these bend together after initial fractional loading of the primary beam **20** to share the torque load. Thus, the wrench handle **10** travels a certain arc (degrees) to sustain the preset load when the secondary beam **21** releases by reason of the trigger latch **22** being displaced therewith to engage the obstruction which, in this instance, is the inner top wall of the elongated handle housing **10** that causes the disconnect between the beams **20–21** upon being flexed to their preset load. Then the primary beam **20** must take over the full load and these occurrences cumulatively create a momentary interruption, a mild vibratory shock and some audible click due to the trigger disconnect and the release of the secondary beam **21** to impart a signal to the user who, thereupon, will stop any further turning to avoid an over-pull by continuing the application of force.

The effect of this is to cause a sudden relaxation of applied force to the drive end **12** as the user receives the audible and physical signal that the preset load has been reached. Normal relation of the instrumentalities then takes place due to the straight natural at rest attitude of the secondary beam **21** is resumed upon release of the tragger latch **22** which is then spring-urged to return to its initial position of engagement with the secondary beam **21**. This is aided by the primary beam **20** which also assumes a straight attitude upon release and user relaxation to slightly displace the trigger latch **22**

backwardly to assist in the re-latching of the trigger for again connecting the primary and secondary beams **20–21** in readiness for the next turning operation.

One object of the present invention is to simplify the construction and improve the operation of devices of the character mentioned.

Another object is to provide simple and compact preset torque measuring devices that are accurate, dependable in operation, and embodies improved presetting measuring means for accurately controlling the tightening load.

Still another object is to provide a torque turning tool having improved preset trigger control disconnect means with reacting wear compensating features to insure accuracy of measurements over an extended period of use.

A further object is to provide a self-contained torque measuring turning tool with simple and effective multiple scale calibrated instrumentalities cooperating with self-restoring preset elements to fasten nuts and the like to any predetermined degree of tightness within the capacity range thereof.

A still further object is to provide a torque wrench with a turning shank having a trigger release and self-restoring mechanical control for connecting and disconnecting cooperating beams in conjunction with multiple scale preset elements calibrated in the English and metric systems of measurements.

Still a further object is to provide an improved presetting and releasing torque wrench having a multiple scale ramp slide to mechanically interrupt the applied torque load at the preset value without the user's involvement therein.

Other objects and advantages will appear from the following description of an illustrated embodiment of the present invention.

In the drawing:

FIG. **1** is a side view in elevation of the device embodying features of the present invention.

FIG. **2** is an enlarged fragmentary sectional view in elevation of the device shown in FIG. **1** taken substantially along the longitudinal center line of FIG. **1.**

FIG. **3** is an enlarged fragmentary side view in elevation of the slide retainer rod within the handle member, parts thereof being broken away to clarify the illustration.

FIG. **4** is an enlarged fragmentary cross-sectional view in elevation of the adjustable multiple scale slide and ramp taken substantially along line IV—IV of FIG. **2.**

FIG. **5** is a fragmentary enlarged bottom view of the slide, ramp and retainer therefor taken substantially along line V—V of FIG. **3,** the ramp being shown in section to clarify the illustration.

FIG. **6** is an enlarged sectional view in elevation of the rod retainer cam taken substantially along line VI—VI of FIG. **3.**

FIG. **7** is an enlarged perspective view of the trigger release and connect mechanism mounted between the primary and secondary beams for operative connection with the preset instrumentalities.

FIG. **8** is a perspective development view of the associated parts constituting a sub-assembly of the multiple scale calibrated slide and ramp involving the preset elements, the ramp and slide being shown in modified form.

The structure selected for illustration is not intended to serve as a limitation upon the scope or teachings of the invention, but is merely an illustrative embodiment thereof. There may be considerable variations and adaptations of all or part of the teachings depending upon the dictates of commercial practice. The present embodiment comprises an elongated tubular handle member **10,** in this instance of rectangular cross-section, to also serve as a housing for instrumentalities to be hereinafter described. The forward end **11** has a projecting work engaging member **12** complementarily sized for closing the handle end **11** with minimum looseness to preclude interaction therebetween.

The housing projecting work engaging member **12** has a square bore **13** extending therethrough in a vertical direction to slidably receive a correspondingly shaped wrench socket engaging shank **14.** The shank **14** is preferably though not essentially fitted with properly spaced standard spring impelled ball detents **15–16** provided on the socket receiving shank **14** as clearly illustrated in the above identified copending patent application of which this is a continuatinuation-in-part. The bore **13** which slidably receives the shank **14,** has a minute recess **17** therein to cooperate with the ball detents **15–16** on the shank **14** to retain the latter in one of two extreme positions depending upon the direction of turning the socket (not shown) that may be required for tightening or loosening fasteners because the applied turning force is unidirectional with the flex beams involved in the structure to be hereinafter described. It should be noted that with the use of two ball detents **15–16** on the shank **14,** one detent **15** serves as an position indexing expedient therefor while the exposed ball detent **15** serves to retain the wrench socket thereon or vice versa depending upon the positioning thereof as more fully set forth in the above referred to copending patent application.

The work engaging head **12** is retained in the elongated housing-handle **10** by means of a pivot pin **18** which also permits slight pivotal movement thereof responsive to applying turning force thereto by means of the handle end application of manually applied turning force thereto, in the region of the reduced end region **19** thereof. As shown, the work engaging head member **12,** has in this instance, a flex beam **20** extending integrally therefrom and inwardly of the elongated handle member **10** for substantially the entire length thereof. This beam **20** serves as the primary bending or flexing beam which resists the turning movement applied to the handle **10–19** when the work engaging head has a standard wrench socket (not shown) on its shank **14,** in registry with a nut or other standard fastener.

A secondary and shorter bending beam **21** is fitted and attached by threaded studs **21'** in this instance two, proximate to the work engaging head **12** so that both beams **20–21** ultimately resist the turning movement applied through the handle member **10** as the preset load is approached and both beams **20–21** flex as will appear more fully hereinafter. The secondary beam **21** is approximately one-half the length of the primary beam **20,** in this instance, and their characteristics are such that the primary beam **20** flexes first to carry a trigger release mechanism such as a latch **22** (FIG. **7**) in connecting operative relation to the secondary beam **21.** The trigger latch **22** involves a substantially U-shaped inverted bifurcated member having vertical confronting lever arms **23** that terminate in horizontal

arms 24 that pivotally connect with the primary beam 20 disposed therein proximate to its midpoint through a lever arm bridging pin 25 serving as a mount therefor. The arms 23 of of the upstanding trigger latch 22 have elongated slots 26 therein to receive a bridging stop pin 27 to limit the pivotal movement of the trigger arms 23–24.

The upstanding trigger vertical arms 23–24 comprise an integral part of the bracket plate 28 to present a horizontally and forwardly projecting curved nib 29 thereon. The nib 29 is positioned in the path of and engageable with a stepped shoulder 30 provided on the end of the secondary beam 21 for tiltable connection and release relative thereto as will appear more fully hereinafter. A curved flat spring 31 is, in this instance, riveted at one end as at 32, to the trigger bracket plate 28 opposite to the nib 29 thereon. The curved flat spring 31 engages the upper edge of the primary beam 20 to normally tilt the trigger latch 22 in a counterclockwise direction (viewed from FIG. 7) to normally engage and provide for connection with the secondary beam 21 through the trigger latch nib 29 and the stepped secondary beam confronting end 30. This occurs by reason of the urge exerted by the curved flat spring 31 that positions the trigger latch 22 to provide for connection therebetween when the secondary beam extremity 30 is in the path thereof as the primary beam 20 is flexed to bring the trigger latch 22 in engagement therewith as an initial turning load is applied by manually turning the handle end region 19 in tightening a fastener such as a nut.

The trigger latching bracket 28 has an upstanding pin 33 extending upwardly therefrom to terminate in an angulated extremity formed by angular faces disposed substantially at 45° angles to define an edge directed toward the upper inside surface 35 of the tubular handle-housing 10 serving as a stop for further beam flexing and to momentarily release the secondary beam 21 from connection with the primary beam 20 by causing the trigger latch 22 to pivot in a clockwise direction (viewed from FIG. 7) against the urge of the curved flat spring 31 as will appear more fully hereinafter. By the same action when the latch pin 33 is out of contact with the interior housing wall 35 and the secondary beam 21 is free to assume its straight unflexed attitude, the spring 31 tends to latch the trigger nib 29 into engagement with the stepped shoulder end 30 of the secondary beam 21 whenever the latter's extremity 30 is proximate thereto. This occurs during the initial flexing of the primary beam 20 to more than one-half of the predetermined and preset load, and coincident thereto the secondary beam 21 will present its stepped end 30 for registry with the trigger's complemental nib 29 to establish their connection responsive to the urge of the spring 31.

Therefore, further increasing of the turning load from thereon will cause bending or flexing of both beams 20–21 and elevate the trigger latch 22 with its pin 33 until the latter is obstructed by the interior housing wall 35. When this occurs, the latched connection 29–30 becomes disconnected because the trigger latch 22 is pivoted in a counterclockwise direction, and a partial interruption to further turning the fastener takes place as the user thereupon receives an audible click of impingement and a momentary disconnect coincident therewith. The user immediately is alerted by both of these occurrences which evidences that the preset turning load has been reached and further turning is ceased. This momentary relaxation upon the part of the user, enables the secondary beam 21 to assume a straight attitude and the trigger latch 22 through the urge of its spring 31 will cause the beams 20–21 to again connect to enable the wrench to be again applied to another fastener to repeat the operation.

The primary beam 20 tends to return to its straight attitude and assists in the reconnection with the secondary beam 21 through the trigger latch 22, by providing the rearward extremity 36 thereof with a suitably curved elongated flat spring 37 which is riveted or otherwise attached thereto as at 38 by suitable fasteners 39 to constantly urge the primary beam 20 in a counterclockwise direction (viewed from FIG. 2) to normally retain the trigger latch nib 29 in engagement with the stepped end 30 of the secondary beam 21. Thus, the beams 20–21 are normally retained in connected engagement when they are both permitted to assume their straight initial attitudes to function as a single beam until the preset turning load has been attained.

To the end of providing a trigger latch release control, however, the end region 36 of the primary beam 20 has a shoe adjusting screw 40 fitted into a threaded aperture 41 so that its enlarged head 42 may loosely fit into a recess 43 provided in a trough-shaped shoe plate 44 for swaged connection. The shoe plate 44 complements the edge 45 of an adjustable ramp bar 46 that has a pivotal pin receiving hole 47 therein near one end thereof to receive a pin 48. The pin 48 has projecting ends beyond the solid ramp bar 46 for pivotally mounting the latter in aligned holes 49 provided in the sides of an open bottomed inverted substantially U-shaped channel slide 50. The channel slide 50 loosely receives the ramp bar 45 therein for pivotal mounting relative thereto on its pin 48. An elongated threaded set screw 51 is threadedly connected to an aperture proximate to the other end of the ramp bar 46 to enable angular positioning of the latter relative to the channeled slide 50 which are slidable as a unit within the handle housing 10.

Initial setting and calibration is effected by positioning the ramp 46 pivotally relative to the primary beam 20 by means of the swivelly connected screw-shoe 40–42 which permits linear displacement of the slide 50 within the handle housing 10 as well as angular adjustment by turning the set screw 51. To this end, the bottom wall 52 of the elongated handle housing 10 is provided with two screw driver inserting holes 53–54 spaced to correspond with the spacing of the ramp adjusting set screw 40–51 so that access thereto may be had in effecting the adjustment thereof and the final inspection for accuracy of the preset calibrated instrumentalities as will presently appear. It should be noted that the ramp 46 has an open bottom cross-slot 55 therein to accommodate a threaded screw 56 that extends through aligned apertures 57 in the calibrated inverted U-shaped slide 50. An enlarged thumb nut 58'' engages the threaded screw 56 to provide for the finger displacement thereof within the handle housing 10 for presetting the value at which the turning load will disconnect the secondary flex beam 21 from the primary flex beam 20.

The slide 50 has two opposed enlarged side walls defining the inverted U-shaped configuration, and these two opposed parallel walls afford multiple scale calibrations, in this instance four separate scales with the

English system of calibrations in inch and foot pounds 58–59 on one surface (FIG. 8) separated by the slide displacing finger engaging button 57. The opposite and similar parallel outside surface of the inverted U-shaped channelled slide 50 (not visible in FIG. 8), is provided with dual metric calibrations such as newtons (opposite to the inch-pound scale) and kilograms (opposite to the foot-pound scale), thereby affording the use of the wrenching device to preset values in dual capacity ranges for both the English and metric systems of measurements or possibly other special systems depending upon the dictates of commercial practice. To this end, the tubular handle housing 10 is provided with elongated rectangular openings 60–61 in the opposite side walls thereof in confronting relation to the calibrated opposite surfaces 58'–59' and their opposite counterparts on the slide 50 to enable viewing therethrough in presetting the desired turning load with reference to suitable indexing lines such as the arrows 62–63 etched or otherwise inscribed on the lower edges of the viewing openings 60–61.

In order to lock the selected position of the calibrated slide 50 to avoid accidental or other unauthorized resetting thereof, the slide 50 is in this instance provided with an inwardly offset wall terminus 64 to which a wire flexible rod 65 is suitably anchored to extend rearwardly through an aperture through an aperture in a bearing 66 fixed by set screws 67 in the reduced handle end region 19 of the tubular handle housing 10. The bearing 66 receives a stub shaft 69 journalled therein, and the latter in turn carries a circumferential cam 70 (FIG. 6) which has an arcuate notch 71 in the high region thereof to lock the extremity of the rod 65 and thus preclude any possible accidental displacement of the slide 50. The locking occurs as the rod 65 rides over the circumference of the cam 70 and is sprung into locked position as the shaft 69 is rotated by a knurled knob 72 serving as an end handle member enclosure for the reduced handle end region 19 in which it is journalled for attachment to the end of the stub shaft 69. In order to provide for the free sliding movement and displacement of the slide 50 inside of the handle housing 10 in the region of the rectangular viewing openings 60–61 by finger engagement with the slide buttons 57, the internal upper wall 35 of the housing 10 is indented as at 73–74 with slide spacing nibs in the confronting end wall thereof to avoid the accumulation of foreign substances and minimize friction to insure ready relative movement therebetween for changing the presetting responses of the instrumentalities.

It should be noted that the slide can be positively locked against displacement by the set screw 67 which extends through the wall of the reduced handle region 19 and also the radius of the bearing 66 to impinge against the flexible wire rod 65 so that positive locking occurs. There will be some wear between the relatively moving parts 29–30 of the trigger latch 22 as well as on the extremity of the upstanding pin 33–34 thereof, but these wearing regions are compensatory and commensurate so that the wear on elements 29–30, on one hand, and elements 33–34, on the other hand, are commensurate by design to insure accuracy in the precision measuring elements over an extended period of time.

It will be apparent from the foregoing that the primary beam 20 is supported between the pin 18 at the forward end thereof and the adjusting screw and shoe 40–44 through the intermediary instrumentalities such as the ramp 46, the channelled slide 50, and the adjusting screw 51. This support is assisted by the beam spring 37 that urges all of these instrumentalities toward the upper interior wall 35 of the handle housing 10. When the work engaging member 12 with its socket receiving shank 14, engages a fastener and turning force is applied in a clockwise direction viewed from FIG. 3, the primary beam 20 bends to carry the trigger latch 22 in the path of the secondary beam 21 so that engagement is effected between the latch nib 29 and the stepped secondary beam extremity 30–31 to cause beams 20–21 to flex as a unit until the trigger latch pin 33–34 which is moving closer to the interior end wall 35 of the handle housing 10 until the latter makes contact therewith and the latch trigger 22 disengages the secondary beam extremity 30–31 and with the disengagement of the beam 21 and the release thereof from the primary beam 20, the secondary beam 21 tends to assume its straight attitude and hits against the interior housing wall 35 to produce an audible click and a momentary vibratory mild interruption that is transmitted to the user's hand to signal that the preset torque load has been reached. The user immeidately relaxes his applied turning force and this permits the trigger latch 22 to again connect the primary and secondary beams 20–21 as both assume their straight attitudes. This insures that the parts have been restored to their initial position and the turning application of a preset torque load may be applied to another fastener.

Various changes may be made in the embodiment of the invention herein specifically described without departing from or sacrificing any of the advantages of the invention or any features thereof, and nothing herein shall be construed as limitations upon the invention, its concept or structural embodiment as to the whole or any part thereof except as defined in the appended claims.

I claim:

1. A preset torque wrench or the like comprising a rigid tubular handle member, a pair of superposed flex beams disposed along and within said elongated tubular handle member, a work engaging head member anchored to both of said flex beams and projecting within said tubular handle member, means for detachably connecting said flex beams together to share the torque load and to displace said first named means commensurate with the flex of said beams, said detachable means being displaced a fixed distance with said beams until actuated by engagement with a confronting wall of said tubular handle member to limit any further displacement thereof to effect the release of said beams from each other, and calibrated scale means adjustably associated with said handle member and operatively connected to one of said beams to control the flexing moment arm thereof, thereby presetting the load at which said detachable beam connecting means is actuated to release said beams from connected engagement to signal and momentarily arrest any further torque load turning of said work engaging member.

2. A preset torque load wrench defined in claim 1 wherein said calibrated scale means includes slidably and pivotally adjustable ramp means connected thereto for adjustable positioning relative to said beam to adjust the preset load limit at which said detachable connecting means is released.

3. A preset torque load wrench defined in claim 2 wherein said calibrated scale means is slidable relative to an opening in said handle member to preset the load limit of release for said detachable connecting means.

4. A preset torque load wrench defined in claim 3 wherein said calibrated scale means has spaced surfaces to receive multi-scale calibrations for viewing relative to an indexing point on said viewing opening to preset said detachable connecting means in a multiple of measuring systems.

5. A preset torque load wrench defined in claim 4 wherein means including an external control on said handle means operatively connect with said slidable calibrated means to selectively lock said latter means in any adjusted position.

6. A preset torque load wrench defined in claim 5 wherein said handle member has oppositely aligned multiple scale viewing openings therein, and said slide member has parallel surfaces for receiving calibrations in different measuring systems on each surface for viewing through said handle openings.

7. A preset torque wrench or the like defined in claim 2 wherein the superposed flex beams consist of s substantially longer primary flex beam and a shorter flex beam above the primary beam, and said independently operable detachable connecting means and ramp means are mounted on said primary flex beam to control the release of said shorter flex beam at a preset load.

8. A preset torque wrench or the like defined in claim 7 wherein said ramp means are pivotally mounted to a multi-scale slide mounted in said handle member.

9. A preset torque wrench or the like defined in claim 8 wherein adjustable screw means are mounted on said primary flex beam to control the pivotal position of said ramp means relative to said multi-scale slide displaceably mounted in said handle member.

10. A preset torque wrench or the like defined in claim 9 wherein means are provided on said handle member to lock said multi-scale slide in any preset position within the limits of its displacement.

* * * * *