

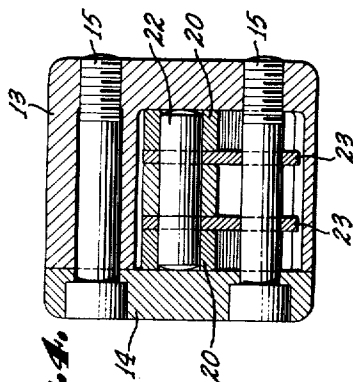
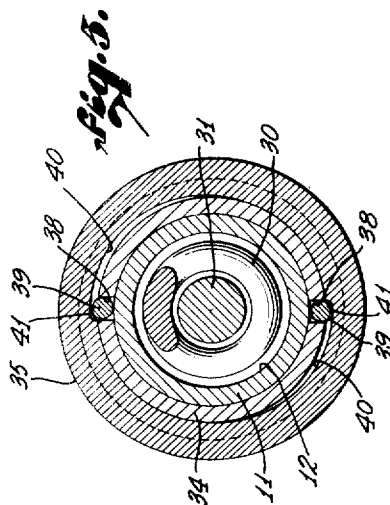
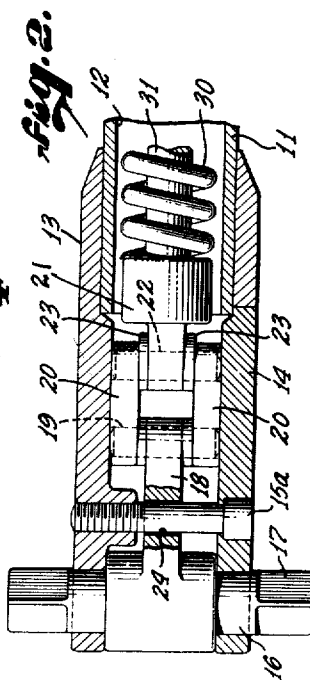
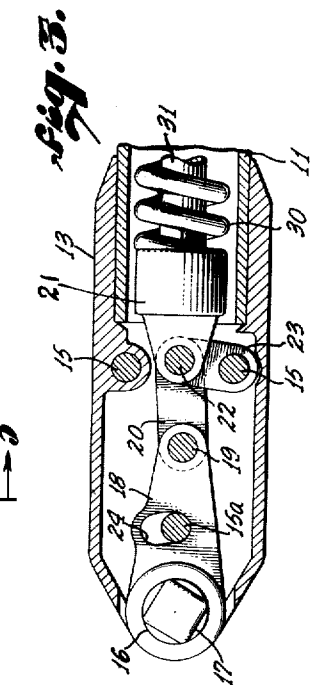
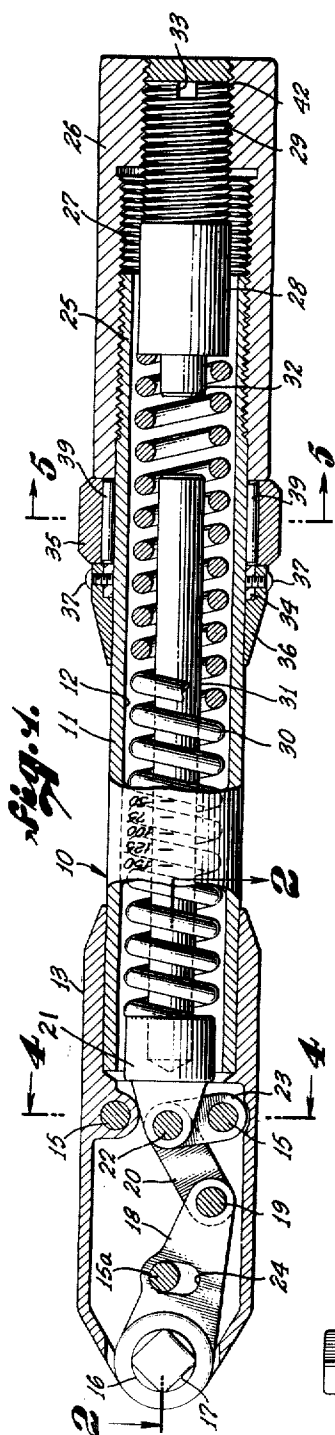
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2,667,800

ADJUSTABLE BREAK-THROUGH TORQUE WRENCH

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## UNITED STATES PATENT OFFICE

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ADJUSTABLE BREAK-THROUGH TORQUE  
WRENCH

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2 Claims. (Cl. 81—52.4)

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This invention relates to machinery and tools and more especially to a wrench of the limited torque type.

An object of the invention is to provide novel improvements in a wrench of the limited torque type.

Another object of the invention is to provide a torque wrench of improved type wherein a predetermined torque can be readily determined in use.

An additional object of the invention is to provide a novel torque wrench wherein the limit of desired torque can be readily indicated and the tool adapted for adjustment to varying amounts of predetermined torque values.

Another object of the invention is to provide a torque wrench of novel construction of the break through type that is adjustable as to break through torque values and is adjustable as to a plurality of such values and having features for locking adjustment against accidental shifting.

Other objects and advantages will appear and be brought out more fully in the following specification, reference being had to the accompanying drawing.

In the drawing:

Figure 1 is a longitudinal sectional view of an embodiment of the present invention.

Figure 2 is a sectional view taken along the line 2—2 of Figure 1.

Figure 3 is a partial view in section showing the toggle link features seen in Figure 1, shown in position after operation.

Figure 4 is a sectional view taken along the line 4—4 of Figure 1.

Figure 5 is a sectional view taken along the line 5—5 of Figure 1.

In the drawing the numeral 10 designates generally a wrench of limited torque embodying the present invention and comprising a tubular body and handle member 11 formed with a bore 12, open at both ends. A shell 13 is suitably secured to body member 11 at one end and is provided with a side plate 14 secured to the shell by a plurality of bolts 15.

Shell 13 and plate 14 provide bearings for a spindle 16 having square ends 17 for engaging the sockets of socket wrench elements, a lever arm 18 being integral with spindle 16 and having a pivot connection 19 to one end of a link 20. A cylindrical element 21 has a pivot connection 22 to link 20 and a link 23 is connected between the pin of pivot 22 and one of the shell bolts 15. Lever arm 18 is formed with a slot 24 through which extends one of the shell cover bolts 15a,

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which serves to limit the movement of the lever arm.

Member 11 has a threaded end portion 25 and a sleeve member 26 has a threaded bore portion 27 engageable with threads 25 of member 11. Sleeve 26 has a threaded reduced bore 42 and a cylindrical spring seat element 28 has a threaded end portion 29 engaging in threaded portion 42 of the sleeve. A compression spring 30 is positioned in bore 12 and seats against seat element 28 and cylindrical element 21, a guide stem 31 for the spring being secured to element 21 if desired. Element 28 may have a similar spring guide stem 32 if desired. Seat element 28 is formed with a screw driver slot 33 to permit longitudinal adjustment of element 28 in the sleeve.

Sleeve 26 has a tubular end portion 34 into which extends a portion of body member 11, the outer diameter of which portion 34 is reduced and a cam collar 35 is rotatable on this reduced portion. A holding collar 36 for cam collar 35 is secured on end portion 34 as by screws 37. Portion 34 is formed with a pair of longitudinal slots 38 in each of which is positioned a bearing roller 39 and sleeve 35 is formed with cam surfaces 40 of graduated diameters and is also formed with shoulders 41 for engaging rollers 39. Thus when collar 35 is rotated to the left as seen in Figure 5 cam surfaces 40 will engage rollers 39 and cause a locking engagement of the rollers with body member 11 and prevent a rotation of sleeve 26 on body member 11. Conversely when collar 35 after being thus locked is rotated to the right to the position as seen in Figure 5, the locking engagement is released and the sleeve 26 can be turned so as to either increase or decrease the compression of spring 30 in its engagement with element 21. Collar 36 may be provided with scale indicia or other marking which will indicate the actual torque which the wrench will apply before operation of the toggle joint. In order to change the initial settings of this torque, seat element 28 may be adjustably positioned in sleeve 26 by use of the screw driver slot 33 as will be obvious.

In the operation of the invention a wrench socket element or other tool may be connected to the lower end 17 of spindle 16, for example, and upon right hand rotation of the wrench as seen in Figure 2, a torque will be applied to the connected tool and upon the limit of torque being reached as determined by the particular setting of sleeve 26, toggle link 18—20 will shift to the position shown in Figure 3, the movement of link 18 being limited by bolt 15a engaging the end of

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slot 24. This toggle link movement can be readily felt and heard by the operator of the tool and he will know that the indicated torque has been reached. The wrench 10 can however be given further tightening rotation if the operator particularly desires to do this, however he will be aware that this applied torque is in excess of that indicated by the setting of sleeve 26. It will be seen from Figure 3 that pin 19 which connects link 18 and link 20 does not move to the center line of spindle 16 and pin 22 and therefore upon release of the applied torque the toggle link will be sprung back to the position shown in Figure 1.

While in the foregoing there has been shown and described the preferred form of this invention, it is to be understood that minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

I claim:

1. In a torque wrench of the class described, a hollow shell open at its ends and at one of its sides, a cover plate closing the open side, several bolts passing through the shell removably securing said cover plate in place, a transverse tool spindle mounted in one end of the shell, an arm extending inwardly of the shell from said spindle, a tubular body having an end secured in the other end of the shell, a reciprocating stem within said body, a cylindrical head carried at one end of said stem and having a reduced portion projecting into the shell, a pair of laterally disposed links pivotally connected with one of said bolts at one of their ends and at opposite sides of said reduced portion, a second pair of links pivotally connected at one of their ends at opposite sides of said reduced portion commonly with the first pair of links and at their other ends with and at opposite sides of the free end of said arm, said arm and said links constituting a form of toggle, a sleeve, constituting a handle, telescoped on the other end

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of said body and in threaded engagement therewith, a compression spring within said body and encircling said stem with one end bearing against said head, an adjustable member, constituting a seat for the opposite end of said spring, within the other end of said body and having threaded engagement with the outer end of said sleeve, so that by reversely turning the latter relatively to the body, the compression of the spring will be correspondingly varied, and cooperative means mounted on said body and said sleeve for locking the latter against relative turning movements with respect to the body.

2. The invention as defined in claim 1, with the said locking means comprising an annular cam element mounted for turning movements on the inner end of said sleeve, the inner end of said sleeve having a pair of oppositely disposed longitudinal slots underlying said cam element, a roller engaged in each of said slots and having contact with the surface of said body, and an adjustable stop collar mounted on said body in abutted relation with respect to the adjacent ends of said sleeve and the cam element.

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