

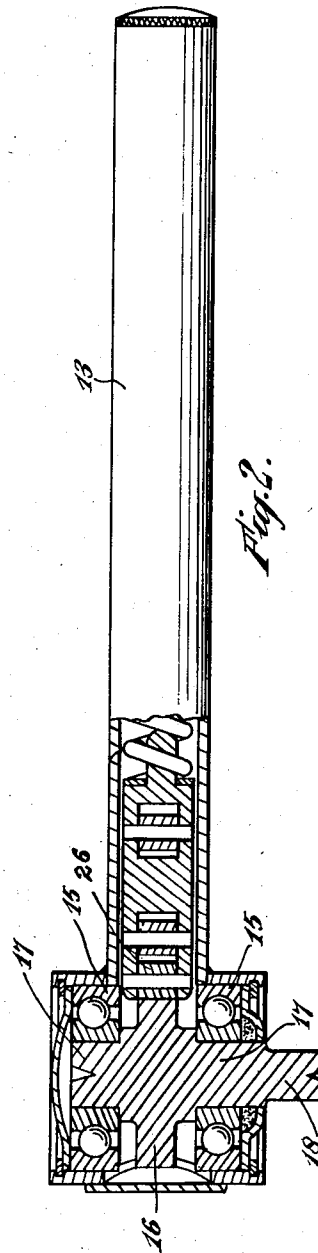
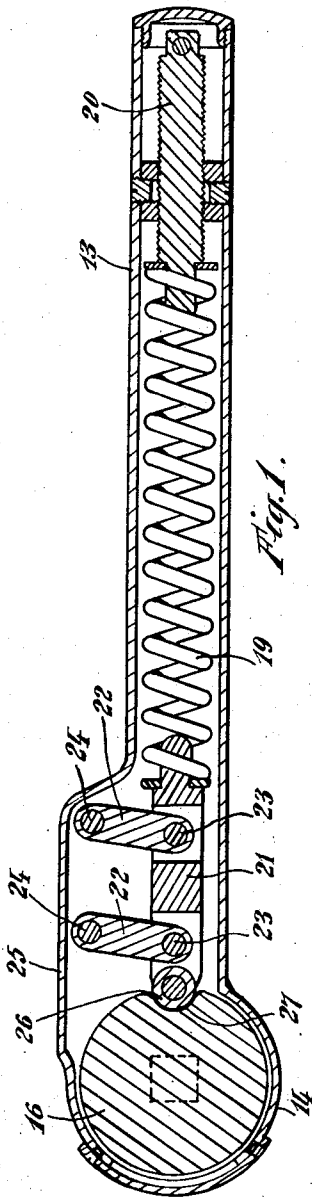
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TORQUE WRENCH WITH OVERLOAD RELEASE MEANS

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TORQUE WRENCH WITH OVERLOAD
RELEASE MEANS

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This invention relates to improvements in torque wrenches such as are used where it is important in tightening a nut on a bolt or stud that a definite amount of tension is exerted, in order that the part or parts to be secured by the nut and bolt or stud are firmly and permanently secured together. It will be apparent that in tightening a nut with a torque wrench, a certain optimum torque may be applied, which whilst giving sufficient tension must not approach the value at which the bolt or stud may break under the tension applied. In cases where it is vital that an exact safe tension be applied, such as in automobile or aero engines, some means must be provided, whereby the amount of tension on the bolt or stud is controlled.

The object of the present invention is to provide a simple but reliable wrench which may be used readily as in the manner of an ordinary wrench, but does not permit the desired tension to be exceeded by the person operating the wrench. It is a further object of the invention to provide a means, whereby a considerable range of tension may be effected by a simple adjustment to the wrench.

According to the invention the torque wrench comprises a lever handle furnished with a head at one end constituting a housing for a cam rotatable therein, said cam having means for receiving a socketed head or jaw and resilient means bearing on said cam to restrict the rotation thereof.

Preferably, the lever handle is of tubular form to receive a spring adapted to bear on a roller engaging in a recess in the rotatable cam. The handle is fitted with a head which embraces the cam and provides a bearing surface therefor, the cam being enclosed by side plates through one of which a squared lug projects for engagement with the known type of castellated nut, socketed head or jaw. The spring loading applied to the roller holds the cam against rotation until the leverage is sufficiently great to cause the cam to rotate so that no further movement is applied to the castellated nut, socketed head or jaw.

In order that the invention may be clearly understood, reference is directed to the accompanying drawings, wherein:

Fig. 1 is a longitudinal section of one form of torque wrench according to the invention,

Fig. 2 is a similar view to Fig. 1 at right angles thereto.

The arrangement according to the invention shown in Figures 1 and 2 of the drawings illustrates one form of torque wrench for use with a

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detachable jaw which may be attached by insertion on to a lug or other convenient means at the head of the wrench. The torque wrench comprises a tubular lever handle 13 fitted with a head 14 which serves as a housing for a pair of ball races 15, 15 which support a cam 16.

The cam is formed with a pair of trunnions 17, 17 which engage the inner races of the ball bearings one of the trunnions being extended as at 18 to provide a squared end for engagement with a socketed head or jaw. The lever handle 13 houses a spring 19, one end of which is engaged by an adjustable plug 20 and the other end of which bears on a tappet or rocker member 21. The member 21 is suspended by means of a pair of links 22, 22 to which it is pivoted at 23, 23 the other ends of the links being pivoted at 24, 24 within an enlargement 25 formed in the head of the wrench, the member 21 is thus capable of swinging to and fro against the action of the spring 19 when moved by the cam 16. The member 21 rotatably supports a roller 26 which engages a concave part 27 formed in the periphery of the cam 19.

An advantage arising from the invention is that friction due to moving parts of the device is considerably reduced. Friction may be reduced further by mounting the links 22 and roller 26 on needle type roller and bearings.

Principle of operation of the torque wrench is as follows:

The torque is built up through the compression of a spring acting on a pivoted rocker member which carries a roller. A plunger holds the spring under compression and through the medium of the roller running over the contour of a special cam sets up a torque reaction which reaches its maximum just before the roller reaches the concentric track of the cam.

When the roller has reached the concentric track of the cam, the torque reaction breaks down, and as there is no further contour for the roller to run up, the roller runs round the cam, until it again reaches the cavity in the cam, into which it is now pushed by the spring.

The wrench is now ready for another torque test, and depending on the number of cavities or cam contours situated round the operating cam so will there be an equivalent number of torque impulses per revolution of torque wrench handle round the axis of the cam.

Thus, if a suitable attachment is fitted to the cam centre, such as a socketed head, or jaw, the torque reaction set up by rotating the wrench handle around the axis of the cam, will be trans-

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mitted to the nut or bolt, through the medium of the socketed head or jaw and will thus accurately torque load said nut or bolt to the pre-set loading of the spring.

What I claim and desire to secure by Letters Patent is:

1. A torque wrench comprising a hollow handle, a hollow head at one end of the handle, a rotatable cam mounted in said head, said cam having a recess in its peripheral surface and axial means for engaging a member to be rotated by said wrench, a rocker member pivotally mounted in said head on a pivot which is disposed in offset relation to the axis of the handle, a roller carried by said rocker member, and spring means within the handle biasing said rocker member to normally hold the roller within the recess in the cam so that the cam will move with the handle as a unit when less than a predetermined torque is applied to the cam, and when a torque in excess of the predetermined torque is applied to the cam the roller will ride out of the cam recess and over

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the periphery of the cam and the handle will move relatively to the cam.

2. A torque wrench according to claim 1 wherein the force of the spring means is transmitted through the rocker member to the roller in a direction substantially parallel to the axis of the handle.

3. A torque wrench according to claim 1 wherein the pivotal mounting for the rocker member is provided by a pair of parallel links.

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