Dec. 8, 1936. K. PFEIFFER 2,063,622

PRESSURE INDICATING WRENCH

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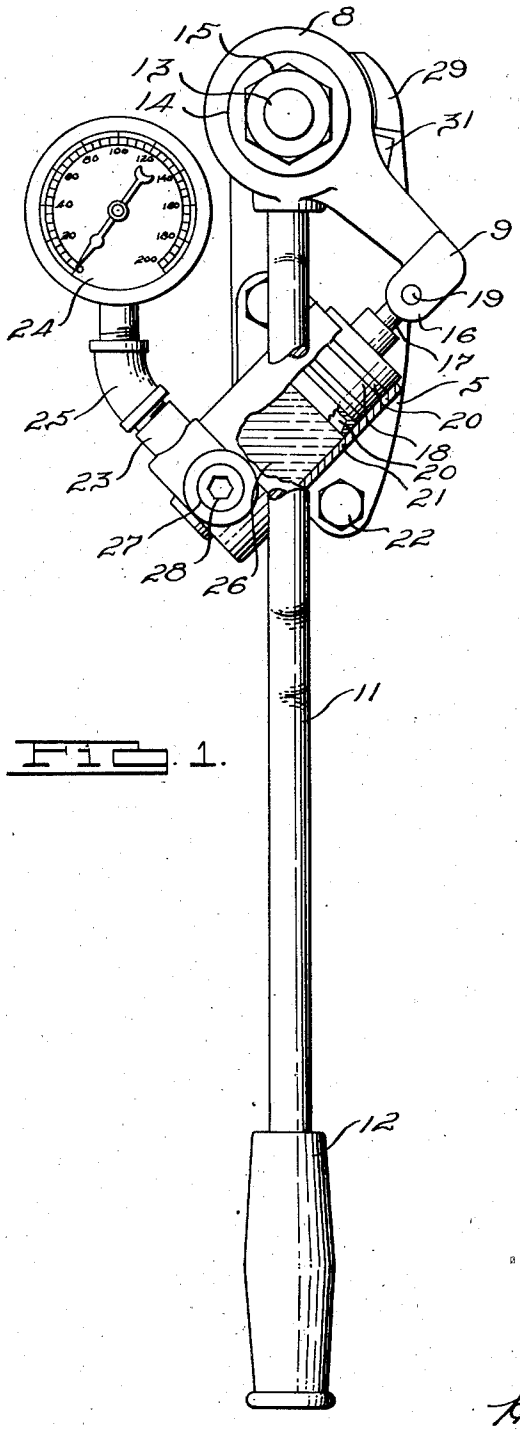


Fig. 1.

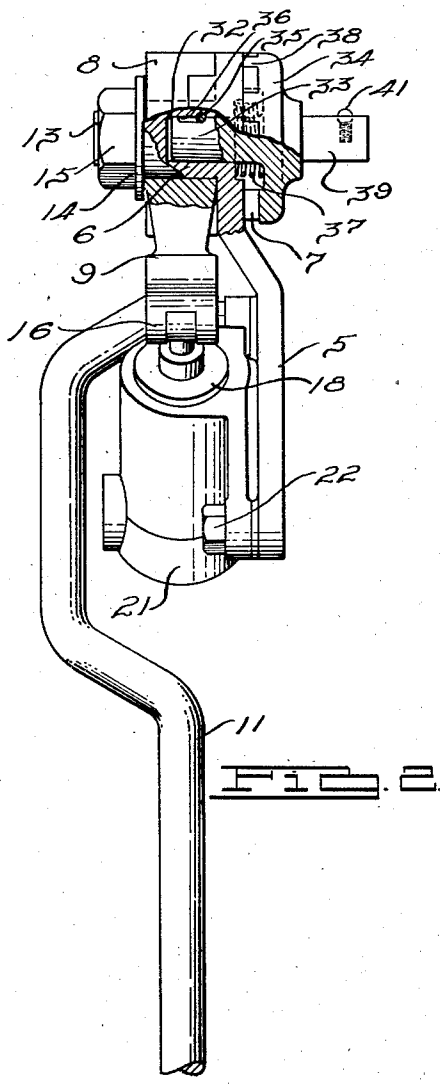


Fig. 2.

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PRESSURE INDICATING WRENCH

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2 Claims. (Cl. 265—1)

My invention relates to wrenches and particularly to a wrench which indicates the amount of pressure which is applied to a stud, nut or like element.

Power wrenches have been employed heretofore wherein a fluid was utilized as a means for applying a pressure to tighten a nut, screw or bolt. It is also known that certain friction type of wrenches have been employed which can be set to apply a predetermined pressure above which no force can be exerted.

In practicing the present invention, I employ a wrench whereon any amount of pressure desired may be applied, a gauge being employed to record the amount of pressure so that the operator may be able to apply the same pressure to others of a series of studs, screws, bolts, nuts or like elements.

Accordingly, the main objects of my invention are; to provide a wrench by which a pressure is applied to a nut engaging end through pressure means which indicates the amount of pressure exerted; to provide a wrench having a head which may be adjusted to various positions relative to the wrench so that the wrench may be operated through a limited space to tighten an element; to provide a stop between the actuated and operated end of the wrench so that it may be employed to loosen screws, nuts or bolts once they have been set; to provide a wrench which accurately indicates the pressure applied to tightening a nut, stud or the like, so that a series thereof may be tightened an equal amount, and in general to provide a wrench which is rigid in construction, accurate in indicating the pressure applied, and which is economical of use and manufacture.

Other objects and features of novelty of my invention will be either specifically pointed out or will become apparent when referring for a better understanding of my invention to the following description taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a plan view, partly in section, of a wrench embodying features of my invention, and Fig. 2 is a view in side elevation of the structure illustrated in Fig. 1, with parts in section.

In the figures, I have illustrated a bracket 5 having an extending boss 6 and spaced oppositely extending lugs 7. Upon the boss is rotatably mounted a hub 8 having an extending arm 9 thereon and an extending handle 11 by which the wrench is operated. A hand grip 12 may be provided on the end of the handle 11, as illustrated in Fig. 1. The end of the boss 6 is provided with a threaded stud 13 upon which a washer 14 is retained by a nut 15 to retain the hub 8 on the boss 6 for pivotal movement.

The arm 9 is provided with a bifurcated end portion 16 to which a piston rod 17 of the piston 18 is loosely pivoted by a pin 19. Some play is provided between the end of the rod 17 and the pin 19 to permit the arcuate movement of the arm 9 without binding the piston 18. The piston 18 is provided with suitable sealing rings or packings 20 to prevent the flow of fluid thereby. The piston is sealed within the walls of a cylinder 21 which is fixed to the bracket 5 by suitable means herein shown as bolts 22. The opposite end of the cylinder is provided with an outlet opening 23 to which a gauge 24 is supported by a suitable conduit 25. A fluid 26, preferably oil, is introduced into the cylinder through an opening 27 sealed by a plug 28. The bracket element 5 carries a fixed stop 29 which is engaged by a stop 31 on the arms 9.

The boss 6 is provided with a cylindrical aperture 32 in which a cylindrical projection 33 of a driving head 34 is positioned for longitudinal movement. The longitudinal movement is limited by a ball 35 operating in a slot 36 contained within the wall of the cylindrical projection 33. A spring 37 is disposed between the head 34 and the bracket 5 for the purpose of biasing the head 34 outwardly to have projections 38 on the head 34 clear the projections 7 on the bracket 5. The projections 7 and 38 interfit with each other and in this manner the tool and head are separated and revolved to a new mated position so that the head may be turned through a small degree repeatedly without removing the wrench from the element to be tightened. The end of the head 34 terminates in a square shank 39 having a spring pressed ball 41 therein for receiving a nut-engaging element which is retained on the shank 39 by the ball 41 in a conventional manner. It is to be understood that a ratchet and pawl can be substituted for the projections 7 and 38 when desired.

The wrench was constructed primarily to be used in the automotive trade for the purpose of applying an equal force to all of the studs or nuts which retain the cylinder head on the engine block. It was found from actual test that the uniform tightening of the clamping element of the head is desirable to uniformly distribute stresses over the engine block, the cylinders of which were found to warp as much as .003 to .004 out of round when the head is attached.

When the wrench is employed with the leveling and clamping plate as set forth in the patent of

K. W. Connor, No. 2,006,158 issued June 25, 1935, the assignee of the exclusive licenses under the present application, further advantages are provided. Since the clamping of the plate sets up strains in the cylinder which will be set up therein when the cylinder head is clamped to the block in service, the cylinder will be accurately finished to a circular form while under the service stress condition. After the grinding and the stresses are relieved, the cylinders will not be exactly round but will be returned to cylindrical shape when the head is screwed down with the same pressure as was applied to the clamping plate before the grinding and finishing operation. For this reason, the wrench is an accurate check of the loading of the studs or nuts of the plate and head before and after the grinding operations, respectively, and in this manner assurance will be had that the cylinders will be exactly round when the cylinder head is screwed upon the engine block.

The present wrench is rigid in construction and accurate in indicating the torsional pull applied as an arbitrary number or in foot-pounds load. I have shown an ordinary gauge which indicates the pressure as an arbitrary number and not the exact foot-pound load applied in torsion to the nut. When desired a dial may be employed which reads the actual torsional loading in foot-pounds applied to the nut or stud. Since, however, the wrench in the present instance is employed to apply a similar load on all of a series of nuts, the mere indicating of the pressure gives accurate indication of the similarity of force applied thereto.

While I have described and illustrated but a single embodiment of my invention, it will be apparent to those skilled in the art that various changes, additions, omissions and substitutions may be made therein, such for instance, as using a cylinder with a vein therein which operates through a liquid to turn a vein and the nut engaging head and having a gauge mounted directly thereabove in direct communication with the liquid within the cylinder, all of which may be effected without departing from the spirit and scope of my invention, as set forth in the accompanying claims.

I claim as my invention:

1. An indicating wrench including an element engaging portion having a portion adapted to engage an element to be rotated, said element engaging portion having a cylinder secured thereto, the axis of the cylinder being disposed substantially tangential to a circle whose center lies in the axis of said element engaging portion, an operating handle pivotally connected to said element engaging portion coaxially therewith, a piston in said cylinder operatively connected with said handle and a fluid pressure gauge communicating with the interior of said cylinder to register the torque applied to said element engaging portion by said handle.

2. An indicating wrench including an element engaging portion having a portion adapted to engage an element to be rotated, said element engaging portion having a cylinder secured thereto, the axis of the cylinder being disposed substantially tangentially to a circle whose center lies in the axis of said element engaging portion, an operating handle pivotally connected to said element engaging portion coaxially therewith, a piston in said cylinder, a piston rod connected to said piston and operatively engaging said handle, fluid within said cylinder for transmitting torque applied by said handle to said element engaging portion and a pressure gauge in communication with the interior of said cylinder for indicating the pressure of the fluid therein and consequently the magnitude of such torque.

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