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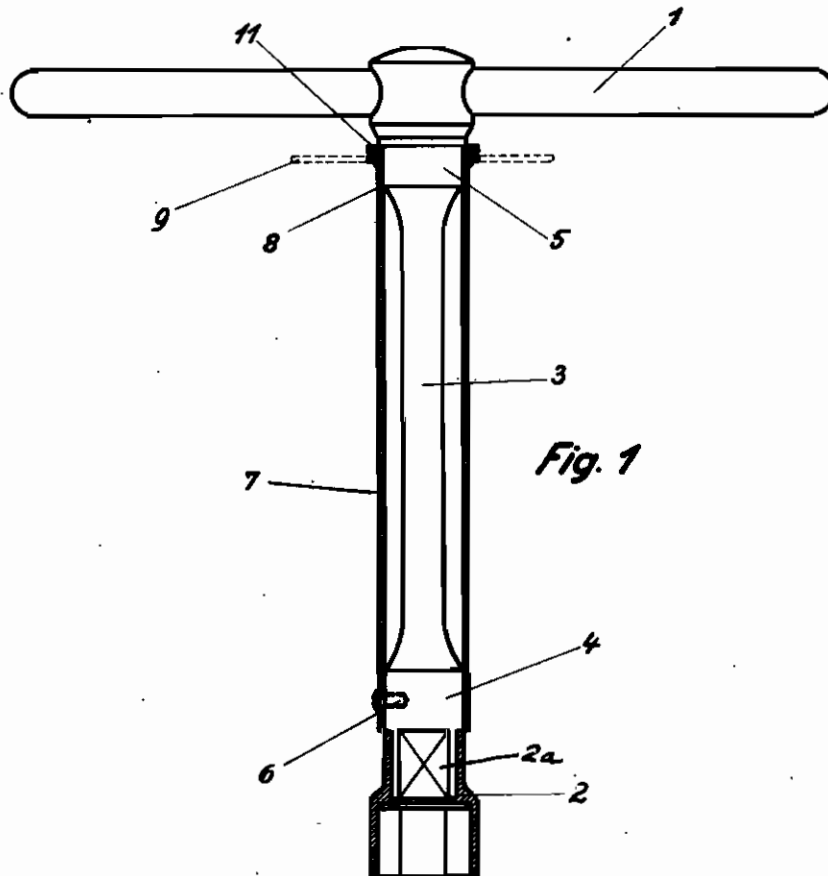


Fig. 1

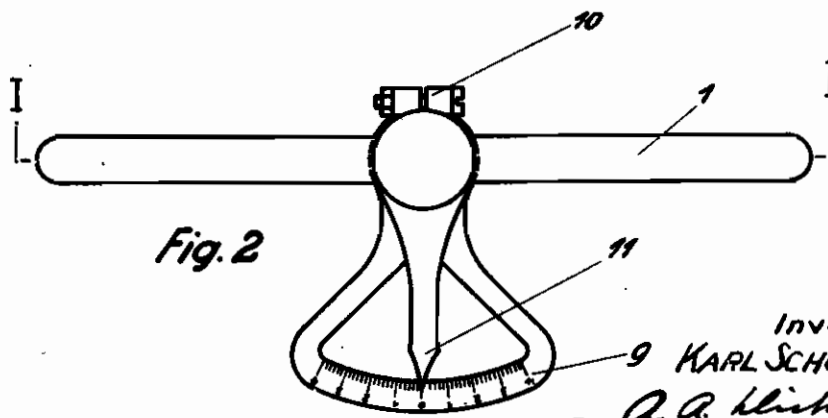


Fig. 2

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The present invention relates to improvements in wrenches and particularly to socket wrenches.

It is an object of the invention to provide such wrenches which indicate the amount of torque exerted by the wrench when applied to nuts, bolts, lag screws or the like.

It is another object to provide an improved wrench embodying a torsion bar as an element thereof to transmit and measure the torque exerted thereby.

It is another object to provide in such a structure means connected to opposite ends of said torsion bar to indicate the amount of twist and therefore the torque transmitted thereby.

It is another object to provide such a wrench including a tubular housing which may conveniently perform the function of protecting the relatively thin torsion bar against injury as against undue bending stresses, and also serve at the same time to support one of the elements of the indicating device to show relative movement between the upper and lower ends of the torsion bar and thus to indicate the amount of torque.

It is another object to provide such a wrench in which the indicating device is located at the upper end thereof where it may be easily read.

A further object is to provide such a wrench of slender construction so that it may be entered into and rotate within narrow spaces.

Another object of the invention is to provide a construction in which either or both of the elements of the indicating device, such as a scale and pointer, may be adjustable to permit relative readjustment thereof to take care of any permanent twisting or set of the torsion bar.

Other objects will appear from the following description of an illustrative embodiment of the invention taken together with the attached drawings wherein:

Fig. 1 shows a wrench embodying the invention, the socket member and surrounding sleeve being shown in vertical cross-section taken on the line 1—1 of Fig. 2, whereas

Fig. 2 shows a plan view thereof.

Referring to said figures, the numeral 1 indicates a usual or suitable type of operating handle serving to rotate one or another of a number of interchangeable sockets 2 which engage with the usual squared end 2a which may be formed as an integral part of the torsion bar 3, having an enlarged lower portion 4 and enlarged upper cylindrical portion 5, to which the handle 1 is attached. The portion 3 is preferably accurately finished by grinding and polishing to give a fine smooth accurate surface.

The invention contemplates the provision of any suitable cooperating means attached respectively to opposite ends of the torsion bar to indicate the amount of twisting and therefore the torque at any time. In the form shown this takes the form of the tube 7 which surrounds the torsion bar 3 and which is attached to the enlarged portion 4 as by means of a screw 6. The upper end 6 of said tube is journaled upon the enlargement 5 and serves to carry one of the cooperating indicating elements such as the scale 9, over which plays the pointer 11 which is shown as attached to the enlarged end 5, being clamped thereto for relative rotary adjustment as by the clamp 10. These parts are so arranged that when the wrench is not subjected to torsion, the pointer 11 will lie over the zero point of the scale.

As shown, the scale is preferably graduated in both directions from the zero point so that it will serve to indicate not only the torque when the screw or nut is being tightened but also the reverse torque when unscrewing occurs.

It is, of course, to be understood that the scale might be attached to the part 5 and the pointer connected to the sleeve 7. Various other modifications are to be regarded as coming within the principles of the invention. For example, the torsion transmitting element 3 may take the form of a tube which is especially desirable in cases where the wrench is to be made relatively short. In such cases, the torsion element may consist of a series of nested sleeves, the ends of which are so connected together as to operate in series whereby even a short wrench may be made to provide a considerable twisting motion so as to produce considerable scale movement and thereby permit more exact reading of the scale indications.

Other obvious possible modifications are that the scale may be provided with adjustable sliders so that when a predetermined torque has been applied that fact may be readily recognized or sliders may be provided which are moved by the pointer 11 so that the amount of torque applied may be read subsequently.

An important advantage is that the surrounding tube 7 not only provides means for holding one of the scale devices 9 or 11 but also serves to give rigidity to the wrench and to protect the torsion member 3 against bending. This is especially important as in many cases the member 3 must be made of rather small diameter.