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AXIAL IMPACT TYPE ROTARY TOOL

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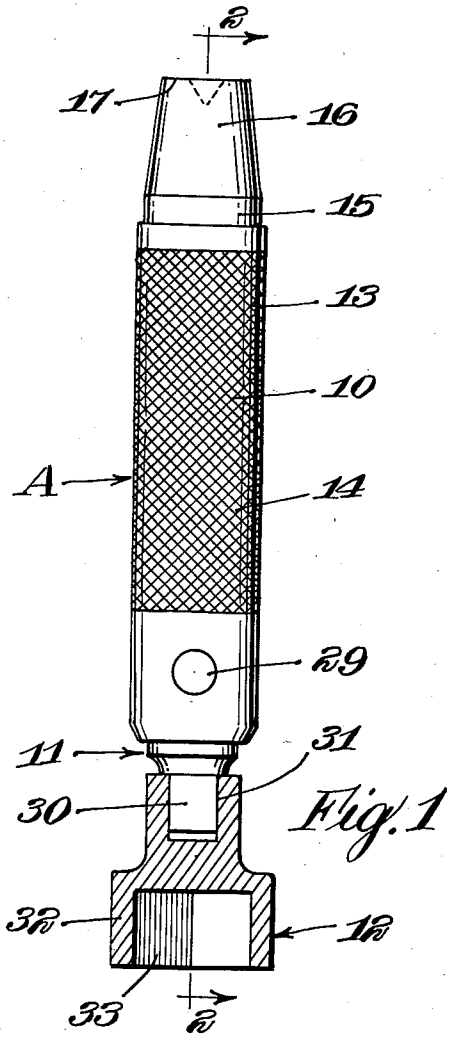


Fig. 1

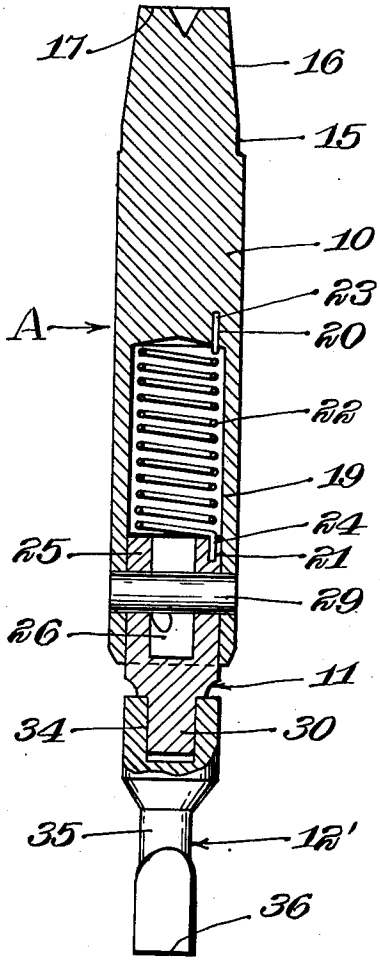


Fig. 2

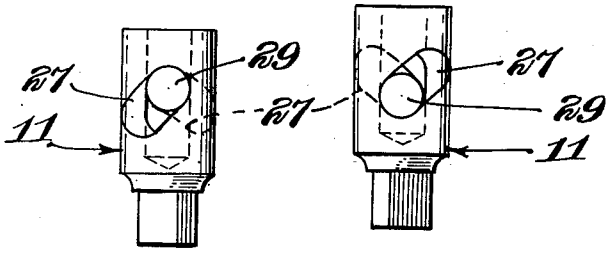


Fig. 3 Fig. 4

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AXIAL IMPACT TYPE ROTARY TOOL

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1 Claim. (Cl. 81—52.3)

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Our invention relates to an improvement in axial impact type rotary tool wherein it is desired to provide a simple and efficient means of loosening screws and bolts.

The object of the present invention is to provide a simple apparatus for loosening screws and bolts and particularly those which are difficult to loosen. Many screws and bolts become rusted in place so that extreme difficulty is experienced in loosening them. As a result the bolts often must be cut or drilled away, requiring considerable valuable time and effort. With our apparatus most screws and bolts so anchored may be loosened with a single hammer blow, thus avoiding the previous difficulty.

A feature of the present invention lies in the provision of a screw and bolt loosening apparatus including a handle portion and a cam portion connected thereto. The handle portion is connected to the cam portion in such a way that a longitudinal blow on the handle portion will cause a twisting movement of the cam portion, thus transferring a sharp blow into a sudden twisting movement. This twisting movement is usually sufficient to loosen bolts or screws.

A feature of the present invention lies in the fact that the cam portion of the apparatus is largely enclosed within the handle portion thereof, thus preventing injury to the hands of the operator during the operation of our tool. The cam portion is connected to the handle portion by means of a transverse bar which is secured in fixed relation to the handle. An inclined slot is provided through each side of the cam portion. Upon longitudinal movement of the handle portion relative to the cam portion, the cam will be forced in a rotative direction by the pin, thus creating the required twisting action. The cam is positioned within a socket in the handle, and in axial alignment therewith. Thus the force of the blow is centered directly upon the cam. As the cam is centered with the bolt or screw loosening tool, the blow is transmitted centrally thereto, thus holding the tool in place during its rotative movement.

A feature of the present invention lies in the provision of a torsion spring interposed between the handle and the cam portion. This torsion spring tends to hold the cam portion in projected position ready to be twisted by a relative longitudinal movement between the handle portion and the cam portion.

A further feature of the present invention lies in providing a multi-sided axial lug on the cam portion of any tool designed to be accommodated

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in a corresponding socket of a screw driver shank or socket wrench. As a result the cam portion may be fitted with a axial screw driver shank for loosening screws and the like, or may be equipped with a socket wrench fitted for accommodating bolts or nuts of various sizes.

These and other objects and novel features of our invention will be more clearly and fully set forth in the following specification and claim.

In the drawings forming a part of our specification:

Figure 1 is a side elevational view of our screw and bolt loosening device, a portion thereof being shown in section.

Figure 2 is a vertical section through the apparatus of Figure 1 on the line 2—2 of Figure 1, a different head being shown thereupon.

Figure 3 is an elevation view of the cam portion of our loosening device in one extreme position.

Figure 4 is a view similar to Figure 3 showing the cam portion of the loosening device in its other extreme position.

The screw and bolt loosening device A includes a handle 10, a cam element indicated in general by the numeral 11, and a head portion indicated in general by the numeral 12. The head 12 is removable and replaceable with a head of a different size or shape.

The handle portion 10 comprises an elongated shank 13 preferably being knurled or otherwise roughened on its exterior surface as indicated at 14. The upper extremity of the handle 13 is preferably provided with a portion 15 of reduced diameter terminating in a tapered upper extremity 16. The upper extremity 16 is provided with a flat or slightly rounded end surface 17 which may be struck by a hammer or other percussion instrument. The handle body 10 is provided with a coaxial socket 19 which extends a considerable distance into the handle from the lower end thereof on the end opposite the surface 17. The cam element 11 fits snugly within the socket 19 and is slidable and rotatable therein. An aperture 20 is provided in the handle body at the base of the socket 19, and a second aperture 21 is provided in the inner extremity of the cam element 11. A torsion spring 22 is positioned in the socket 19 having one end 23 thereof anchored in the aperture 20 and the other end 24 thereof anchored in the aperture 21. The torsion spring tends to urge the cam element 11 in one rotative position for a purpose which will be later described in detail.

The cam element 11 comprises an upper end 25, preferably formed in the shape of a sleeve

having an axial recess 26 therein. This sleeve 25 is provided with a pair of inclined slots 27 in the wall thereof. A pin 29 extends through the handle 10 near the lower extremity thereof and extends through the slots 27 in the sleeve 25. The slots 27 are so arranged as to guide the cam element 11 in a rotary direction as the pin moves through the length of the slots 27. In other words, longitudinal movement of the cam element 11 relative to the handle 10 will cause the cam element to rotate throughout a predetermined angular distance. The torsion spring 22 is so constructed and arranged as to urge the cam element outwardly of the handle 10. In other words, the cam element 11 normally projects from the handle 10 in the manner illustrated in Figures 1, 2, and 3 of the drawings. However, if the cam element 11 is held from longitudinal movement and the end 17 of the handle 10 is struck with a hammer or similar instrument the cam element 11 will be rotated into the position illustrated in Figure 4 of the drawings. At the completion of the blow the spring 22 will tend to urge the cam element 11 into its original projected position as shown in Figures 1, 2, and 3.

The outer end of the cam element 11 is provided with a multi-sided projecting lug or shank 30 which is engageable in a similarly shaped socket 31 of the bolt or nut engaging device 12. As illustrated in Figure 1 of the drawings this device 12 may be provided with an enlarged end 32 having a multi-sided socket 33 therein for accommodating a nut or the head of a bolt. Alternatively as illustrated in Figure 2 of the drawings the nut loosening device 11 may be removed and the element 12' substituted therefor. The element 12' includes a multi-sided socket 34 identical to the socket 31 and designed to receive the shank 30. The device 12 also includes a shank 35 aligned with the socket 34 and bearing a wedge shaped end 36 in the nature of a screw driver. The element 12' may be used for loosening screws having slots therein by engaging the wedge shaped head 36 in the slot of the screw driver and causing rotation thereof.

The operation of our tool is believed obvious from the foregoing description. The shank 30 is fitted with a suitable element 12 or 12' to fit the nut, bolt head, or screw slot of the bolt or screw to be loosened. The tool is then applied to the element to be loosened by either engaging the bolt head or nut in the socket 33 or by engaging the wedge end 36 of the element 12' in the screw slot. The handle 10 is then firmly held with one hand while the end 17 of the handle is struck a sharp blow with a hammer or similar tool. The force of the blow tends to move the handle 10 toward the bolt or screw to be loosened. As the

cam element 11 is held from longitudinal movement, relative movement of the handle 10 will cause the head 12 or 12' to be rotated. Sufficient leverage is obtained in this way to loosen most nuts or bolts which have been rusted or otherwise become adhered in place.

It will be noted that the slots 27 are enclosed within the socket 19 and that all of the exposed portions of the handle and cam element are substantially cylindrical. Thus the sudden rotative force will have no tendency to catch the gloves or fingers of the operator to cause injury thereto. The slots 27 are arranged at a substantial angle to a plane perpendicular to the axis of the tool so that a considerable rotative force is exerted upon the tool head.

In accordance with the patent statutes, we have described the principles of construction and operation of our screw and bolt loosening device, and while we have endeavored to set forth the best embodiment thereof, we desire to have it understood that obvious changes may be made within the scope of the following claim without departing from the spirit of our invention.

We claim:

An axial impact type rotary tool for loosening a threaded member and including a handle element, a socket in one end thereof, a cam element slidably and rotatably supported in said socket, a pin extending through said handle element transversely of said socket and normally fixed relative thereto, said cam element having cam slot means therein through which the pin extends, said cam slot means acting to rotate the cam element upon axial movement thereof relative to said handle element.

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