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(54)

A tool for removing a threaded fastener.

(57)

A tool for removing threaded fasteners, such as screws and/or bolts, having recessed sockets in their heads, with the tool including an elongated broach (11) polygonal in cross-section, with a sleeve (12) having a like cross-sectional configuration slidably mounted thereon. The sleeve (12) is provided at one end with a protruding insert head (17) that is capable of being projected into countersunk bores so as to abut with the countersunk head of a fastener, while the opposite end of the sleeve may be countersunk so as to provide a receptacle (15) for receiving the exposed head of the fastener to be removed.

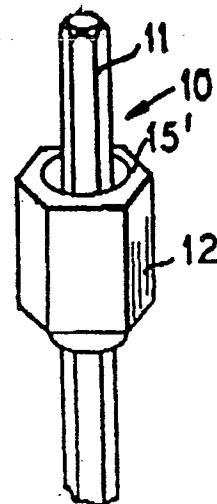


FIG. 1

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A TOOL FOR REMOVING A THREADED FASTENER

This invention relates to a tool utilised to assist in the removal of fasteners of the type having a head with a recessed socket from a threaded bore when the recessed socket has become so damaged that a normal tool is incapable of insertion and engagement during the attempt to remove the same.

According to the present invention, a tool for removing a threaded fastener of the type having a head with a recessed socket therein from a threaded bore comprises a sleeve having a bore therethrough; an elongate broach extending through the bore in the sleeve; the cross-section of the broach being polygonal and slightly larger than the recessed socket in the fastener whereby end portions of the broach can be forcefully projected into the recessed socket; the cross-section of the bore in the sleeve being such as to permit relative axial movement between the sleeve and the broach but to prevent relative angular rotation therebetween when a turning force is applied to the sleeve; said sleeve having a projection at one end which is adapted to abut against the countersunk head of a fastener and a recess at the other end which is arranged to fit over the exposed head of a fastener, both the projection and the recess serving to align the broach with the recessed socket of a threaded fastener.

In utilising the tool of this invention, it is vital that the broach before its forcible insertion into the recessed socket of the fastener head be in longitudinal alignment with the shank of the fastener. To assure this alignment, the sleeve is slidably moved along the broach so that it may either receive in its receptable end the head of the fastener or, alternatively, in the case of a countersunk fastener, be projected into the countersunk bore for flat facial abutment with the exposed complementary flat surface of the head of the fastener. In either of these engagements, the sleeve will function to position and maintain the broach in proper longitudinal alignment during the period of its forceful insertion into the stripped socket of the head of the fastener.

It should also be noted that, once the broach has operatively been placed in fixed engagement with the socket, the sleeve, by reason of its hexagonal cross-section, is adapted to be readily gripped by a tool, such as a wrench, for imparting rotation to the fastener through the broach.

In order that the invention may be more readily understood, it will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view of the tool assembly of this invention;

Figure 2 is a side elevational detailed sectional view of the sleeve of the tool;

Figure 3 is a perspective view of the elongated broach of the tool;

Figure 4 is a fragmentary partially sectional detailed view of the tool in use on a countersunk head of a fastener; and

Figure 5 is a fragmentary partially sectional detailed view of the tool as used on an exposed head of a fastener.

As illustrated in Figure 1, the tool 10 of this invention includes an elongated polygonal broach 11 and a polygonal sleeve 12. The sleeve 12 is provided with a centre bore 13, the cross-section of which resembles the polygonal cross-section of the broach 11 so that such sleeve 12 is freely slidable longitudinally on the broach 11.

As viewed in Figure 2, the sleeve 12 has one end 14 recessed as at 15, with the recess 15 having open communication with the internal bore 13 of the sleeve 12. It should be noted that the end recess 15 of the sleeve 12 is normally circular in cross-section and of a diameter greater than that of the centre bore 13.

The opposite end 16 of sleeve 12 is formed to provide a longitudinally circular projection forming an insert head 17. It should again be noted that the counter bore 13 extends throughout the length of the insert end 17 by reason of the fact that the diameter of the insert 17 is greater than that of the bore 13.

When the tool is used to extract a countersunk hex head fastener 18, as illustrated in Figure 4, the sleeve 12 is positioned such that its insert end 17 projects into the counter bore 19 and sits in facial contact upon the exposed flat head 20 of the fastener 18. In this position, the broach 11 will be in substantial longitudinal alignment with the shank 21 as well as the hex socket 22 formed in the head 20 of the fastener 18. As the sleeve 12 holds the broach in such alignment, the broach can be forcibly inserted into the stripped hex socket 22 formed in the flat head 20 of the fastener 18. This forceful insertion of the broach 11 may be accomplished by striking the free standing exposed opposite end with a tool, such as a hammer and the like. When the broach has been forcibly inserted in the hex socket 22, a suitable tool, such as an adjustable wrench, may be clamped upon the sleeve 12 for rotating it, as well as the broach, in an unthreading rotational direction which will be imparted to the fastener 18 so as to effect removal

of the same.

In Figure 5, the tool 10 of this invention is shown in application upon the exposed head 23 of a hex head fastener 24. In this circumstance the opposite end of the sleeve 12 is aligned with the fastener 24 so that the head 23 of the fastener is received within the recess 15 formed in the end 14 of the sleeve 12. In such a position, the purpose, function and operation of the co-operating broach 11 and sleeve 12 are similar to that previously described.

From the foregoing it is apparent that an efficient tool for effecting removal of exposed or countersunk stripped head fasteners is provided. The tool may be made in sizes to correspond to the commercially available head fasteners such that the broach 11 will always possess a configured diameter slightly larger than the recessed socket in the head of the fastener.

5. A tool as claimed in any preceding claim, wherein said sleeve has an outer peripheral surface that is polygonal in cross-section.

Claims

1. A tool for removing a threaded fastener of the type having a head with a recessed socket therein from a threaded bore, said tool (10) comprising a sleeve (12) having a bore (13) therethrough; an elongate broach (11) extending through the bore in the sleeve; the cross-section of the broach being polygonal and slightly larger than the recessed socket in the fastener whereby end portions of the broach can be forcefully projected into the recessed socket; the cross-section of the bore in the sleeve being such as to permit relative axial movement between the sleeve and the broach but to prevent relative angular rotation therebetween when a turning force is applied to the sleeve; said sleeve having a projection (17) at one end which is adapted to abut against the countersunk head (20) of a fastener (21) and a recess (15) at the other end which is arranged to fit over the exposed head (23) of a fastener, both the projection and the recess serving to align the broach with the recessed socket of a threaded fastener.

2. A tool as claimed in claim 1, wherein the bore of said sleeve is polygonal in cross-section to correspond substantially with the peripheral contour of said broach.

3. A tool as claimed in claim 1 or 2, wherein said projection at one end of said sleeve projects longitudinally therefrom, is circular in cross-section and concentric with said bore of said sleeve.

4. A tool as claimed in claim 1, 2 or 3, wherein said recess at the opposite end of said sleeve is circular in cross section and concentric of said bore of said sleeve.

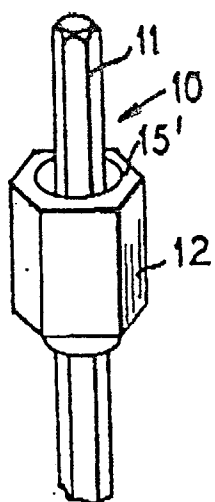


FIG. 1

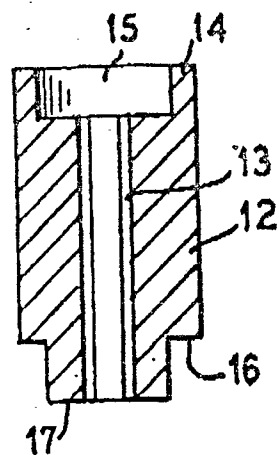


FIG. 2

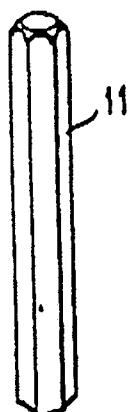


FIG. 3

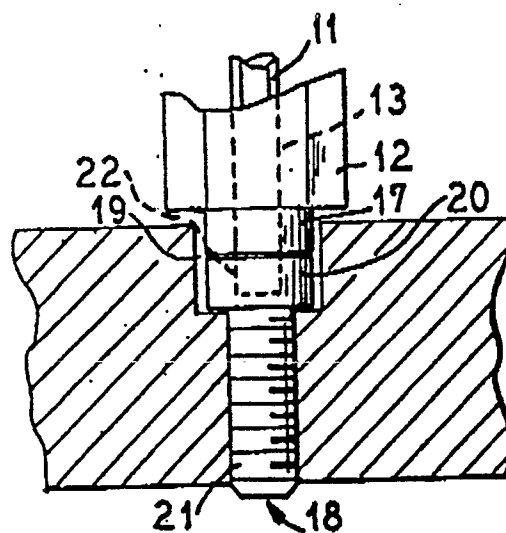


FIG. 4

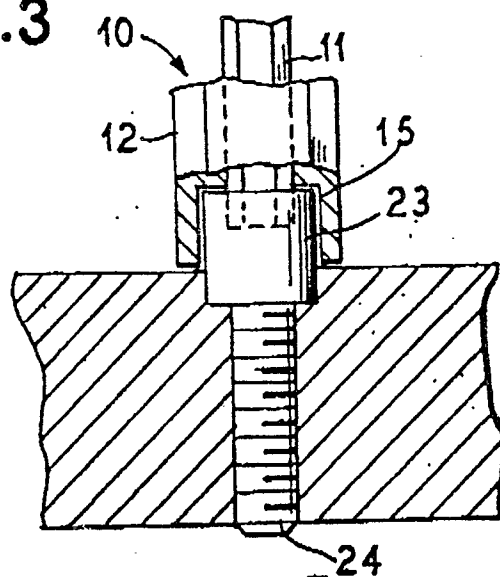


FIG. 5



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-2 121 197 (E.F. JACKMAN) * Page 2, lines 37-72; figure 1 * ---	1,5	B 25 B 23/00 B 25 B 13/54
Y	GB-A-1 029 357 (R. MANKOVITZ) * Whole document * ---	1,2,5	
Y	US-A-4 503 737 (D. diGIOVANNI) * Abstract; figures 4,6; column 4, lines 1-14 * ---	1,2,5	
A	METALWORKING PRODUCTION, vol. 110, no. 16, 20th April 1966, page 89, London, GB; O. HILLIG: "Key gets at hidden screws" * Whole article * ---	4	
A	US-A-3 587 363 (L.W. ROGERS) * Column 1, line 68 - column 2, line 6; column 2, lines 34-44; figures 1-5 * ---	3	
A	CH-A- 593 116 (STOBA AG) ---		TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	DE-A-3 123 112 (J. LAUDES) ---		B 25 B
A	DE-B-2 437 142 (G. BRASE) ---		
A	US-A-4 604 917 (E. POLONSKY) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23-03-1989	Examiner MAJERUS H.M.P.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			