

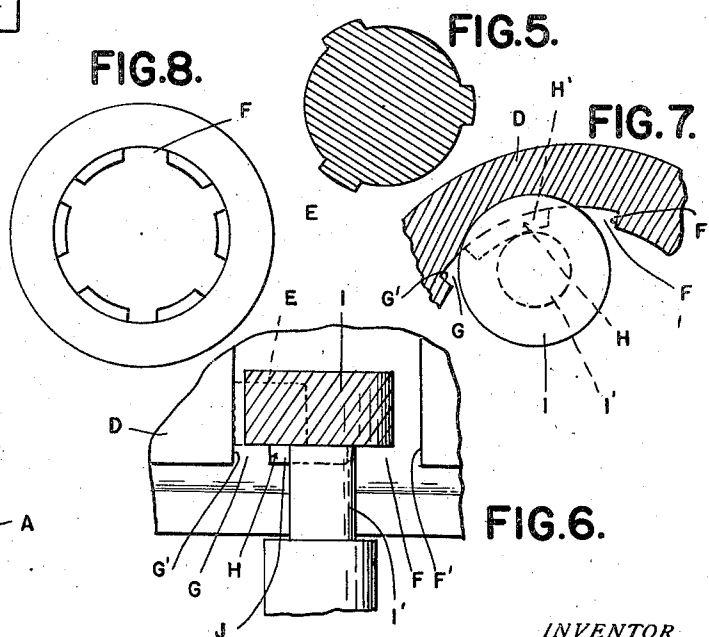
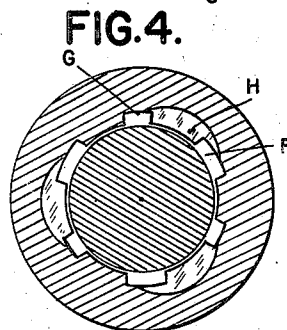
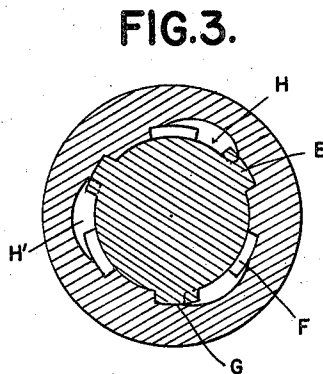
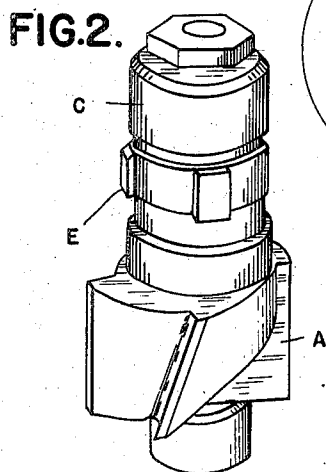
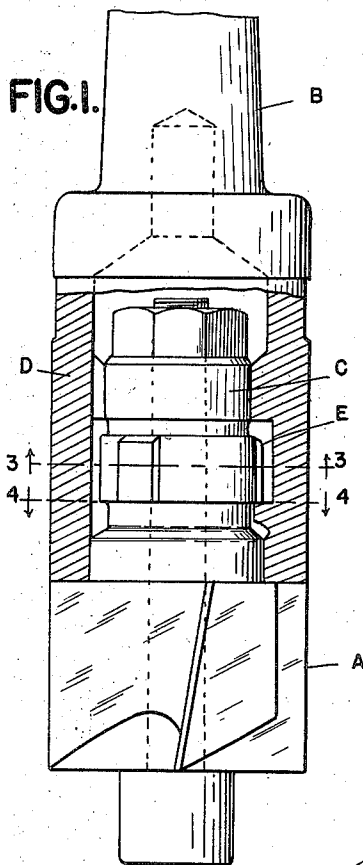
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2,103,379

METHOD OF FORMING A ROTARY TOOL

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METHOD OF FORMING A ROTARY TOOL

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3 Claims. (Cl. 29—156)

The invention relates to rotary tools of that type in which the cutting tool is provided with a shank detachably engageable with a socket on a rotary spindle. With such constructions it is desirable to provide means for quickly and easily engaging or disengaging the tool and also for holding it very accurately aligned with the axis of the spindle. Furthermore, where the tool is intended for heavy duty, it is necessary to provide torque driving means between the socket and the shank of the tool which will withstand the stresses to which it is subjected and without displacing the tool from true axial alignment.

It is the object of the present invention to obtain a construction meeting the conditions as above specified and also one which can be easily manufactured with a high degree of accuracy. To this end the invention consists in the construction and the method of forming the same as hereinafter set forth.

In the drawing:

Figure 1 is a longitudinal section through the socket showing the tool in elevation and in engagement therewith;

Figure 2 is a perspective view of the tool detached;

Figures 3 and 4 are sections respectively on lines 3—3 and 4—4 of Figure 1;

Figure 5 is a cross section through the shank of the tool;

Figure 6 is an enlarged elevation showing the relation of the bayonet grooves to the locking lugs;

Figure 7 is an enlarged cross section showing the manner of forming the bayonet joint grooves for locking the shank in the socket;

Figure 8 is an end view of the spindle.

The rotary tool A may be of any suitable construction adapted to be mounted on a rotary spindle B in axial alignment therewith. This mounting comprises a cylindrical shank C on the tool which is insertable axially within a cylindrical socket D upon the spindle. Torque is transmitted from the socket to the shank through a plurality of driving lugs on the latter engaging bayonet joint grooves in the socket.

To transmit the high torque which is necessary in a heavy duty tool, it is desirable to have more than one driving lug, but where there are a plurality of such lugs then difficulty is experienced in providing accurate meeting faces between all of these lugs and the shoulders on the socket. If there is any lack of accuracy then the stress will all be thrown on one lug as the others will be held thereby out of contact with

their respective shoulders. I have, therefore, devised a method of manufacture by means of which such high degree of accuracy is assured, while at the same time the necessary operations are easily performed. Any desired number of driving lugs E may be formed on the cylindrical shank C of the tool to project radially therefrom, but there are preferably at least three of such lugs uniformly spaced angularly with respect to each other. Corresponding to these lugs are a series of longitudinal grooves F formed in the socket D preferably by broaching which insures the desired degree of accuracy. With only these straight grooves for receiving the lugs E there would be nothing to lock the shank in its socket and it is, therefore, necessary to provide laterally extending grooves into which the lugs E may be turned after the shank has been fully inserted in the socket. However, the driving of the lugs must be accomplished by shoulders which are at the end of these laterally extending slots which necessitates very accurate positioning of the latter. This I accomplish as follows:

In addition to the grooves F which are broached in the socket D, I provide a second series of grooves G intermediate the grooves F but of lesser width. These are simultaneously broached with the broaching of the grooves F and, therefore, are accurately positioned in relation thereto. I then insert a rotary mill into the socket, the radius of this mill being sufficiently restricted so that it may be used for cutting away the alternate ribs H which are intermediate the grooves F and G, and without cutting into the remaining ribs. Thus as shown in Figure 7, the mill I after insertion within the socket is moved radially to cut away the rib H' forming a concave recess in the wall of the socket. Also, as will be seen in this figure, the rib H' is completely cut away before the periphery of the mill comes in contact with the shoulders F' and G' of the ribs respectively adjacent to the slots F and G. The shank I' of the mill is of a diameter to clear the rib H' in the position shown in Figure 7, and is of sufficient length to be inserted into the end of the socket D to the proper location. Thus after the milling operation there is left a portion J of the rib H' which bears against the lower face of the lug E to hold the shank C from axial movement. The operation just described may be repeated to cut away each alternate rib H', thereby forming the bayonet grooves which permit a rotation of the shank C in the socket to bring the lugs E

into driving contact respectively with the shoulders G'.

What I claim as my invention is:

1. The method of forming a tool socket comprising the forming of said socket with a cylindrical bore, forming in the inner wall of said socket a series of longitudinally extending grooves and a second series of grooves of lesser width intermediate and parallel to said first series leaving ribs therebetween, and cutting away portions of alternate ribs a predetermined distance from the end of the socket to form transverse grooves therein connecting the wide and narrow grooves, the remaining ribs constituting limiting shoulders at the end of each transverse groove accurately and uniformly positioned with respect to the corresponding wide grooves.

2. The method of forming a tool socket comprising forming a cylindrical bore, broaching the inner wall of said socket to form therein a series of longitudinally extending grooves and a second series of grooves of lesser width intermediate and parallel to said first series leaving ribs therebetween, milling the alternate ribs to cut away the same a predetermined distance from the outer

wall of said socket and to form transverse grooves connecting the adjacent wide and narrow grooves, said longitudinal grooves forming clearance spaces for the mill whereby the full depth of the rib is cut away without interference with adjacent ribs.

3. The method of forming a tool socket comprising the forming of a cylindrical bore therein, broaching the inner wall of said socket to simultaneously form therein two series of longitudinally extending grooves the grooves of one series being of lesser width and intermediate and parallel to the grooves of the other series leaving longitudinal ribs between adjacent grooves, introducing into said socket a mill of lesser diameter than said bore and moving the same radially to cut away alternate ribs a predetermined distance from the end of the socket, and forming transverse grooves connecting said longitudinal grooves, the diameter of said mill in relation to the width and spacing of said longitudinal grooves being such that the rib is cut away its full depth without interference by the mill with adjacent ribs.

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