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DETACHABLE BIT SCREW DRIVER CONSTRUCTION

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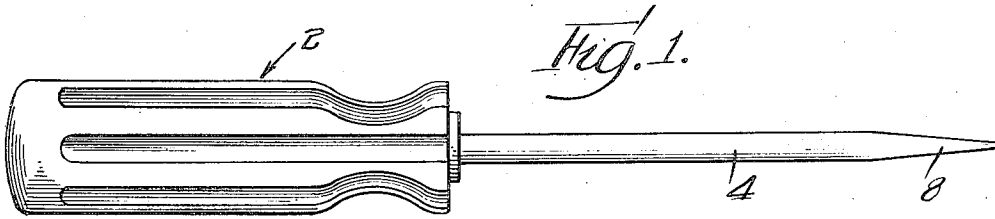


Fig. 1.

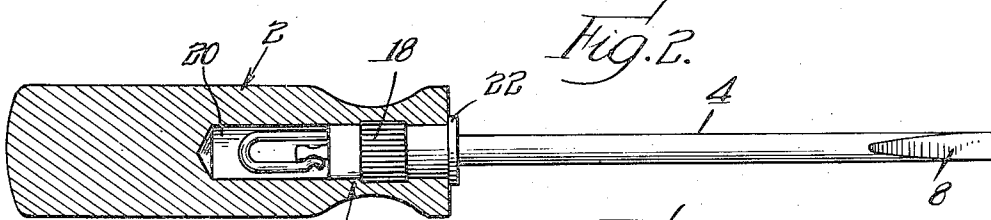


Fig. 2.

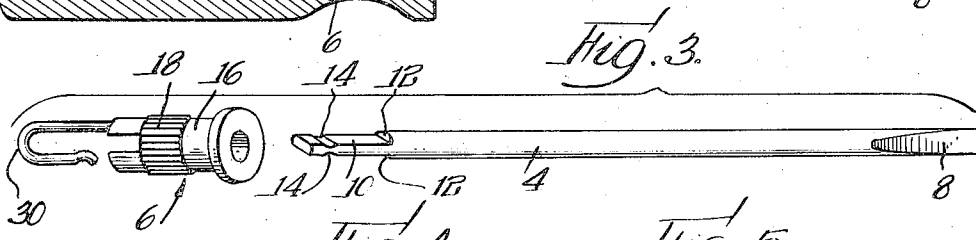


Fig. 3.

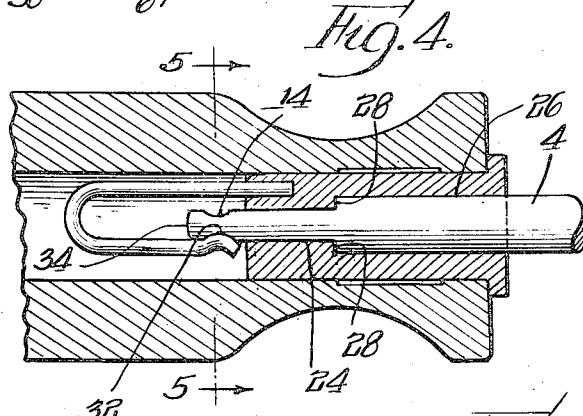


Fig. 4.

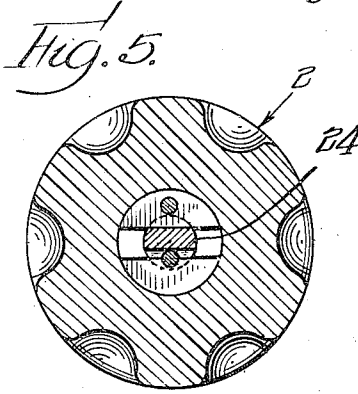


Fig. 5.

Fig. 6.

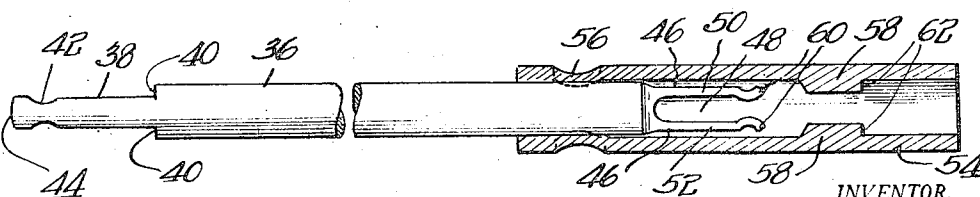
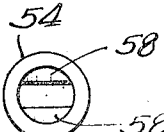


Fig. 7.



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DETACHABLE BIT SCREW DRIVER
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5 Claims. (Cl. 279-104)

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This invention relates to a detachable bit tool, and more particularly to the construction of a screw driver bit and socket for detachably receiving same.

It is an object of the invention to provide a more simple and inexpensive, and yet more efficient, construction of screw driver bit and socket for detachably receiving same.

A more specific object of the invention is to provide a simpler and yet more efficient socket which can be easily pressed into a tool handle for assembly therewith and for thereafter detachably receiving and efficiently holding a tool bit.

Another important object of the invention is to provide an automatic chuck or socket wholly contained within the tool handle and so constructed that the bit may be attached to, and detached from, the handle in driving relation thereto by the simple axial insertion and removal of the bit.

A further important object of the invention is to provide such a detachable bit tool with a simple and inexpensive, yet efficient and rugged, detachable extension detachably to receive the tool.

Other and further objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings wherein:

Fig. 1 shows a screw driver embodying the present invention;

Fig. 2 is a view in longitudinal section taken through the handle of the screw driver of Fig. 1;

Fig. 3 is an exploded perspective view of the socket and bit of Figs. 1 and 2;

Fig. 4 is an enlarged fragmentary view in longitudinal section to better illustrate the construction of the socket and bit of Figs. 1 and 3;

Fig. 5 is a view in cross section taken along the line 5-5 of Fig. 4;

Fig. 6 is a view, partly in section, of an extension for the screw driver of Figs. 1 to 6; and

Fig. 7 is an end view of the extension socket of Fig. 6.

As shown in the drawings, a screw driver embodying the present invention may comprise a handle 2 of any suitable construction, a screw driver bit 4, and a bit-receiving socket 6 mounted in the handle 2. The screw driver bit 4 is formed at one end with the usual blade 8 and its other

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end with a flattened, reduced shank portion forming position locating shoulders 12 at the junction of the flattened shank portion with the rounded shank portion of the bit. Flattened shank portion 10 is provided with transverse, preferably semi-circular grooves 14 in each of the opposite faces.

The bit-receiving socket 6 comprises a pin, rod or cylinder 16 having a plurality of axially directed splines 18 for securing the socket to, and entirely within, the handle against rotation relative thereto when the socket is pressed or driven into the central opening 20 of the handle. The pin is formed at its outer end with an annular flange 22 to engage the inner end of the handle and thereby limit the movement of the socket into the opening 20 of the handle. The cylinder 16 is formed at its inner end with a cross slot 24 which is in communication with a semi-circular opening 26, the diameter of which is greater than the width of the cross slot 24 to form diametrically opposite shoulders 28 to engage the shoulders 12 of the screw driver bit and thereby limit the movement of the bit through the socket.

A resilient, wire spring 30 has one end received in a suitable longitudinal opening in the inner end of the cylinder 16 and is affixed to the cylinder 16, in any convenient manner, against longitudinal displacement or disengagement. The spring wire 30 is looped back upon itself to provide a free end portion to provide a bit latching portion 32 at its free end. The body of the spring 30 therefore provides a resilient mount for the latching portion 32, which latter is preferably pressed inwardly into a convex circular form complementary to the part circular, concave notches 14 adjacent the end of the screw driver bit 4. The free end or latching portion 32 of the spring loop is normally so positioned by the resilience of the spring as to project over the cross slot 24.

The screw driver bit is inserted in the socket and rotated while applying a pressure thereto axially of the bit and handle so that when the flattened portion 10 is aligned with the cross slot 24 continued axial pressure upon the bit will cause it to pass through the socket until the latch portion 32 of the spring loop snaps into one

of the part circular recesses or notches 14 adjacent the inner end of the bit.

The diametrically opposite notches 14 permit latching of the bit in the socket whenever the flattened portion 10 can be passed through the cross slot 24 of the socket. If only one notch was provided, it would be possible to introduce that part of the bit into the cross slot without latching the bit to the socket.

The concave wall of the notches provide camming surfaces which cause outward movement of the complementary shaped latching portion 32 when the pressure is applied axially of the bit in a direction to withdraw it from the socket.

It should be noted that the inner end 34 of the screw driver bit 4 is rounded or tapered to form a cam-like surface cooperating with the cam-like, convex surface of the latch portion 32 of the wire spring, the cam-like surface portion of the end of the bit forcing that latch portion outwardly as the bit is inserted into the socket.

As shown in Figs. 6 and 7, the screw driver may be provided with a detachable extension carrying a socket for detachably receiving the screw driver bit so that the bit may be inserted directly into the handle socket when a short bladed screw driver suffices and may be inserted in the extension socket and the extension inserted in the handle socket when a long screw driver is necessary. The extension may comprise a rod 36 having at one end a flattened portion 38 corresponding to the flattened portion 10, shoulders 40 corresponding to the shoulders 12, semi-circular grooves 42 corresponding to the grooves 14, and a rounded end surface 44 corresponding to the rounded end surface 34 of the bit 4. At the opposite end the extension 36 is reduced in cross section and has opposite flattened surfaces 46 and a longitudinal cut or opening 48 which forms resilient latching or clutching fingers 50 and 52.

The extension socket comprises, in addition to the resilient latching or clutching fingers 50 and 52, a sleeve 54 press-fitted on the end of the rod 36 and fixed thereto as by a swaging or pressing operation which embeds annularly grooved portion 56 into the shank of the rod 36 inwardly of the fingers 50 and 52. The sleeve 54 is provided internally with opposed projections 58 which form between them a rectangular opening for receiving the flattened end portion 10 of a screw driver bit and thereby secure the bit and socket 34 against relative rotation. The spring fingers 50 and 52 are formed at their free ends with inwardly directed concave camming and latching portions 60 corresponding to the latching portion 32 of the spring latch 30.

It will be evident that on insertion of the rod 36 into the socket 6, the extension will be secured to the handle for rotation therewith and detachably locked to the handle and furthermore that on insertion of the flattened end 10 of the bit 4 into the sleeve 54, the rounded end portion of the bit will force the latching and camming portions 60 outwardly to spread the latching fingers 50 and 52 to permit the latching projections 60 to move over the flattened end portion 10 of the driver bit and snap into the part circular groove 14 of the bit so as to latch the bit to the socket sleeve 54 and the rod 36.

It should be noted that the forward edges of the projections 58 of the sleeve 54 form shoulders 62 adapted to engage the shoulders 12 of the driver bit thereby to limit the inward movement of the driver bit and to prevent the circular grooves 14

from being moved past the latching projections 60.

It will be obvious that changes may be made in the form, construction and arrangement of the parts without departing from the spirit of the invention or sacrificing any of its advantages, and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

What I claim is:

1. In a detachable bit tool, a handle, a socket fixed to said handle, means integral with said socket to prevent rotation of said socket with respect to said handle, said socket having a longitudinal opening therein to receive the shank of the bit and shaped to cause rotation of the bit on rotation of the socket, and spring urged latch means normally urged into the path of the bit when inserted into the socket to engage the shank of the bit, said bit having shoulder means over which the spring urged latch means snaps on insertion of the bit shank detachably to secure the bit to the handle socket, said shoulder means being shaped to cam the latch means outwardly of the socket on exertion of a longitudinal pull on the bit to detach the bit from the handle socket.

2. In a detachable bit tool, a handle having an opening at one end, a bit receiving socket mounted substantially entirely within the opening in said handle and fixed to said handle, means integral with said socket to prevent rotation of said socket with respect to said handle, said socket having a longitudinal opening therethrough to receive the shank of the bit and shaped to cause rotation of the bit on rotation of the handle and socket and a looped spring secured to said socket, extending inwardly of said handle from said socket and having a resilient, free end portion for detachably latching the bit to the socket.

3. In a detachable bit tool, a handle having an opening extending longitudinally inwardly from one end thereof, a socket mounted in said opening and fixed to said handle, means integral with said socket to prevent rotation of said socket with respect to said handle, said socket having a longitudinal opening therein to receive the shank of the bit and shaped to cause rotation of the bit on rotation of the handle and socket, the opening in the handle being of greater length than the socket and a looped spring wire in the portion of said handle opening extending beyond said socket, said wire being secured at one end to the socket and having at its other free end a camming and latching portion adapted to engage a correspondingly shaped portion adjacent the inner end of the bit resiliently to latch the bit to the socket.

4. In a detachable bit screw driver, a handle, a bit receiving socket secured to said handle, a screw driver bit, an extension bit comprising a rod having at one end a portion adapted to be inserted in said socket for detachable securement to said socket and having at its other end a resilient latching means for detachably securing said screw driver bit against longitudinal separation from the rod and a socket sleeve fixed to said last mentioned end of the rod and surrounding said latching means, said sleeve having a longitudinal opening therein to receive the shank of the screw driver bit and shaped to cause rotation of the bit on rotation of the handle, the handle socket and said extension bit.

5. An extension for a detachable bit screw driver comprising a rod having at one end a por-

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tion adapted to be inserted in a bit receiving socket for detachable securement to said socket, a resilient latching means at the other end of said rod for detachably securing a screw driver bit to the rod, and a socket sleeve fixed to said last mentioned end of the rod and surrounding said latching means, said sleeve having a longitudinal opening therein to receive the shank of a screw driver bit and shaped to cause rotation of said bit upon rotation of said extension.

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