

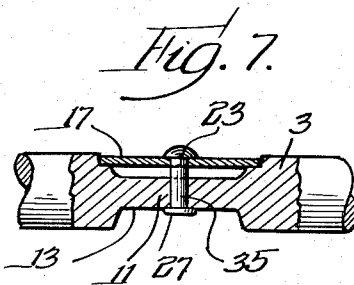
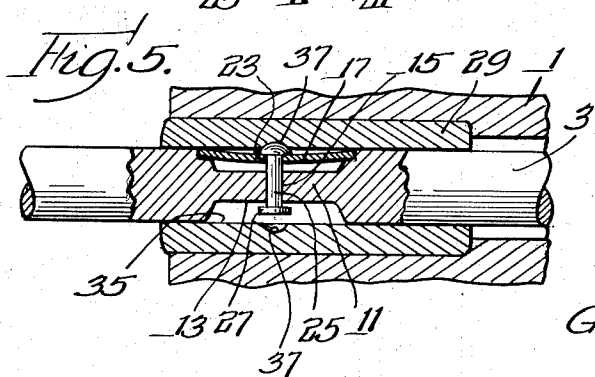
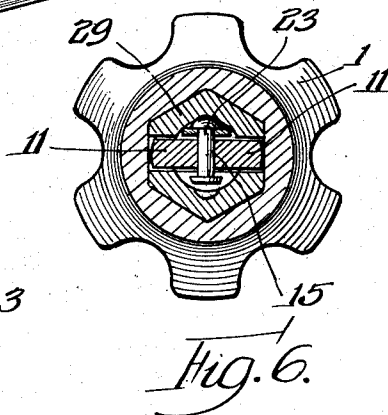
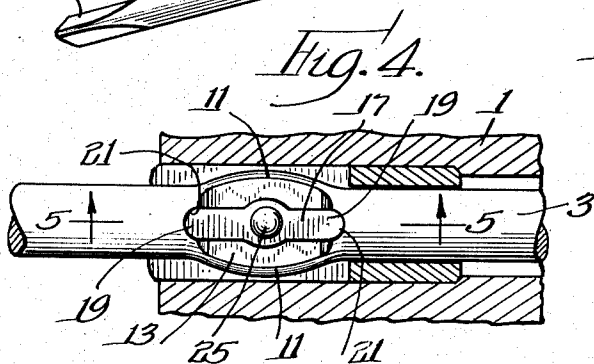
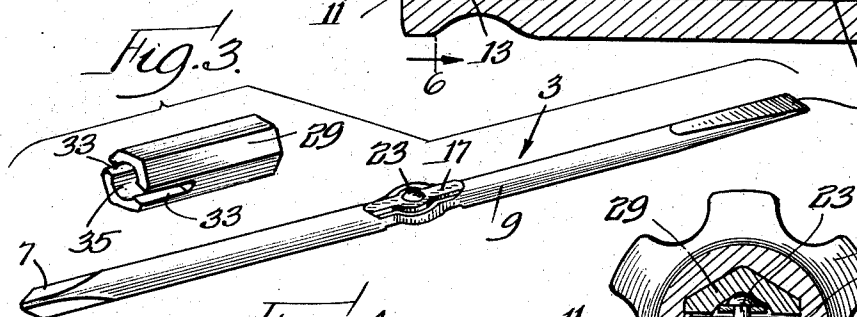
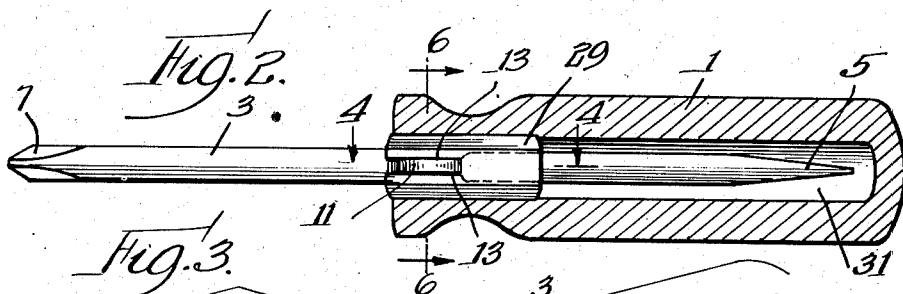
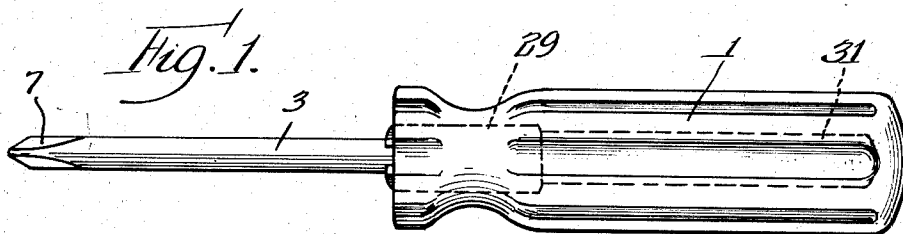
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SCREW DRIVER CONSTRUCTION

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SCREW DRIVER CONSTRUCTION

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This invention relates to a hand tool of the type having a handle and a work piece, and more particularly to a screw driver or the like having a detachable bit.

In order to save space in storage and to make it unnecessary to invest in a large number of duplicate parts, screw drivers or the like are frequently made with detachable bits so that a single handle may be used with any one of a plurality of bits which may be either single or double ended. Prior detachable bit screw drivers fall into one of two general classes: those in which the bit and handle are connectible or disconnectible by relative longitudinal movement and those which require other movements such as transverse or rotative in addition to longitudinal movement. The former, because of the ease of operation, is greatly to be preferred and is the type with which the current invention is concerned.

It has been common practice heretofore in separable bit screw drivers of the class with which this invention is concerned to provide the bit with an enlarged body portion of a shape such as hexagonal to resist relative rotation between the handle and the bit, the body portion being cooperable with a longitudinally apertured sleeve carried by the handle. A transverse aperture has been provided in the body portion of the bit containing a coil spring biasing a ball radially outward, the aperture having had a narrow neck to restrict the movement of the ball. One or more cooperating indents has been provided in the sleeve portion to receive the ball and thus resist longitudinal movement between the handle and bit.

Certain disadvantages attend the construction just described. Screw driver bits are generally of fairly small diameter and may be readily formed from bar stock. It is generally impossible to incorporate a ball and spring in the relatively small shank of a screw driver bit unless it is provided with an enlarged section such as the hexagonal body portion previously referred to, and such an enlarged section makes it difficult or impossible to manufacture a bit from bar stock. Likewise the sleeve is generally not thick enough to accommodate a ball and spring to force the ball against an indent in the shank of the bit. Furthermore, dirt enters the aperture around the ball and eventually becomes so tightly packed as to prevent movement of the ball. As there is no way of removing dirt from behind the ball, the bit is then useless.

Among the important objects of this invention

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is the provision of a tool handle and work piece separable by a relative longitudinal motion in which it is unnecessary to provide an enlarged portion on the shank of the work piece.

It is another object of this invention to provide a hand tool such as a screw driver having a handle and work piece or bit detachably connectable by longitudinal motion having resiliently biased transversely movable latching means which are exposed and may be readily cleaned.

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

Figure 1 is a side view of a detachable bit screw driver embodying the present invention;

Figure 2 is a longitudinal cross sectional view of the screw driver shown in Figure 1;

Figure 3 is a perspective view of a detachable bit and cooperating locking sleeve;

Figure 4 is an enlarged fragmentary sectional view taken along the line 4-4 in Figure 2;

Figure 5 is a sectional view taken along the line 5-5 in Figure 4;

Figure 6 is a cross sectional view taken along the line 6-6 in Figure 2; and

Figure 7 shows the portion of the bit shank shown in Figure 5 when the same is removed from the handle.

In the particular embodiment chosen for the illustration of this invention, a detachable bit screw driver has a handle 1 and a bit 3 detachable therefrom. The bit is shown as double ended, having a conventional screw driver blade 5 and a four-pronged driver 7 for cross-slotted screws. It is to be understood, however, that the bit could be single ended if desired and could include other types of drivers, such as clutch head drivers, socket type drivers, etc. At a convenient location which in the present embodiment is substantially midway between the ends of the bit, a portion of the shank 9 of the bit is flattened to produce a pair of radial flanges 11 and consequent indented portions 13. An aperture 15 is provided substantially perpendicular to and at the center of the flattened portion of the shank 9. A leaf spring 17 has its end portions 19 lying within small recesses 21 at opposite longitudinal extremities of one of the indents 13. The spring 17 has an aperture 23 at its center aligned with the aperture 15 and an oval head pin 25 is passed through the two apertures with the oval head adjacent the spring. The other end is peened over as at 27 to retain portions of spring 19

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under slight tension within recesses 21. The movement of pin 25 in one direction is limited when the peened end of pin 25 abuts the surface of the indent 13, but the pin is movable in the opposite direction when the oval head is depressed against the tension of spring 17.

A sleeve 29 is secured within an axial aperture 31 in the handle 1 at an open end thereof and is of a shape such as hexagonal to prevent rotation between the sleeve and the handle. The sleeve 29 is provided with a longitudinal slot 33 on each side of an axial bore 35 and the flanges 11 fit within the slots as the shank 9 is fitted within the bore 35 to prevent relative rotation of the bit and the sleeve. A pair of radial indents 37 are provided in the inner surface of the bore 35 perpendicular to the plane of the slots 33 to receive the head of the pin 25.

To join the handle 1 and bit 3, it is only necessary to insert the end of the bit which is not to be used, shown in Figure 2 as the conventional screw driver blade 5, into the aperture 35 of the sleeve 29 and move the bit and handle axially toward each other so that the flanges 11 fit into the slots 33. As the pin 25 reaches the free end of the sleeve 29, which in the figures is on the left, it is forced inward toward the indent 13, flexing the spring 17. As the head of the pin reaches one of the indents 37, it is forced into this indent by the spring to inhibit further longitudinal motion. At this time the innermost edges of the flanges 11 are abutting the ends of the slots 33 to positively preclude further telescopic motion of the bit and handle. In driving or removing screws, the only axial force urges the bit and handle toward one another, and this is resisted by the flanges 11 abutting the ends of the slots 33, as just mentioned. Torsional forces are, of course, resisted by the flanges 11 cooperating with the slots 33. Thus the flanges 11 and slots 33 provide a coupling between the bit and handle.

Very slight forces, if any, tend to separate the bit and handle longitudinally and the head of the pin 25 pressing within the indents 37 under the influence of the spring 17 successfully resists such forces. If a strong pull is asserted between the bit and handle, however, the oval head of the pin 25 will be cammed downward against the influence of the spring by the complementary surface of the indent 37 of the bit and handle and thus readily separate by a simple longitudinal motion.

Although for purposes of illustration I have shown and described a particular embodiment of my invention, I do not intend to be limited thereby but only by the spirit and scope of the appended claims.

I claim:

1. A detachable bit tool comprising a handle having an axial opening at one end, a tool bit having a shank, a flange on said shank, a flattened portion on said shank substantially coterminous with said flange, means in the opening

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of said handle cooperable with said flange to couple said handle and said bit, elongated latching means extending outwardly from and substantially normal to said flattened portion of said shank, and a leaf spring bridging said flattened portion and normally urging said elongated latching means outwardly from said flattened portion.

2. In a detachable bit screw driver, a handle having an axial bore, a tool bit having a shank, a pair of radial flanges on said shank, indented portions on opposite sides of said shank coterminous with said flanges forming a flattened portion, said flattened portion having an aperture therethrough, an oval headed pin fitting loosely within the aperture in the flattened portion and being peened over to prevent detachment, resilient means normally biasing said pin outwardly with its head lying without the periphery of said shank, means in the bore in said handle cooperating with said flanges to couple said bit and said handle, and means complementary in shape to the head of said pin to inhibit longitudinal motion between said handle and said bit.

3. A detachable bit tool comprising a handle having an axial bore open at one end, a tool bit having a shank, latching means carried by said shank and having a camming latching surface, resilient means normally urging said latching means toward latching position, said resilient means disposed externally of said shank and readily accessible, a polygonal configuration on said shank, means in said handle cooperable with the polygonal portion of said shank to couple said handle and said bit, and means in said handle complementary in shape to the latching means on said shank detachably to secure said tool bit in said handle.

4. A tool bit comprising a work portion, an elongated shank, a flattened portion on said shank, said flattened portion having an aperture therethrough, a coupling portion on said shank adjacent said flattened portion, an oval headed pin in said aperture and extending therefrom, the end of said pin being peened over to retain said pin in said aperture, and a substantially flat leaf spring member bridging said flattened portion and biasing the oval head of said pin outwardly substantially transversely away from said flattened portion.

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