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SCREW-HOLDING SCREW DRIVER

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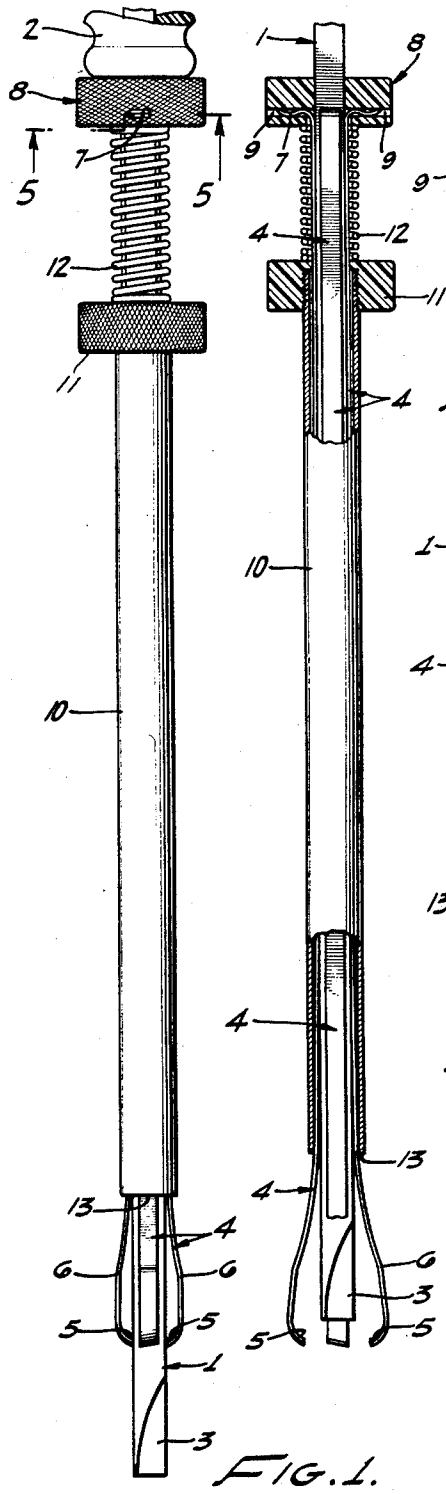


FIG. 1.

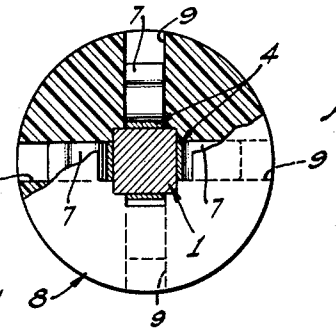


FIG. 5.

FIG. 2.

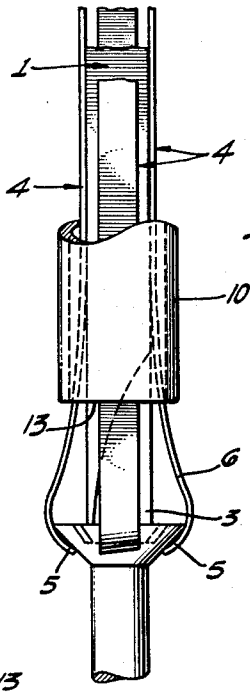


FIG. 3.



FIG. 4.

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SCREW-HOLDING SCREW DRIVER

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1 Claim. (Cl. 145—52)

This invention relates to screw drivers, more particularly to screw drivers having screw retaining means, and included in the objects of this invention are:

First, to provide a screw driver which incorporates a novel screw gripping and retaining means which is bodily movable longitudinally of the screw driver shaft, between an extended position projecting beyond the tip of the screw driver and a retracted position on the shaft of the screw driver, so that the screw driver tip may protrude.

Second, to provide a screw gripping and retaining means for screw drivers which may be expanded to pass over a screw head or contracted to grip a screw head or the shaft of the screw driver, irrespective of its longitudinal position on the screw driver; thus the screw head may be first gripped, then drawn longitudinally into engagement with the screw driver tip.

Third, to provide a screw gripping and retaining means for screw drivers which occupies a minimum diameter so that the screw driver may be inserted into small bores or otherwise relatively inaccessible places.

Fourth, to provide a screw gripping and retaining means for screw drivers which may be readily slipped from the screw driver when not needed and readily disassembled for replacement of parts should they become damaged or broken.

With the above and other objects in view, as may appear hereinafter, reference is directed to the accompanying drawings in which:

Figure 1 is a fragmentary side view of a screw driver with the screw head gripping unit shown in its retracted or inoperative position;

Fig. 2 is a fragmentary side view, partially in section, showing the finger elements extended longitudinally beyond the screw driver tip and expanded radially;

Fig. 3 is an enlarged fragmentary view showing the finger elements engaging a screw head and holding the screw head in engagement with the screw driver tip;

Fig. 4 is a fragmentary view of the screw driver shaft and tip taken in a plane 45° displaced from Figs. 1, 2, and 3;

Fig. 5 is an enlarged transverse sectional view through 5—5 of Fig. 1.

The screw driver includes a screw driver shaft 1 which is preferably square in cross section although the shaft may be polygonal with a greater or lesser number of sides or circular in cross section. One end of the shaft is provided with a conventional handle 2 shown fragmentarily in Fig. 1, the other or extended end of the shaft is provided with a wedge-shaped screw driver tip 3 which is preferably formed by beveling opposite corners of the shaft 1 so that the tip end extends diagonally. The opposite faces of the tip are preferably concave, as shown in Fig. 4. The screw driver tip 3 is within the projected boundaries of the shift 1. While a wedge-shaped type of screw driver tip is shown, it should be understood that various other screw driver tips, such as a Phillips screw driver tip, may be provided.

Extending longitudinally of each of the four sides of the shaft 1 is a finger strap 4 which is slightly narrower than the side of the screw driver shaft. The finger straps are preferably formed of spring steel.

The ends of the finger straps 4 adjacent the tip end of the shaft 1 are inturned to form finger elements 5, and the portions adjacent the finger elements are bowed outwardly as indicated by 6. The extremities of the finger straps 4 adjacent the handle 2 are bent radially outward to form anchor elements 7.

The screw driver shaft 1 slidably receives a collar 8 having radial slots 9 adapted to receive the anchor elements 7. The anchor elements 7 may be corrugated or otherwise shaped so that they are frictionally retained in the radial slots 9. The radial length of each anchor element 7 is such that on removal of the collar 8 and finger straps 4 from the screw driver shaft 1 the individual finger straps may be removed from or secured to the collar.

The finger straps 4 are held in place on the screw driver shaft 1 by an elongated sleeve 10, preferably extending from a position adjacent the screw driver tip 3 to a position near the collar 8.

At its end nearest the collar 8, the sleeve 10 is secured to a sleeve collar 11 which may have dimensions similar to the collar 8. A coil spring 12 is interposed between the collars 8 and 11 so as to urge the sleeve 10 toward the finger elements 5 of the finger straps 4.

By reason of the outwardly bowed portions 6, the adjacent end of the sleeve 10 designated 13 functions as a cam. That is, when the sleeve 10 is moved toward the finger elements 5 the finger elements are urged radially inward, whereas when the sleeve 10 is moved in the opposite direction away from the finger elements the finger elements spread radially, as shown in Fig. 2.

The inturned extremities of the finger elements 5 may be twisted slightly so that when the finger elements are brought together they tend to nestle, so that the finger elements can retain or grip an object having a diameter smaller than the width of the finger strap 4.

Operation of the screw driver is as follows:

The finger straps 4 together with the sleeve 10, collars 8 and 11, and spring 12 are slidable as a unit along the screw driver shaft 1. By reason of the fact that the screw driver tip does not project beyond the normal boundaries of the screw driver shaft, the entire unit may be removed from the screw driver shaft. When the unit is removed from the screw driver shaft, the parts may be disassembled by moving each of the finger straps radially inward to disengage the anchor elements 7 from the collar 8 and withdraw axially through the bore of the collar. The sleeve 10 and its collar 11 as well as the spring 12 may be readily slipped axially from the finger straps 4. Thus the finger straps may be easily replaced if damaged or broken.

Normally, the entire unit comprising the finger straps 4, sleeve 10, and collars 8 and 11 occupies a longitudinally retracted position, such as shown in Fig. 1 of the drawings. In this position the screw driver tip 3 protrudes so that the screw driver may be used in a conventional manner. The spring 12 exerts sufficient force on the sleeve 10 to cause the cam end 13 thereof to compress the finger elements 5 into gripping engagement with the sides of the screw driver shaft 1 so that the unit or assembly tends to remain in place thereon.

When it is desired to utilize the finger elements 5, the collar 11 is drawn toward the collar 8 against the spring 12 so that the sleeve 10 is retracted relative to the finger elements 5. This permits the finger elements 5 to expand radially as shown in Fig. 2. The entire assembly may then be slipped axially relative to the screw driver

shaft 1 until the finger elements 5 extend beyond the shaft.

The head of a screw may be inserted between the finger elements 5 whereupon the sleeve 10 may be released, allowing the spring 12 to force the sleeve 10 toward the finger elements 5 so as to radially contract the finger elements about the screw head. With the screw head lightly held by the finger elements 5, the entire assembly is retracted until the screw driver tip 3 engages the slot of the screw head. If it is desired to increase the grip of the finger elements 5, the sleeve 10 may be manually forced beyond the action of the spring 12. To release the screw head, it is merely necessary to retract the sleeve 11 which permits the finger elements 5 to expand radially.

While a particular embodiment of this invention has been shown and described, it is not intended to limit the same to the exact details of the construction set forth, and it embraces such changes, modifications, and equivalents of the parts and their formation and arrangement as come within the purview of the appended claim.

I claim:

A screw driver, comprising: a handle, a shaft, square in cross section and uniform throughout its length fixed to said handle, said shaft having a screw driver tip completely within the projected area of said shaft; a plurality of individual finger strips slidable longitudinally on the flat sides of said shaft and extending throughout the major portion of the length thereof, said finger strips

having inturned radially expansible and contractible finger elements disposed at the tip end of said shaft, and outturned anchor elements at their other ends; a collar having radial slots removably receiving said anchor elements and slidable on said shaft adjacent said handle to longitudinally extend and retract said finger elements relative to said screw driver tip; a thin walled tubular sleeve surrounding said finger strips throughout the major portion of the length thereof and longitudinally slidable relative to said finger strips to expand and contract said finger elements; an enlargement at the end of the sleeve adjacent said collar; and a spring interposed between said enlargement and said collar and surrounding said finger strips tending to force said sleeve in a direction to contract said finger elements; said finger strips, collar, sleeve, enlargement, and spring being slidable as a unit on said shaft and removable as a unit from the tip end thereof, said finger strips on removal from said shaft being radially movable for disengagement of said anchor elements from said collar.

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