March 9, 1943. J. H. GEMMELL 2,313,710

SCREW DRIVER

Filed July 30, 1940

FIG_1_

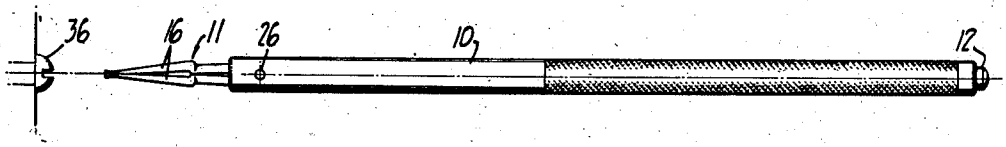


FIG_2_

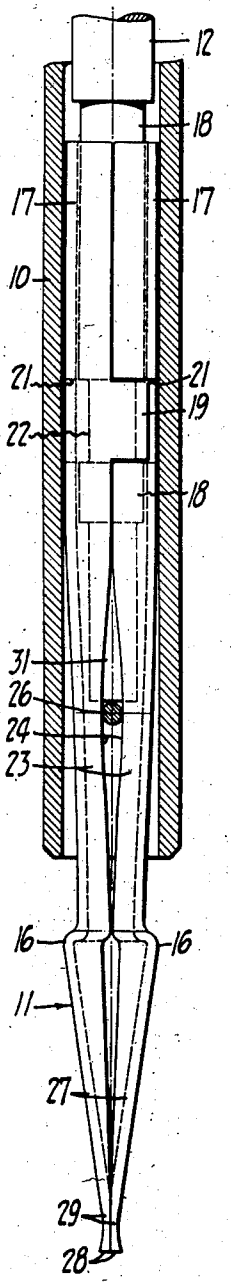


FIG_3_

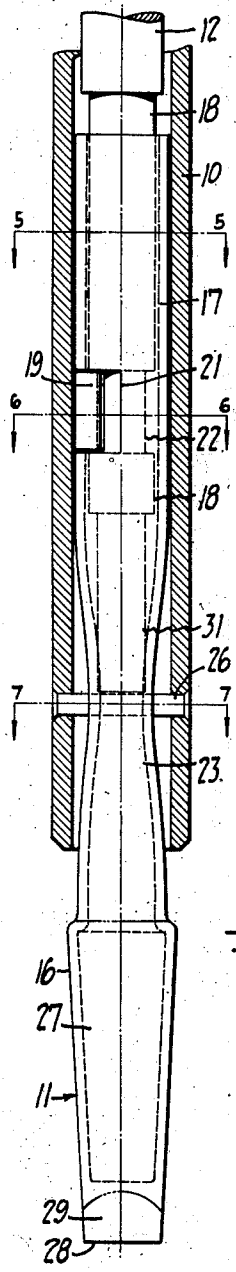


FIG_4_

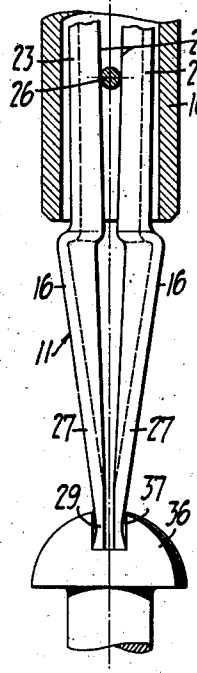
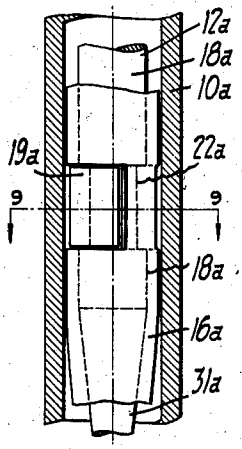


FIG_8_



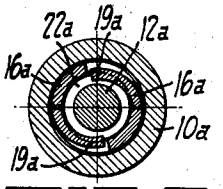


FIG_9_

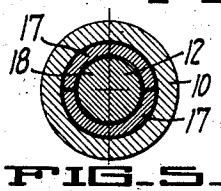


FIG_5_

FIG_6_

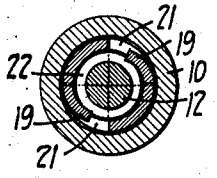
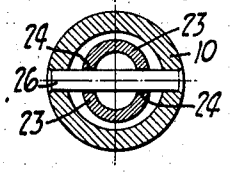


FIG_7_



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SCREW DRIVER

James H. Gemmell, Oakland, Calif.

Application July 30, 1940, Serial No. 348,392

3 Claims. (Cl. 145—50)

The present invention relates to screw drivers of the screw holding type and is concerned more particularly with the provision of an improved screw driver of this type which is economical to manufacture and assemble, and is constructed to hold a screw effectively.

It is a general object of the invention, therefore, to provide an improved screw holding screw driver.

Another object of the invention is to provide an improved screw holding screw driver which is constructed to facilitate economical production and assembly.

Another object of the invention is to provide an improved screw holding screw driver which is provided with screw engaging surfaces of a novel construction to enable maximum surface to surface contact between the driver bit and the screw slot.

Other objects and advantages of the invention will be apparent from the following description of a preferred embodiment thereof as illustrated in the accompanying drawing, in which:

Figure 1 is an elevational view of a screw driver constructed in accordance with the instant invention;

Figure 2 is an enlarged view of the screw driver with the handle shown in section;

Figure 3 is an enlarged view similar to Figure 2 but taken at right angles thereto;

Figure 4 is an enlarged detail view showing the screw driver in screw holding relation with a screw;

Figure 5 is a transverse sectional view taken in a plane indicated by the line 5—5 in Figure 3;

Figure 6 is a transverse sectional view taken in a plane indicated by the line 6—6 in Figure 3;

Figure 7 is a transverse sectional view taken in a plane indicated by the line 7—7 in Figure 3;

Figure 8 is a fragmentary sectional view illustrating a modified form of construction; and

Figure 9 is a transverse sectonal view taken in a plane indicated by the line 9—9 in Figure 8.

Referring to Figure 1, the screw driver includes a tubular handle 10 in which a blade assembly including a head 11 and a release rod 12 are mounted for sliding movement.

The blade assembly comprises opposed similar bit sections 16 (Figs. 1–3) which are blanked and formed from sheet metal stock. Each bit section 16 includes an semi-cylindrical shank portion 17 adapted to engage a reduced portion 18 of the release rod 12 and fit closely within the tubular handle 10. Each semi-cylindrical portion 17 is provided with a circumferentially extending locking ear 19 which extends into the mating recess 21 of the cooperating bit section and which is formed inwardly from the curvature of the semi-cylindrical portion to engage in a locking groove 22 in the rod. The groove 22 in the rod is formed between portions 18 of the rod of the same diameter for engagement with the semi-cylindrical portion 17 of the bit section.

From the semi-cylindrical portion 17 thereof, each bit section converges radially inwardly to form a tapered portion 23 which has inner cam edges 24 for cooperation with retaining and spreading pin 26 suitably secured as by riveting in diametric position in the tubular handle. The tapered portions 23 of the opposite bit sections terminate in heads 27 which flare outwardly to a greater diameter and then taper down to the screw engaging ends.

The head portions 27 of the respective bit sections terminate in screw slot engaging ends 28 of special construction. The inner surfaces of ends 28 are preferably flat for flush engagement in the released position of the tool as seen in Figure 2. The outer surfaces of ends 28 are formed to provide a thinner section 29 in the bit closely adjacent but spaced from the end edge. While it is preferred to form the surface 29 with a radius, it may be formed in any other suitable manner to provide a thinner section at a point spaced from the end of the screw engaging portion for cooperation with the walls of the screw slot when the bit sections are engaged therewith. This condition is shown in Figure 4 where the substantial area of contact between the bit sections and the screw slot walls is clearly evident.

As shown, the release rod 12 is provided with an extension 31, which in the released position of the screw driver engages pin 26, as shown in Figures 2 and 3 to provide a stop for the movement of the head of the screw driver in one direction relative to the handle. Movement in the other direction is limited by the engagement of head portions 27 with the end of the tube.

To assemble the bit sections on the head 12, they are placed on the rod by substantially radial movement relative thereto with their bent ears 19 engaging in the groove 22 so that their semi-cylindrical portions 17 fit the reduced portion 18 of the rod snugly. The rod and head assembly is then slid into the tube so that the bit sections are held on the rod by the tube which prevents the ears 19 from moving out of the groove 22. In this way the bit sections are locked against endwise movement with respect to the release rod and are held by the tube against

radial movement out of engagement therewith. The pin 26 is then inserted and fastened as by riveting to complete the assembly.

Figure 4 illustrates the engagement of the screw driver with a screw, which engagement is effected merely by pushing the screw 36 onto the bit sections, and continuing the pushing until the blade and release rod assembly telescopes inwardly with respect to the tubes. During the telescoping movement engagement of pin 26 with the inner cam edges 24 of the bit sections causes expanding thereof so that the screw engaging ends are forced outwardly into engagement with the opposite side walls of the screw slot 37. By providing thicker end edges for the screw engaging portions of the bit sections, a substantially surface-to-surface engagement can be established between the walls of the screw slot and the outer side faces of the bit sections, as seen in Figure 4, where the curvature provided is slightly exaggerated. This enables a substantially greater frictional holding force to be exerted on the screw. Obviously where a screw driver is designed for a particular size of screw, the angularity of the outer surface of the bit section may be controlled to maintain a substantially flush engagement between the bit sections and the walls of the screw slots when the bit sections are flexed during expansion thereof while being engaged in a screw.

Figures 8 and 9 illustrate a modified form of construction which is generally similar to that described in connection with Figures 1 to 7, but varies therefrom in certain particulars. In the form shown in Figures 8 and 9, the bit sections 16*a* are secured on the release rod 12*a* independently of the tubular handle 10*a* and the locking ears 19*a* not only serve to lock the bits against endwise movement on the rod but also against radial movement relative thereto. As seen most clearly in Figure 9, this is accomplished by extending the locking ear 19*a* to circumferential length of slightly more than 90°, so that the spacing between the end of ear 19*a* and the opposite side edge of the bit is less than diameter of the reduced portion 22*a* of the rod 12*a*. The rod 12*a* is provided with a tapered end portion 31*a* which extends downwardly from the lower reduced portion 18*a*. In assembly, the bit sections 16*a* are placed in mating engagement and then slid endwise over the tapered end portions 31*a* of the rod 12*a*, until the ears 19*a* snap into the slot 22*a*. This effectively locks each bit section on the rod independently of the tube both against endwise movement and against radial movement relative thereto.

I claim:

1. A screw driver of the screw-engaging type comprising a tubular handle and a blade assembly mounted for telescoping movement within the handle, said blade assembly including a pair of opposite bit sections formed to provide complemental inter-engaging portions to facilitate assembly in the desired relative positions and a rod for engagement by said portions, circumferential ears and opposed recesses on said bit sections, said ears having their ends formed inwardly from their general curvature, recess means on said rod for engagement by said inwardly formed ends, and cam means carried by said handle and extending between said bit sections to engage cam portions thereof upon movement of said blade assembly within said handle and cause expansion of said bit sections into holding engagement with a screw.

2. A screw driver of the screw-engaging type comprising a tubular handle and a blade assembly mounted for telescoping movement within the handle, said blade assembly including a pair of opposite bit sections formed to provide complemental inter-engaging portions to facilitate assembly in the desired relative positions and a rod for engagement by said portions, circumferential ears and opposed recesses on said bit sections, said ears having their ends formed inwardly from their general curvature, recess means on said rod for engagement by said inwardly formed ends, said ears serving to prevent both endwise and radial movement of said bit sections, and cam means carried by said handle and extending between said bit sections to engage cam portions thereof upon movement of said blade assembly within said handle and cause expansion of said bit sections into holding engagement with a screw.

3. A screw driver of the screw-engaging type comprising a tubular handle and a blade assembly mounted for telescoping movement within the handle, said blade assembly including a pair of opposite bit sections formed to provide screw engaging portions and with complemental inter-engaging portions to facilitate assembly in the desired relative positions, and a rod for engagement by said portions, circumferential ears and opposed recesses on said bit sections, said ears having their ends formed inwardly from their general curvature, recess means on said rod for engagement by said inwardly formed ends, and means operable in response to relative endwise movement of said handle and said blade assembly for spreading said screw-engaging portions into holding engagement with a screw.

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