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THIMBLE SCREWDRIVER HAVING SCREW RETAINING MEANS

Filed June 25, 1953

2 Sheets-Sheet 1

Fig. 1

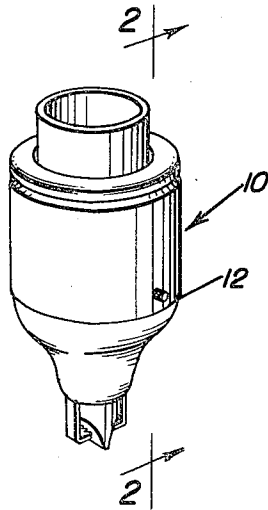


Fig. 2

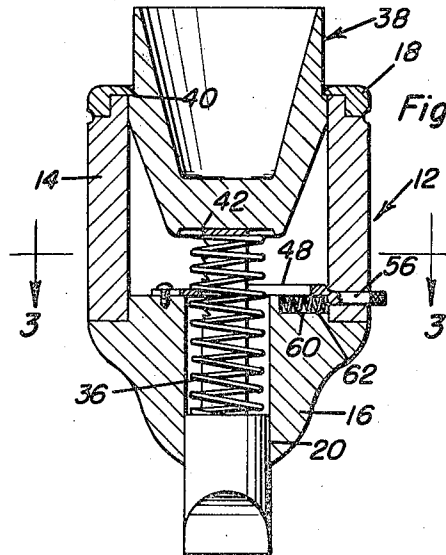


Fig. 3

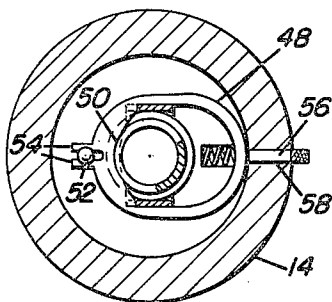


Fig. 4

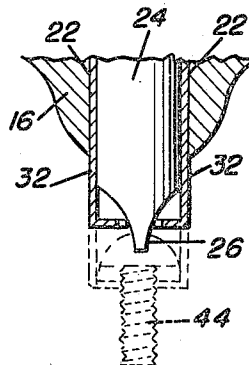
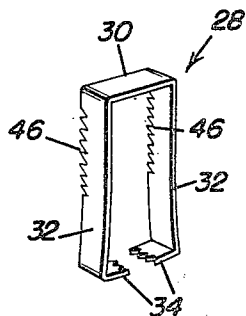


Fig. 5



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Fig. 6

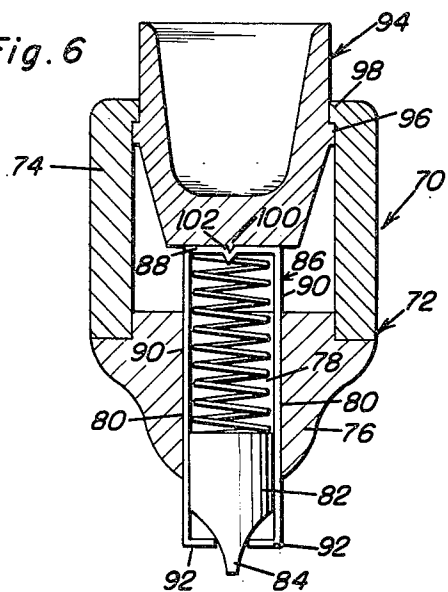


Fig. 7

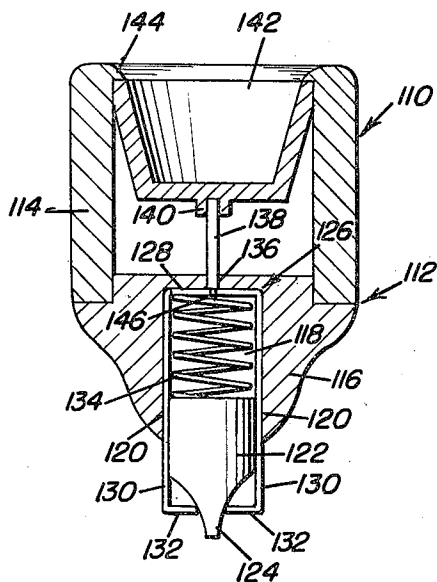


Fig. 8

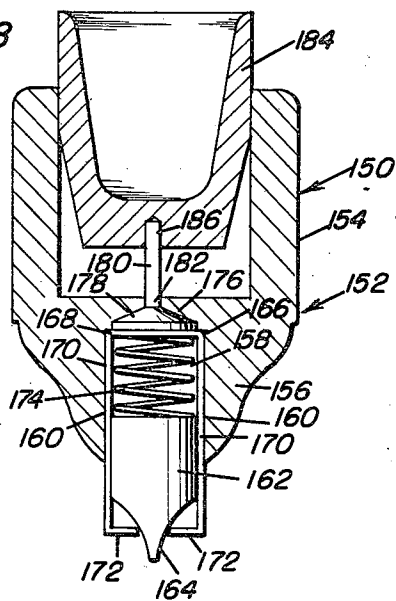
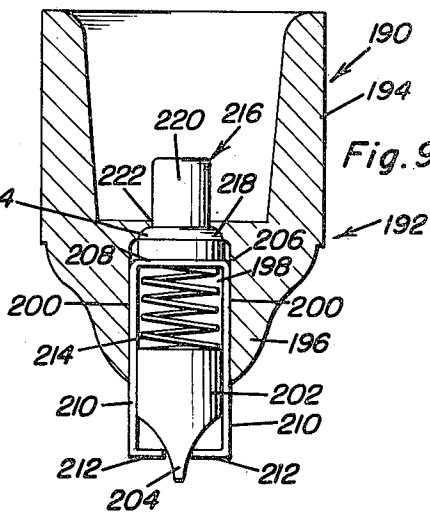


Fig. 9



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THIMBLE SCREWDRIVER HAVING SCREW RETAINING MEANS

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7 Claims. (Cl. 145—52)

This invention relates in general to improvements in hand tools, and more specifically to an improved screwdriver construction.

In the repair and assembly of many types of equipment, especially electronic equipment, it has been found necessary to position and replace certain small fasteners, especially screws, which are positioned in rather confined spaces whereby it is difficult for a repairman or an assembler to properly position the screw or screws.

It is therefore a primary object of this invention to provide an improved screwdriver construction which will facilitate the positioning and replacement of such screws in small or otherwise confined places.

Another object of this invention is to provide an improved screwdriver of the thimble type which is provided with screw retaining means whereby a screw may be properly retained on the tip of a screwdriver blade so as to facilitate replacement of such screw.

Another object of this invention is to provide an improved thimble screwdriver having screw retaining means, said thimble screwdriver including a finger receptacle rotatably mounted within the housing carrying a screwdriver blade and the screw retaining means, the finger receptacle being movable within the housing to move the screw retaining means to an inoperative position.

A further object of this invention is to provide an improved thimble screwdriver having screw retaining means for retaining screws on the tip end of an associated screwdriver blade, said thimble screwdriver including locking means for retaining the screw retaining means in adjusted positions whereby exertion on a finger receptacle which is utilized to position the screw retainer will not affect the setting of the screw retainer.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of a preferred form of the invention and shows the thimble screwdriver provided with locking means for the screw retainer;

Figure 2 is an enlarged vertical sectional view taken substantially upon the plane indicated by section line 2—2 of Figure 1 and shows the general construction of the thimble screwdriver;

Figure 3 is a transverse horizontal sectional view taken substantially upon the plane indicated by the section line 3—3 of Figure 2 and shows the specific construction of the locking means for the screw retainer;

Figure 4 is a fragmentary vertical sectional view taken through the lower portion of the thimble screwdriver of Figure 1 at right angles to the section line 2—2 and shows both inoperative and operative positions of the screw retainer, the operative position being shown by dotted lines;

Figure 5 is an enlarged perspective view of the screw retainer and shows the general outline of the same;

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Figures 6, 7, 8 and 9 are vertical sectional views similar to Figure 2 taken through the centers of modified forms of thimble screwdrivers.

Referring now to the drawings in particular, it will be seen that there is illustrated in Figures 1 through 5, inclusive, a preferred form of the invention. The thimble screwdriver illustrated in these figures is referred to in general by the reference numeral 10 and includes a housing which is referred to in general by the reference numeral 12. The housing 12 includes a generally cylindrical body portion 14 and an inverted conical bottom portion 16, the body portion 14 and the bottom portion 16 being in interlocked relation. The housing 12 also includes a locking ring 18 carried by the upper end of the body portion 14, the purpose of the locking ring to be set forth in more detail hereinafter.

Extending through the bottom portion 16 is a centrally located bore 20 which is generally circular in cross-section. Communicating with the bore 20 are diametrically opposed recesses 22. Disposed within the lower portion of the bore 20 and rigidly secured therein is a shank portion 24 of a screwdriver blade 26.

In order that a screw may be retained on the screwdriver blade 26 for insertion into a threaded opening, the thimble screwdriver 10 includes a screw retainer which is referred to in general by the reference numeral 28. As is best illustrated in Figure 5, the screw retainer 28 is generally channel-shaped in outline and includes an upper web portion 30 which has integral therewith depending legs 32. The legs 32 terminate in inwardly directed, aligned, opposed flanges 34.

It will be noted that when the screw retainer 28 is properly positioned, the legs 32 are seated within the grooves 22 for vertical movement. Disposed in the upper portion of the bore 20 and engaging both the upper end of the shank 24 and the underside of the web portion 30 is a coil spring 36. The coil spring 36 retains the screw retainer 28 in an inoperative position with the flanges 34 engaging opposite sides of the screwdriver blade 26, as best illustrated in Figure 4.

Disposed in the upper portion of the housing 12 is a thimble-like finger receptacle 38. The finger receptacle 38 is provided with an annular shoulder 40 which engages the inner side of the locking ring 18 and results in the retention of the finger receptacle 38 within the body portion 14. The finger receptacle 38 has formed in the underside thereof a circular cross-sectional recess 42 in which is received the upper end of the screw retainer 28. By depressing the finger receptacle 38 further into the confines of the body portion 14, the coil spring 36 may be compressed with the resultant downward movement of the screw retainer 28 to a position whereby the flanges 34 may engage a screw, such as the screw 44, for retaining the same on the screwdriver blade 26.

It will be understood that the recess 42 in the finger receptacle 38 is of a size to permit rotation of the screw retaining means 28 relative to the finger receptacle 38. After the screw 44 has been properly positioned on the screwdriver blade 28, the threaded portion of the screw 44 is inserted into an internally threaded opening (not shown) and the housing 12 rotated relative to the finger receptacle 38. The necessary pressure to be applied on the screw 44 is applied through the finger receptacle 38, and the housing 12 rotated thereabout.

In order that the screw retainer 28 may be locked in a predetermined position, such as the screw retaining position illustrated in dotted lines in Figure 4, the upper portions of the legs 32 at adjacent edges thereof are provided with serrated portions 46 which are best illustrated in Figure 5. The serrated portions 46 are disposed within the body portion 12 above the bottom portion 16 and engaged by a yoke 48 carried by the upper surface of the

bottom portion 16. The yoke 48 is generally oval-shaped in outline and includes a screw retainer engaging portion 50, the portion 50 engaging between adjacent serrations of the serrated portion 46.

It will be noted that the yoke 48 is retained against vertical movement through the housing 12 by a locking pin 52 carried by the bottom portion 16. The locking pin 52 is positioned within a bifurcated inner end 54 of the yoke 48. The outer end of the yoke 48 is provided with a pin 56 which extends through a horizontal bore 58 in the body portion 14. As is best illustrated in Figure 2, the upper part of the body portion 16, which is disposed within the confines of the lower part of the body portion 14 is provided with a recess 60 in which is disposed a spring 62. It will also be noted that the pin 56 is vertically offset with respect to the yoke 48 so that the same is engaged by the spring 62 to retain the yoke 48 in a screw retainer locking position.

When it is desired to position the screw retainer 28 relative to the screwdriver blade 26, the pin 56 is depressed inwardly with the result that the portion 50 is disengaged from the serrated portion 46. The screw retainer 28 is then free for movement either in response to urging of the spring 36 or the downward urging of the finger receptacle 38. After the screw retainer 28 has been moved to a desired position, it may be locked in that position by merely releasing the pin 56 which results in movement of the yoke 48 to a locking position in response to urgings of the spring 62.

Referring now to Figure 6 in particular, it will be seen that there is illustrated a modified form of thimble screwdriver which is referred to in general by the reference numeral 70. The thimble screwdriver 70 includes a housing 72 which is generally cup-shaped. The housing 72 includes an upper cylindrical body portion 74 and an inverted conical bottom portion 76. It will be noted that the body portion 74 and the bottom portion 76 are interlockingly secured together.

The bottom portion 76 is provided with a centrally disposed bore 78 which has communicating therewith diametrically opposed grooves 80. Disposed within the lower portion of the bore 78 is a shank portion 82 of a screwdriver blade 84.

Disposed within the recesses 80 and projecting upwardly into the interior of the housing 72 is a screw retainer which is referred to in general by the reference numeral 86. The screw retainer 86 includes an upper web portion 88 which has formed integrally therewith depending legs 90. The legs 90 terminate at their lower ends in inturned screw retaining flanges 92.

The legs 90 are guidingly disposed within the recesses 80 and the web portion 88 is disposed within the interior of the housing 72 within the confines of the body portion 74. Disposed within the upper part of the body portion 74 and partially projecting out of the same is a thimble-like finger receptacle which is referred to in general by the reference numeral 94. The finger receptacle 94 includes an annular shoulder 96 which engages an inturned annular flange 98 formed at the upper end of the body portion 74, the flange 98 retaining the finger receptacle 94 within the confines of the body portion 74.

It will be noted that the bottom of the finger receptacle 94 is seated on the upper surface of the web portion 88. The bottom of the finger receptacle 94 is provided with a centrally located depending pin 100 which is received within a centrally disposed recess 102 formed in the top of the web portion 88. The pin and recess connection permits the rotation of the screw retainer 86 with respect to the finger receptacle 94. It will be understood that the screw retainer 86 is positioned in the same manner as described above with respect to the screw retainer 28 with the downward movement of the screw retainer being facilitated by a downward movement of the finger receptacle 94.

Referring now to Figure 7 in particular, it will be seen

that there is illustrated another form of thimble screwdriver which is referred to in general by the reference numeral 110. The thimble screwdriver 110 includes a housing which is referred to in general by the reference numeral 112. The housing 112 includes a generally cylindrical body portion 114 and a depending inverted conical bottom portion 116. The bottom portion 116 is provided with a blind bore 118 which opens through the lower end thereof. The blind bore 118 has communicated therewith diametrically opposed vertical recess 120 which also opens through the lower end of the bottom portion 116.

Disposed within the lower end of the bore 118 and projecting therefrom is a shank 122 of a screwdriver blade 124. Also disposed within the bore 118 and having portions thereof disposed within the recesses 120 is a screw retainer which is referred to in general by the reference numeral 126.

The screw retainer 126 includes an upper web portion 128 which has integral therewith depending legs 130. The legs 130 terminate in inwardly directed flanges 132. It will be noted that the legs 130 are guidingly received within the grooves 120. Disposed within the upper end of the bore 118 between the upper end of the shank 122 and the bottom of the web portion 128 is a coil spring 134 which urges the screw retainer 124 to the inoperative position illustrated.

In order to facilitate movement of the screw retainer 126 to an operative position, the bore 118 is provided with a reduced extension bore 136 which opens into the interior of the housing 112. Disposed within the bore 136 is an elongated pin 138 carried by a boss 140 at the bottom of a thimble-like finger receptacle 142. The finger receptacle 142 is rotatably retained within the housing 112 by an inturned annular shoulder 144 formed at the upper end of the body portion 114.

The pin 138 is provided with a reduced lower end 146 which is disposed within a bore in the web portion of the screw retainer. It will be seen that when the finger receptacle 142 is depressed, the screw retainer 126 is also depressed so that a screw may be conveniently positioned on the screwdriver blade 124 and retained thereon by the flanges 132.

Referring now to Figure 8 in particular, it will be seen that there is illustrated a further modified form of thimble screwdriver which is referred to in general by the reference numeral 150. The thimble screwdriver 150 includes a cup-like housing 152 which has an integrally formed body portion 154 and a bottom portion 156.

The bottom portion 156 is provided with a blind bore 158. Communicating with the bore 158 and disposed in diametrically opposed relation are grooves 160, the bore 158 and the grooves 160 opening through the bottom of the bottom portion 156.

Disposed within the lower portion of the bore 158 is a shank 162 of a screwdriver blade 164. Partially surrounding the screwdriver blade 162 is a screw retainer which is referred to in general by the reference numeral 166. The screw retainer 166 includes an upper web portion 168 which has formed integrally therewith depending legs 170. The legs 170 are guidingly disposed in the grooves 160 and terminate at their lower ends in inturned opposed flanges 172.

In order that the screw retainer 166 may be retained in the inoperative position illustrated, there is disposed in the upper part of the bore 158 between the shank 162 and the web portion 168 a coil spring 174 which urges a screw retainer 166 upwardly.

The bore 158 terminates in a conical upper end 176 in which is disposed a conical head 178 of a pin 180. The pin 180 passes through a relatively small bore 182 which communicates the interior of the housing 152 with the bore 158.

Disposed within the body portion 154 of the housing is a finger receptacle 184. The finger receptacle 184 is

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provided with a bore 186 in a bottom wall thereof in which is retained an upper end of the pin 180.

When it is desired to move the screw retainer 166 downwardly to a screw retaining position against the resistance of the coil spring 174, the finger receptacle 184 is moved downwardly with the downward force thereof being transmitted to the screw retainer 166 by the pin 180. It will be understood that the pin 180 and its head 178 are free to rotate with respect to the housing 152 so that the housing 152 may be rotated about the finger receptacle 184 to screw a screw or the like into its desired position.

Referring now to Figure 9 in particular, it will be seen that there is illustrated a still further modified form of thimble screwdriver which is referred to in general by the reference numeral 190. The thimble screwdriver 190 includes a housing which is referred to in general by the reference numeral 192, the housing being substantially identical to the housing 152. The housing 192 includes a cylindrical body portion 194 which has formed integrally therewith an inverted conical-shaped bottom portion 196.

The bottom portion 196 is provided with an internally threaded bore 198 which has communicating therewith diametrically opposed grooves 200. Disposed within the lower portion of the bore 198 is a shank 202 of a screwdriver blade 204.

Also disposed within the bore 198 and partially surrounding the screwdriver blade 204 is a screw retainer which is referred to in general by the reference numeral 206. The screw retainer 206 includes an upper web portion 208 which has formed integrally therewith depending legs 210. The legs 210 are guidingly disposed within the grooves 200 and terminate at their lower ends in intumed flanges 212.

Disposed in the upper part of the bore 198 between the shank 202 and the web portion 208 is a coil spring 214. The coil spring 214 urges the screw retainer 206 upwardly to the inoperative position illustrated.

In order that the screw retainer 206 may be moved downwardly for reception of a screw, there is provided an actuator which is referred to in general by the reference numeral 216. The actuator 216 includes a lower head 218 which is disposed at the extreme upper end of the bore 198 above the web portion 208. The actuator 216 also includes a shank 220 which is formed integrally with the head 218 and passes upwardly into the interior of the housing 192 through a bore 222 formed in the upper part of the bottom portion 196 and communicating with a bore 198 with the interior thereof. It will be understood that the bore 222 is of a smaller diameter than the bore 198 so as to form a shoulder 224 against which the head 218 seats in its uppermost position. It will be understood that the actuator 216 is actuated by placing one's finger within the body portion 194 and depressing the same. The depressing of the actuator 216 results in the downward movement of the screw retainer 206 against the urging of the spring 214 so that a screw may be engaged by the flanges 212 and retained on the screwdriver blade 204.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said

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blade to retain a screw in engagement therewith, spring means urging said screw retainer to a screw-retaining position, said screw retainer being releasable from the screw-retaining position from within said housing, a finger receptacle rotatably mounted within said housing, said finger receptacle being connected with said screw retainer to facilitate selective positioning of said screw retainer.

2. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said blade to retain a screw in engagement therewith, spring means urging said screw retainer to a screw-retaining position, said screw retainer including a portion projecting into the interior of said housing to facilitate movement of said screw retainer to a screw releasing position, a finger receptacle rotatably mounted within said housing connected with said portion for moving same.

3. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said blade to retain a screw in engagement therewith, spring means urging said screw retainer to a screw-retaining position, means projecting into the interior of said housing to facilitate movement of said screw retainer to a screw releasing position, a finger receptacle rotatably mounted within said housing connected with said means for moving same, said means including a pin projecting through said bore.

4. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said blade to retain a screw in engagement therewith, spring means urging said screw retainer to a screw-retaining position, said screw retainer being releasable from the screw-retaining position from within said housing, locking means carried by said housing retaining said screw retainer in an adjusted position.

5. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said blade to retain a screw in engagement therewith, spring means urging said screw retainer to a screw-retaining position, means projecting into the interior of said housing to facilitate movement of said screw retainer to a screw releasing position, locking means carried by said housing retaining said screw retainer in an adjusted position.

6. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said blade to retain a screw in engagement therewith, spring means urging said screw retainer to a screw-retaining position, said screw retainer being releasable from the screw-retaining position from within said housing, locking means carried by said housing retaining said screw retainer in an adjusted position, said locking means including a serrated portion on said screw retainer, a yoke surrounding said screw retainer and lockingly engaging said serrated portion.

7. A thimble screwdriver comprising a cup-shaped housing including a bottom, a central bore through said bottom, a screwdriver blade disposed within said bore and projecting below said bottom, a screw retainer disposed within said bore and partially surrounding said blade to retain a screw in engagement therewith, spring

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means urging said screw retainer to a screw-retaining position, said screw retainer being releasable from the screw-retaining position from within said housing, locking means carried by said housing retaining said screw retainer in an adjusted position, said locking means including a serrated portion on said screw retainer, a yoke surrounding said screw retainer and lockingly engaging said serrated portion, said serrated portion and said yoke being disposed within said housing, said yoke being resiliently urged to a locking position.

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