Nov. 6, 1951 A. U. ESLICK 2,574,026

SCREW HOLDING SCREW DRIVER

Filed Feb. 4, 1947 2 SHEETS—SHEET 1

Fig. 1.

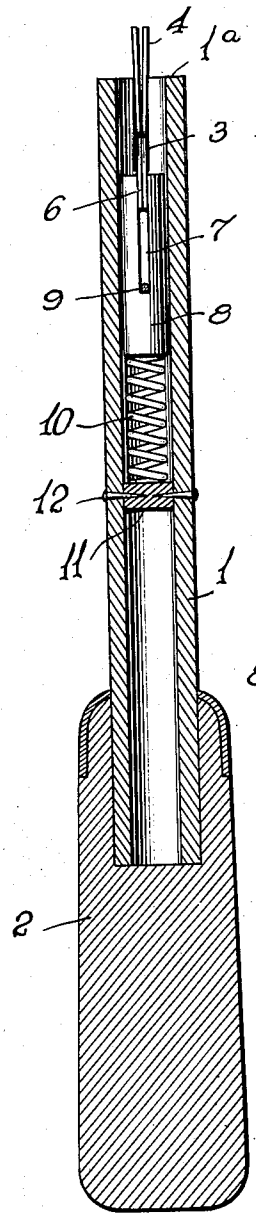


Fig. 2.

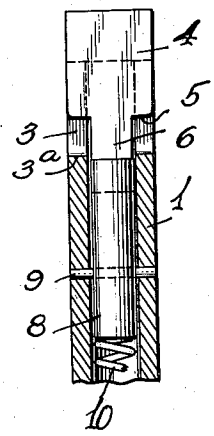


Fig. 3.

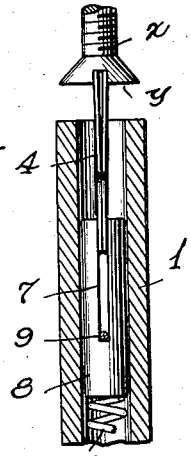


Fig. 4.

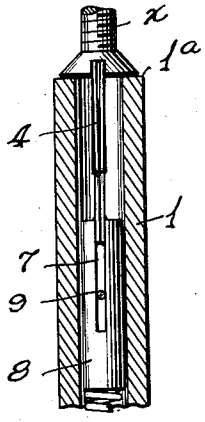


Fig. 5.

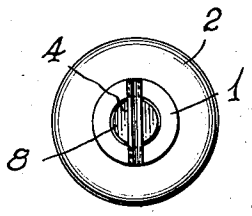


Fig. 6.

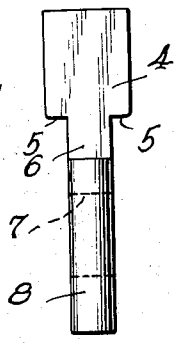


Fig. 7.

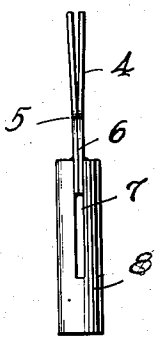


Fig. 8.

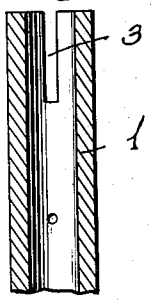
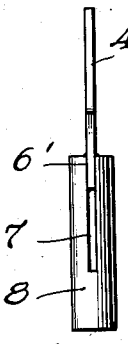


Fig. 9.



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SCREW HOLDING SCREW DRIVER

Filed Feb. 4, 1947 2 SHEETS—SHEET 2

Fig. 10

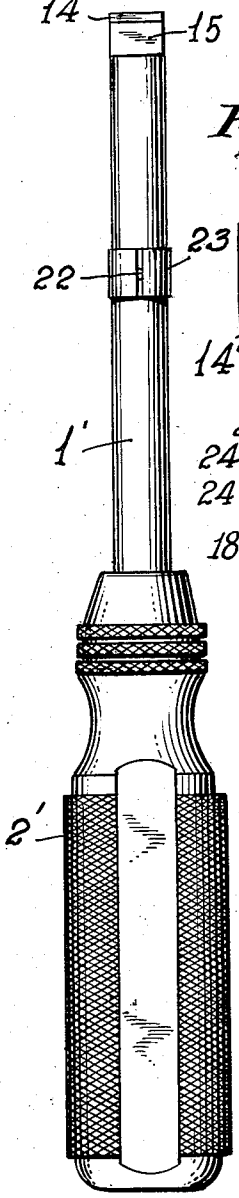


Fig. 13

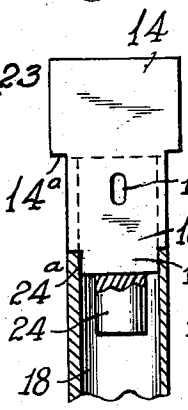


Fig. 11

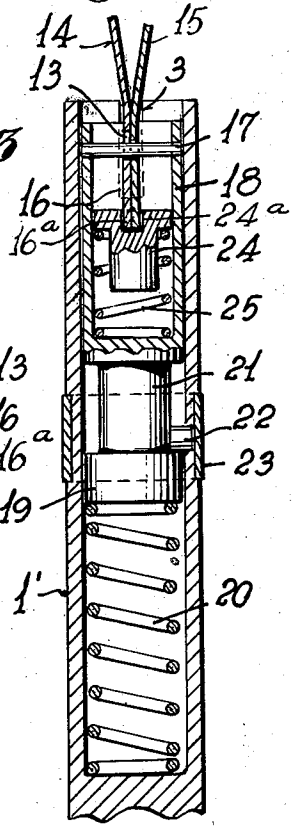


Fig. 12

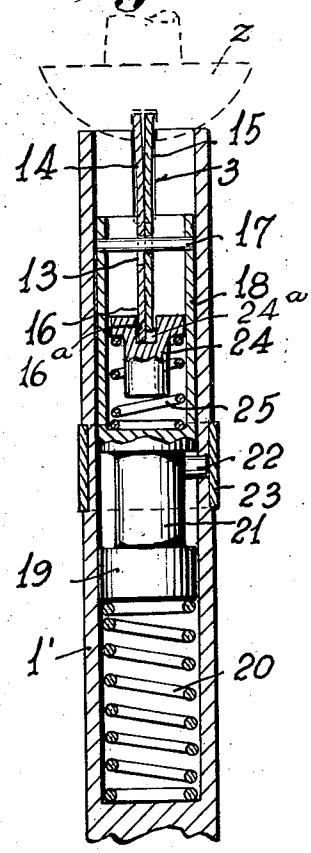


Fig. 14

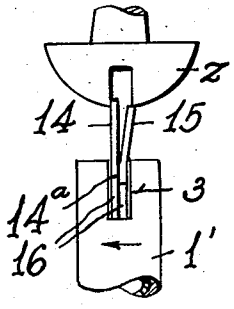


Fig. 15

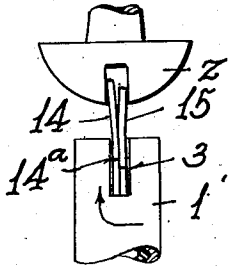
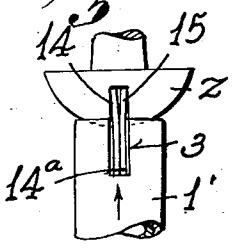


Fig. 16



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SCREW HOLDING SCREW DRIVER

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Application February 4, 1947, Serial No. 726,293

7 Claims. (Cl. 145—50)

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This invention relates to hand tools, and more particularly to screw drivers.

The present application is in the nature of a continuation-in-part of my prior copending application Serial No. 648,869, filed February 20, 1946, now abandoned.

One object of the invention is to provide a construction in which a flat bearing is provided to engage the face of a flat head screw on each side of the kerf, so as to hold such screw in alinement as it is being driven.

Another object is to devise an improved bit movably mounted within a hollow shank, and so designed as to be capable of gripping or holding a screw by engagement with the slot or kerf thereof.

A further object of the invention is to so construct the bit as to facilitate its insertion into the slot or kerf of a screw.

Still another object is to provide improved means for holding the bit and associated parts in assembled relation within the shank.

With the above and other objects in view, and to improve generally on the details of such tools, the invention consists in the construction and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawings, in which:

Fig. 1 is a longitudinal section through one form of my improved screw driver, parts being in elevation, and the bit being shown as projecting beyond the shank to the maximum extent;

Fig. 2 is a fragmentary longitudinal section through the end portion of the screw driver, the same being taken on a plane at right angles to that of Fig. 1;

Fig. 3 is a fragmentary view similar to Fig. 1 but showing a screw in position on the end of the bit;

Fig. 4 is a view similar to Fig. 3, but showing the bit and screw in retracted position;

Fig. 5 is an end view of the screw driver shown in Fig. 1;

Fig. 6 is a side elevation of the bit and carrier shown in Fig. 2;

Fig. 7 is a similar view looking in a direction at right angles to that of Fig. 6;

Fig. 8 is a fragmentary sectional view of the end portion of the shank alone;

Fig. 9 is a view similar to Fig. 7, but showing a modified construction;

Fig. 10 is a side elevation of a form of screw

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driver somewhat different from that shown in Fig. 1;

Figs. 11 and 12 are fragmentary longitudinal sections, similar to Figs. 3 and 4, but on a further enlarged scale, and showing the end portion of the screw driver illustrated in Fig. 10, a round headed screw being indicated in Fig. 12 in dotted lines.

Fig. 13 is a side elevation of one of the parts of the bit shown in Figs. 11 and 12 and the support therefor; and

Figs. 14, 15 and 16 are diagrammatic views, in side elevation, illustrating successive steps in placing the bit in position in the kerf of a screw.

Referring to the drawings in detail, and more particularly first to Figs. 1 to 8, inclusive, my improved screw driver comprises a hollow shank 1, shown as tubular, to which is rigidly attached a suitable handle 2.

The end of the shank opposite the handle is transversely flat or square, as indicated at 1^a, and is provided with a diametrically disposed longitudinally extending slot 3, best illustrated in Fig. 8.

The screw engaging bit of my improved screw driver preferably comprises a pair of thin, flat, resilient strips, shown as similar, the outer portion 4 of each of which is relatively wide, while the inner portion 6 thereof is relatively narrow.

The width of the portion 4 is preferably substantially equal to the outside diameter of the shank 1, as shown in Fig. 2, while the width of the portion 6 is somewhat less than the inner diameter of the shank.

The inner ends of the portion 6 of the strips are in close contact with each other and are rigidly secured, as by welding or brazing, into the outer end of a slot 7, formed in a cylindrical block or carrier 8, which is freely slidable within the hollow shank 1.

A cross pin 9 extends through the shank and works freely in the slot 7, this pin serving to limit the outward movement of the block or carrier 8.

A helical spring 10 is confined between the inner end of the block 8, and a suitable stop 11 secured within the shank as by means of screws or pins 12. The spring 10 is normally under compression and tends to maintain the block 8 and bit in their outermost position, as shown in Figs. 1, 2 and 3, with the pin 9 engaging the inner end of the slot 7.

The outer portions 4 of the resilient strips con-

stituting the bit are formed to normally bend outwardly or spring apart, as shown in Fig. 1. This construction is utilized to enable the bit to frictionally engage the sides of the slot or kerf in the head of a screw,and thus grip or hold a screw x, as shown in Fig. 3. In other words, a screw can be placed in position on the end of the bit, and will be held there by the resilience of the strips.

Shoulders **5** are formed between the wide portions **4** and the narrow portions **6** of the bit, and these shoulders engage the inner end **3a** of the slot **3**, when pressure is applied to the handle **2**, to limit the extent to which the bit and carrier are forced back into the shank. The engagement of the slot **3** with the wide portions **4** of the bit also serves to lock the shank and bit together against relative rotation. In other words, this slot transmits the torque of the handle to the bit.

After a screw has been mounted in position on the end of the bit, as shown in Fig. 3, it may be placed in the position to be driven, and pressure then applied to the handle **2**. As a result of such pressure, the bit will be forced back into the shank until it reaches the position shown in Fig. 4.

If the screw x is of the type having a flat head or face, as indicated at y in Fig. 3, when the parts reach the position shown in Fig. 4, this flat head or face will be substantially in contact with the flat end **1a** of the shank, such flat end of the shank thus affording a bearing surface of wide area for the head of the screw. By virtue of engagement of the flat head of the screw with this wide bearing surface, the screw is held in alinement and prevented from wobbling, or being deflected sidewise, as so often occurs when screw drivers of the conventional form are used.

The slots or kerfs in the heads of screws vary somewhat in depth. The parts of my improved screw driver are so proportioned that when the shoulders **5** engage the end of slot **3**, to stop the inward movement of the bit, as described, the outer end of the bit projects beyond the square or flat end of the shank a distance no greater than the depth of the shallowest kerf, so that the face of the screw may seat firmly against the end of the shank. When screws are encountered having a deeper kerf, the spring **10** will resiliently urge the bit outwardly until its end engages the bottom of the kerf, while the pressure exerted against the handle will force the flat head of the screw into contact with the end of the shank, as before. Thus, whatever the depth of the kerf, the bit will extend to the bottom thereof, while at the same time the flat head of the screw will engage the end of the shank.

In Fig. 9, I have shown a modification in which the bit consists of only a single, flat piece or strip, having an outer wide portion **4'** and an inner narrow portion **6'**. In this case, the thickness of the strip is substantially equal to the width of the slot **7**, so that it may be mounted in the end of such slot, as shown. A bit of this type may be employed where the screw holding feature, as shown in Fig. 3, is not desired, and when employed, it will operate in the manner shown in Fig. 4, so far as holding the screw in alinement is concerned.

Referring now to Figs. 10 to 16 inclusive, I have shown a slightly different construction of screw driver. This comprises a tubular shank **1'** set into a handle **2'** as before, and the end of the tubular shank is likewise provided with a diametrically extending slot **3**. As in the previous figures, the bit comprises a pair of resilient strips, designated **14** and **15**, mounted with their inner ends in contact and with their outer ends flaring or sprung apart. These strips each have relatively wide outer portions working in the slot **3**, and relatively narrow inner portions **16** which extend down into a hollow block or carrier **18**, with their edges received in slots in this carrier, aligned with the slots **3**. Between the wide and narrow portions are formed shoulders, such as indicated at **14a** in Fig. 13, which engage the inner ends of the slot **3** to limit the inward movement of the bit, as described in connection with the previous figures.

In the present construction, however, the strips **14** and **15** are of slightly different length and are mounted for relative movement with respect to each other.

The strip **14**, which is the longer, is provided with a slot **13**, working freely over a transverse pin **17** set into the walls of the hollow carrier **18**, and is provided at its end with a narrow tongue or extension **16a**. The other strip **15** is provided with a hole which snugly fits the pin **17** and is thus fixed with respect to the carrier **18**.

The inner ends of the two strips are normally held in alinement by engagement with the bottom of a slot **24a** formed in the face of a plunger **24** resiliently supported on a spring **25** enclosed within the hollow carrier **18**. This is shown in Fig. 11, and by reference to this figure it will be seen that when in this position the free end of the strip **14** projects somewhat beyond that of the strip **15**. In practice I find that satisfactory results are obtained by having the strip **14** project about $\frac{1}{64}$ of an inch beyond the strip **15**.

By virtue of the fact that the inner end of the strip **14** is resiliently supported on the plunger **24** it will be seen that, when pressure is applied against its free end, this strip **14** is pushed inward until the free ends of the two strips are brought into registry as shown in Fig. 12, the slot **13** permitting such inward movement.

The carrier **18**, supporting the bit, is yieldingly urged outwardly by means of a spring **20**, as previously described. In Fig. 12, I have shown in dotted lines a fragment of a round headed screw z as it appears when in position to be driven, the carrier having moved back into the shank until the free ends of the strips constituting the bit project from the open end of the shank just far enough to effectively engage in the kerf of the screw, as described in connection with the previous figures, and the round head engaging and fitting against the end of the hollow shank **1'**. This serves as a chuck or socket and assists in steadying and guiding the screw.

Instead of the pin and slot connection, **7** and **9**, shown in Figs. 1 to 4, I employ a slightly different means for limiting the outward movement of the carrier and for maintaining the parts in assembled relation. Referring to Figs. 11 and 12 this means comprises a head **19** formed on the inner end of the carrier and engaging the spring **20**, the carrier between this head and the outer hollow portion being reduced in diameter as shown at **21**, thus providing a shoulder or abutment at each end of this reduced portion. A button or stud **22** inserted through an opening in the tubular shank **1'** projects radially inward into substantial contact with the reduced portion of the carrier at a point between these shoulders or abutments, and this stud is held in position and prevented from coming out by means of a resilient split sleeve **23** which surrounds the shank and overlies the stud. Preferably a shal-

low groove is formed in the outer surface of the shank to receive this sleeve, so that it is held against longitudinal movement.

The outward movement of the carrier 18 is limited by the engagement of the abutment formed by the head 19 with the stud 22 as shown in Fig. 11, and the distance between the abutments is such that the carrier may move inwardly to a sufficient extent to permit the screw head to engage the end of the shank, as shown in Fig. 12.

If it is desired to remove the carrier from the shank for replacement or repair, it is only necessary to spread the split sleeve 23 and shift it longitudinally, in order to release the stud 22 and permit the entire carrier to be withdrawn.

It will be understood that the spring 25 supporting the plunger 24 is preferably slightly weaker than the main spring 20 supporting the carrier, so that this spring 25 will yield sufficiently to permit the free ends of the strips 14 and 15 to be brought into registry before sufficient pressure is applied to move the carrier as a whole.

The purpose in making one of the strips project slightly beyond the other will be obvious from an inspection of Figs. 14 to 16. In positioning the bit in the kerf of a screw, the longer strip is first placed against the round surface of the screw head and the bit moved toward the left. This causes the strip 14 to drop into the kerf and thus position the bit relative to the kerf, as shown in Fig. 14. Then by continuing to move the bit toward the left, the free ends of the two strips are pressed together so that by a slight longitudinal movement the strip 15 also enters the kerf. Then by a continued longitudinal movement the bit is finally brought into driving position against the screw as shown in Fig. 16. Thus it will be understood that the longer strip 15 serves to guide the bit and to facilitate its insertion into the kerf of the screw.

What I claim is:

1. A screw driver comprising a tubular shank, a bit freely slidable within said shank, means operating in all positions of the bit for resiliently urging said bit outwardly, means for stopping the outward movement of said bit in a position with its end projecting a substantial distance beyond the end of said shank, whereby the bit yields inwardly when pressed against a screw by a thrust applied to said shank, means for limiting the inward movement of said bit in such manner that, when the bit is in its extreme innermost position, its end still projects beyond the end of said shank to some extent, so that it can enter the kerf in the head of a screw, and means for locking said bit and shank together against relative rotation.

2. A screw driver comprising a hollow shank having an internal diameter smaller than the head of a screw to be driven, and formed with a transversely flat outer end the entire periphery of which lies in the same plane, a bit freely slidable but non-rotatably mounted within said shank, a spring constantly urging said bit outwardly so that its end projects a substantial distance beyond the flat end of said shank, whereby when said bit is applied to a screw head, and pressure is exerted on said shank, said bit is forced back into the shank until the latter engages the screw head, and means for so limiting such inward movement that, in its final position, the bit is rigidly supported and projects beyond said flat end of the shank a distance no greater than the depth of the kerf in the screw head, whereby the said flat end of the shank forms a wide bearing engaging the end face of a screw head being driven, and thus prevents the screw from wobbling.

3. In a screw driver, the combination with a handle, of a tubular shank rigidly fixed thereto, a bit mounted in said shank, said bit comprising a pair of resilient strips, a carrier supporting said strips with their inner ends in contact with each other, the free ends of said strips being constructed to spring apart, said carrier being capable of limited free sliding movement relative to said handle within said shank, means operative in all positions of said bit for yieldingly urging said carrier toward the end of said shank, the free ends of said strips projecting beyond the end of the carrier and shank at all times, so that said strips may be forced back into said shank by applying pressure thereto, the end portion of said shank having a diametrically disposed slot in its side walls extending longitudinally and opening out through the end thereof, and the outer end portions of said strips sliding freely in said slot, whereby, as said strips move inwardly, their free ends are, by engagement with the sides of said slot, caused to approach each other.

4. In a screw driver, the combination with a tubular shank, of a bit mounted therein, said bit comprising a pair of resilient strips, a carrier supporting said strips with their inner ends in contact with each other, the free ends of said strips flaring outwardly and constructed to spring apart, said strips being relatively longitudinally movable, resilient means for causing the free end of one strip to normally project slightly beyond that of the other, whereby, when pressure is applied thereto the said free ends of the strips are brought into registry, means for mounting said carrier for limited sliding movement within said shank, and means for yieldingly urging said carrier toward the end of said shank.

5. In a screw driver, the combination with a tubular shank, of a bit mounted therein, said bit comprising a pair of resilient strips, a carrier supporting said strips with their inner ends in contact with each other, the free ends of said strips flaring outwardly and constructed to spring apart, one of said strips being fixed in said carrier and the other being mounted therein for relative longitudinal movement, means for resiliently holding said movable strip with its free end normally projecting slightly beyond that of the fixed strip, whereby, when pressure is applied thereto, the said free ends of the strips are brought into registry, and means for yieldingly mounting said carrier for limited longitudinal movement within said shank.

6. A screw driver comprising a tubular shank, a bit mounted therein and projecting therefrom, said bit consisting of a pair of resilient strips relatively longitudinally movable with respect to each other and in contact for at least a part of their length, and means for yieldingly maintaining one of said strips in such position that its free end projects slightly beyond that of the other.

7. A screw driver comprising a hollow shank, open at one end, and having an internal diameter smaller than the head of a screw to be driven a bit slidably but non-rotatably mounted within said shank, spring means constantly urging said bit outwardly to a position in which its end projects a substantial distance beyond said open end of said shank, whereby, when said bit is applied to a screw head, and pressure is exerted longitudinally on said shank, said bit is forced

back into the hollow shank until the end of the latter engages the screw head, said spring means causing said bit to substantially abut against the bottom of said kerf, the said open end of said shank lying in a single plane throughout its entire periphery and being shaped to serve as a chuck or socket in which the round head of a screw is received when being driven.

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