Sept. 11, 1951 R. L. BARTLETT 2,567,466

SCREW DRIVER

Filed April 22, 1946

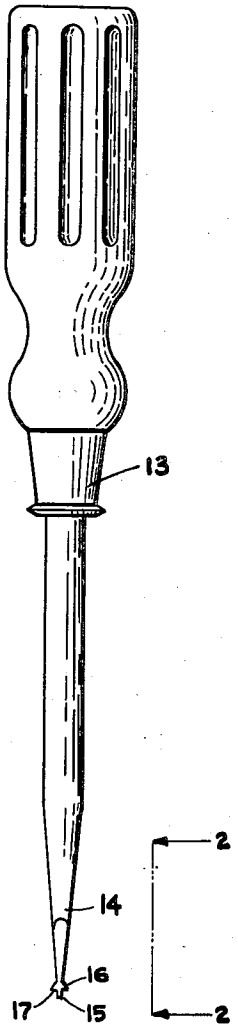


Fig 1

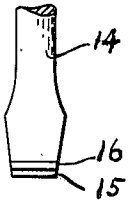


Fig 2

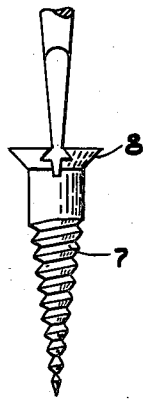


Fig 3

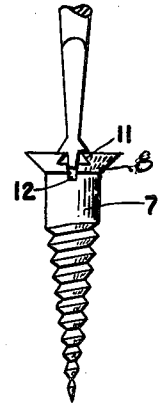


Fig 4

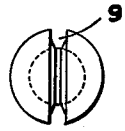


Fig 5

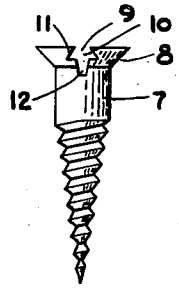


Fig 6

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SCREW DRIVER

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1 Claim. (Cl. 145—50)

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This invention relates to screw drivers and a screw having a head with which the screw driver coacts, for holding the screw and the screw driver in operative relation to each other while the initial driving action is imparted to the screw, it being an object of the invention to provide against disengagement of the screw and the screw driver during the initial driving action.

It is a further object of the invention to provide a screw having a kerf in its head, the said kerf merging with a slot having overhanging walls producing a dovetail-like groove; and furthermore, to provide a slot extending inwardly from the groove, which slot is in line with the kerf.

Furthermore, it is an object to provide a screw driver having a bit adapted, during the initial manipulation of driving the screw, to be seated in the slot, whereas the said screw driver is provided with flanges and outer surfaces which conform to the dovetail slot and fit therein during the initial driving action, it being understood that the screw driver is removed from its set position as described and that the bit is inserted in the kerf with the flanges resting on the outer surface of the head so that the screw driving operation may be continued.

It is obvious that the screw driver must be removed from the head before the head is fully seated; otherwise the screw driver could not be removed from its seat by movement of the screw driver transversely of the head.

With the foregoing and other objects in view, the invention consists in the details of construction, and in the arrangement and combination of parts to be hereinafter more fully set forth and claimed.

In describing the invention in detail, reference will be had to the accompanying drawings forming part of this application, wherein like characters denote corresponding parts in the several views, and in which:

Figure 1 illustrates a view in elevation of the screw driver, showing its edge;

Figure 2 illustrates a detail view, showing the bit in a position at right angles to that in which it is shown in Fig. 1;

Figure 3 illustrates a view in elevation showing a screw with the screw driver engaging the head thereof;

Figure 4 illustrates a similar view, showing the parts in different positions of adjustment;

Figure 5 illustrates a plan view of the head of the screw; and

Figure 6 illustrates a view showing the detail of the head of the screw.

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In these drawings, the screw 7 has a head 8 with a transversely disposed kerf 9, and a groove 10 with overhanging side walls, such as 11, and the groove merges with a groove or channel 12 parallel with the kerf.

A screw driver 13 has a blade 14 whose driving or operating end has a transversely disposed bit 15 which extends downwardly from a head having flared sides 16 which are intended to fit between the overhanging side walls 11. In the initial driving position, the bit 15 fits in the groove 12, as shown in Figure 3. After the screw has been installed on the screw driver, the screw is turned until it has a firm anchorage in a member which is to be fastened by the screw, but before the head of the screw becomes imbedded to a degree which would prevent the screw driver from being removed from the groove, it is moved transversely of the groove and caused to disengage the head of the screw. Thereafter, the shoulders 17 are caused to engage the upper surface of the head of the screw, in which position the driving bit 15 extends into the groove 12 and the screw driving proceeds until the screw is fully set and the screw driver is thus freed by lifting the bit from the groove 12. By this arrangement, the screw and the screw driver are held in operative relation to each other while the initial driving of the screw occurs, and it has proven a satisfactory means for holding the screw in position while it is initially seated and driven.

As indicated in the drawings, the head 16 is in the form of a pair of enlargements which extend laterally of the bit faces and thus from opposite sides of the bit, the enlargements being spaced a material distance from the free end of the driving shank of the screw driver. Each enlargement extends the full width of such end zone, and each is formed with a planar bottom face extending at right angles to the axis of the driver, the upper face being inclined upward and inward from such planar face with its upper end merging into the face of the bit. Since the planar faces of the enlargements extend in a common plane, it will be understood that when these faces are brought into cooperation with a planar face or faces of the screw, the planar faces of the enlargements serve as a means for applying pressure in the axial direction of the tool when pressure is applied on the tool by the user in driving the screw. In this respect the bottom planar faces are of advantage through the fact that the width of the face beyond the bit provides an extended surface transverse of the usual screw kerf, so that the pressure is being applied over an extended transverse area and thus largely

increases the area of the pressure application on the screw as compared with the linear effect produced by the end of the bit applied in the usual manner.

Since the head of the screw has the cross-sectional contour of its kerf zone similar to that of this portion of the bit of the driver, and also has a planar face corresponding in dimensions to the bottom planar face of the enlargements, it will be understood that such enlargement bottom planar faces form the means for applying the axial pressure whether the driver is being used in the position of Fig. 3 or that of Fig. 4, thereby relieving the thin end of the driver of this service.

This particular structural relationship between the driver and screw head provides a number of definite and important advantages. For instance, while the driver bit zone can be freely inserted into the screw head kerf by relative movement in the direction of length of the kerf, the two cannot be moved relatively in any other direction, the bit zone practically fitting within the kerf zone of the screw. Hence, in effect, the driver and screw temporarily combine to produce a pseudo unitary structure or two-part unit produced by assembling the two prior to any attempt to position the screw relative to its work. In effect, this practically gives the screw a length equal to the combined length of screw and driver for positioning the screw, since the two are separable only by applying relative movement to the two parts in this one direction; during the positioning of the screw there is no occasion to apply such relative movement, so that the fact that such movement is possible is not disadvantageous—the pseudo unitary relation of the two parts permits the screw tip to be aimed in any direction and brought accurately to the desired position of contact, after which the direction of drive is accurately provided by simply manipulating the handle of the driver until the exact direction is present.

The unitary relationship remains during the succeeding driving of the screw—generally the greater portion of the length of the screw—the relationship being disturbed only when the head of the screw approaches the seating position; for removal of the bit from the screw, the entire depth of the screw kerf must be above the top surface of the work (to avoid the necessity for defacing the work to permit removal of the driver) so that the major portion of the driving is provided when the assembly is in this unitary relationship. This is of advantage not only because of the activity of the planar faces of the enlargements above pointed out, but also due to the fact that the presence of both enlargements form an area of considerable dimensions the opposite sides of which are spaced apart material distances so that the rotating pressure application is being distributed over a wide area; the side faces of the end tang may also be active in connection with the rotation pressure, so that the distribution of the latter is not limited to the sides of the enlarged zone but also extends to a diametrical zone of the screw. As a result, there is little or no possibility of varying the driving direction of the screw or of canting the driver relative to the screw head.

When it is necessary to dislodge the driver from this unitary position relative to the screw, the latter has been driven to such extent that its direction of advance is fixed and the steadying effect above pointed out is no longer needed. The

driver is then drawn in the direction of length of the kerf, the one direction in which the two can be separated; the specific structure which presents the length of the enlargements as linear is of advantage through the fact that rapid withdrawal is possible, since there is no requirement of manipulating the driver other than in the single direction. While this has the effect of ending the pseudo unitary relationship between the two elements, the two are again brought into cooperative relationship by re-assembling them in the manner shown in Figure 4, this being by endwise movement of the driver and which brings the planar bottom faces of the enlargements into direct contact engagement with the planar end face of the screw, the end tang of the bit passing into the kerf; since the position of the planar bottom faces of the enlargements has been shifted by the re-assembling, the end tang has also been shifted relative to its slot. However, the shift of the latter does not take it completely above its slot, so that the side faces of the tang end remain active for providing rotation pressure, the axial pressure being applied by the bottom planar face as before but with the pressure applied on the exposed planar face of the screw head.

In the re-assembled position of the driver, the enlargements do not provide the dominant agency for rotating the screw that was present during the initial assembly of the driver and screw, since the enlargements have been shifted from an internal position relative to the screw head to a position external of such head, a condition which renders the periphery of the enlargements inactive as a driving agency, the shifting, however, not disturbing the activity of the enlargements for applying the desired axial pressure, since the bottom planar faces are active under both conditions. However, the axial pressure in itself tends to set up a frictional component between the opposed contacting faces tending to aid in the rotation of the screw, the dominant pressure rotationally in the latter position being provided by the end tang 15, the side faces of which engage the kerf walls both above and below the spaced enlargements which receive the head enlargements during the initial positioning.

As will be understood from the above, the driver and the screw are connected together during the positioning and the major portion of the threading action in such manner as to form, in effect, a screw of excessive length and capable of being positioned and driven by hand manipulation, the driver and actual screw forming a two-part unit which is the practical equivalent of such a screw; this unitary relationship is established prior to the beginning of the positioning activities, and is maintained until the screw has been driven to an extent where it is approaching its final seating position—the undriven zone need be no greater than a length which leaves the screw head kerf completely exposed above the surface of the work, at which time the screw direction of penetration has been completely fixed, so that it is no longer necessary to provide the pseudo unity which had been needed for positioning and to assure proper driving direction without possibility of wobbling or cocking. Only when the unit has reached this position is the relationship between the two parts of the unit changed through disassembling and then reassembling.

In the changed relationship the bottom planar

faces of the enlargements remain active as before, for applying the axial pressure, the change substituting a different coacting face on the screw; the change shifts the dominancy in rotational pressure from the enlargements to the end tang 15, but the frictional component is also an aiding factor in this respect. When the screw has been completely seated, the driver part of the two-part unit is then withdrawn, leaving the screw in its secured relation to the work.

Hence, during the positioning and the major portion of the driving, the portion which requires accuracy to assure the desired screw direction of drive, the two-part unit is functioning as a unitary structure, inseparable excepting in one direction; after the screw has been driven to accurately fix its direction and its approaching its seated position, the change is made in the relationship of the parts (to enable final separation) but the two parts remain cooperative to complete the driving; only after the screw has been finally seated, is active relationship between screw and driver ended, leaving the screw performing its desired service with the work, while the driver is in condition for repeating the operation with a second screw similar to the first.

I claim:

A screw driver comprising a gripping member, a blade secured to the gripping member, a driving bit transversely disposed with respect to the blade at the free end of the blade, said driving bit being generally of tapered form, an enlargement extending laterally from each bit face and spaced a material distance from the bit end, each

enlargement having a planar bottom face extending at right angles to the axis of the screw driver and the upper face of each enlargement being inclined upwardly and inwardly from said planar face with its upper end merging into the face of the bit, the said enlargements being adapted to fit in a similarly shaped groove in the screw head with the bit end extending into a channel below the groove so that turning of the screw driver will anchor the screw, the said planar faces of the enlargements being adapted to rest on the top of the screw above the groove whereby the bit end will project a sufficient distance into the channel to complete driving of the screw.

ROBERT L. BARTLETT.

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