

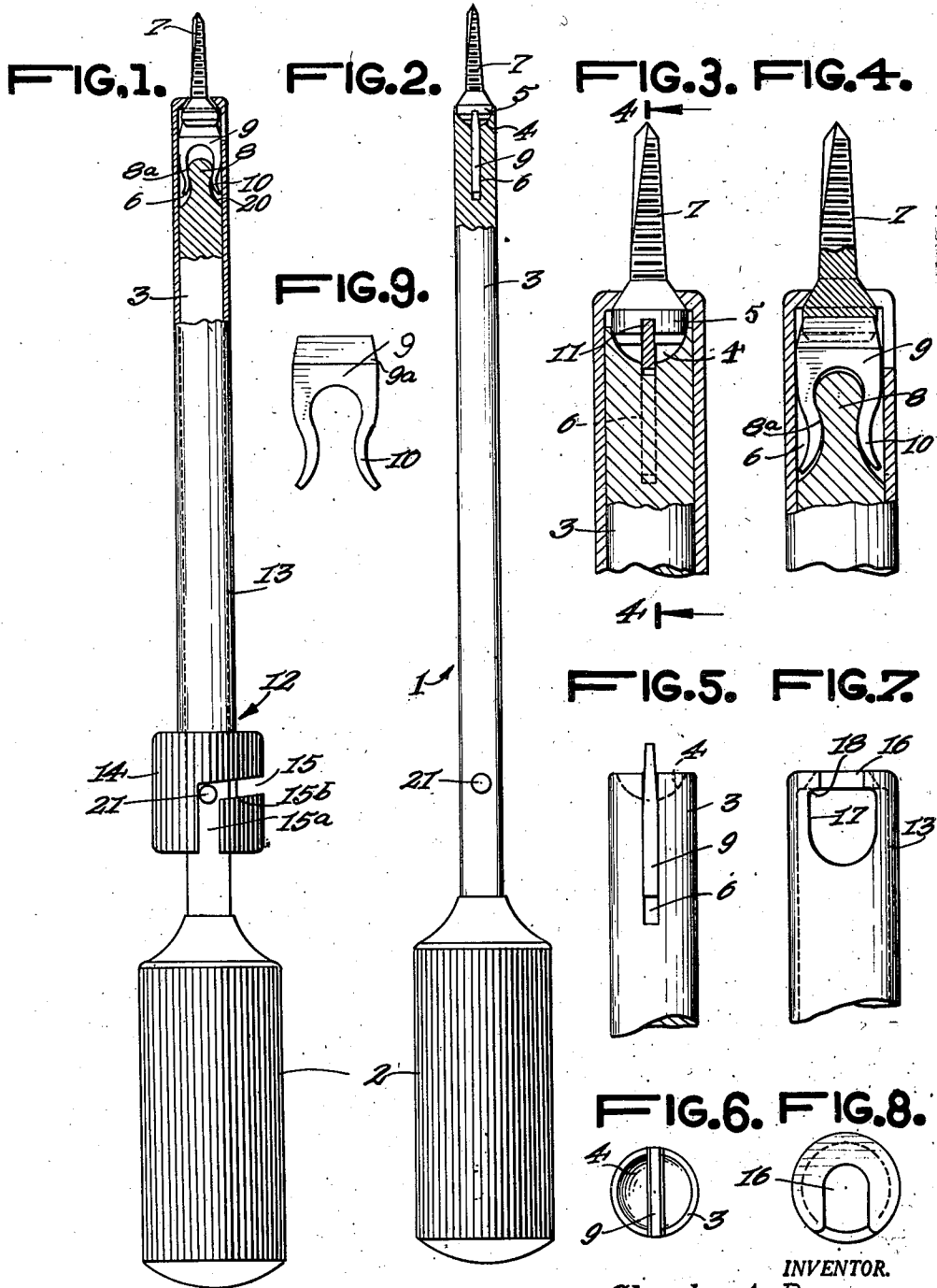
March 2 1943.

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2,312,869

SURGEON'S BONE SCREW DRIVER

Filed July 27, 1942



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2,312,869

SURGEON'S BONE SCREW DRIVER

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Application July 27, 1942, Serial No. 452,417

6 Claims. (Cl. 145—52)

This invention relates to a surgeon's bone screw driver, and its principal object is to provide a screw driver of this character which is conveniently and economically manufacturable, conveniently and efficiently utilizable in con-
sonance with professional work, and effectively sterilizable.

Other objects and advantages will hereinafter appear.

This device is an improvement upon the screw driver shown and described in my copending patent application, filed May 4, 1942, Serial #441,689.

In the accompanying drawing—

Fig. 1 is a general elevation of the surgeon's bone screw driver constituting the invention, showing it as it appears while in engagement with its independent locking device.

Fig. 2 is a general elevation of the screw driver, without its independent locking device.

Fig. 3 is a fragmentary cross-sectional elevation, in an enlarged scale, showing the combined terminals of the screw driver and its locking device in operative position of locked engagement with the screw-head.

Fig. 4 is a fragmentary transverse-sectional elevation of the screw driver, taken on line 4—4 of Fig. 3.

Fig. 5 is a fragmentary elevation, in an enlarged scale, showing the terminal of the screw driver, without its locking device.

Fig. 6 is a top plan view of the terminal of the screw driver, as it appears in Fig. 5.

Fig. 7 is a fragmentary elevation, in an enlarged scale, showing the terminal of the independent locking device.

Fig. 8 is a top plan view of the terminal of the locking device, as it appears in Fig. 7.

Fig. 9 is a front elevation of a detail of the screw driver.

The screw driver 1 proper comprises a handle 2 having a shank 3, in the terminal of which is formed a cupped depression 4 adapted to embrace the slotted screw-head 5 of a surgical screw 7. In said terminal there is formed a slot 6, which is so configured that it provides a symmetrical cammed member 8. Within the slot 6, and in embracement with the member 8, there is insertible a screw-driving blade 9, Figs. 3, 4, 9, having a pair of laterally springy prongs 10 adapted to press against the cammed sides 8a of member 8 in such manner that the latter normally maintains the working part 9a of the blade 9 within the cup 4 and projecting beyond the shank 3, as illustrated in Fig. 5. When the

screw driver is applied upon the screw-head 5, for the threading operation, its cup 4 embraces the head 5 while the blade 9 enters the screw-slot 11 and presses thereagainst under tension produced by the cooperation of its prongs 10 with the cam 8, in the manner shown in Fig. 2.

For coaction with the screw driver 1 there is provided a locking device 12, Fig. 1, comprising a tube 13 having at one end a head 14 with a bayonet slot 15, and at its opposite terminal a slot 16, Figs. 7, 8, with a lateral enlargement 17 and a shoulder 18 at its tip, as illustrated. The slot 16 is of a width corresponding to the base-portion 19 of screw-shank 7, the enlarged opening 17 of said slot is ample to permit lateral entry within the tube 13 of the screw-head 5, and the shoulder 18 is provided for the retention of said head, in the manner shown in Figs. 1-4. The shank 3 of screw driver 1 is slidable within the bore 20 of tube 13, and carries a pin 21 for operative engagement with the bayonet slot 15 of the locking device 12.

When it is desired to initially drive the surgical screw 7 partially into place, it is first inserted into the terminal of tube 13 of locking device 12 by laterally passing its base-portion 19 and head 5 through the slot 16 and the opening 17, and the screw is then held to bear its underside against the shoulder 18 of said terminal, in the position shown in Figs. 1, 3, 4. Thereupon, the shank 3 of the screw driver is slid longitudinally into the bore 20 of tube 13 and its blade 9 directed to enter the head-slot 11, the pin 21 simultaneously entering the vertical portion 15a of the bayonet slot 15. The handle 2 is then turned partially, to cause the pin 21 to about upon the transverse inclined shoulder 15b of bayonet slot 15 to compel the blade 9 to enter the screw-slot 11, under tension as above described, and force the screw-head 5 to bear with its underside against the shoulder 18 of the locking device 12, in which manner the surgical screw 7 becomes firmly locked to the screw driver in operative state.

In performing the delicate surgical operation of fastening broken bones or fastening plates on broken bones, it is vital to initially insert the screw and thread it partially and accurately into precise location, and to thereafter drive it entirely home with care, skill, and freedom from impediments. For this purpose, therefore, the surgical screw 7 having been firmly secured to the screw driver as above described, the implement of the invention may be then utilized by the surgeon to initially thread the screw into lo-

cation as required. The screw driver is then released and disengaged from the bayonet-slot connection of the locking device 12, and is slid outwardly from the bore 20 thereof and entirely removed from the device. The device 12 is then removed from the partially threaded screw by slipping it away laterally from the head 5 and shank-portion 19 thereof. Thereupon, the surgeon returns the screw driver proper to the partially threaded screw, and inserting its blade 9 into the head-slot 11 he applies the implement in a normal manner to drive the screw home fully. In thus threading in of the screw, the cupped terminal part 4, surrounding the blade 9, assures a firm hold of the screw-head 5 and prevents accidental disengagement of the blade from screw-slot 11, and should circumstance or impediment render it difficult or impossible to retain in registry the axes of the screw driver and the screw, the former may be deviated and the efficient threading of the screw nevertheless continued, with the cupped part 4 embracing the screw-head to prevent separation of the blade 9 from head-slot 11 and the tensional pressure of the blade within the slot, resulting from coaction of the prongs 10 and cam 8, assuring an axial application of pressure of the blade upon the screw.

The blade 9 is readily removable completely from the shank 3 by merely withdrawing it longitudinally out of the slot 6 and embracement of its prongs 10 with the cam 8, the prongs spreading apart sufficiently to disengage from the cam. It will be noted therefore that this entire implement consists of but three integral parts 1, 12, 9 that are conveniently separable from each other, and due thereof and the general character of the formation of these parts, as seen from the illustration in the drawing, the entire implement may be effectively sterilized in connection with the operation, in accordance with medical requirements.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. A surgeon's bone screw driver for a surgical slot-headed screw, including the combination of a handle-mounted shank provided with a cupped terminal for receiving the screw-head, said shank having therein a slot extending from said terminal and configured to form a cam, a screw-driving blade longitudinally slidable in said slot having a pair of springy prongs engaging said cam, said cam normally causing said prongs to maintain said blade with the operative-portion thereof projecting exteriorly of said terminal, said blade when pressed inwardly into said slot being under tension by the pressure of said prongs upon said cam, and said blade being adapted to apply said tensional pressure upon the screw-head while projected in its screw-slot.

2. A screw driver for a slot-headed screw including the combination of a handle-mounted

shank having therein a slot extending from its terminal and configured to form a cam, a screw driving blade longitudinally slidable in said slot having a springy prong engaging said cam, said cam normally causing said prong to maintain said blade with the operative portion thereof projecting exteriorly of said terminal, said blade when pressed inwardly into said slot being under tension by the pressure of said prong upon said cam, and said blade being adapted to apply said tensional pressure upon the screw-head while projected in its screw-slot.

3. A screw driver for a slot-headed screw including the combination of a handle-mounted shank having therein a slot extending from its terminal and configured to form a cam, a screw driving blade slidable in said slot having a springy prong engaging said cam, said cam normally causing said prong to maintain said blade with the operative portion thereof projecting exteriorly of said terminal, said blade when pressed inwardly into said slot being under tension by the pressure of said prong upon said cam, and said blade being entirely withdrawable from said slot and shank by its prong being disengageable from said cam.

4. A screw driver as in claim 2 having in coaction therewith an independent device for locking the screw to said blade comprising a tube for therethrough passing said shank, the terminal of said tube having means for therein inserting the screw-head laterally with a shoulder for receiving the underside of the screw-head, and means upon said tube and shank for therewith locking said blade within the slot of the screw-head, with said head pressed against said shoulder, and with said blade pressing in the screw-slot under tension of said cam and prongs.

5. A screw driver as in claim 2 having in coaction therewith an independent device for locking the screw to said blade comprising a tube for therethrough passing said shank, the terminal of said tube having means for therein inserting the screw-head with means for receiving the underside of the screw-head, and means upon said tube and shank for therewith locking said blade within the slot of the screw-head, with said head pressed against said receiving means, and with the blade pressing in the screw-slot under tension of said cam and prongs.

6. A screw driver as in claim 3 having a coaction therewith an independent device for locking the screw to said blade comprising a tube for therethrough passing said shank, the terminal of said tube having means for therein inserting the screw-head with means for receiving the underside of the screw-head, and means upon said tube and shank for therewith locking said blade within the slot of the screw-head, with said head pressed against said receiving means, and with the blade pressing in the screw-slot under tension of said cam and prongs.

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