

Feb. 27, 1945.

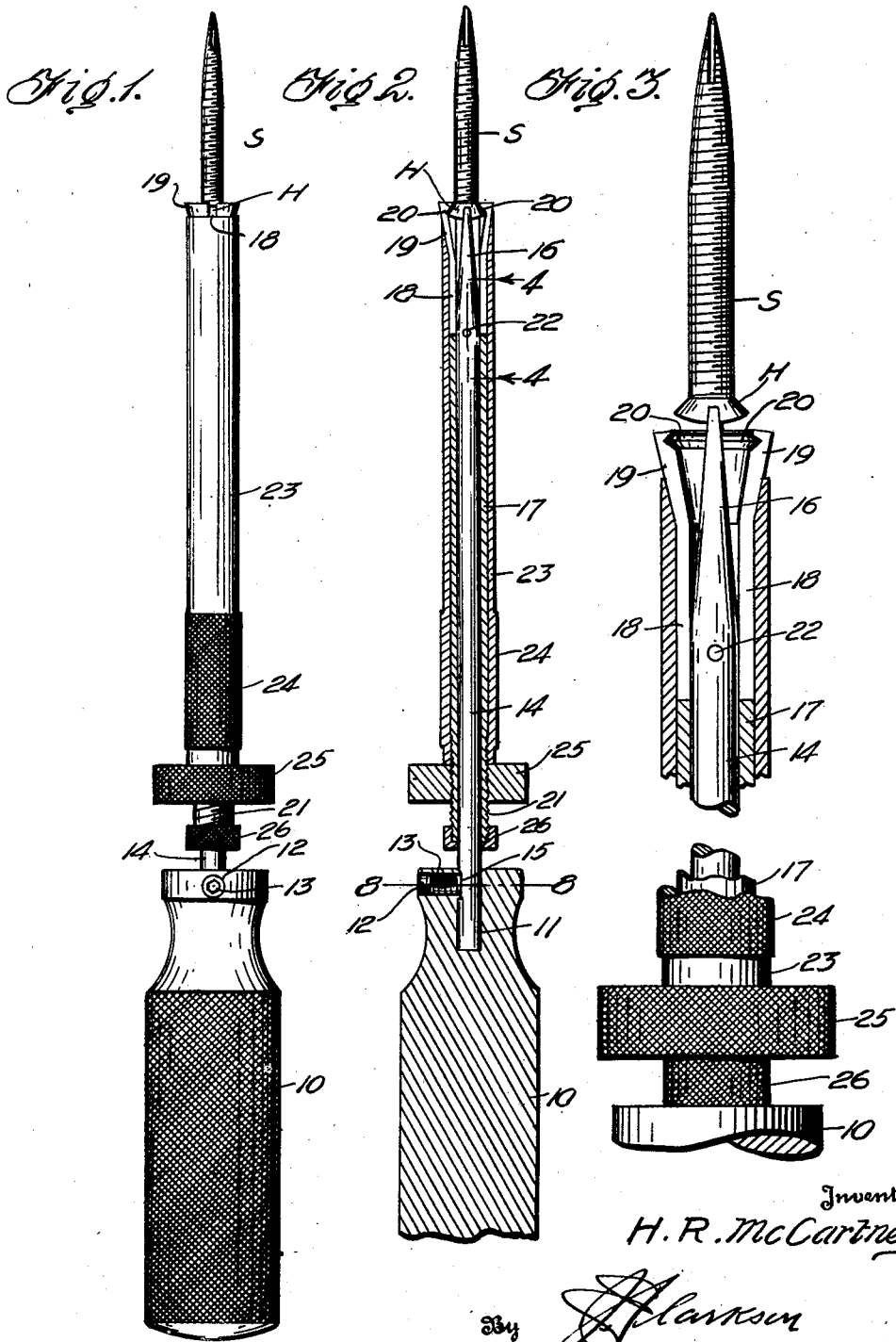
H. R. McCARTNEY

2,370,407

SCREW DRIVER

Filed Jan. 5, 1944

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Fig. 4.

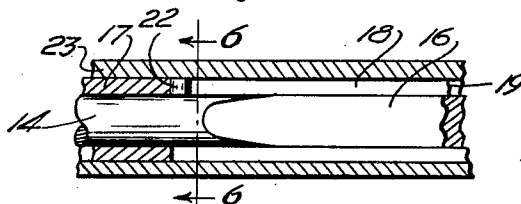


Fig. 5.

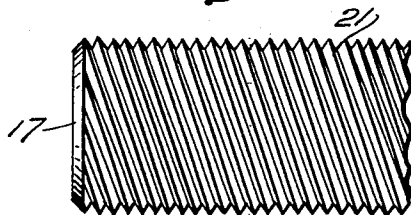


Fig. 7.

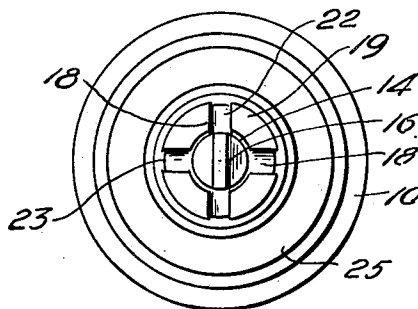


Fig. 6.

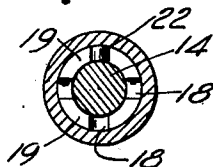
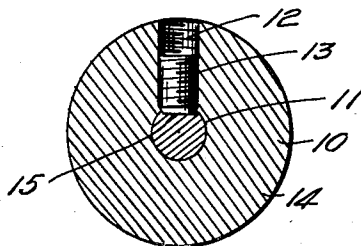


Fig. 8.



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UNITED STATES PATENT OFFICE

2,370,407

SCREW DRIVER

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Application January 5, 1944, Serial No. 517,129

1 Claim. (Cl. 145—52)

This invention relates to screw holders and drivers and has special reference to a device of this character particularly adapted for use in surgical operations.

In one method of treatment of bone fractures a metal plate, provided with screw receiving openings, is laid on the broken bone in such manner as to cross the fracture. To so locate the plate it is, of course, necessary to make suitable incision of the flesh over the fracture. Bone screws are then used to secure the plate solidly to the bone at both sides of the break. Such screws are usually driven by a screw driver having some screw holding means. Heretofore no proper provision has been made for disengaging the screw from the holding means without disengaging the kerf in the head of the screw thus making it necessary at the final part of the driving of a screw to reengage the bit in the kerf. This is attended generally with considerable difficulty since the screw head, when nearly seated, is apt to be hidden by oozing from the walls of the incision.

One important object of the present invention is to provide a novel screw driver having a screw holding means so constructed and arranged that it may be disengaged from the screw without disengagement of the driver bit from the screw head kerf.

A second important object of the invention is to provide a novel device of this character wherein the screw holding means may be retracted toward the handle of the screw driver when disengaged.

A third important object of the invention is to provide a novel device of the kind described having novel operating means for the screw holder.

A fourth important object of the invention is to provide a screw holder operating means of novel character positioned adjacent the handle of the screw driver.

With the above and other objects in view, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claim.

In the accompanying drawings like characters of reference indicate like parts in the several views, and—

Figure 1 is a side elevation of the improved screw driver.

Figure 2 is a longitudinal axial section of the device.

Figure 3 is an enlarged detail view, partly in

section and showing the relation of the parts upon release of the screw holder and its retraction toward the handle.

Figure 4 is an enlarged detail section on the line 4—4 of Figure 2.

Figure 5 is an enlarged detail showing conventionally a certain steeply pitched screw thread used on one element of the device.

Figure 6 is a section on the line 6—6 of Figure 4.

Figure 7 is an enlarged end view with the parts arranged as in Figure 3.

Figure 8 is an enlarged section on line 8—8 of Figure 2.

15. In the embodiment of the invention as here shown there is provided a handle 10 having the major portion of its outer surface knurled to afford a secure grip to the user. At its forward end this handle is provided with a rearwardly extending axial bore or recess 11 and a radially internally threaded passage 12 communicates with the forward end of the recess 11. A set screw 13 is held in the passage 12.

The driver element proper consists of a rod or shank 14 circular in cross section and of such size as to fit snugly in the recess 11. In alignment with the passage 12 the rod is provided with a flat 15 on which engages the end of the screw 13 so that the rod is held firmly in the handle but may be removed when it is desired to store the device or to use a rod of different character but of the same body diameter. At its forward end the rod 14 is flattened on opposite sides to provide a bit 16 having the usual screw kerf engaging edge.

Slidable on the rod 14 is a collet having a tubular body portion 17 fitting closely on the rod and provided at its forward end with longitudinal slots 18 dividing this end into jaws 19 which flare outwardly at their forward ends and are provided on the inner faces with screw head engaging notches 20. The jaws 19 tend to spring outwardly. At its rear end the collet tube is provided with an external multiple screw threaded portion, the thread 21 here shown (Fig. 5) forming a quadruple threaded screw. The purpose of this steeply pitched screw arrangement is to facilitate quick engagement and disengagement of the jaws 19 with the head H of a screw S as will be presently explained. Projecting from the rod 14 is a pin 22 which fits in one of the slots 18 and thus prevents the collet from rotating on the rod.

Slidable on the collet 17 is a sleeve 23 which is internally chamfered at its forward end to

engage the jaws 19 and force them inwardly upon movement of the sleeve forwardly on said collet. The rear end of the collet is knurled as at 24. On the threaded portion 21 is a knurled nut 25 which engages the rear end of the sleeve 23 to force the same forwardly when it is desired to close the jaws on a screw head. Also a nut 26 is threaded on the rear extremity of the collet to limit unscrewing movement of the nut 25 and this nut also engages, upon retraction of the collet, with the head 10 to limit retractive movement of the collet.

In using the device the operator grasps the handle in one hand with the thumb and first finger of that hand engaging the nut 25 which is unscrewed until it engages the stop nut 26. The knurled part 24 of the sleeve is then gripped by said thumb and finger and the sleeve retracted until it engages the nut 25. The retraction of the sleeve is then continued to also retract the collet until the nut 26 engages the head 10. Under these conditions the parts will be positioned as in Fig. 3 with the edge of the bit projecting beyond the forward end of the collet. A screw is then taken by the operator in the other hand and the bit engaged in its kerf. The nut 25 is then gripped as before and moved forwardly. This carries the collet and sleeve forward without the sleeve moving forward to close the jaws. The pin 22 now is engaged by the rear end of the slot 18 in which it lies and thus limits

forward movement of the collet. Finally the nut 25 is screwed up which forces the sleeve forwardly and closes the jaws 19 on the screw head. The screw is thus clamped rigidly to the screw driver. The screw is now inserted through the bone plate and screwed into the bone until the collet engages the plate whereupon the operations of unscrewing and retraction are repeated while the handle is held pressed in the direction of the screw S so that the bit is maintained in kerf engagement with said screw which is now screwed home.

What is claimed is:

In a screw driver for surgical use, a handle, a shank fitted in said handle and having a bit at its forward end, a collet longitudinally slidable on said shank and having jaws at its forward end, means to prevent rotation of said collet on said shank, a sleeve slidable and freely rotatable on said collet, said collet having the end adjacent said handle exteriorly steeply pitched threaded, a nut on the threaded end of said collet and bearing against the end of said sleeve, said nut and the portion of the sleeve adjacent thereto being knurled whereby to be grasped to prevent rotation of one with respect to the other, and a cap nut on the extremity of the collet adjacent said handle and limiting unscrewing portion of the nut on the collet.

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