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E. TURGEON

2,484,765

ROTARY IMPACT TYPE SCREW DRIVER

Filed April 12, 1946

Fig. 1.

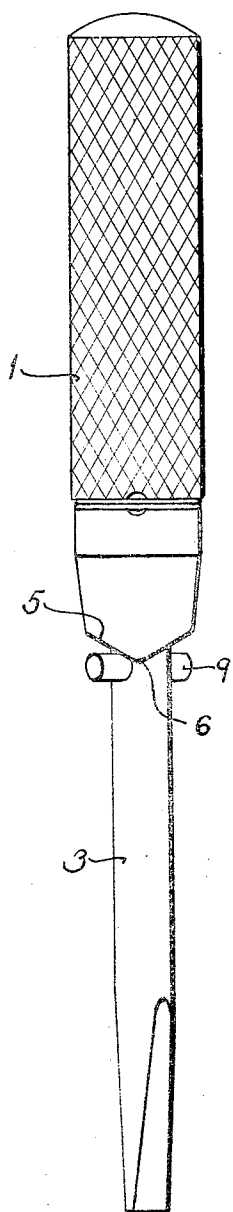


Fig. 2.

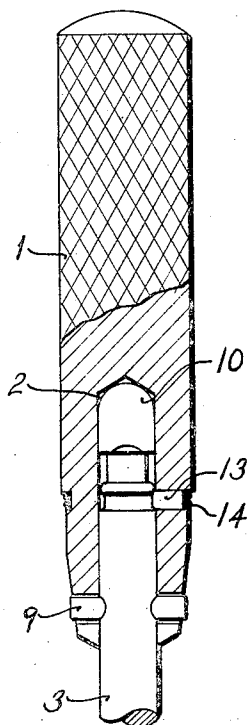


Fig. 3.

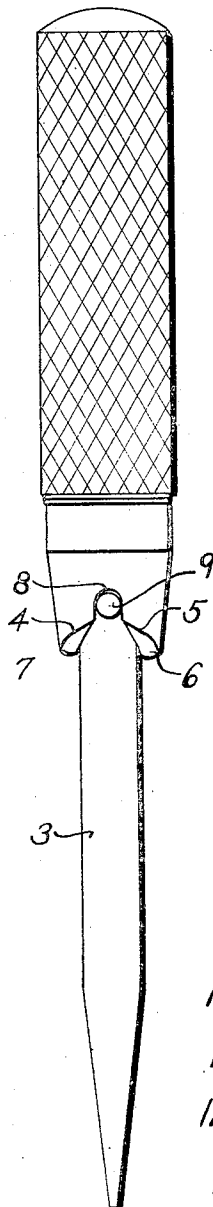


Fig. 4.

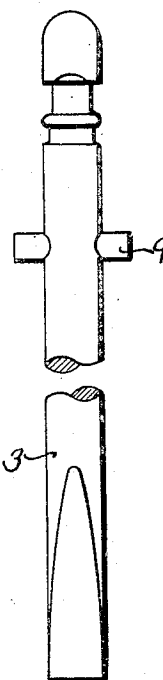


Fig. 5.

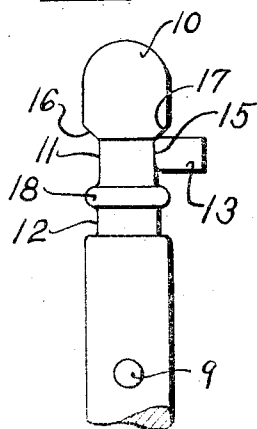
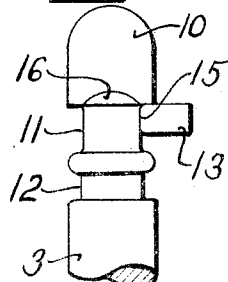


Fig. 6.



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ROTARY IMPACT TYPE SCREW DRIVER

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Application April 12, 1946, Serial No. 661,618

1 Claim. (Cl. 145—50)

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This invention relates to a screw driver or similar tool of the character described in my previous Patent 1,743,505, January 14, 1930, and the object of the present invention is to improve the construction of such tools for reducing manufacturing cost and for greater utility in use.

As fully explained in my previous patent, the general purpose of such a tool is for the removal or loosening of screws and the like which are set too firmly for removal by an ordinary means, and to accomplish this removal by an efficient application of force through cam leverage and inertia in a most effective manner. The principle of operation is of course equally applicable for the reverse action of driving in a screw tightly to its seat, and my tool is designed for equal efficiency in either right or left hand turning.

Referring to the drawings which show the present embodiment of my invention,

Fig. 1 is a side elevation of the complete tool, the shank thereof being of the screw driver type and in position for a camming right hand turn;

Fig. 2 is a partial section through the handle or driver of the tool showing the interior engagement when the shank is fully home in its socket;

Fig. 3 is a side elevation of the complete tool at right angles to that shown in Fig. 1;

Fig. 4 is a detached view of the tool shank;

Fig. 5 is an enlarged detail of the upper end of the shank to show the position of the locking pin in register with the release ramp in the upper groove of the shank;

Fig. 6 is a similar view to Fig. 5 showing the shank at right angles to that in Fig. 5 with the locking pin out of register with the release ramp of the said shank.

Referring more particularly to the drawings, the tool comprises a driver 1 which serves as a handle member and may be knurled on the outside as shown. This driver, as shown in Fig. 2, is provided with an internal axial socket 2 opening out of its lower end and adapted to receive therein the upper end of the tool shank 3, which is fitted in the socket 2 for a limited longitudinal movement and a rotatable movement relative to said driver.

The lower end of the driver 1 has a tubular wall surrounding the entrance of the socket 2, said wall being formed with two similar and oppositely disposed V-shaped cam members 4 and 5. The lower end of each cam member converges to a relatively sharp apex such as at 6 and 7 and intervening between the upper ends or base portions of said cam members 4 and 5 are two wall notches such as 8 which are at diametrically

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opposite sides of said driver and one of which is shown clearly in Fig. 3. The side walls of said notches 8 are parallel to the axis of the driver. The shank 3 is provided with a cross lug 9 projecting from each side thereof and which is adapted to ride on the cam surfaces on cams 4 and 5 and also to be lockably engaged within the notches 8 when the shank 3 is pushed inwardly to its extreme home position within the socket 2.

The upper or inner portion of the shank 3 is formed with a rounded head 10 adapted to seat on the bottom of socket 2 and below said head with two annular grooves, viz. an upper relatively wide annular groove at 11 and a lower relatively narrower annular groove at 12. Adapted to selectively engage in either of these grooves is a locking pin 13 which is radially mounted in the side wall of the driver 1 and normally pressed by a spring 14 so as to insert itself in one of said grooves 11 or 12. The inner engaging end 15 of said locking pin 13 is relatively sharp cornered and the upper shoulder of the groove 11 is likewise sharp cornered in large part to form a locking shoulder against the end of said locking pin 13. However, at diametrically opposite points of the upper shoulder of groove 11 there are formed beveled portions or release ramps 16 and 17, see Figs. 5 and 6. When the shank 3 is turned to bring either of said release ramps 16 and 17 into register with the locking pin 13, the shank may be easily withdrawn from the socket 2 against the yielding force of the spring pressed pin 13. Conversely when the pin 13 is not in register with said ramps 16 and 17, the shank 3 is securely locked within the driver 1 and while it may have a limited longitudinal movement therein, this movement will not be sufficient to allow the cross pin 9 to ride over the apex 6 or 7 of the cams 4 or 5.

These release ramps 16 and 17 are located on the upper shoulder of groove 11 to register with the locking pin 13 for easy release of the shank. When shank 3 is turned for registration of pin 13 with ramp 16 or 17 the shank 3 may be withdrawn from the driver 1 but not otherwise. The dividing wall 18 between the wide groove 11 and the narrow groove 12, as shown in Fig. 5, is formed with rounded corners so that the locking pin 13 may easily ride over the same in either direction in moving into either of said grooves 11 or 12.

In accordance with the above construction, it will be readily understood that when it is desired to use the tool as an ordinary screw driver the shank 3 is pushed all the way home into its socket 2 so as to lock the lug 9 into the wall

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notches 8. The locking pin 13 at that time will be engaged in the narrow groove 12 at the upper end of the shank and will hold the same firmly in position so that the shank will turn with the handle in either direction for use in the usual manner of a screw driver or similar tool. When it is desired to use the tool for loosening a stubborn screw which may have been frozen or rusted in position, the shank is pulled out slightly in its socket to bring the locking pin 13 into engagement with the upper groove 11. The screw driver shank is then turned until the outer end of the cams 4 and 5 engage with the cross lug 9. Thereupon a sharp blow from a hammer against the top of the driver while holding it by hand from turning, will cause the shank to turn under great force through the coacting leverage of the cams 4 and 5 on the lug 9. As fully described in my previous patent, various other types of shanks 3 may be used in my tool for working on nut heads, broken screws, etc.

The advantages of my present tool over that shown in my previous patent are in the improved arrangement for converting the tool into use as an ordinary screw driver or the like. The provision of the locking notches 8 and the double holding grooves 11 and 12 make possible a much cheaper construction for the lower end of the cams 4 and 5 than in my previous tool. Various other advantages will be apparent from the detailed description heretofore given of my present tool.

What I claim is:

A rotary tool of the class described comprising in combination, a driver serving as a handle and having a shank receiving socket and entrance thereto in one end of said driver, a shank removably fitted therein for longitudinal and rotative movement with respect to said driver, the wall of said socket adjacent said socket entrance being formed into oppositely disposed depending V-shaped cams and notches formed in said wall at the juncture of the adjacent opposed cam surfaces of said cams, the sides of each notch being parallel to the axis of said tool, the shank having

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a lug engageable by said cams for the turning of said shank upon relative longitudinal movement of said driver and shank, said shank lug also being engageable in said wall notches for locking said driver and shank together for a common rotative movement in either direction, means for detachably holding said shank in the socket of said driver and comprising a pair of longitudinally spaced annular grooves on the inner end of said shank, the wall separating said grooves having a rounded surface, a locking pin slidably mounted in said driver and adapted to be selectively engaged in one of said grooves, the outermost groove with respect to said socket being spaced from said inner end of the shank a distance equal to the spacing between said locking pin and the bottom of the socket, said outermost groove being of substantially the same width as the width of the shank engaging end of said locking pin, the innermost groove with respect to said socket being of a width substantially equal to the longitudinal travel of the shank lug on the surfaces of said V-shaped cams, the engagement of the pin with said outermost groove serving to hold the shank lug in the aforesaid wall notches, and the engagement of said pin with said innermost groove serving to limit the longitudinal movement of said shank when the shank lug is in engagement with said V-shaped cams, the innermost shoulder of said innermost groove being formed with a beveled ramp for the release of said locking pin, and means to urge said pin inwardly against the shank.

EDMOND TURGEON.

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The following references are of record in the file of this patent:

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