

June 29, 1943.

W. A. DE VELLIER

2,323,018

SCREW DRIVER

Filed June 19, 1941

2 Sheets-Sheet 1

Fig. 1.

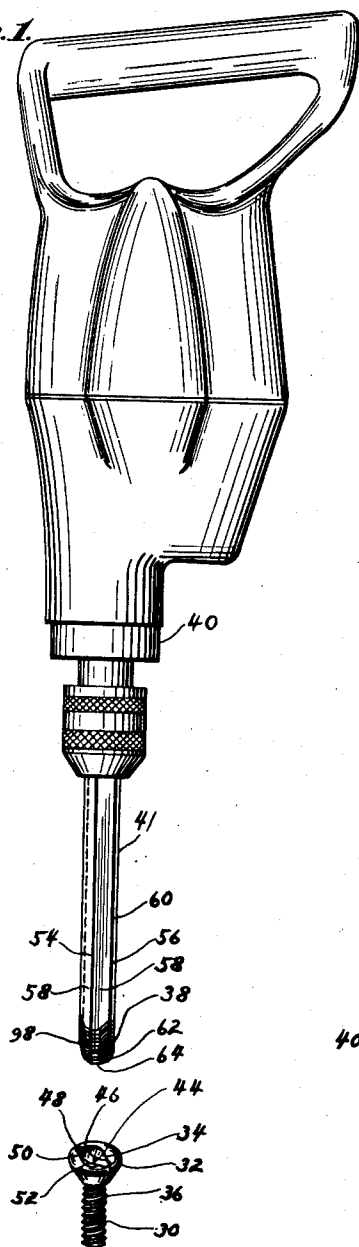


Fig. 2.

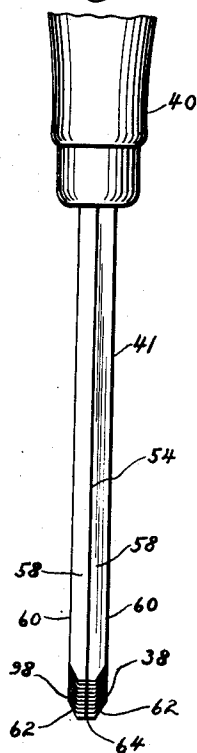


Fig. 3.

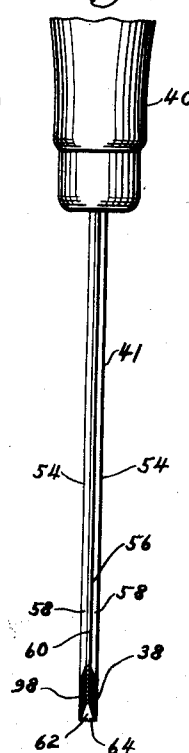
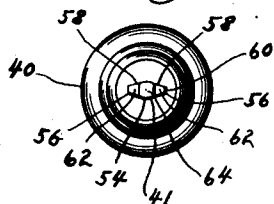


Fig. 4.



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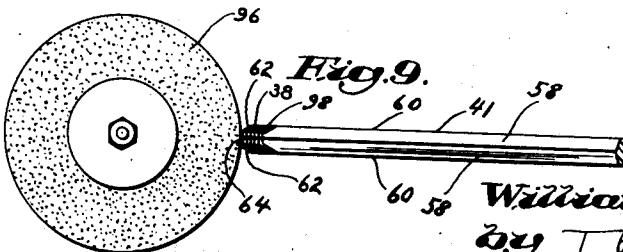
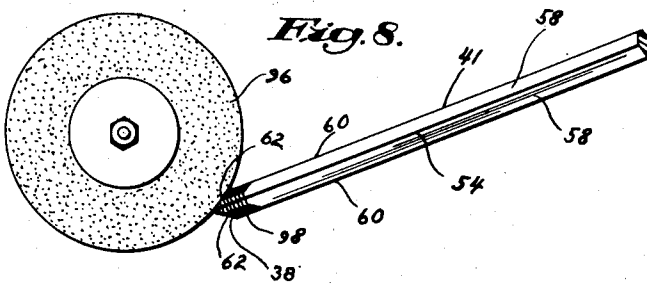
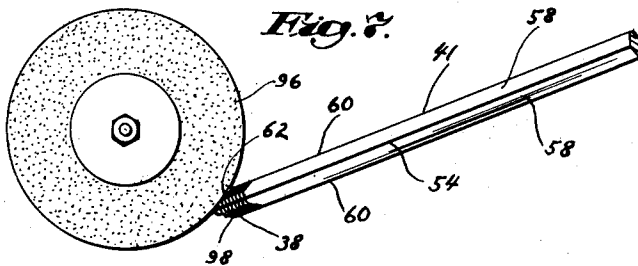
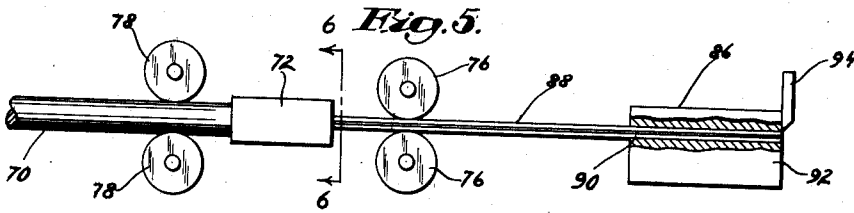
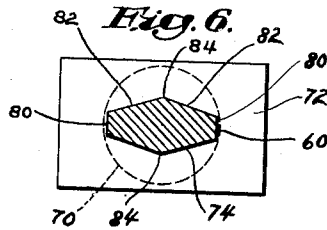
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2,323,018

SCREW DRIVER

Filed June 19, 1941

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,323,018

SCREW DRIVER

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Application June 19, 1941, Serial No. 398,778

1 Claim. (Cl. 145—50)

My invention relates to improvements in screw drivers and methods of their manufacture.

An object of my invention is to provide a screw driver particularly adapted for use with a screw having a recess in the head thereof of truncated diamond shape, as shown in my Patent No. 2,193,477 for Screw, issued March 12, 1940, although if desired screw drivers of different shapes for different shaped recesses may be provided in accordance with my invention.

A further object of my invention is to provide a screw driver having a tip of exactly cooperating shape to that of the recess so as to provide an area of contact between the entire tip and entire recess, thereby securing the optimum efficiency and preferably one of such a shape and of such an area as to provide a large turning torque for the threaded member to be rotated.

A further object of my invention is to provide a screw driver of a desired shape throughout a substantial portion of the length thereof so that as said screw driver wears down in use, as is often the case with power screw drivers, it may continue to function as a screw driver to fit in the desired recesses and also, if desired, may be ground off at desired intervals to more exactly compactly register against the walls of the recesses.

A further feature of my invention is to provide markings adjacent the tip of such a screw driver to show how it may be accurately ground down so as to have the walls thereof compactly engage the walls of said recesses as it wears down in use.

Further features of my invention relate to improvements in the method of making such a screw driver by a combination of simple drawing and grinding operations therefor, not hitherto employed in the manufacture of screw drivers, to the best of my knowledge, which method provides an accurate screw driver at a relatively small cost.

A further object of my invention is to provide a screw driver having an end of such straight blunt formation that it may be inserted in the driving recess in the screw at any angle without causing any fracture of the screw driver or any portions of the recess.

These and such other objects of my invention as may hereinafter appear will be best understood from a description of the accompanying drawings which illustrate various embodiments thereof.

In the drawings,

Fig. 1 is a view of a power screw driver constructed in accordance with my invention adapt-

ed to be inserted in the head of a machine screw provided with a recess of cooperating shape to receive the end of the screw driver.

Fig. 2 is a side elevation of a lower end of a hand screw driver constructed in accordance with my invention.

Fig. 3 is an end elevation of the part of the hand screw driver shown in Fig. 2.

Fig. 4 is a reverse plan view of my improved hand screw driver shown in Figs. 2 and 3.

Figs. 5-9 illustrate steps in my novel method of making such a screw driver, Fig. 5 being a diagrammatic side elevation of my improved method illustrating the steps of drawing a continuous bar of metal through a suitable die to shape the bar into the desired shape and cutting therefrom individual lengths of the desired length of the shank of a turning tool, Fig. 6 being a cross sectional view taken adjacent the drawing die along the line 6-6 of Fig. 5, Fig. 7 being a diagrammatic side elevation illustrating the step of first grinding down one end wall obliquely, Fig. 8 being a diagrammatic side elevation illustrating the step of grinding the opposite end wall obliquely and Fig. 9 being a diagrammatic side elevation illustrating the step of grinding the base to form a hexagonal base of the desired shape either in the original method of manufacture or to maintain the shank in the desired shape as the shank wears down in use.

In the drawings, wherein like characters of reference indicate like parts throughout, 40 generally indicates a screw driver constructed in accordance with my invention, having a shank 41 of truncated diamond shape throughout the length thereof constructed in accordance with my invention and having an end or tip 38 of a configuration complementary to the desired recess 34 in the head 32 of a machine or other type of screw 30. I have shown in Fig. 1 a machine screw of the type shown and described in my co-pending application for patent on Screws and apparatus for the manufacture thereof, said screw being provided with a truncated diamond shaped recess 34 extending within the head thereof with the center portion thereof in the axial line of the shank 36 thereof. As stated, in said application said recess 34 has the hexagonal base 44, straight side walls 46 and the end walls 48 tapering obliquely outwardly, inwardly and downwardly as at 50 to said base 44 in accordance with the teachings of my Patent No. 2,193,477 for Screws, issued March 12, 1940. Said screw, as shown, is also preferably provided with a partially spherical guide recess 52 shown and

claimed in my co-pending application for Screw and apparatus for the manufacture thereof, Ser. No. 398,543, filed June 18, 1941.

An object of my invention is to provide a screw driver 40 having an end 38 of exactly complementary shape to said recess 34 and preferably having an end 38 of such straight blunt construction that when it is inserted in the screw receiving recess 34 while being rapidly rotated, it will not tend to gouge out the walls of said recess 34 and break any portions of the end of the screw driver. For this purpose the end 38 of the shank 41 of such a screw driver 40, whether it be a power screw driver as shown in Fig. 1 or a hand screw driver as shown in Figs. 2-4, is also constructed of truncated diamond shape through at least a substantial portion of the length thereof, in the embodiment shown, substantially throughout the entire length thereof and is provided with the obtuse angle portions 54 and the acute angle portions 56 with the pair of side walls 58 on each side thereof and the truncated end walls 60 at the acute angle ends 54 thereof.

My improved screw driver is provided with a lower hexagonal tip end 64 complementary to the hexagonal base 44 of said recess 34, the side walls 58 being extended to the lower tip end. The end or portion adapted to sink in the recess 34 is provided with the supplemental end walls 62 similarly inclined to the end walls 48 of the recess 34, thus being inclined outwardly from the tip end 64 to the truncated end walls 60 of the diamond shaped shank 41. Thus where a screw constructed in accordance with the teachings of my copending application is provided having the truncated diamond shaped recess 34 and the partially spherical guide recess 52, it is obvious that the end portion 38 having the inclined end walls 62 will first rest in said guide recess 52 with the inclined end walls 62 first resting in said guide recess so as to be guided thereby on the rotation of the screw driver shank 41 so that the entire end 38 of said screw driver shank 41 may sink into the recess 34, it being obvious that after the end 38 of the screw driver shank 41 has sunk into said recess 34, the respective side walls 58 and end walls 62 of said end 38 will lie compactly against and be complementary to the side walls 46 and inclined end walls 48 of said recess 34 to provide an optimum area of contact and hence turning torque for the end 38 of the screw driver bearing against the exposed internal periphery of said recess 34.

I have also provided a novel method of making a screw driver shank for turning tools for threaded members which comprises drawing a continuous rod 70 of any desired shape through a drawing die 72 having a shaped hole 74 of the desired finished shape of the shank 41, in any suitable manner, such as in the embodiment shown, by means of the feeding rolls 76, the rod 70 being guided in its approach to said drawing die 72 by the guide rolls 78, as shown in Fig. 5. The shaping hole 74 is of complementary shape to that desired in the shank. Thus said die shaping hole 74 is of a truncated diamond shape similar to the desired cross sectional shape of the shank 41 and is truncated at each acute angle end thereof to provide the end walls 80 complementary to the end walls 60 in said shank 41 and with the pairs of straight side walls 82 tapering from said truncated end walls 80 to the obtuse angle portions 84 thereof.

I have also shown in Fig. 5 a suitable cutting mechanism 86. The continuous bar 70 is thus shaped into the continuous length 88 of truncated diamond shape and drawn through a hole 90 of cooperating shape in the anvil 92 and at the desired predetermined intervals by hand, machinery, or otherwise, the cutting blade 94 is brought down to cut off the shaped bar 88 in individual lengths 41 of the desired length for the shanks 41 of the turning tools 40.

The end 38 of the shank 41 is then provided in the following manner: The shank 41 is held at the desired oblique angle to the rotating grinding wheel 96 to grind one inclined end wall 62 thereof adjacent the tip end from the lower portion of the respective end wall 60 of said shank 41 as shown in Fig. 7. The position of the shank 41 is then half rotated so as to grind off the opposite tip end wall 62 as shown in Fig. 8. The shank 41 is then held substantially at right angles to the rotating grinding wheel 96 to grind off the flat tip end 64 and hence provide a flat tip end 64 of hexagonal shape complementary to the base 44 of the recess 34 in the screw head 32. It is also obvious that the same method for grinding down the end 38 having the hexagonal tip end 64 and the inclined end walls 62 may be provided to maintain the end 38 of the screw driver shank at intervals throughout the use thereof in a condition to compactly fit within the turning recess 34 and for this purpose each side wall 58 and, if desired, each end wall 60 may be provided with the spaced parallel aligned markings 98 shown in Figs. 2, 3, 7 and 9 to indicate the amounts that the inclined end walls 62 and tip 64 may be ground down after use to provide a new uniform end 38, also of the configuration for complete contact with the walls of said recess 34 as the screw driver end 38 when initially made.

So far as I am aware I am the first to provide a screw driver having a cross sectional area throughout a substantial length thereof similar to the cross sectional area of the recess in the screw head and I am also the first to provide a screw driver having an end 38 exactly complementary to the turning recess 34 and the first to provide a screw driver having markings 98 indicative of how to maintain the screw driver in use at optimum standard of efficiency.

It is thus apparent that I have provided a novel type of screw driver and method of manufacturing the same with the advantages described above.

It is understood that my invention is not limited to the specific embodiments shown and methods described and that various deviations may be made therefrom without departing from the spirit and scope of the appended claim.

What I claim is:

A shank for a turning tool for threaded members, said shank being in cross section of truncated diamond shape throughout at least a substantial part of the length thereof and having a tip comprising a flat hexagonal tip end and end walls inclined outwardly and upwardly to the truncated end walls of the truncated diamond shaped shank whereby the tip and the inclined tip end walls may be ground down as worn down in use to provide a continuous tip of the desired predetermined shape throughout the decreasing length of said shank in use.

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