Nov. 3, 1942. C. G. AUSTIN 2,300,392

SCREWDRIVER

Filed April 15, 1940 2 Sheets-Sheet 1

Fig. 1

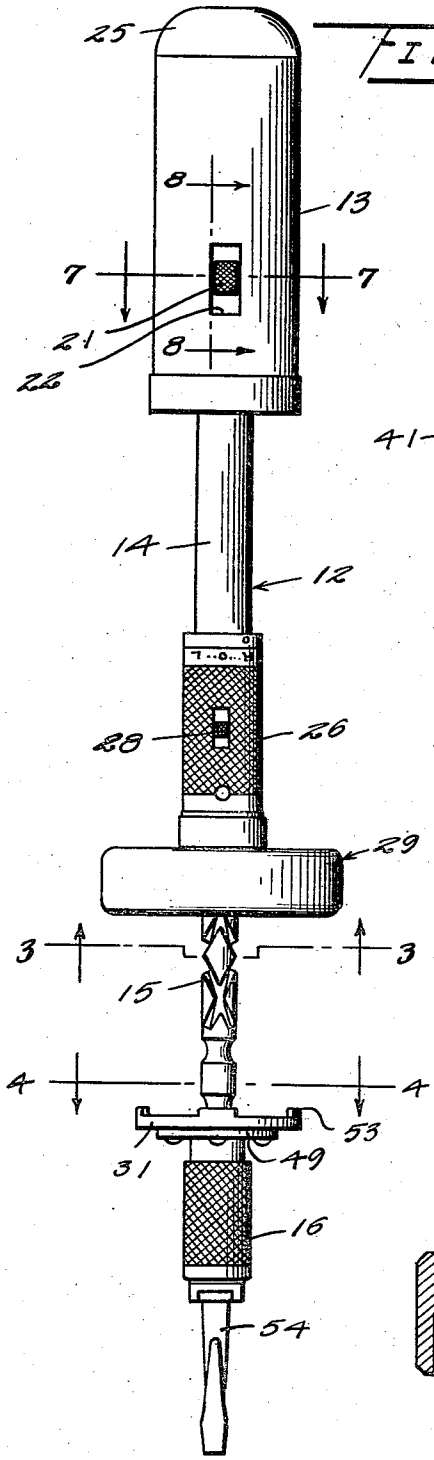


Fig. 3

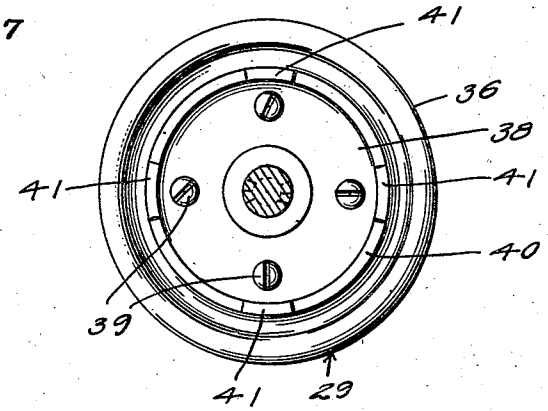


Fig. 4

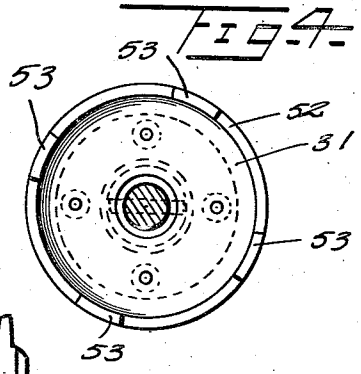
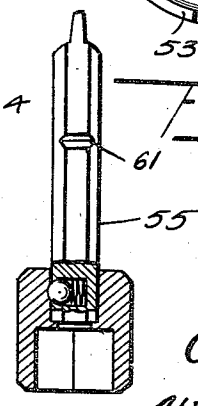


Fig. 9



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SCREWDRIVER

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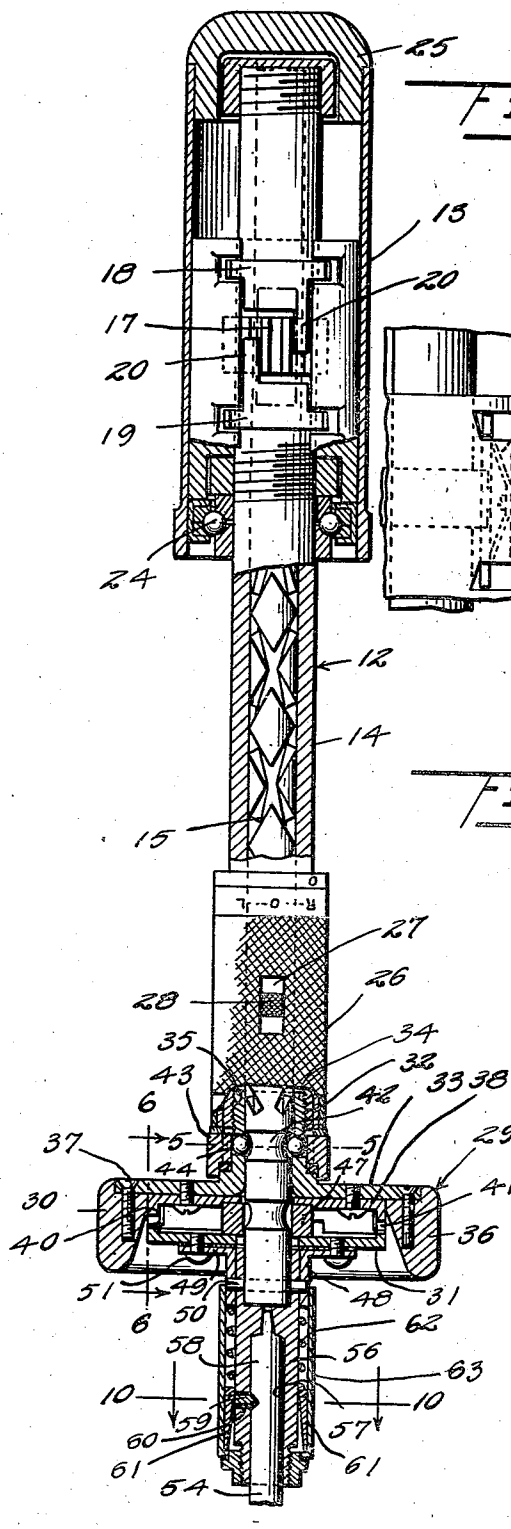


Fig. 2.

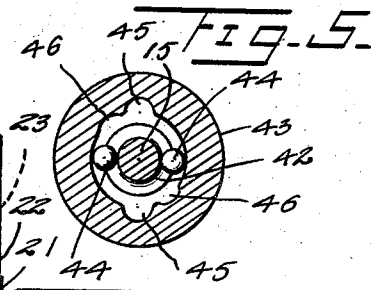


Fig. 5.

Fig. 8.

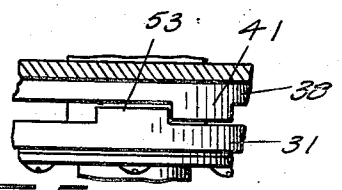


Fig. 6.

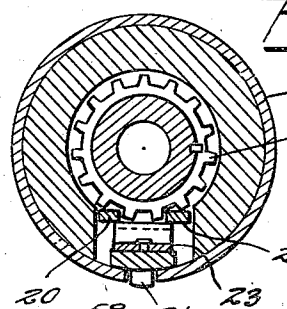


Fig. 7.

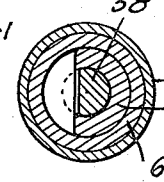


Fig. 10.

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2,300,392

SCREW DRIVER

Chris G. Austin, Mabel, Minn.

Application April 15, 1940, Serial No. 329,768

2 Claims. (Cl. 145—50)

The present invention relates to improvements in screwdrivers and similar tools.

The primary object of the invention resides in the provision of a screwdriver that may be used for either speed or power whichever may be required when using the tool.

A further object of the invention resides in the provision of a screwdriver having means incorporated therewith for exerting unusual pressure in two directions at the same time namely, inward pressure and rotating motion which is advantageous when, for example, removing a screw that is embedded to such an extent that it is difficult to remove the same, or when desiring to tightly position the screw in the work.

A still further object of the invention resides in modifying a conventional speed screwdriver to accomplish the above results, namely, the addition of power to a screwdriver without requiring additional pressure or power on the part of the operator.

The invention will be fully and comprehensively understood from a consideration of the following detailed description when read in connection with the accompanying drawings which form a part of the application.

In the drawings:

Figure 1 is an elevational view of a screwdriver embodying the features of the present invention.

Figure 2 is a view similar to Figure 1 with parts thereof in vertical section.

Figure 3 is a sectional view taken substantially on line 3—3 of Figure 1.

Figure 4 is a sectional view taken substantially on line 4—4 of Figure 1.

Figure 5 is a sectional view taken substantially on line 5—5 of Figure 2.

Figure 6 is a sectional view taken substantially on line 6—6 of Figure 2.

Figure 7 is a sectional view through the handle being taken on line 7—7 of Figure 1.

Figure 8 is a detail sectional view of the ratchet handle taken on line 8—8 of Figure 1.

Figure 9 is an elevational view partly in section illustrating a type of socket which may be used with the screwdriver.

Figure 10 is a sectional view through the bit holding means and being taken substantially on line 10—10 of Figure 2.

Referring to the drawings for a more detailed description thereof, the new and improved tool is generally designated by the reference numeral 12 and comprises a handle 13, sleeve 14, spiral shank 15 extensibly movable within said sleeve, and tool holding chuck 16.

The handle 13 is of the well known ratchet type embodying the use of a ratchet wheel 17 mounted on the sleeve 14 within the handle 13 and a pair of dogs 18 and 19, respectively. Each dog is formed with a finger 20 adapted to be urged into and out of engagement with the ratchet wheel 17 by means of a knob 21 movable within a slot 22 formed in the handle 13. A spring 23 is secured to the knob 21, said spring adapted to exert pressure on the respective dogs 18 and 19 upon movement of the knob within the slot 22. When the knob 21 is centrally disposed within the slot 22, the spring applies equal pressure to each of the dogs so that the handle will be locked onto the sleeve 14. However, movement of the knob up or down will permit the ratchet handle to rotate in one direction only, either to the right or to the left independent of the sleeve 14. The handle 13 is mounted on ball bearings 24 and the upper end is closed by means of a cap 25.

As is well known in screwdrivers of the speed type, means is also provided for controlling the direction of rotation of the spiral shank which means is similar to the ratchet mechanism above described and usually includes the use of a rotatable spindle such as indicated at 26 in Figures 1 and 2 of the drawings. The spindle 26 is rotated either to the right or to the left depending upon the desired direction of rotation of the shank 15. In accordance with the present invention, however, a slot 27 is formed in the spindle 26 and has movably mounted therein a knob 28. The knob 28 is moved up or down, and the spindle 26 will be so marked, to determine the direction of rotation of the spiral shank 15. Since the ratchet mechanism within the spindle 26 is of the type employed in the handle hereinabove described, it is not believed that a further illustration or description thereof is required.

The means for adding power to the tool is generally designated by the reference numeral 29 in Figures 1 and 2 of the drawings and comprises what may be termed a fly wheel 30 carried by and rotatable with the sleeve 14 and a plate 31 attached to the lower end of the spiral shank 15. The fly wheel 30 is attached to the sleeve 14 by the means more particularly shown in Figure 2 of the drawings wherein it will be noted that the lower end of the sleeve 14 is internally threaded as indicated at 32. A plate 33 having an upwardly extending tubular portion 34 that is exteriorly threaded as indicated at 35, is attached to the threaded portion of the sleeve 14. An annular member 36 is attached by means of screws or the like 37 to the plate 33 and forms

a housing for the clutch plate 38, said clutch plate being attached to the lower side of the plate 33 by means of screws or the like 39. The clutch plate 38 is formed with a ring 40 which fits within the annular member 36 and on which are formed a plurality of spaced teeth 41, preferably four in number. It will be noted that the spiral shank 15 is extensible through the fly wheel 30, but a means has been provided for locking the shank 15 within the sleeve 14 in its retracted position, which position is shown in Figure 2 of the drawings. Referring more particularly to Figures 2 and 5 of the drawings, it will be observed that the lower end of the spiral shank has a concaved portion 42 surrounded by a ring 43, said ring retaining oppositely disposed ball bearings 44 within the concaved portion 42. The ring 43, however, has depressions 45 and 46 formed at diametrically opposed positions whereby when said ring is partially rotated the ball bearings 44 will be disposed therein to permit extensible movement of the spiral shank 15. When in the position shown in Figures 2 and 5 of the drawings, however, the spiral shank will be locked thereby precluding movement thereof and when in said position the sleeve 14, spiral shank 15 and fly wheel 30, will be rotated in unison by the handle 13 for normal use of the tool. A spacing ring 47 is welded or otherwise secured centrally of the clutch plate 38 to be contacted by the plate 31 when said members are brought together in the use of the tool.

As afore indicated the plate 31 is carried by the lower end of the spiral shank 15 and the means of attaching the same comprises a sleeve 48 having an annular flange 49, said sleeve being attached to the shaft by means of a pin 50. The plate 31 is attached to the annular flange 49 by means of screws or the like 51 and the periphery of the plate 31 is formed with a raised ring 52 on which are formed spaced teeth 53, preferably four in number.

The bit stock 16 which carries the bit 54 or the socket 55 shown in Figure 9 of the drawings, comprises a sleeve 56 mounted on the lower end of the spiral shank 15 over which is disposed the sleeve 48, the pin 50 locking the sleeves 48 and 56, respectively, to the lower end of the shank 15. A socket 57 is formed on the sleeve 56 for receiving the shank portion 58 of the screwdriver 54 and said shank portion is locked within the socket by means of a pin 59 normally pressed into engagement with a slot 60 formed in the shank by means of the tapered ring 61. A tension spring 62 surrounds the sleeve 56 and is disposed between the end of the sleeve 48 and the tapered ring 61 all of which is held by means of a slidable sleeve 63. Pressing downwardly on the sleeve 63 will move the tapered ring against the tension of the spring 62 to release the pin 59 from the slot 60 whereby removal of the shank portion 58 is permitted or its insertion within the socket. Upon releasing pressure on the sleeve 63, the spring 62 will return the tapered ring to normal position effecting locking engagement of the pin 59 within the slot 60 of the shank 58.

From the above description when taken in connection with the accompanying drawings, it will be readily apparent that a means has been provided for locking the handle 13 to the sleeve 14 whereby rotation of the handle will rotate the sleeve and the tool holding chuck 16. By means of the ratchet disposed on the sleeve 14 within the handle 13, said handle can be rotated either to the right or to the left without effecting rotation of the sleeve. A means has also been provided whereby the fly wheel and its associated mechanism is locked to the sleeve 14 which means also locks the spiral shank within the sleeve in which position the tool will function as an ordinary screwdriver with the ratchet means in the handle operating or not as desired. When desiring to use the tool as a speed screwdriver, the ring 43 is partially rotated to release the spiral shank 15. The button or knob 21 in the handle 13 is then placed in the neutral position shown in Figures 2 and 8 of the drawings whereby rotation of the handle will likewise rotate the sleeve 14 and tool chuck 16. The knob 28 is, of course, moved up or down depending upon the desired direction of rotation of the screwdriver 54. The tool is then operated in the manner of a conventional speed screwdriver.

However, when desiring to obtain the use of the power means for removing an embedded screw, or for tightening a screw, the knob 21 is moved forwardly or rearwardly depending upon the desired turn of the ratchet handle 13. The handle is then pulled upwardly while maintaining the screw bit 54 in engagement with the screw. When lifting the handle upwardly, the annular ring 36 and the clutch plate 38 will be disengaged from the plate 31, which position is shown in Figure 1 of the drawings. Pushing downwardly on the handle will rotate the sleeve 41 and the fly wheel 29 and the momentum gained by the rotating fly wheel will drive and effect rotation of the plate 31 upon contact thereof. The momentum gained will create sufficient pressure to remove the embedded screw or to tighten the position of the screw in the work. It is to be understood, of course, that the interlocking of the teeth 41 with the teeth 53 of the clutch plate 38 and plate 31, respectively, forms the means of imparting rotation to the chuck 16 which carries the tool.

Also it will be understood, of course, by those skilled in the art that variations in the hereinabove described device involving the substitution of substantial equivalents for the devices described are intended to be comprehended within the spirit of the present invention and that the invention is capable of extended application and is not confined to the exact showing of the drawings nor to the precise construction described and, therefore, such changes and modifications may be made therein as do not affect the spirit of the invention nor exceed the scope thereof as expressed in the appended claims.

What is claimed is:

1. A screwdriver tool, comprising a thrust handle, a sleeve having swivelled connection with the thrust handle for independent rotation relative thereto, a fly-wheel on the sleeve, a spiral shank in the sleeve and connected thereto so as to permit relative rotation of the shank and sleeve, means in said sleeve holding the shank clutched to the sleeve against relative longitudinal non-rotative movement of the shank and sleeve, said means being operable to permit such movement so the shank may be projected without rotation out of the sleeve, a tool-holding chuck connected with the shank, means on said sleeve engageable with the spiral shank whereby thrust pressure on the handle will cause the shank and sleeve to rotate relatively, so when the sleeve is held stationary by the hand of the operator, the shank and tool will be rotated, and when the shank is held stationary by the tool in a screw slot the

sleeve and fly-wheel will be rotated, and means on the fly-wheel and the shank respectively to connect them to rotate together, whereby the inertia force of the rotating fly-wheel will be transmitted to the screw engaged by the tool.

2. A screwdriver tool, comprising a thrust handle, a sleeve having swivelled connection with the thrust handle for independent rotation relative thereto, a fly-wheel on the sleeve, a spiral shank in the sleeve and connected thereto so as to permit relative rotation of the shank and sleeve, means in said sleeve holding the shank clutched to the sleeve against relative longitudinal non-rotative movement of the shank and sleeve, said means being operable to permit such movement so the shank may be projected without rotation out of the sleeve, a tool-holding chuck connected with the shank, means on said sleeve engageable with the spiral shank whereby thrust pressure on the handle will cause the shank and sleeve to rotate relatively, so when the shank is held stationary by the tool in a screw slot the sleeve and fly-wheel will be rotated, a toothed disc on the shank, a correspondingly positioned toothed disc on the fly-wheel in facing relation to the disc on the shank whereby the shank and the fly-wheel will be operatively connected to rotate together and the inertia force of the rotating fly-wheel will be transmitted to the screw engaged by the tool.

CHRIS G. AUSTIN.