

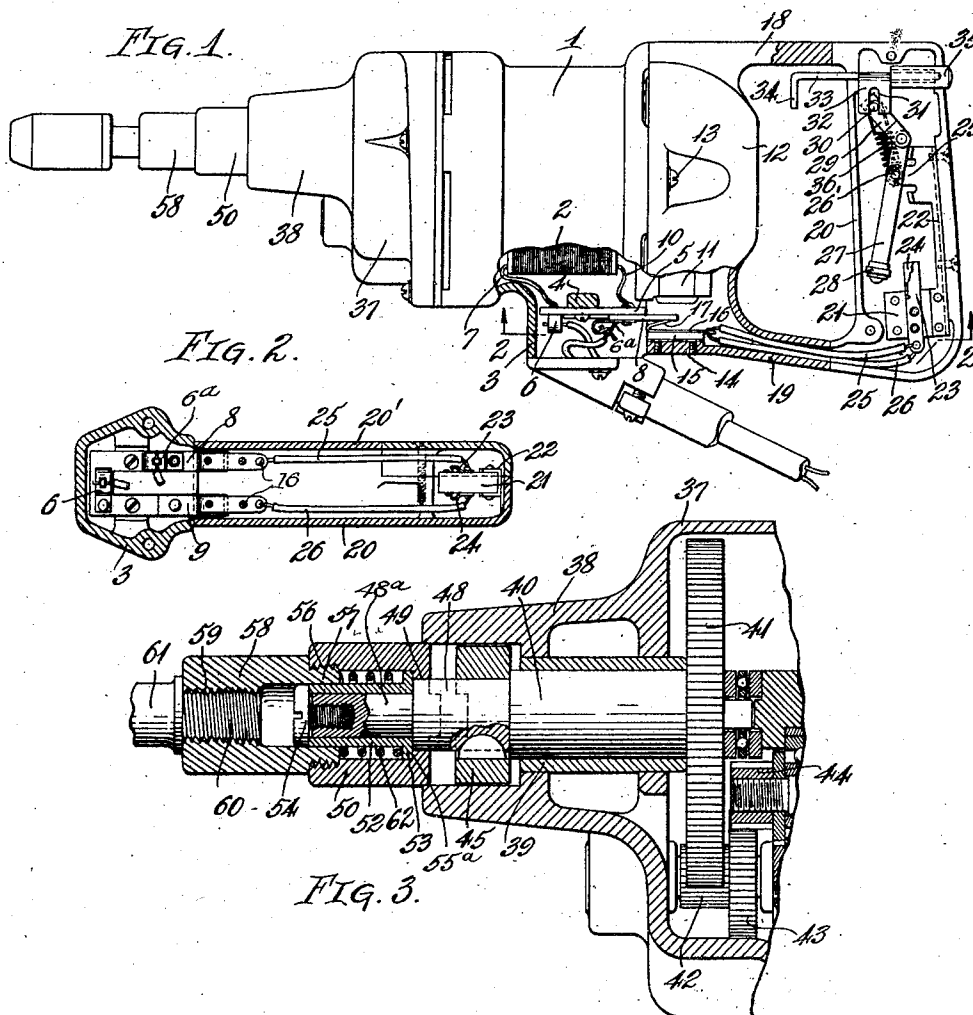
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SCREW DRIVER

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UNITED STATES PATENT OFFICE.

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SCREW DRIVER.

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This invention relates to portable hand tools and particularly to portable electrically driven screw drivers.

One feature of the invention relates to the control and its arrangement whereby it is handy and whereby access may be had to the motor brushes and other parts by removing the end cap without disturbing the electrical connection of the switch as well as the motor and whereby the electrical connections between the switch and motor are re-established when the end cap is replaced.

Other features of the invention will be brought out more in detail in the following description, drawings and claims.

Referring to the drawings, Fig. 1 is a side elevation of a tool constructed according to my invention, with parts broken away to show the control switch and the electrical arrangement; Fig. 2 is a section upon the line 2-2 of Fig. 1; Fig. 3 is an enlarged section of the part showing the main spindle and clutch mechanism; Fig. 4 is an enlarged detail view in elevation showing the clutch; Fig. 5 is a section looking at the bit clutch member; and Fig. 6 is a section looking at the end of the spindle clutch member.

In the arrangement shown, 1 represents the main motor casing which receives the motor field winding 2. Said casing is provided on one side, which we will assume is the bottom, with a junction block housing 3 provided with a cross strip 4 to which is suitably secured an insulating junction block 5 provided with a spring connection clip 6 connected by a wire 7 to the motor. Another connecting clip 6^a is also mounted on this block 5 and is in turn electrically connected to a contact strip 8 which is adapted for engagement with a suitable contact carried by the handle, as will appear. The block 5 is still further provided with another contact strip 9. Both of these strips 8 and 9 project beyond the housing 3, as shown in Figs. 1 and 2. The contact 9 is connected to the other wire 10 of the motor circuit so that when the circuit is completed between these strips 8 and 9, current will be supplied to the motor. The construction of the armature and field are unimportant, except that the usual commutator projects beyond the motor casing 1, as is usual, and cooperates with a pair of brushes 11, one being shown in Fig. 1. The commutator and the brushes are all housed in a rear cap 12

secured to the motor casing. This cap is provided with an insulating block 15 provided with two handle leaf contacts 16, each having a bent spring end portion 17 for engagement with the projecting portions of the leaf contacts 8 and 9, as shown clearly in Figs. 1 and 2. The end cap 12 is provided with an upper solid rearwardly extending portion 18 and a lower hollow extension 19, both of which merging into a half-round handle or gripping portion 20 adapted to receive the switch mechanism, the complete handle being formed by the cover 20'.

The switch mechanism includes an insulating block 21 supported upon a mounting 22 and provided with spaced leaf contacts 23 and 24 connected by leads 25 and 26 respectively, to the handle leaf contacts 16. The mounting 22 at its upper end is provided with supporting ears 25' carrying a pivot 26' supporting the movable contact lever 27 provided with a bridge member 28 adapted for engagement between the contacts 23 and 24 to complete the circuit there-through. The contact lever 27 projects to the rear of pivot 26 and is there connected to a toggle arm 29 provided with a pin 30 engaging in a slot 31 in a suitable bracket 32 carried by a reciprocating controller or finger piece 33 slidably mounted in the handle portion and provided with a downwardly extending portion 34 to be grasped by the finger of the operator. The opposite end of this finger piece 33 is provided with a button 35 for manipulating the switch in the opposite direction, as will appear. The pin 30 is connected by a spring 36 with the pivot 26 of the contact lever 27 and the arrangement is such that when the finger piece 34, for example, as shown in Fig. 1, is moved toward the right, carrying with it the pin 30, the spring 36 will be moved beyond the straight line position of the levers 27 and 29 with the result that the switch will be thrown into engagement with the contacts 23 and 24 with a quick snap and the circuit will be closed. When pressure is brought to bear upon the button 35 in the opposite direction, the parts will be moved contrawise, the switch will be released and the circuit will be broken.

Secured to the main motor casing 1 is a gear housing 37 provided with an extension 38 adapted to receive a main spindle bear-

ing 39 in which is mounted the main spindle 40. This spindle is driven by a gear 41 meshing with a pinion 42 which forms a part of a compound gear including another gear 43 meshing with the motor pinion 44. The extension 38 extends beyond the bearing 39 to receive the work spindle clutch member 45 of a construction as shown more clearly in Fig. 4, wherein suitable diametrically opposed recesses 46 form clutch shoulders 47. This clutch member is mounted upon a reduced portion 48 of the work spindle and this reduced portion engages in an opening 49 of the tool clutch member 50 which is provided with opposed lugs 51 of substantially the shape of the recesses or notches 46. The tool clutch member 50 is of sleeve form somewhat larger than the main spindle extension 48 and receives within it a bushing 52 surrounding a still further reduced spindle portion 48^a and provided with a stop flange 53 projecting beyond the circumference of the extension 48. This bushing flange 53 engages a shoulder 55^a between the two reduced spindle portions 48, 48^a and is held in place by a suitable screw 54 secured within the outer end of the spindle portion 48^a. The flange 53 also serves to engage within the shoulder 55 formed near the clutch end of the tool clutch member 50 and serves to limit the outward movement of the clutch. The tool clutch is internally threaded at its outer end as at 56 and receives the threaded shank 57 of a tool socket 58 in turn internally threaded at 59 to receive the threaded shank 60 of the tool or screw driver bit 61. A spring 62 surrounds the bushing 52 and thrusts on the one end against the stop 53 and on the other

against portion 57 of the socket member 58 causing all of these parts, together with the tool clutch member to be forced outward resulting in the disengagement of the clutch.

Having described my invention, I claim:

1. In a motor hand tool, a main casing, a motor therein, a work spindle driven thereby, a suitable cable connection for the supply cable leading to the tool, a junction block for the motor terminals and the cable connection and including switch contacts, and a combined end cap and handle removably secured to the casing and provided with a controlling switch and suitable contacts adapted to cooperate with the contacts of the junction block whereby the end cap and handle may be removed without disturbing the electrical connections to the motor.

2. In a motor hand tool, a main casing, a motor within the same with its commutator extending beyond said casing, a junction block housing extending from said casing, a junction block within said housing wired to the incoming cable and to the motor, switch contacts carried by said junction blocks and extending from the motor casing, an end cap covering the exposed commutator of the motor and provided with a housing portion housing said switch contacts of the junction block, a handle carried by said end cap, a switch within the handle, a contact block mounted in the housing of the end cap, and yielding contacts carried thereby to cooperate with the switch contacts of the junction block.

In testimony whereof I hereby affix my signature.

BURTON W. SWEET.