

May 7, 1929.

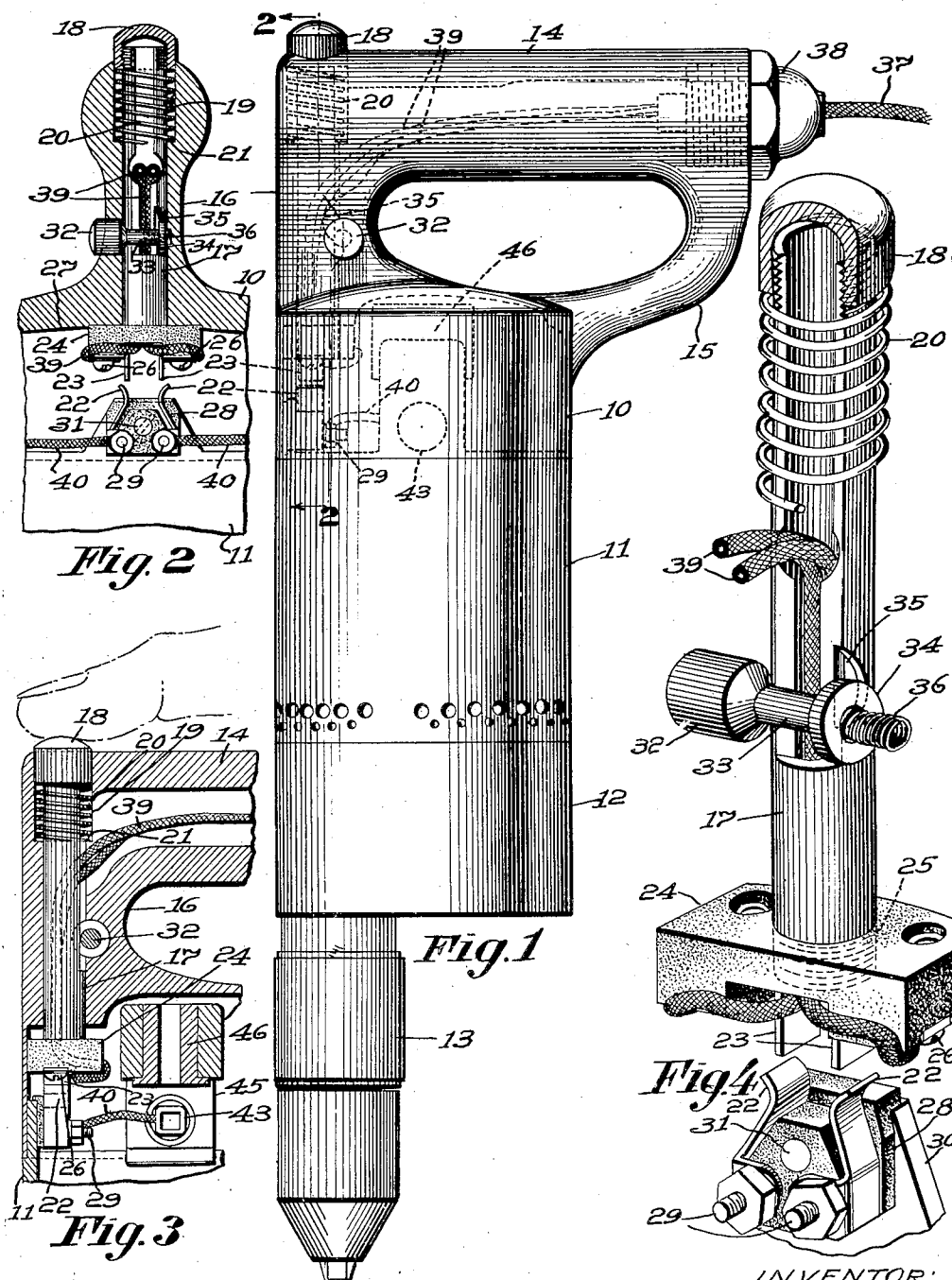
F. E. FARLEY

1,712,261

SWITCH FOR POWER DRILLS

Filed March 22, 1926

2 Sheets-Sheet 1



INVENTOR:
Fred E. Farley
BY *W. H. Harris*
ATTORNEY

May 7, 1929.

F. E. FARLEY

1,712,261

SWITCH FOR POWER DRILLS

Filed March 22, 1926

2 Sheets-Sheet 2

Fig. 5

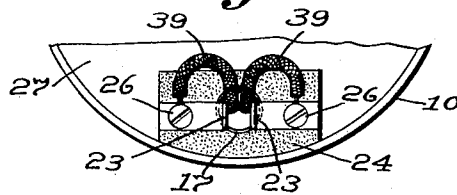


Fig. 6

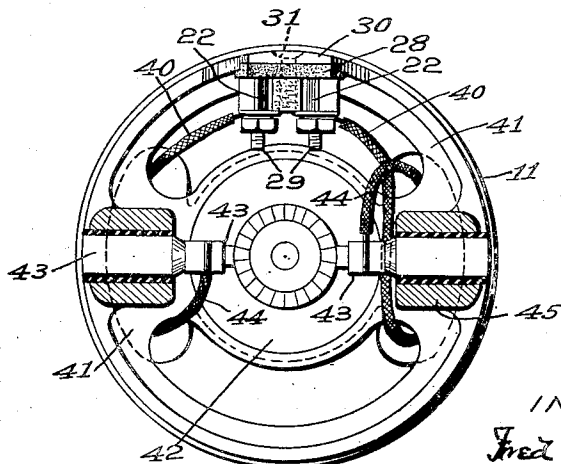
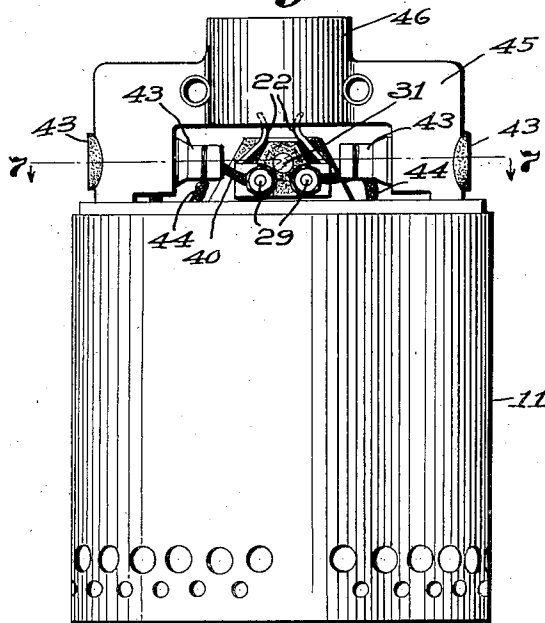


Fig. 7

INVENTOR
Fred E. Farley
BY *W. H. Davis*
ATTORNEY

UNITED STATES PATENT OFFICE.

FRED E. FARLEY, OF GREENFIELD, MASSACHUSETTS, ASSIGNOR TO GOODELL-PRATT COMPANY, OF GREENFIELD, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

SWITCH FOR POWER DRILLS.

Application filed March 22, 1926. Serial No. 96,659.

This invention relates to electric drills and more particularly to means for supplying and controlling the electric current to the motor that drives the drill.

Motor driven drills of the type that are mounted in a small, light casing so that they are convenient to handle and operate are extensively used.

These motor drills are commonly provided with an electric switch mounted in or upon the casing for controlling the supply of current to the motor, but the construction and location of the switch is important, because, in order to drill holes accurately it is necessary to hold the drill casing accurately in the proper position throughout the drilling operation, and if the switch is inaccessible or hard to shift, the operator is likely to slacken his hold on the drill casing while actuating the switch, thus permitting the drill casing to shift from its proper drilling position.

One important feature of the present invention therefore resides in a switch construction whereby the operator may close the switch by pressing upon one plunger and may open the switch by pressing upon a second plunger, and the operator may operate either plunger with the thumb of one hand while he maintains a firm grasp upon the supporting handle with that hand.

Another feature of the invention resides in the construction whereby the current supply wires are led from a source of supply to a hollow handle secured to the upper part of the casing and are led downwardly within the handle to the switch and motor.

Other features of the invention and novel combination of parts in addition to the above will be hereinafter described in connection with the accompanying drawings which illustrate one good practical form of the invention.

In the drawings:

Fig. 1 is a side elevation of an electric drill provided with the feature of the present invention;

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a vertical sectional view of a portion of the handle of Fig. 1;

Fig. 4 on an enlarged scale is a perspective view of the sliding plunger and contact elements.

Fig. 5 is a fragmentary view of the inside

of the upper section of the casing looking at the lower end of the plunger;

Fig. 6 is a side view of an intermediate portion of the casing; and

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 6.

The casing supporting handle and switch operating means forming the subject matter of the present invention may be associated with motor drills of various constructions, and in the construction shown the enclosing casing consists of an upper section 10, an intermediate section 11, and a lower section 12. The electric motor as is usual may be mounted in the intermediate section 11 while the reducing gears (not shown) are enclosed in the lower section 12, and the driving spindle 13 may extend downwardly from the lower section 12, as is usual.

The casing is provided with a handle at its upper end for supporting and manipulating the power drill, and the handle preferably consists of a hollow portion 14 that is adapted to be grasped by the hand, and with the end portions 15 and 16 for connecting the handle to the upper section 10 of the casing.

The switch operating means is preferably located in the portion 16 of the handle, as this is the portion adjacent the operator's thumb when the handle 14 is grasped, and within the portion 16 is slidably mounted a plunger 17 which may conveniently be formed of a hollow tube. The upper end of the plunger 17 is threaded to receive the cap 18 that slides within the enlarged bore 19 of the handle portion 16 and the plunger is yieldingly held in an elevated position so that the cap projects from the upper face of the handle as shown. A spring the lower end of which rests upon a shoulder 21 and the upper end of which engages the lower end of the cap, serves to hold the plunger in its elevated position ready to be depressed by the operator's thumb as shown in Fig. 3.

The switch mechanism controlled by the plunger 17 might be variously constructed, but is preferably of the double pole type, and as shown consists of the fixed contact elements 22 and the movable contact elements 23. The movable contacts 23 are secured to a head or block 24 formed of insulating material and this head is conveniently secured to the lower end of the

plunger 17 by providing the head with a threaded socket 25 into which the lower end of the plunger is screwed.

The contacts 23 may be formed of L-shaped pieces of sheet metal that fit in grooves formed in the lower face of the head 24, and they may be secured in place by the bolts 26 which also form means for securing the conductor wires to the contacts 23, as will presently appear. The head 24 is supported within the upper section 10 of the casing by the plunger 17, and the upward movement of the plunger under the action of the spring 20 is limited by engagement of the head with the inner face 27 of the casing. The outer curved face of the head 24 preferably engages the inner curved wall of the casing 10 to thereby prevent the head and plunger from turning in the casing.

The fixed contacts 22 are conveniently mounted upon a block 28 of insulating material to which they are secured by the bolts 29, and the block 28 is secured to an upstanding ear 30 of the section 11 by the bolt 31. The arrangement is such that when the plunger 17 is depressed the contacts 23 engage the inner curved faces of the fixed contacts 22.

It is desirable that means be provided for holding the plunger depressed in its switch closed position, and to this end, in the construction shown, a second plunger or latch element 32 is provided that is mounted in the handle portion 16 to slide transversely of the plunger 17. The plunger 32 has a portion 33 of reduced diameter to clear the slabbled-off portion of the vertical plunger 17, and has a head portion 34 adapted to enter a notch 35 formed in a wall of the plunger 17. The plunger 32 is urged outwardly toward its locking position by the spring 36 and may be forced inwardly to release the vertical plunger by pressing upon the projected end 32. The arrangement is such that when the vertical plunger 17 is depressed to close the switch it is automatically locked in the depressed position by engagement of the head portion of the plunger 32 with the notch 35, and the switch is opened by pressing the laterally extending plunger 32 inwardly to release the vertical plunger 17.

It should be noted that the plungers 17 and 32 are so positioned that the operator may easily operate either plunger with the thumb of the hand which grasps the handle 14, and that he may operate them without releasing his hold upon the handle. In this manner the motor drill may be controlled by one hand, thus leaving the operator's other hand free.

The electric cable 37 for supplying current to the motor is preferably led in through the hollow handle 14 and through a

hollow nut 38 screwed in the end of this handle. The conductor wires 39 are led downward within the hollow plunger 17 and the ends of these wires are secured to the contact posts or bolts 26, and the wires 39 are sufficiently slack to accommodate the vertical movement of the plunger 17. As a result of this construction the wires 39 are well protected against injury and the point at which they are flexed is at a substantial distance from the contacts 23, thus avoiding any danger of the wires being caught between the fixed and movable contacts.

The current in the construction shown is conducted from the lower contacts 22 by wires 40 that lead from the contact posts 29 to the fixed electro-magnets 41 of the motor 42, and these magnets are connected to the brush supporting tubes 43 by wires 44. The tubes 43 are conveniently mounted in the bracket or casting 45 secured to the section 11 of the casing and this casting has a bearing 46 for supporting one end of the motor shaft.

It will be apparent from the foregoing that the fixed contacts 22 are permanently connected to the motor, and that the movable contacts 23 are permanently connected to the current supply wires 39. As a result of this construction the connection between each of the wires 39 and the motor is broken as long as the switch is open, thus making it impossible for the current to reach the motor as long as the switch is open.

What is claimed is:

1. In combination with a portable electrical device having a casing and electric mechanism therein, a handle for supporting and manipulating the casing and having an opening for receiving a current supply wire, a hollow plunger slidably mounted in the handle and having the current supply wire extending through the plunger, and a switch for controlling the current to said mechanism and consisting of a fixed contact supported by said casing and a movable contact connected to said wire and positioned to be moved by the plunger into and out of engagement with the fixed contact.

2. In combination with an electrical device having a casing and electric mechanism therein, a handle for manipulating the casing and having an opening for receiving current supply wires, a hollow plunger slidably mounted in the handle to project into said casing and having the current supply wires positioned within the hollow plunger, fixed contacts mounted in said casing and connected to said mechanism and cooperating contacts secured to said plunger to be moved thereby into and out of engagement with the fixed contacts and connected to said conductor wires.

3. In combination with a portable electrical device having a casing and electric

mechanism therein, a handle for supporting and manipulating the casing, a hollow plunger slidably mounted in the handle and having a current supply wire extending into the plunger through an opening in a side wall of the hollow plunger and downwardly therein, and a switch for controlling the current to said mechanism and consisting of a fixed contact supported by said casing and a movable contact connected to said wire and secured to the plunger to be moved by the plunger into and out of engagement with the fixed contact.

4. In combination with a portable electrical device having a casing and electric mechanism therein, a handle for supporting and manipulating the casing, a plunger slidably mounted in the handle and having a projecting end adapted to be forced inwardly to close the switch, a switch for controlling the current to said mechanism and consisting of a pair of fixed contacts supported by the casing and a pair of movable contacts secured to the plunger to be moved thereby into and out of engagement with the fixed contacts, and flexible current supply wires secured directly to the movable contacts so that the wires will flex to accommodate the travel of the movable contacts.

5. In combination with a portable electrical device having a casing and electric mechanism therein, a handle for supporting and manipulating the casing, a hollow plunger slidably mounted in the handle, a switch for controlling the current to said mechanism and consisting of a fixed contact supported by said casing and a movable contact secured to the plunger to be moved thereby into and out of engagement with the fixed contact, and a flexible current supply wire extending through the hollow plunger to said movable contact and arranged so that it will flex to accommodate the travel of the plunger.

6. In combination with a portable electrical device having a casing and electric mechanism therein, a handle for the casing, an electric switch for controlling said mechanism including cooperating contacts, a sliding plunger mounted in said handle to engage and disengage the contacts and having a side wall cut away to form a clearance space, a second plunger extending across the path of the first plunger and mounted to slide transversely of the first plunger into and out of locking engagement with the latter and provided with enlarged

heads at its opposite ends and a reduced intermediate portion extending across said cutaway portion, the head at the inner end of the second plunger being constructed to engage the first plunger to hold the latter depressed and operable also to limit the outward movement of the second plunger.

7. In combination with a portable electrical device having a casing and electric mechanism therein, a handle for supporting and manipulating the casing, an electric switch for controlling said mechanism including cooperating contacts, a sliding plunger mounted in said handle to engage and disengage the contacts and having a projecting end adapted to be forced inwardly to close the switch, a second plunger mounted in the handle to slide transversely of the first plunger to lock the latter in the switch-closed position and provided with a reduced intermediate portion that extends across the first plunger and having enlarged heads at its opposite ends disposed at opposite sides of the first plunger, a spring for moving the second plunger automatically to its locking position as the first plunger is moved to the switch closing position, and the plungers being positioned so that the operator may actuate either plunger by pushing it inward while maintaining a firm grasp upon the handle with the hand that actuates the plungers.

8. In combination with a portable electrical device having a casing and electric mechanism therein, a handle for supporting and manipulating the casing, an electric switch for controlling said mechanism including cooperating contacts, a sliding plunger mounted in said handle to engage and disengage the contacts and having a projecting end adapted to be forced inwardly to close the switch, a second plunger mounted to slide transversely of the first plunger and provided with an enlarged head at its inner end adapted to lock the first plunger in the switch closed position and constructed to retain the second plunger in place, a spring for moving the second plunger outwardly into locking position as the first plunger is moved to the switch closing position, and the latter plunger being positioned to be released by an inward pressure upon its outer end.

In testimony whereof, I have signed my name to this specification.

FRED E. FARLEY.