F. L. SIMMONS.

SWITCH FOR MAGNETIC CHUCKS.

APPLICATION FILED MAR. 14, 1918.

1,402,802. Patented Jan. 10, 1922.

4 SHEETS—SHEET 1.

Fig. 1.

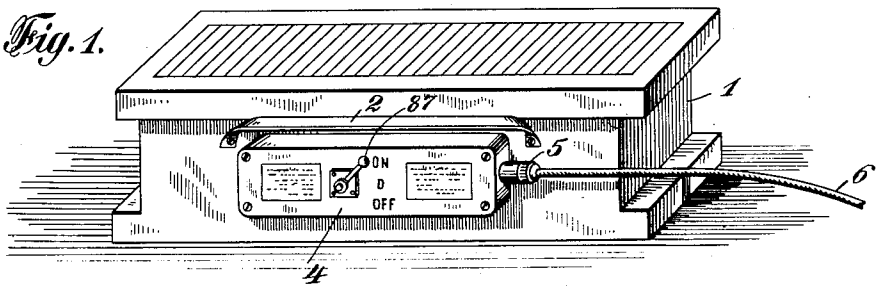


Fig. 11.

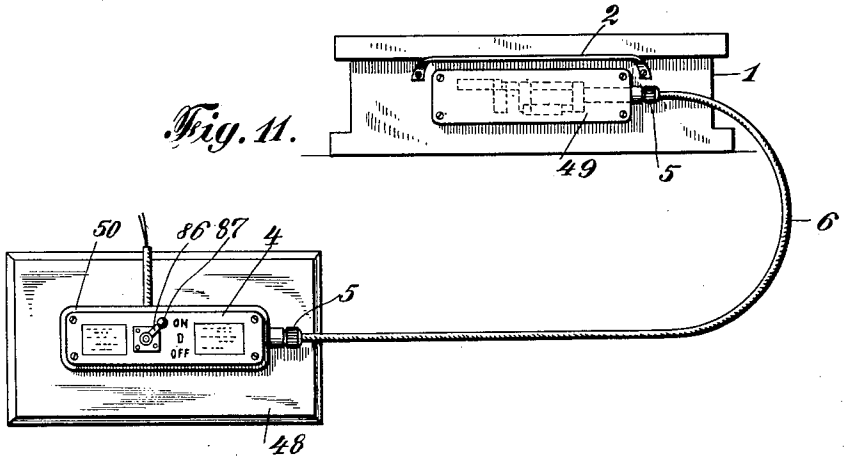


Fig. 9.

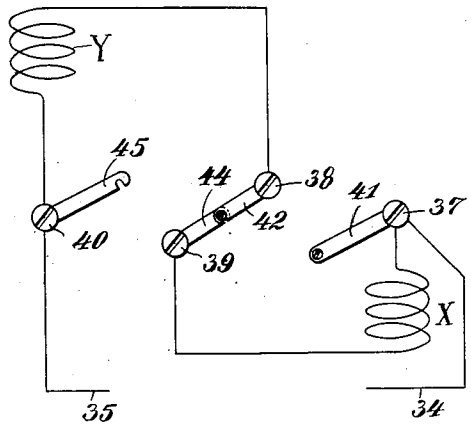
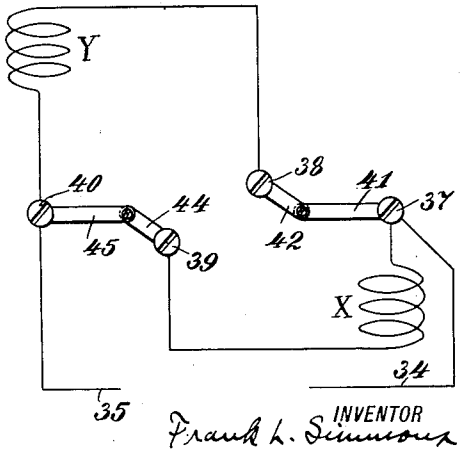


Fig. 10.



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4 SHEETS—SHEET 2.

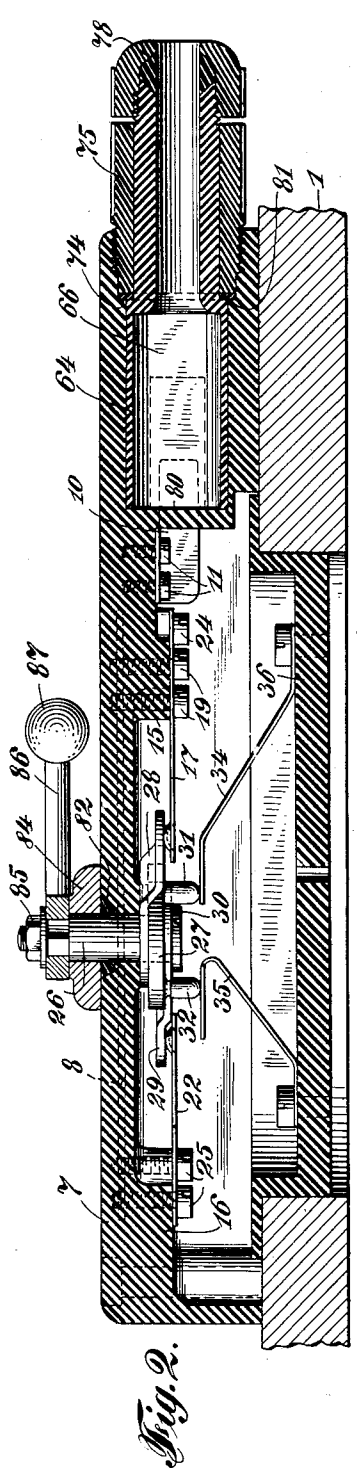


Fig. 2.

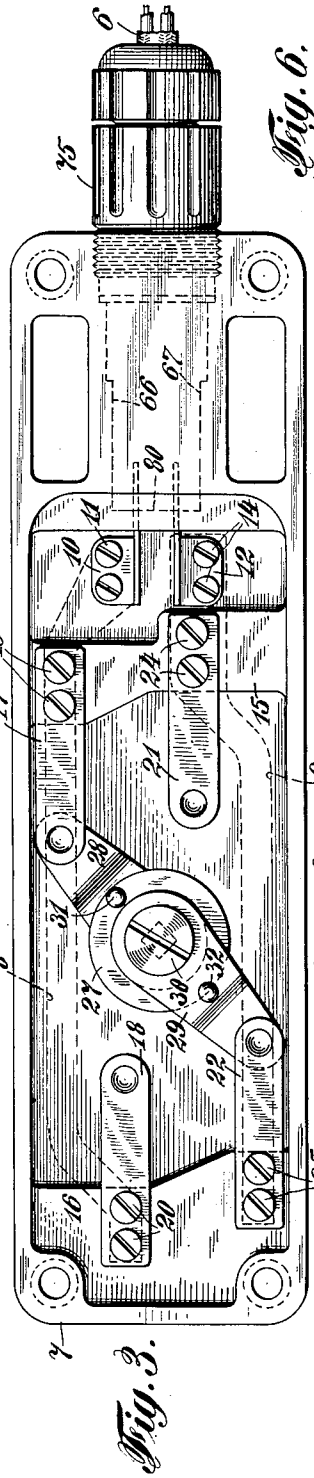


Fig. 3.

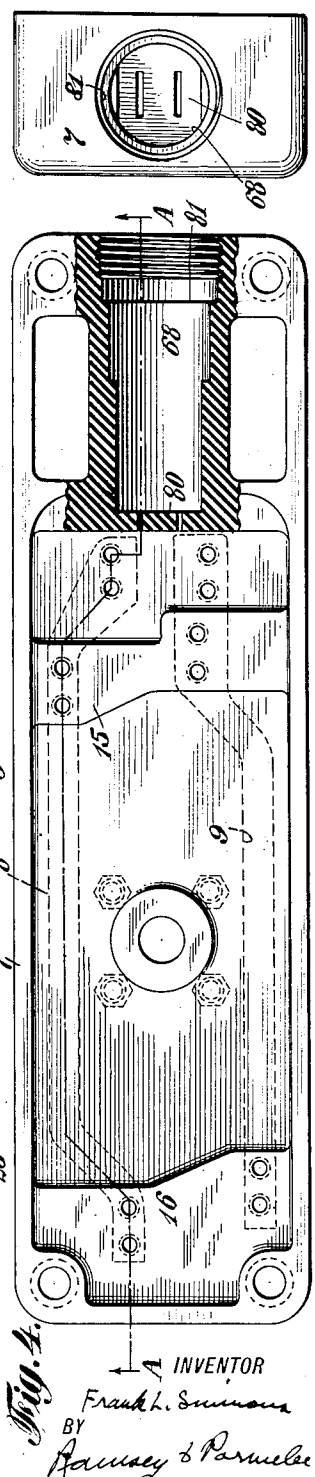


Fig. 4.

Fig. 6.

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4 SHEETS—SHEET 3.

Fig. 5.

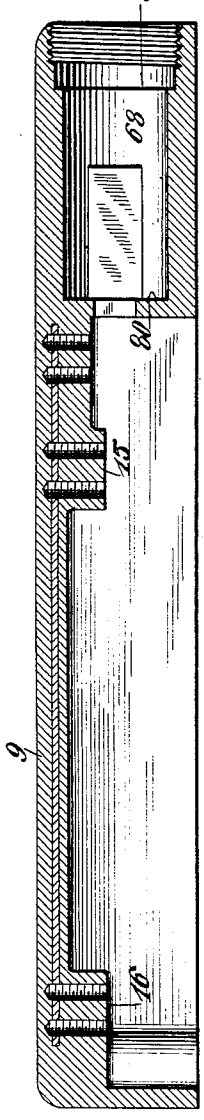


Fig. 12.

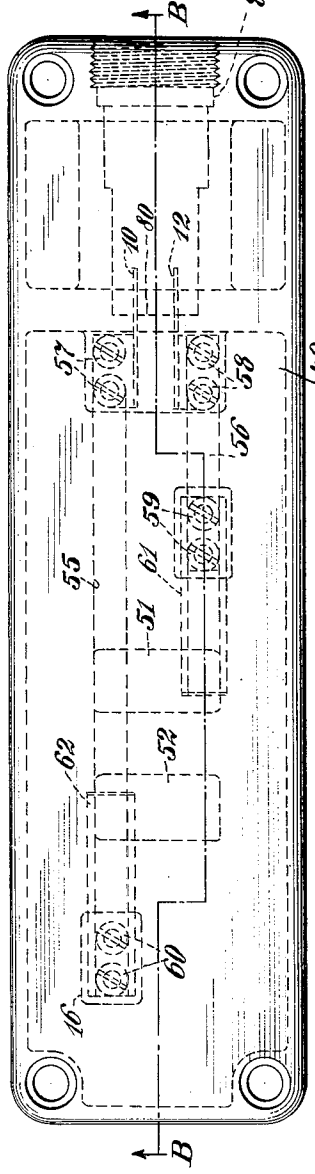


Fig. 13.

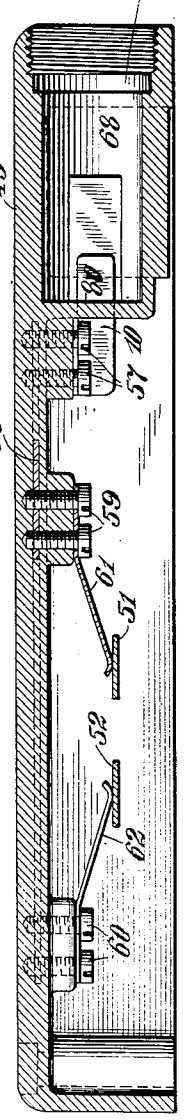
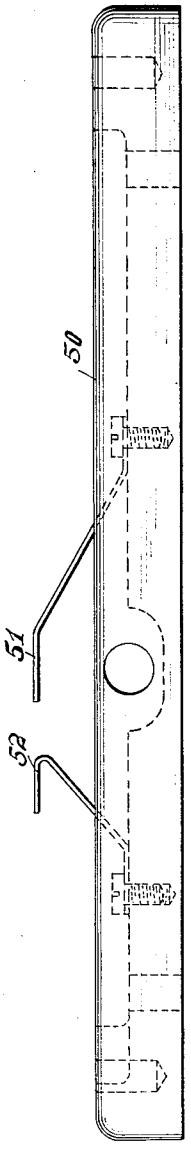


Fig. 14.



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4 SHEETS—SHEET 4.

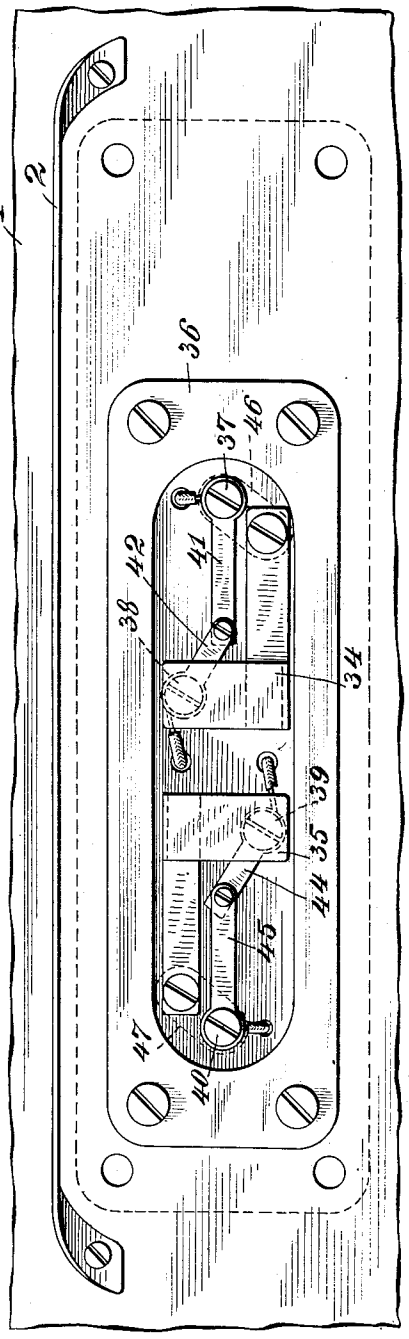


Fig. 7.

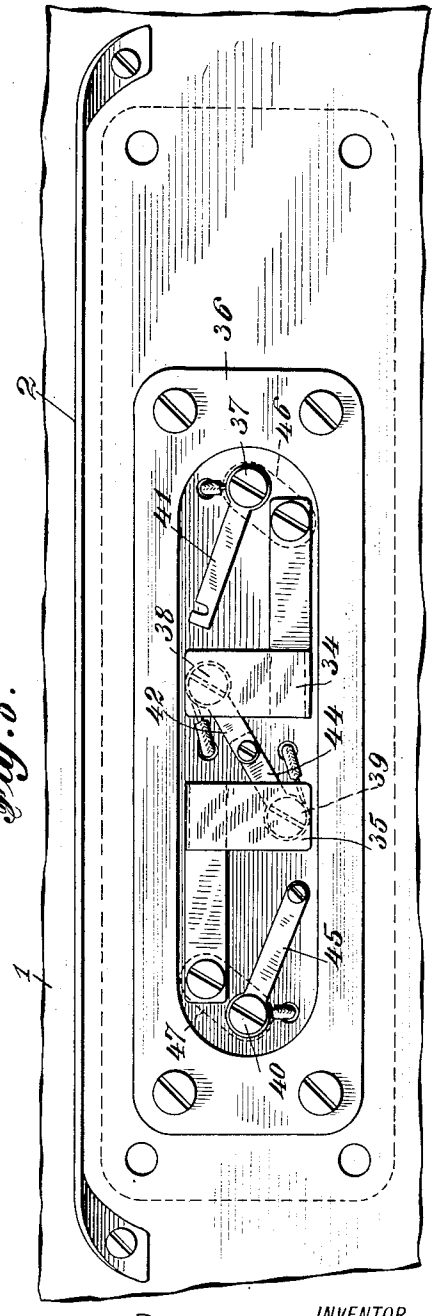


Fig. 8.

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SWITCH FOR MAGNETIC CHUCKS.

1,402,802. Specification of Letters Patent. Patented Jan. 10, 1922.

Application filed March 14, 1918. Serial No. 222,375.

To all whom it may concern:

Be it known that I, FRANK L. SIMMONS, a citizen of the United States, residing at Woonsocket, in the county of Providence, State of Rhode Island, have invented certain new and useful Improvements in Switches for Magnetic Chucks, of which the following is a specification.

This invention relates broadly to electrical apparatus, and more particularly to a switch and connections for magnetic chucks.

The principal object of the present invention is to provide a waterproof switch and connections adapted to be attached to the front wall of the chuck.

Another object of the present invention is to provide a switch for magnetic chucks, as above specified, characterized by pole changing connections in the path of the switch arms, in passing from the position of "on" to the position of "off" so that the current is momentarily turned on in a reverse direction whereby work on the chuck is de-magnetized.

A further object of the present invention is a switch for magnetic chucks and the like, wherein the body of the switch is formed of bakelite or other moldable material, and in which are embedded electrical conductors that are adapted to be connected to the switch points.

A further object of the present invention is to provide a switch for magnetic chucks and the like adapted to cooperate with interchangeable terminal boxes to permit the switch to be used either directly upon the magnetic chuck, or upon a suitable stationary switchboard.

Another object of the present invention is to provide a waterproof switch more particularly adapted for magnetic chucks, wherein the switch mechanism is adapted to cooperate with terminal boxes in such manner that the switch may be mounted directly on the magnetic chuck or on a stationary board separate from the chuck and with a connection box cooperating with the terminal box.

Other and further objects of the present invention will in part be obvious and will in part be pointed out hereinafter in the specification following by reference to the accompanying drawings wherein like parts are represented by like characters throughout the several figures thereof.

Figure 1 is a perspective view of a magnetic chuck with the de-magnetizing switch on the front thereof.

Figure 2 is a sectional view through the de-magnetizing switch and a portion of the front wall of the chuck; and with the adjustable connectors in the terminal box removed.

Figure 3 is a plan view of the back of the de-magnetizing switch.

Figure 4 is a plan view of the housing or shell for the de-magnetizing switch with the plug receptacle shown in section.

Figure 5 is a sectional view of the de-magnetizing switch housing or shell taken on line A—A Figure 4.

Figure 6 is an end view of the housing or shell.

Figure 7 is a front view of the terminal box in position on the front wall of the magnetic chuck and showing the adjustable terminal connections connected in such manner that the coils are in parallel and adapted to be energized by 110 volt circuit.

Figure 8 is a view similar to Figure 7, with the exception that the adjustable terminal connections are connected in such manner that the coils are in series and are adapted for 220 volt circuit.

Figure 9 is a diagrammatic view of the connections adapted for 220 volt circuit.

Figure 10 is a diagrammatic view of the connections when adjusted for 110 volt circuit.

Figure 11 is a view illustrating the de-magnetizing switch on a stationary separate board with a housing over the terminal box.

Figure 12 is a plan view of the housing covering the terminal box when the de-magnetizing switch is arranged on a stationary board.

Figure 13 is a view showing a section on line B—B Figure 12.

Figure 14 is a view showing the stationary terminal block on which the de-magnetizing switch is set when the switch is mounted on a stationary board as illustrated in Figure 11.

One of the principal uses of magnetic chucks is to hold thin flat articles that are adapted to be surface ground. To prevent

undue heating of the article which is being ground it is common in the art to continually flood the surface with a cooling fluid. Heretofore in the art the general practice has been to lead a cable to the chuck and to place the switch at some distant point out of the zone of the cooling fluid so that there was no danger of short circuiting the switch by parts becoming wet or water soaked. The most desirable place for mounting the switch is directly on the side wall of the chuck and this is done in the art in substantially all cases where the chuck is to be used on a machine using a cutting tool, such as a planer or miller, or wherever the work on the chuck is maintained dry during the operations. Where hardened steel articles are being ground or operated upon they become more or less saturated with magnetism and where an ordinary switch is used considerable residual magnetism is left after the current is broken and it is customary to treat the pieces by an especially constructed demagnetizing machine, in order to destroy the residual magnetism.

The present invention, among other features, comprises a waterproof de-magnetizing switch adapted to be mounted directly upon the face of the chuck and to be able to withstand any amount of cooling fluid or water without any danger of short circuiting or leakage of the electric current. This switch is provided with a pole changing mechanism so that when the switch is being opened it automatically reverses the current through the chuck, for a short period of time, which is sufficient to reverse the magnetism and overcome the residual magnetism and to bring the work to normal without establishing magnetism of opposite polarity. Preferably the housing of the switch is of molded plastic material, such as bakelite, in which is embedded the various electrical conductors for transmitting current from one contact piece to another.

Should it be desirable to mount the demagnetizing switch on a separate switchboard, provision for such change is made without changing the structure of the chuck or the switch, and such provision comprises providing the terminal boxes with contact members constructed to cooperate either with the contact pins on the switch, or contact members in housings comprising terminals for the cable leading to the switch. Lighting and power circuits are usually wired for either 220 volts or 110 volts and sometimes it is necessary to change the chuck from one voltage to the other. To facilitate such changes, with a minimum amount of structural changes in the chuck, the terminal box on the chuck is provided with four connecting plates and may be connected up only in one of two ways, i. e., in such manner that the coils of the chuck will all be in series, or in such manner that one-half of the coils of the chuck will be in one circuit and the other half be in another circuit with the two circuits in parallel. Under the former condition the chuck is ready for 220 volts and under the latter condition the chuck is ready for a 110 volt circuit.

Referring now more particularly to the drawings, and more especially to Figures 1 to 6, inclusive, the magnetic chuck 1 is provided with a protecting sleeve or canopy 2 beneath which is mounted the de-magnetizing switch 4 to which is attached the terminal plug 5 that is secured to the waterproof electric cable 6.

The de-magnetizing switch 4 comprises a housing 7 which preferably is formed of molded insulating material, such as bakelite, in which are molded the conductor plates 8 and 9, respectively. The conductor plate 8 is electrically connected with the terminal clip 10 by means of the screws 11 which are threaded through the bakelite into the conductor plate 8; and the conductor plate 9 is similarly connected to the terminal clip 12 by means of the screws 14 that are threaded through the bakelite into the conductor plate 9. Switch blade blocks 15 and 16 are preferably molded integral with the housing 7 and stationary switch blades 17 and 18 are electrically connected with the conductor plate 8 by means of the screws 19 and 20, while the stationary switch blades 21 and 22 are electrically connected with the conductor plate 9 by the screws 24 and 25. The housing 7 is provided with an opening for the switch post 26 which carries a disk 27, on opposite sides of which are mounted the switch arms 28 and 29. The switch post and disk are of insulating material, preferably bakelite, thereby insulating the switch arm 28 from the switch arm 29. The stub screw 30 is adapted to hold the switch arm 29 upon the disk 27 while the arm 28 is retained between the disk and the housing 7. These switch arms 28 and 29 are provided with squared openings that cooperate with squared portions on the switch post 26 to prevent any relative turning between the switch post and the switch arms. Contact pins 31 and 32 are provided on the switch arms 28 and 29, respectively, and are adapted to be in continuous engagement with the spring plates 34 and 35 carried by the chuck terminal box 36. This terminal box is also preferably molded bakelite and is provided with four stub screws 37, 38, 39 and 40, which carry short swinging arms 41, 42, 44 and 45, respectively. A pair of connector plates 46 and 47 are molded in the body portion of the terminal box 36 and form the electrical connection between the spring plate 34 and stub screw 37; and spring plate 35 and stub screw 40. The terminals of the coil or coils X are connected with the

stub screws 37 and 39, respectively; while the terminals of the coil or coils Y are connected with the stub screws 38 and 40. When the arms 42 and 44 are connected together the entire chuck coils are in series; when arm 41 is connected to arm 42, and arm 44 is connected to arm 45, one-half of the coils of the chuck are in multiple relatively to the other half thereof. This enables one single chuck to be used on two voltages by making the very slight changes in connections.

Where it is desirable to mount the demagnetizing switch at a distance, for example upon the switchboard 48, a waterproof housing 49, preferably bakelite, is mounted on the chuck and the switch 4 is mounted on a terminal base 50. This terminal base also carries a pair of spring contact points 51 and 52 that are identical in shape with the spring plates 34 and 35 so that one set of dies is sufficient to make both pair of plates.

The waterproof housing 49 (Figs. 12 and 13) similarly to the housing 7, carries embedded conductor plates 55 and 56 which are electrically connected by screws, 57 and 58, respectively, to the terminal clips 10 and 12. These conductor plates 55 and 56 are also electrically connected by screws 59 and 60 to contact clips 61 and 62 that engage the spring plates 34 and 35 of the chuck terminal box, when the parts are assembled for the mounting of the switch 4 on the stationary board 48.

The switch post 26 is surrounded by a watertight gasket 82 that is compressed by the plate 84 which may be held in position by stub screws engaging the nuts 85 that are embedded in the housing 7. The outer end of the switch post 26 is squared and carries an operating handle 86 which forms an indicator for the position of the switch arms on the interior of the switch so that the operator by glancing at the handle can immediately tell whether the current is on or off. If desired the outer end of the handle may be slightly weighted, as at 87, so that the handle will prevent any tendency of the switch arms to accidentally move into contact with the switch points where the switch is opened. The friction between the contact points is sufficient to maintain the switch in closed relation whenever the switch is closed.

The disclosure herein is illustrative of preferred constructions, but is not to be considered in the limiting sense, since the inventions may be carried out in constructions other than those specifically disclosed herein.

Having thus described my invention what I claim is:

1. As an article of manufacture, a housing for electric switches and the like, comprising a body portion of moldable insulating material, metallic conductor plates completely embedded in the top of said body portion, terminal member blocks on the inner side of said top, said terminal member blocks and said conductor plates being provided with screw holes, terminal members, and stub screws connected with said terminal members and threaded into said conductor plates whereby said terminal members are electrically connected with said conductor plates.

2. As an article of manufacture, an electrical switch and the like, comprising a housing of movable insulating material, conductor plates within the body portion of said housing and entirely inclosed, side walls to said body portion to form a hollow cap, terminal clips within said cap, and means electrically connecting said terminal clips with said conductor plates.

3. A housing for an electric switch comprising a body portion of bakelite, conductor plates entirely embedded in said bakelite, switch points, and means operatively connecting said switch points with said conductor plates.

4. An article of manufacture, comprising a housing for electric switches and the like and having a body portion of moldable insulation, conductor plates completely embedded within said body portion, said body portion being provided with openings leading to said conductor plates, switch points adapted to be mounted on said body portion and over said conductor plates, and stub screws threaded into said conductor plates and holding said switch points in position on said body portion and whereby said switch points are electrically connected with said conductor plates.

5. A contact point connected to one side of a direct current line, a second contact point connected to the other side of a direct current line, a switch arm electrically connected with one terminal of a magnetic clutch energizing coil, another switch arm electrically connected with the other terminal of said coil, the first mentioned switch arm normally being in contact with the first mentioned switch point, the second mentioned switch arm normally in contact with the second mentioned switch point, and means whereby the direction of the electric current through said coil is momentarily reversed when said switch arms are quickly moved from operative to inoperative position.

6. A de-magnetizing switch for magnetic chucks and the like comprising a body portion, an energizing coil for said chuck, four switch points mounted on said body portion, two of said switch points being connected with one side of a direct current line and the other two switch points being connected to the other side of the said line, switch arms

electrically connected to the energizing coil for a magnetic chuck in such manner that said switch arms normally contact with said switch points to cause the current to flow through the said coil in one direction, the other pair of switch points being so positioned relative to the path of said switch arms that the movement of said switch arms from operative to inoperative position causes said arms to engage the last mentioned switch points to reverse the current through said coil to de-magnetize the work on the chuck.

7. A de-magnetizing switch for magnetic chucks and the like comprising, in combination, a pair of switch arms adapted to be connected respectively to the ends of the energizing coil for a magnetic chuck, a pair of switch points adapted to lead an electrical current into one of said arms and out of the other of said arms when the switch is operated to energize the chuck coils, and another pair of switch points in the path of said arms when said arms are being moved from operative to inoperative position, the second pair of switch points being so connected as to reverse the current through the said arms and said coils when said switch arms are moved from operative to inoperative position.

8. A waterproof switch for magnetic chucks and the like comprising, in combination, a housing of waterproof insulating material provided with a recess, switch points mounted within said recess, oscillatory switch arms mounted between said switch points and adapted to be electrically connected with the terminals of the coils of a magnetic chuck, and means whereby the current may be momentarily reversed through said switch arms when said switch arms are quickly moved from operative to inoperative position.

9. A switch for magnetic chucks and the like, comprising a waterproof housing, conductor plates within said waterproof housing, switch points electrically connected with said conductor plates, switch arms adapted to be electrically connected with the coils of a magnetic chuck, and other switch points in the path of said switch arms when said switch arms are moved from operative to inoperative position, said second mentioned pair of switch points being so connected as to reverse the flow of current through said switch arms when said switch arms pass in contact with said last mentioned switch points whereby current through said chuck may be reversed.

10. An electric switch for magnetic chucks and the like comprising a switch housing of insulating material, conductor plates molded within said housing, switch points electrically connected to said conductor plates, a shaft of bakelite or the like, a pair of switch arms mounted upon said shaft and insulated one from the other, an operating handle on the front of said housing, and a connector plug for leading electric current to said switch points, and means whereby said connector plug forms a waterproof joint with said housing.

11. A waterproof electric switch for magnetic chucks and the like, comprising in combination, a waterproof housing adapted to be secured to the side wall of the chuck and to form a watertight joint therewith, means within said housing for switching the electric current on or off, a handle for operating said means, a connection between said handle and said means, a watertight joint around said connection where the same passes through said housing, a removable connector plug adapted to transmit electrical current to said means, and means to provide a waterproof joint between said plug and said housing.

12. An electric switch for magnetic chucks and the like comprising a waterproof casing forming a waterproof joint with the side wall of the chuck, switch mechanism within said casing, connections extending through said casing, a handle for operating said connections, a waterproof packed joint around said connections where the same pass through said casing, a detachable terminal plug comprising the termination of a waterproof cable for leading electricity to said switch, and a waterproof joint between said plug and said casing.

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