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ELECTRICAL TOOL HANDLE AND SWITCH

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Fig.1 Fig.2 Fig.3 Fig.4

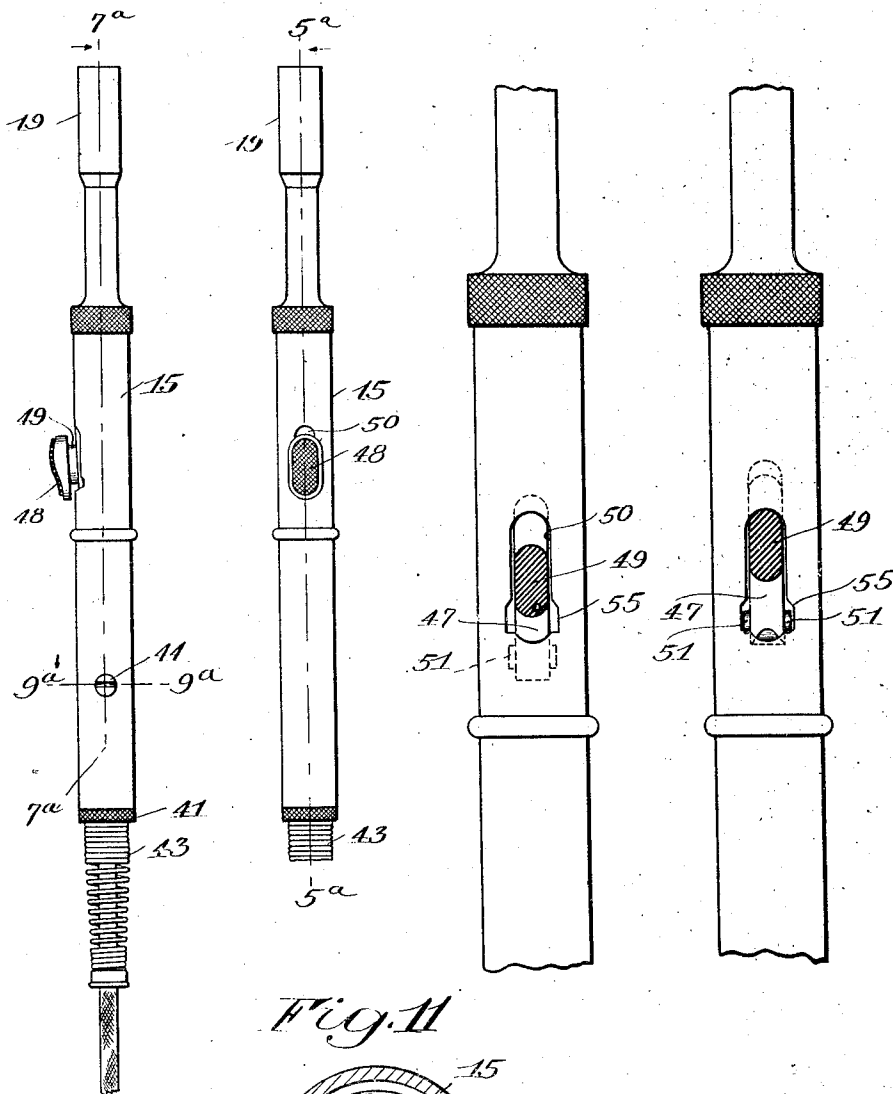
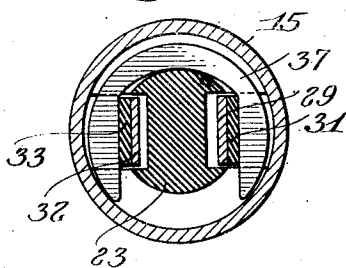


Fig.11



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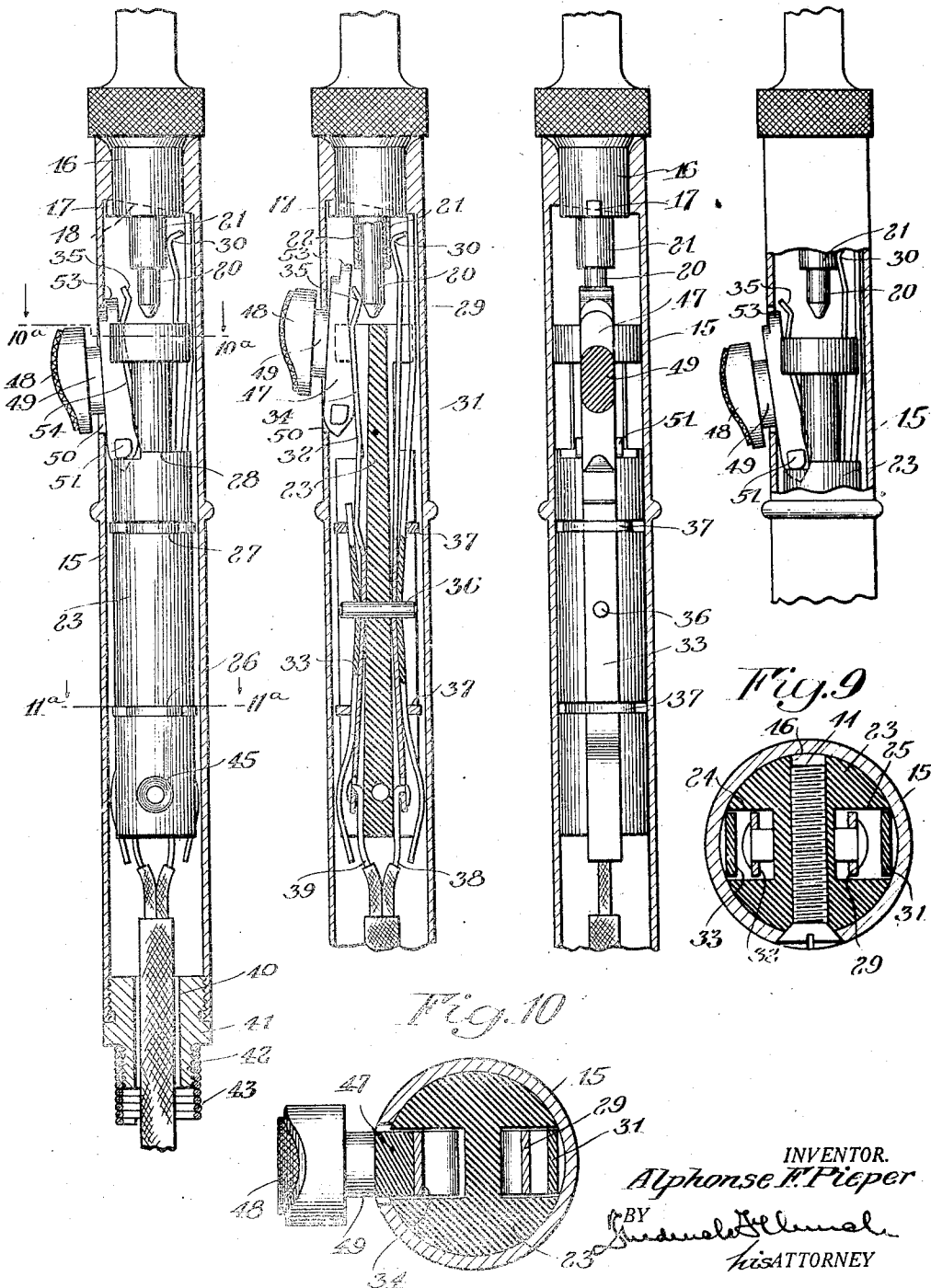
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Fig. 5

Fig. 6

Fig. 7

Fig. 8



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UNITED STATES PATENT OFFICE.

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ELECTRICAL TOOL HANDLE AND SWITCH.

Application filed August 21, 1922. Serial No. 533,426.

This invention relates to electrical tool handles and switches, and more particularly to combined handles and switches for electrically operated hand tools, such, for example, as commonly employed in dental work, one object of the invention being to provide a simple form of switch comprising but a few parts of a character economical to manufacture and assemble within a tool handle of convenient size and shape.

A further object is to provide a combined handle and switch of the above variety, the parts of which are practically constructed and arranged in such a manner that they may be readily assembled and taken apart by unskilled labor practically without the use of working tools. To these and other ends the invention resides in certain improvements and combinations of parts all as will hereinafter be more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings:

Figure 1 is a side view of a combined handle and switch embodying the present invention;

Figure 2 is a similar view of another side of the same;

Figure 3 is an enlarged view, broken away, of parts shown in Figure 2 with a portion in section;

Figure 4 is a view similar to Figure 3, but with the parts in a different position;

Figure 5 is an enlarged side view partly in section on the line 5^a—5^a of Figure 2;

Figure 6 is a view similar to Figure 5 with additional parts in section to illustrate their construction, and shown in a different position;

Figure 7 is an enlarged view partly in section on the line 7^a—7^a of Figure 1;

Figure 8 is a view similar to Figure 5 with the parts in a position occupied during disassembly;

Figure 9 is a transverse sectional view on the line 9^a—9^a of Figure 1;

Figure 10 is a similar view on the line 10^a—10^a of Figure 5, and

Figure 11 is a similar view on the line 11^a—11^a of Figure 5.

Similar reference numerals throughout the several views indicate the same parts.

The invention is embodied in the present instance by way of illustration, in a combined handle and switch particularly adapted for use with electrical dental hand tools,

comprising a tubular handle portion 15, Figures 1 and 5, of elongated substantially cylindrical shape, with relatively thin walls and preferably constructed of insulating material such for example as bakelite, hard rubber and the like. One end of the handle interior or bore is preferably closed by a detachable plug 16, having a lug 17 cooperating with an inclined surface 18 for detachably securing the plug in the tube end. This plug carries a portion indicated at 19 for connection with the instrument. Extending from the latter interiorly through the plug and into the end of the handle bore is a central metal post or contact 20 surrounding which is a second metal contact or sleeve 21, Figure 6, spaced and insulated from post 20 as by means of an interposed sleeve or layer of insulating material 22, as shown. Sleeve 21 is terminated some distance from the end of post 20 to expose the latter for engagement by the cooperating contact described hereafter, and contacts 20 and 21 are of course suitably disposed at the end of portion 19 for connection with the electrical circuit of the instrument. Cooperating with the pair of handle contacts 20 and 21 already described is a second pair of contacts carried by a core piece 23 detachably inserted within the handle from its opposite end. The core piece is preferably generally cylindrical in shape and of a size fitting closely within the bore of the handle as shown.

This piece is preferably formed of a suitable insulating material, with longitudinally extending slots 24 and 25, Figure 9, located on opposite sides thereof. These slots preferably extend the entire length of the core piece which is also formed with a pair of spaced, circumferentially extending narrow grooves 26 and 27, Figure 5, and adjacent one end with a relatively wide circumferential groove or recess 28 for a purpose which will presently appear.

One of the contacts carried by the core piece is shown at 29, Figures 6 and 9, as formed of a strip of resilient metal and located within the core piece slot 25. With the latter in position as shown in Figure 6, the upturned end 30 of contact 29 bears resiliently against the cooperating contact sleeve 21 of the handle. A strip of insulating material 31 is preferably placed in slot 25 over the contact to provide against possible grounding of the latter. The other

contact of the core piece is shown at 32 as comprising a similar resilient conductive strip located in the other slot 24 and protected by a relatively short insulating strip 33. This contact is preferably formed with an inclined portion 34 extending outwardly from the center of the core piece for a purpose which will presently appear, and terminating in an upturned end 35 adjacent and normally in spaced relation with the cooperating contact 20, as shown in Figure 5, it being understood that suitable means are provided as hereafter described for moving contact end 35 into and out of engagement with contact 20 to close the circuit.

The contacts 29 and 32 and their insulating strips 31 and 33 respectively are detachably secured in their respective slots by means of a pin 36 passed therethrough and through an opening in the core piece. The pin preferably has a sufficiently loose fit in the openings in these parts so that it may be readily inserted and removed without any special tool for the purpose, being intended primarily to hold the parts against relative longitudinal movement. The contacts and their insulating strips are additionally secured in their respective grooves by means of yoke-shaped members 37, Figures 6 and 11, detachably inserted by hand in the core piece grooves 26 and 27 in the manner best shown in Figure 11. It is apparent that these yoke shaped members are readily assembled and disassembled, as described, and serve to securely hold the parts in proper assembled relation. The opposite ends of contacts 29 and 32 extend adjacent the outer end of the core piece and to these ends of the contacts are secured respective conductors 38 and 39 connected with a suitable source of electric power. The conductors pass outwardly of this end of the handle, through an opening 40 in a detachable screw plug 41 secured in the handle end, and having a reduced end 42 on which is secured a coiled guard spring 43 for the protection of the conductors. The core piece and its contacts and connected conductors described are secured against longitudinal movement in the handle by means of a screw 44 passed through an opening 45 in one side of the handle and into a threaded opening 46 in the core piece, as best shown in Figure 9.

Means are provided including a finger-piece projecting through an opening in the side of the handle for closing the contacts 32 and 20 or more specifically for pressing the contact end 35 against its own resilience into engagement with contact 20 and for locking it in such engaged position for maintaining the circuit closed. This means comprises, preferably, an actuator or elongated block 47, Figure 6, sliding in core piece groove 24 along the outer side of contact 32.

The actuator is provided with a suitably shaped finger piece 48 connected to the actuator by a neck portion 49 sliding in a slot 50 in the instrument handle. One end of the actuator is provided on opposite sides with laterally projecting abutments 51 extending beyond the sides of core piece slot 24 and located in the wide circumferential recess 28 formed in the core piece adjacent this end. These abutments 51 coming in contact with cooperating abutments or shoulders formed by the adjacent end of the recess 28 of the core piece, limit the movement of the actuator 47 in one direction in which extreme position the other end of the actuator projects partially into the slot 50 in the handle, being of slightly less width than the slot. The movement of the actuator into the slot however is limited by a lip 53 on the actuator which engages the inner side of the handle wall. The actuator block is generally wedged shaped, having its inner surface 54 inclined away from the core piece to conform with the inclined portion 34 of contact 32. With contact 32 spaced from contact 20 in the extreme position shown in Figure 5, finger piece 48 may be depressed to move it transversely in said bore to close the contacts for short periods under control by the pressure of the finger or thumb. Movement of the actuator block longitudinally of the handle to its other extreme position shown in Figure 6 forces the end 35 of contact 32 into engagement with contact 20 to close the circuit and holds or locks the contacts in closed position so long as the parts remain in this position. As shown, of course, this movement of the actuator is prevented by the engagement of its end in the slot 50 of the handle until the fingerpiece is depressed against the spring contact to clear the end of the slot after which the fingerpiece and actuator may be moved to close the contacts as described, the end of the actuator in this position engaging the inner side of the handle wall as shown in Figure 6 and serving to maintain the contacts in closed position. The movement of the actuator to this closed circuit position is limited by engagement of the neck portion 49 of the finger-piece with the end of the slot 50 in the handle and is to be noted in Figures 4 and 6 that the actuator in this position is too long to clear the other end of the slot, so that the actuator in operation is effectively guided for sliding movement between the core piece and handle, so that it cannot normally be removed through the slot in the handle through which the finger piece projects.

To provide for assembling and disassembling the device, however, slot 50 of the handle is formed adjacent one end with enlarged portions 55, Figs. 3 and 4, providing an opening at this portion of sufficient size

to permit the passage therethrough of the corresponding end of the actuator with its projecting abutments 51 after the latter has been moved to the proper position relative to the slot. Such adjustment of the actuator for removal is effected by the simple expedient of removing screw 44 which attaches the core piece to the handle. The core piece may then be slid in the handle in a direction away from contacts 20 and 21 to the position shown in Fig. 8, in which position the actuator is released so that its lip 53 clears the end of slot 50 in the handle. This end of the actuator being released from the slot, the actuator may be moved in the latter until its other end clears the other end of the slot and its abutments 51 register with the enlarged portions 55 of the slot. In this position the actuator may be readily inserted and removed from the handle. It is to be noted that after screw 44 is removed the core piece and actuator mutually retain each other in connection with the handle until the core piece is partially withdrawn from the latter, as described, to release the actuator for removal after which the core piece may be fully withdrawn through the end of the handle in which the detachable plug 41 is fitted. With the core piece detached, it is a simple matter to knock out pin 36 and remove the yoke members 37, thus releasing the contacts 29 and 32 and their insulating strips 31 and 33 for detachment from the core piece. It is apparent that the device may thus be assembled and disassembled during manufacture, repair or cleaning without the necessity for the use of working tools, except a screw driver or other means for removing the screw 46. When once assembled, on the other hand, the parts are securely fastened and maintained in their proper positions.

As indicated in the drawing, the switch parts are comparatively few in number and of a simple and practical form, inexpensive to manufacture. The assembly of the parts, as explained above, may be quickly affected, practically without tools and require no close fitting or accurate adjustment so that skilled labor is unnecessary. The combined handle and switch is, as a whole, compact and self contained and convenient in shape for handling the tool, the finger-piece lying under the natural position of the thumb to enhance the ease of operation.

I claim as my invention:

1. The combination of a tubular tool handle provided with a pair of electrical conductors in one end of its bore, a core piece detachably secured in the handle bore, a conductor carried by said core piece in contact with one of said handle conductors, a second conductor carried by said core piece in spaced relation with the other of said handle conductors, an actuator on the handle mov-

able transversely in said bore to move said spaced conductors into engagement with each other and having also a longitudinal movement in said bore, and cooperating parts on said handle and actuator brought into cooperation by said longitudinal movement of the latter for holding the same in position for maintaining said contacts in engagement with each other.

2. The combination of a tubular tool handle having an electrical conductor extending into the bore thereof at one end, a longitudinally slotted core piece detachably secured in the handle bore, a conductor extending into said handle adjacent its opposite end and having a resilient terminal lying in the core piece slot with its end in spaced relation with said handle conductor, a wedge-shaped actuator slidable in said core piece slot for moving said terminal into contact with said handle conductor and a fingerpiece on said actuator projecting through a slot in the handle wall.

3. The combination of a tubular handle having an electrical contact in one end of its bore, a longitudinally slotted core piece detachably secured in the handle bore, a resilient metal contact carried in said core piece slot having a portion inclined outwardly of the handle away from the core piece with its end in spaced relation with said handle contact, and a wedge shaped actuator slidable in the slot of said core piece between the latter and the handle wall with an inclined surface in engagement with said inclined contact portion for moving said contact end into engagement with said handle contact, and a fingerpiece on said actuator projecting outwardly through and slidable in a slot in the handle wall.

4. The combination of a tubular handle having an electrical contact in one end of its bore, a longitudinally slotted core piece detachably secured in the handle bore, a contact movably carried in said core piece slot for engagement with said handle contact, an actuator sliding in said core piece slot and constructed to move said core piece contact into engagement with said handle contact, a finger piece projecting from said actuator through a slot in said handle, said slot having an enlarged portion, and abutments on said actuator cooperating with the sides of said handle slot and with said core piece to normally retain said actuator in said handle and limit its movement therein, said core piece being detachable to permit abutments on said actuator to be moved through said slot enlargements and the said actuator removed from the handle.

5. The combination of a tubular tool handle having an electrical contact in one end of its bore, a longitudinally slotted core piece detachably secured in the handle bore, a contact movably carried in said core piece

slot for engagement with said handle contact, an actuator sliding in said core piece slot and constructed to move said core piece contact into engagement with said handle contact, a finger piece projecting from said actuator through a slot in said handle, cooperating abutments on said handle, actuator and core piece preventing detachment of devices whereby said core piece may be first partially detached to release said actuator for detachment and said core piece then fully detached from the handle.

6. The combination of a tubular tool handle having an electrical contact in one end of its bore, a longitudinally slotted core piece detachably secured in the handle bore, a contact movably carried in said core piece slot for engagement with said handle contact, an actuator sliding in said core piece slot and constructed to move said core piece contact into engagement with said handle contact, a fingerpiece projecting from said actuator through a slot in said handle, said slot having an enlarged portion and said core piece having also a circumferential recess, cooperating abutment portions on said handle, core piece and actuator including abutments on the latter movable in said circumferential recess for normally preventing detachment of either said actuator core piece and adapted upon partial detachment of said core piece to permit movement of said actuator abutments through said enlarged slot portion and the full detachment of said actuator first and then said core piece.

7. The combination of a tubular tool handle having a pair of electrical contacts adjacent one end of its bore for connection with opposite sides of an electric circuit, a core piece inserted in said bore having spaced, longitudinally extending slots therein, contacts in said slots for cooperation with respective ones of said handle contacts, the contacts of one of said cooperating pairs being normally in adjacent disengaged relation, an actuator slidable in one of said core piece slots for moving said disengaged con-

tacts into engagement to close the circuit, and a fingerpiece projecting from said actuator through an opening in the handle.

8. The combination of a tubular tool handle having a pair of electrical contacts adjacent one end of its bore for connection with opposite sides of an electric circuit, a core piece of insulating material detachably inserted in said handle bore and provided with longitudinally extending slots, a pair of contacts detachably secured in said core piece slots with the end of one disposed for engagement with one of said pair of handle contacts and the end of the other disposed in adjacent spaced relation with the other of said handle contacts, an actuator sliding in an opening in the handle and adapted to be depressed and secured within the handle for moving said spaced contacts in engagement with each other, and devices whereby said core piece may be first partially detached to release said actuator for removal from the handle and the core piece then separated from the handle.

9. The combination of a tubular tool handle having a pair of electrical contacts adjacent one end of its bore for connection with opposite sides of an electric circuit, a core piece of insulating material detachably inserted in said bore and provided with longitudinally extending slots, a contact in one of said slots for engagement with one of said pair of handle contacts, a resilient contact in the other of said slots having an end disposed for movement toward and from engagement with the other of said handle contacts, yoke-shaped clips detachably inserted in circumferential grooves in said core piece for securing said contacts in said slots, connections at opposite ends of the handle for connecting one pair of contacts with an instrument and the other pair with a source of power, and an actuator movable in an opening in the handle for moving said resilient contact toward said handle contact to close the circuit.

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