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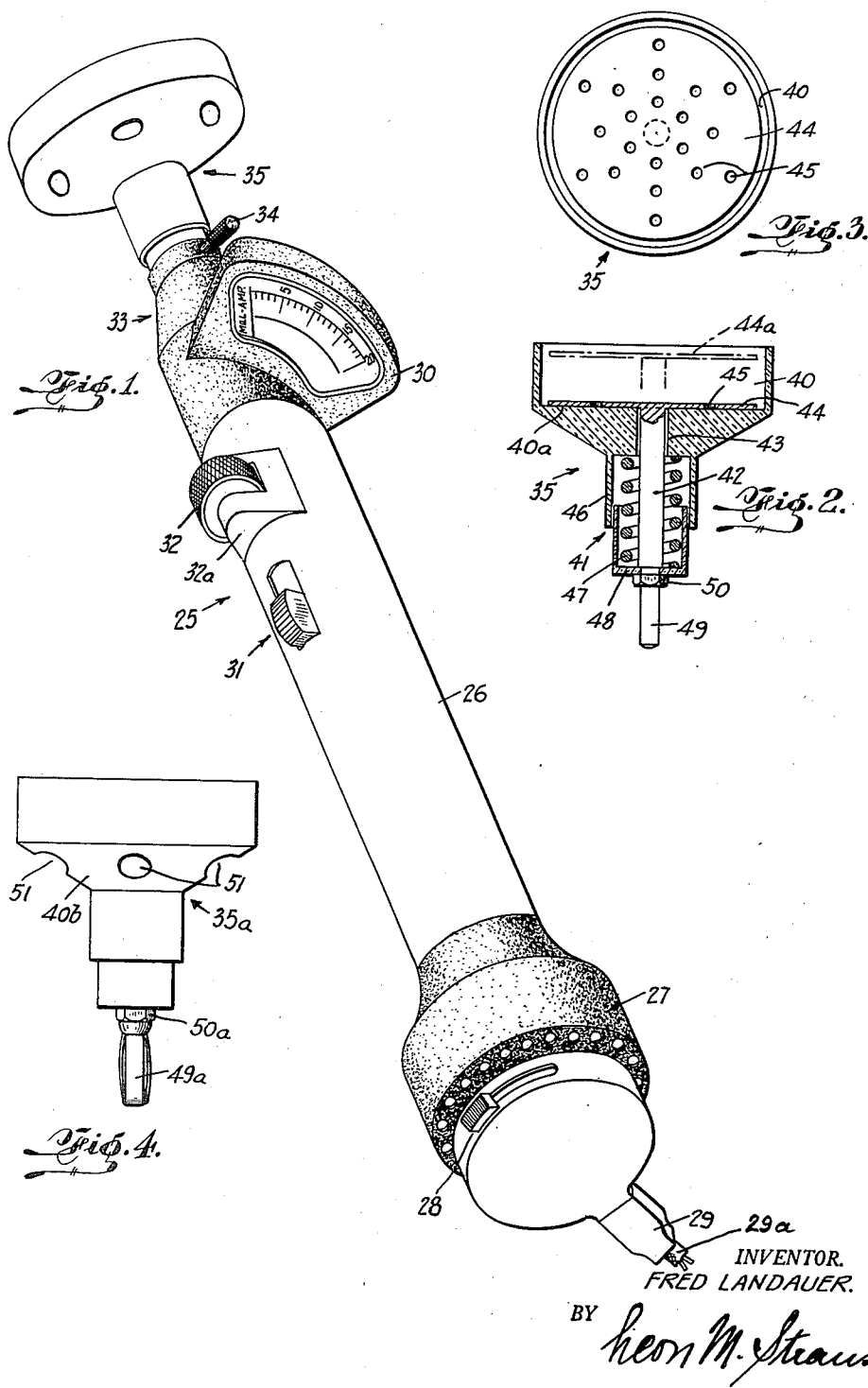
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ELECTRIC TREATMENT APPLIANCE

Filed Jan. 19, 1944

3 Sheets-Sheet 1



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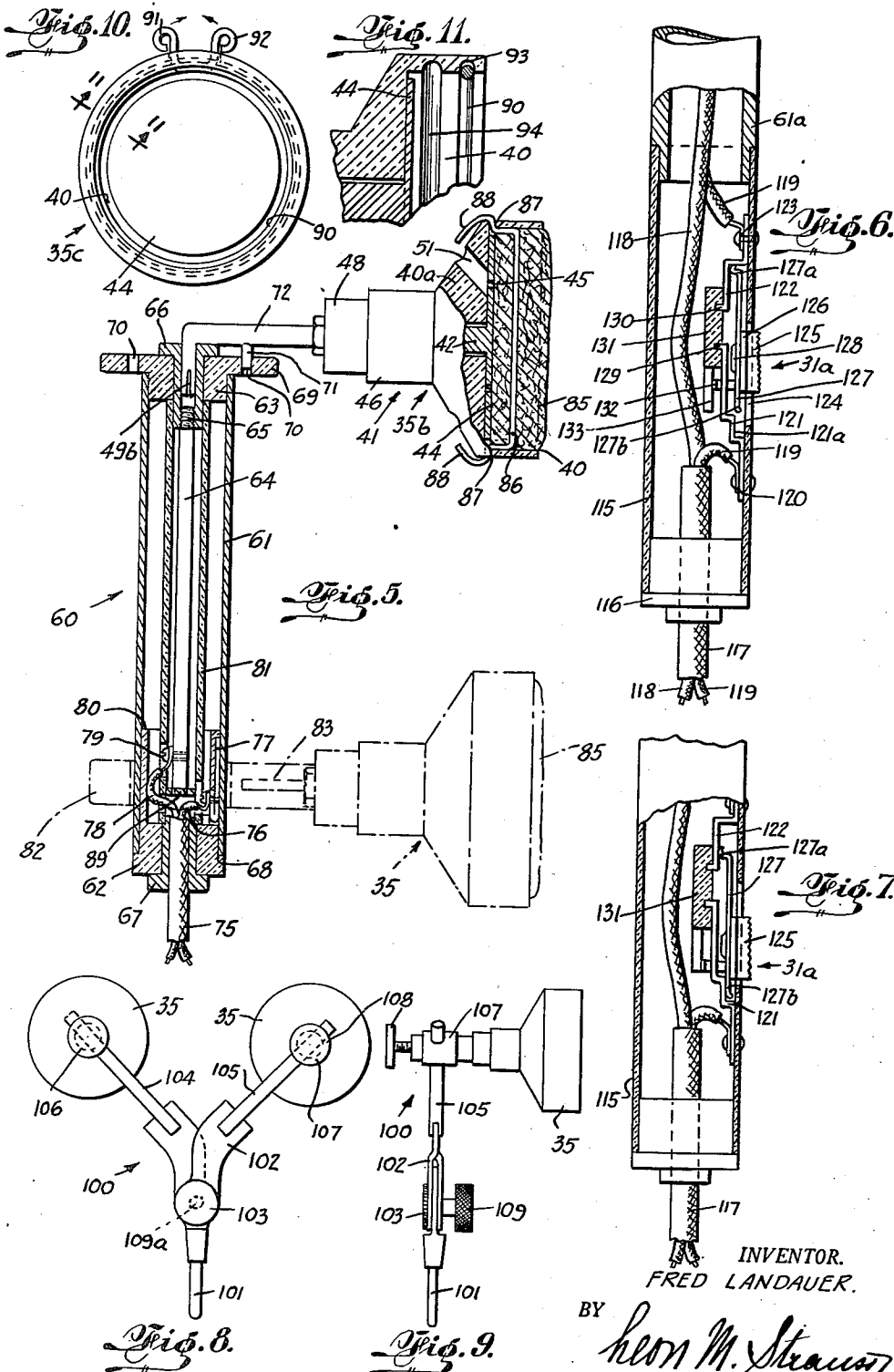
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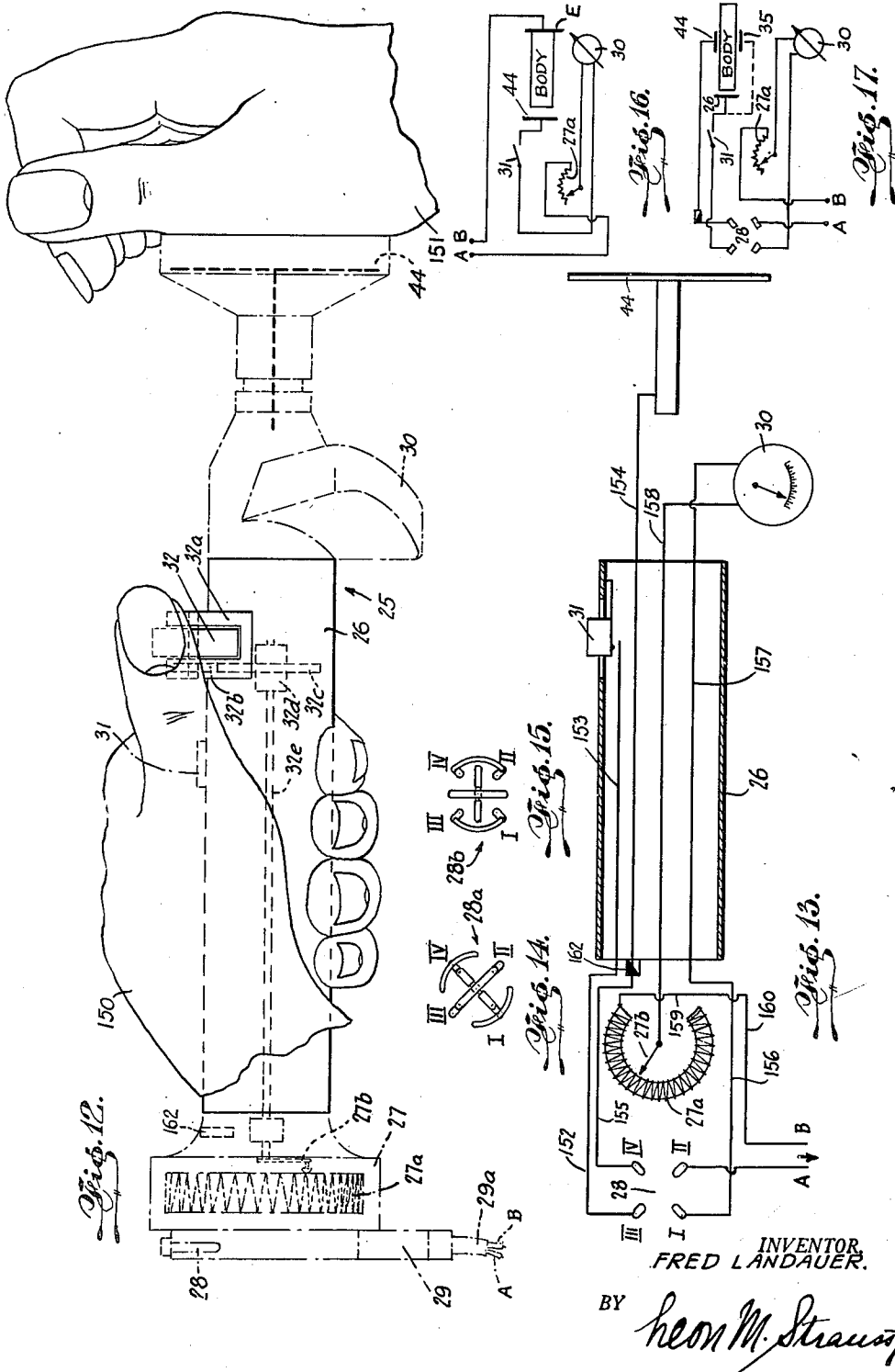
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UNITED STATES PATENT OFFICE

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ELECTRIC TREATMENT APPLIANCE

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9 Claims. (Cl. 128—405)

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This invention relates to electric treatment appliances and more particularly to a portable electro-therapeutic device including one or more electrodes.

It is one of the main objects of this invention to provide a compact and handy device of the aforesaid nature which is light in weight, simple in construction and efficient and easy in operation.

It is another object of this invention to provide a treatment device of the aforesaid type which permits speedy operation and electric current regulation with the fingers of one hand only of the operator or person manipulating said device who may safely hold the same for application to a part of the human body for treatment.

Another object of the invention is to provide guarding means on said device for preventing any undesirable effects which may be otherwise caused by the electric current on a person applying the device.

It is a further object of the present invention to interchangeably connect one or more head pieces or applicators, each containing an electrode, with the housing of the device, which housing may form a handle electrode.

A further object of the invention is to provide a therapeutic device the operative parts of which are so conveniently arranged and located with respect to its handle housing that the device can be easily maneuvered whether it is operated by an operator (physician or nurse) for treatment of a patient or by the patient himself.

Still another object of the invention is to provide means for transforming the electro-therapeutic device, either for self-application and self-service by the patient or for applying the device to the patient by an operator without the latter being included in the electric circuit.

A still further object of this invention is to provide pad means for attachment to the applicator or applicators of the device and to provide further means for preventing escape of liquid from said pad with which the same may be imbued for the operation of the device.

Yet, a further object of this invention is the provision of means to yieldably secure one or more electrodes to the handle forming housing of the device.

These and other objects and advantages of the invention will appear from the following disclosure thereof together with the attached drawings which illustrate certain forms of embodiments thereof. These forms are shown for the purpose of illustrating the invention since the

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same has been found in practice to give satisfactory and reliable results, although it is to be understood that the various instrumentalities of which the invention consists can be variously arranged and organized and that the invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the drawings:

Fig. 1 is a perspective view of an electric treatment appliance or device made in accordance with this invention.

Fig. 2 is a longitudinal sectional view of the head piece or applicator to be applied to the device shown in Fig. 1.

Fig. 3 is a top plan view of the applicator shown in Fig. 2.

Fig. 4 is a side-elevational view of the applicator of Fig. 2 in somewhat modified form.

Fig. 5 is partly a longitudinal, sectional view of an electric treatment device in a simplified form.

Fig. 6 is an enlarged, longitudinal, sectional view of a switch for use in connection with the device shown in Fig. 1 or 5.

Fig. 7 is a similar view of the switch of Fig. 6 showing the switch in another position.

Figs. 8 and 9 are top and side-elevational views, respectively, of an adjustable holder for a plurality of applicators.

Fig. 10 shows one form of a pad-holding structure for use in connection with an applicator.

Fig. 11 is a fragmentary sectional view taken on line 11—11 of Fig. 10.

Fig. 12 shows diagrammatically the application of the device to the hands of a person operating the device.

Figs. 13, 16 and 17 show various wiring diagrams for use in connection with the device of Fig. 1 or 5.

Figs. 14 and 15 show two different positions of a polarity switch shown in the wiring diagram of Fig. 13.

Referring now in greater detail to the drawings, there is shown in Fig. 1 an electric treatment appliance 25 made in accordance with this invention. This appliance is adapted for use in the treatment of parts of the human body, such as the eye, or eyes, nose, ears, hands, legs, etc.

The device consists mainly of the housing 26 forming a handle which may be made of electric current conducting metal, rear portion 27 of insulating material containing a rheostat (or potentiometer) of known construction 27a and a polarity changer 28 to which a cable 29a with

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plug 29 is connected. The forward part 33 of handle 26 carries a mill.-ampere meter 30, interrupter switch 31 and an operating wheel 32 for regulating potentiometer 27a contained in rear portion 27 (Fig. 12).

Adjacent the end of forward part 33 made of insulating material there is removably connected, as by means of a setscrew 34, a head piece or applicator 35, hereinafter described in greater detail. From Fig. 13 of the wiring diagram, the device, including potentiometer 27a contained in rear portion 27, polarity switch 28, meter 30, and interrupter switch 31, is well apparent, but will be referred to further below.

Wheel 32 is rotatably positioned in bearing 32a and is operatively connected by means of gearing 32b—32c—32d with a shaft 32e which upon rotation of wheel 32 causes movement of contact arm 27b relative to the winding of potentiometer 27a in rear part 27.

Applicator 35 is cup-shaped and consists of the hollow shield or front portion 40 and the telescopic rear portion 41 about to be described hereafter.

Connected to a pin 42 which passes through opening 43 of rear portion 41 is a disk 44 which abuts against the rear wall of hollow shield 40. Disk 44 may be provided with a plurality of openings or perforations 45 for a purpose later described. Cup-shaped head piece 35 has the tubular extension 46 in which is housed a spring 47 which abuts against a tubular portion 48 telescopically engaging the inner wall of tubular extension 46. Tubular portion 48 is fixed to pin 42 by means of a nut 50. Pin 42 terminates in a pin plug 49 adapted for connection with the appliance 25 at its forward end 33, as is apparent from Figs. 1 and 12.

Spring 47 which is housed in rear portion 41 tends to hold disk 45 in abutting relation with rear wall 40a of hollow housing or shield 40, as can be easily realized from Fig. 2.

Since tubular portion 48 telescopically engages tubular extension 46, a relative movement of disk 44 with respect to the hollow shield 40 may be achieved whereby disk 44 may be pushed into its extended position 44a (indicated in dot-dash line).

It is well understood that pin plug 49, pin 42 and disk 44 are of electric current conducting material, whereas shield or housing 40 and the rear portion 41 consisting of tubular extension 46 and tubular portion 48 are made from electrically insulating material.

As can be easily realized from Figs. 2 and 3, disk 44 forming an electrode within head piece or applicator 35 may be readily moved within the latter by the hand of a person without coming in contact with the electric current conducting parts 49 and 42.

Fig. 4 shows the cup-shaped head piece of Fig. 2 in somewhat modified form. Head piece 35a carries the nut 50a in a manner similar to that described in Fig. 2. The pin 42 (not shown) terminates in a spring plug 49a which fits into an electric current conductive sleeve or socket (not shown), which is provided at the forward end portion 33 of the appliance 25. As shown in Fig. 4, the rear wall 40b of cup-shaped head piece 35a is provided with a plurality of perforations 51 for a purpose later described.

Fig. 5 shows the electric treatment appliance of Fig. 1 in a more simplified form, the same being indicated by numeral 60. The appliance 60 consists of tubular metallic handle portion 61 into

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which project insulated end pieces 62, 63. End piece 63 is secured in place by a metallic rod 64 which threadedly engages at 65 with a metallic sleeve or locking member 66. Member 62 has a shoulder portion 68 against which the tube member 61 rests, thus forming a smooth handle surface at the end of the device.

The end piece 63 is provided with a guarding means in the form of flange member 69. Flange member 69 and shank 72 have separable, inter-fitting formations, such as perforations 70 and a pin 71 connected to said shank or electrical connecting means 72 leading to electrode housing or head piece 35b. Shank 72 terminates at right angles in slotted pin plug 49b which is secured in position by insertion of slotted pin 49b within the hollow of locking piece 66.

The electric current is supplied by means of a cable 75 which carries the electric current to handle 61 by means of a wire connection 76 and contact piece 77, the latter being connected to the inner surface of metallic tube 61.

The other wire 78 of cable 75 connects to metallic rod 64 as at 79. The end piece 62 terminates in a sleeve 80 which will prevent any accidental contact of the wire 78 with the metallic tube 61 if the connection 79 should come loose for some reason.

Surrounding current conducting rod 64 is an insulating tube 81 which engages sleeves 66 and 67, respectively. The purpose of this insulating tube 81 is to prevent any accidental contact between the metallic rod 64 and the handle sleeve 61 which would cause a short circuit and heating of the handle member 61. As can be readily seen from Fig. 5, locking member or sleeve 67 threadedly engages the adjacent end of tube 81, the latter having the bridge member 89 for holding in position conductor rod 64.

In some instances these electro-therapeutic devices may be employed with a plurality of applicators 35. To this end, a clamping member 82 may be suitably clamped to the current conducting sleeve 61 in any conventional manner. It is well understood that head piece or applicator 35 may be removably connected to clamp member 82 by means of a plug and socket arrangement, as indicated at 83.

As illustrated in the head piece 35b of Fig. 5, a pad made from cotton, sponge rubber or other suitable, liquid-absorbing material 85 may be accommodated within the hollow housing 40. Attached to pad 85 is a wire or string 86 the free ends of which pass through the openings 87 of the housing 40.

The loose ends 88 of the wire 86 project beyond said openings 87 and are bent over, thus locking the pad 85 in place. This wire connection ensures pad 85 to be moved together with disk 44 against the action of the spring housed in the rear portion 41. The wire 86 preferably passes through the center portion of the pad 85. Rear wall 40a of rear portion 41 is provided with one or more openings 51 (Fig. 4) for the purpose of ensuring complete soaking and imbuement of pad 85 when the forward part of the pad is dipped into a wetting agent.

Perforations 45 of disk 44 and apertures 51 of head piece 35b permit the air to circulate and to pass through pad 85.

As illustrated in Figs. 10 and 11, the pad 85 may be secured in place within housing 40 of the head piece by means of a spring ring clamp 90 (instead of wire 86 as aforesaid) terminating in handles 91, 92, respectively, and provided in a suitable

groove 93 within the hollow of housing 40 of the applicator. Pressing towards each other of the ends 91, 92 in accordance with the arrows indicated in Fig. 10 will expand the clamp, thus releasing a pad placed in the hollow of the housing 40.

It will be observed that when a pad is placed within the hollow 40 and soaked with liquid and pressed against a portion of a body under treatment, some of the liquid will ooze out under the pressure, thus exerted. To prevent the loss of such liquid a channel 94 may be provided which will act as a storage space for such excess liquid and then, when the pressure against the pad is released, capillary suction within the pad will again cause absorption of the excess liquid stored within the said channel 94.

Figs. 8 and 9 show a holder device 100 terminating in a plug pin 101 which is connected with a bifurcated forward part 102 swingably connected to plug pin 101 as at 103. Bifurcated forward portion 102 is provided with two rods 104 and 105 which carry clamp posts 106 and 107, respectively. These clamp posts are adjustable on connecting rods 104 and 105 as by means of set screws 108. The angular relationship of the rods 104 and 105 is determined and secured by means of a set screw 109 threadedly engaging pin 109a.

Head pieces 35 are connected, one to each of the clamp posts 106 and 107 in a manner as described with respect to the attachment 83 of Fig. 5.

It may be desirable to supply the current to the device shown in Fig. 5 in continuous flow or intermittently. To accomplish this, a switch, illustrated in Figs. 6 and 7, may be incorporated in the device. Such switch has been built in the electric treatment appliance 25 of Fig. 1 and is indicated there by numeral 31.

As illustrated in Figs. 6 and 7 in greater detail, the switch 31a may be connected to a metallic handle 61a of an appliance either by means of a non-metallic sleeve 115 having at its end a closure piece 116 through which passes the cable 117 with two wires 118 and 119, or switch 31 (Fig. 1) may be insulated from and set in handle housing 26, the operating knob of said switch 31 projecting therewithout. According to Fig. 6, the wire 118 passes through the sleeve 115 while the wire 119 is connected to switch contact member 121 as at 120, whereas the other end of the wire 119 is connected to the switch contact member 122 at 123.

Sleeve 115 is provided with a slot 124 through which protrudes the electrically insulated knob 125 having a shoulder 126 bearing against the inside of the slot 124. Secured to the knob 125 is a sliding contact 127 having a contact button 128 for a purpose later described. The free ends 129, 130, respectively, of the contact members 121 and 122 are fixedly held in a bridge portion 131 forming an integral part of insulating tubular member 115. The sliding switch member 127 forms at one of its ends a permanent sliding contact 127a bearing against the contact member 122 while the other end 127b forms a contact portion for contact with the surface 121a of the contact member 121, when a steady current supply is desired, as shown in Fig. 7.

As illustrated in Fig. 6, the contact point 127b is not engaged with the surface 121a. The switch member 127 is held in position disengaged from contact member 121 by means of a flat spring shoe 132 riding on the projection 133 of the bridge member 131. By pushing knob 125 inwardly in

the slot 124 shown in Fig. 6, engagement will be caused between the button 128 and the contact member 121. Releasing the pressure against knob 125 will cause the spring 132 to force the slide member 127 to be forced outwardly to normal position again, thus breaking the contact between 128 and 121. Repeating such pressure and release of knob 125 will cause an intermittent current supply, as can be well understood.

From the foregoing it is well apparent that switch 31 may be similarly operated but must be electrically insulated within the appliance of Fig. 1 or Fig. 5, or switch arrangement 31a may be employed as a supplemental attachment to the appliance of Fig. 5.

It can thus be seen, that according to this invention there has been provided an electro-therapeutic device of the portable type which has a housing including a handle, the latter forming an electrode and which housing may removably carry one or more additional electrodes projecting and insulated from the electrode handle, so that when said additional electrode is to be applied for treatment to a body part, the handle electrode when grasped by the hand of the person under treatment, will complete an electric circuit passing through the person's body. The electric current may be controlled by regulating means operated at will by the person holding the handle to correspond with the physical conditions of the person under treatment.

It will be realized that different polarities are provided at electrode forming handle 26 and additional electrode 44 contained in the applicator (Figs. 5, 12, 13 and 17), the electric circuit from wires A and B of cable 29a being closable by the person manipulating the device 25 and applying the same, for example, to his hands 150 and 151 (Fig. 12).

Operation

The electric device according to this invention may be applied for treatment in various ways.

(a) According to wiring diagram of Fig. 16 the body of a person may be in contact with a suitable electrode E which is connected to power line B. The device according to this invention contains only a single electrode 44 which is housed in an applicator, the latter being attached to a handle housing carrying interrupter switch 31, rheostat 27a and meter 30.

Electrode 44 of the device may be applied by an operator grasping the handle, to a patient's body, to complete the circuit therethrough.

(b) Fig. 12 illustrates diagrammatically how the electric circuit may be completed from one hand 150 to another hand 151 and through the person's body, said circuit including operating device 25, Fig. 13 indicating the wiring diagram therefor.

Electric current is conducted from any suitable current supply source (not shown) by means of wire A through contact shoes II—III of polarity switch 28 (which may be switched, for example, to position 28a of Fig. 14), conductors 152, 153, interrupter switch 31 to handle 26, from which electric current flows through hand 150 and body of a person to hand 151 to complete the circuit through electrode 44, conductor 154, fuse 162, conductor 155, contact shoes IV—I of polarity switch 28, conductors 156, 157, meter 30, conductor 158, contact arm 27b, potentiometer winding 27a, conductors 159, 160 to wire B. When polarity switch 28 is changed to the posi-

tion of 28b of Fig. 15, the direction of electric current flow will be changed to traverse first electrode 44 and hand 151 in contact with the latter and then to handle 26 and hand 150.

While Fig. 13 shows schematically a wiring diagram as disposed with respect to the operative parts of the device of Figs. 1 and 12, Fig. 17 indicates a wiring diagram of similar character, but somewhat changed for the inclusion of an additional applicator electrode in the device illustrated in Fig. 1. According to this wiring diagram, an auxiliary or additional applicator 35 with electrode in a manner (according to Fig. 5) is being applied to the human body, while an applicator with electrode 44 having a polarity different from that of handle electrode 25 and electrode contained in applicator 35 is placed in the circuit to complete the same through the human body at a different location of the latter. In this instance, an operator, other than the person receiving treatment, may manipulate handle electrode 26 without being included in the circuit.

(c) In the event that an operator has to apply a simple device of the type of Fig. 5 to a patient, the operator may grasp the electric current conducting handle 61 thereof without being included in the electric circuit. To this end, an additional applicator 35 may be connected to the electric current conducting handle 61. The electric circuit is then completed between the electrodes of applicators 35b and 35 and through the body to which these applicator electrodes are applied. It is, of course, understood that the patient himself may also operate such device for self-service. The hand of the operator or physician will then not be affected by the electric current and will not be included in said electric circuit.

It is well understood that wires A and B (Figs. 1, 5, 12, 15 to 17) may be connected to a switch-board, such as shown in Fig. 1a of U. S. Letters Patent No. 2,290,688, dated July 21, 1942, in order to operate the electric treatment appliances made in accordance with this invention.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to the above embodiments, it will be understood that various omissions, substitutions or changes in the forms and details of the device illustrated and its operation may be made by those skilled in the art without departing from the spirit of the invention.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. An electric treatment appliance comprising a metallic handle adapted to conduct electric current, an applicator housing of electrically insulating material carried by said handle, an electrode, said applicator housing having a recess, said electrode being normally shielded within said recess of said applicator housing, spring means operatively connected to said electrode within said applicator housing and permitting displacement of said electrode within said recess under action of said spring means, respective means for conducting electric current to said metallic handle and to said electrode, and switch means carried by said handle and connected to said electric current conducting means, said switch means being adapted to cause continuous current flow in one position and intermittent current flow in another position, whereby upon contact of said metallic handle by a person and upon

abutment of said applicator housing against a body part of said person said electric current conducting means may direct through said switch means electric current to flow, respectively, continuously or intermittently between said electrode and said person in contact with said handle.

2. An electric treatment appliance comprising a hollow handle forming one electrode, an applicator supported by said handle and having an electrically insulated cup, another electrode seated in said cup and shielded by the latter, respective means passing through said handle for conducting electric current to both said electrodes, a further applicator including a further electrode, means connecting said further applicator with said handle electrode, and means electrically connecting in series said further electrode with said handle electrode, said further applicator being cup-shaped and shielding within said cup said further electrode.

3. An electro-therapeutic device comprising a housing including a handle, a first electrode forming the surface of said handle to be grasped by the hand of a person, a second electrode arranged for detachable connection with said housing and for application to a body part to be treated, electric current conductor means connected to said electrodes, respectively, switch means associated with and actuable from the surface of said handle, said switch means being adapted to allow continuous current flow in one position and intermittent current flow to said electrodes in another position, and a shield arranged for position on said handle and for removal therefrom, said second electrode being disposed for movement within said shield.

4. An electric treatment appliance comprising an elongated handle forming a first electrode, a socket forming one end of said handle, a cup-shaped housing made of electrically insulating material, a second electrode positioned within and shielded by said cup-shaped housing, respective electric conductor means connected with said handle and with said socket, an electric extension insertable in said socket for connection with one of said electric conductor means, said cup-shaped housing being swingably connected to said extension and being axially movable with respect to said second electrode, whereby said second electrode may be brought in contact with a body part against which said cup-shaped housing is applied.

5. An electric treatment appliance comprising an elongated handle forming a first electrode, a socket forming one end of said handle, a cup-shaped shield, a second electrode positioned within said shield, electrical connecting means insertable in said socket and extending therefrom to said second electrode, guarding means of electrically insulating material positioned between said handle and said electrical connecting means and preventing contact between said first electrode and said electrical connecting means, said shield being spring-supported and relatively movable with respect to said second electrode and said electrical connecting means, an electric circuit including electrical conductors extending through said handle and, respectively, connected to said first electrode and said socket, and switch means connected to one of said conductors and adapted in one position to intermittently break and close and in another position to continuously close said electrical circuit.

6. An electric treatment appliance comprising

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an elongated metallic handle forming an electrode, a socket including electrically insulating guarding means positioned at one end of said handle, respective electrical conductors extending through said handle and connected to said handle electrode and to said socket, and switch means extending from within said handle therewithout and connected to one of said conductors, said switch means being provided with two operative positions, whereby in one of said positions electric current may be supplied from an electric current source to said handle electrode and said socket intermittently and in another position of said switch means continuously.

7. An applicator for an electro-therapeutic device comprising a housing of electrically insulating material having an open end, an electrode accommodated in said housing, a coil spring, pin-shaped means carrying said spring and supporting said electrode, said pin-shaped means having an extension forming a terminal, whereby said housing may be moved lengthwise of said pin-shaped means against the action of said spring with respect to said electrode so that the latter comes to lie for position at said open housing end and for contact with a body part to be treated.

8. An electric treatment appliance comprising an elongated handle forming an electrode, a socket forming one end of said handle, guarding means of electrically insulating material forming part of said socket and positioned at said one end of said handle, electrical conductors extending through said handle and terminating at said first electrode and in said socket, respectively, whereby said guarding means prevents contact between said first electrode and said electrical conductor in said socket, and switch means connected to one of said conductors and provided with two operative positions for respectively supplying electric current intermittently and continuously to said handle electrode and to said socket.

9. An electric treatment appliance comprising an elongated handle forming a first electrode, a socket forming one end of said handle, an open

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ended housing made of electrically insulating material, a second electrode positioned within said housing, respective electric conductor means connected with said handle and with said socket, an electric extension insertable in said socket for connection with one of said electric conductor means, said extension being connected to said second electrode in said housing, and means carried by said extension arranged to permit axial movement of said housing with respect to said second electrode, whereby said second electrode may be brought in contact with a body part against which said open ended housing is applied.

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