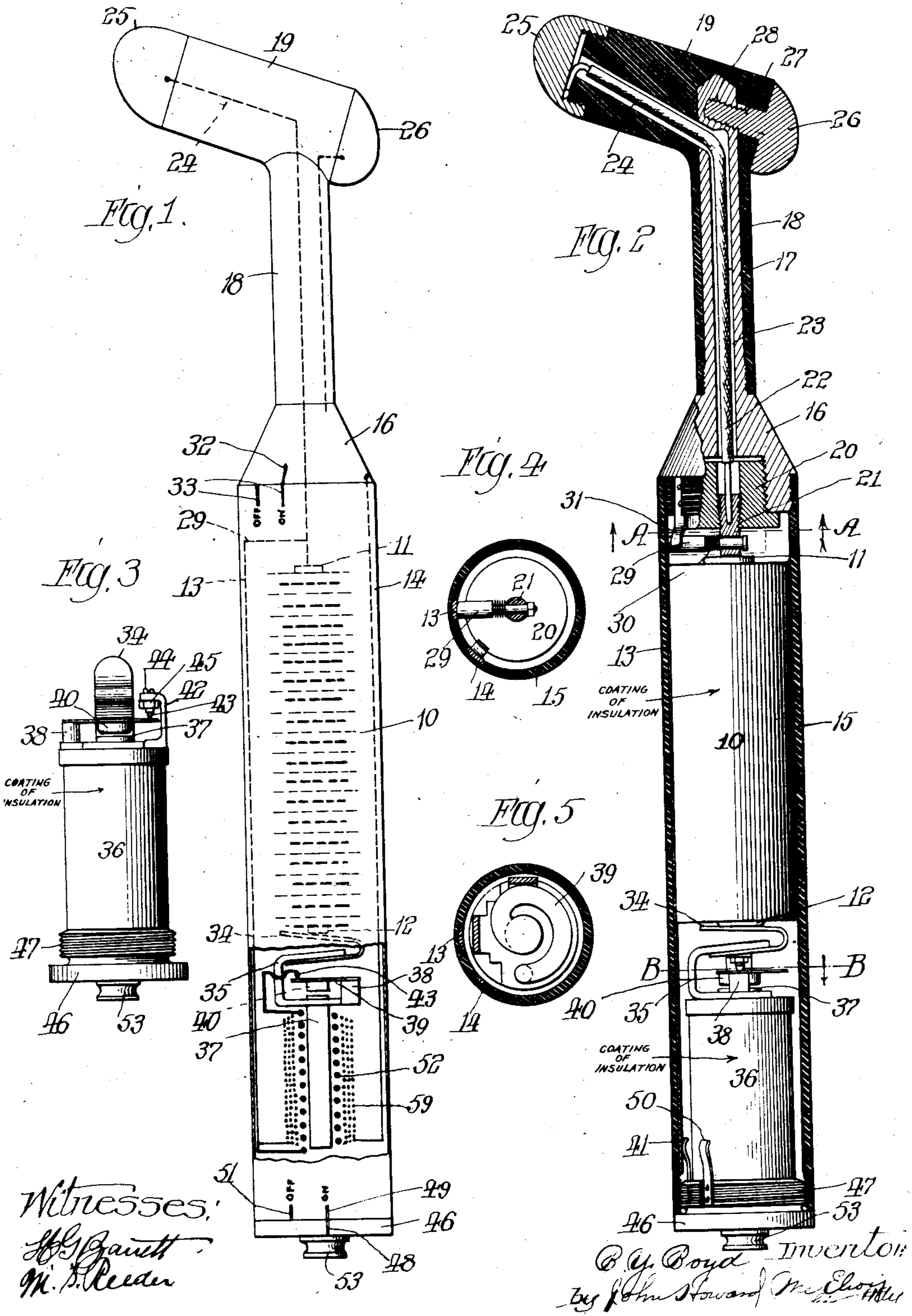


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PATENTED NOV. 12, 1907.

B. Y. BOYD.
ELECTROTHERAPEUTIC INSTRUMENT.

APPLICATION FILED JAN. 18, 1907.



UNITED STATES PATENT OFFICE.

BENJAMIN Y. BOYD, OF CHICAGO, ILLINOIS.

ELECTROTHERAPEUTIC INSTRUMENT.

No. 870,927.

Specification of Letters Patent.

Patented Nov. 12, 1907.

Application filed January 18, 1907. Serial No. 352,849.

To all whom it may concern:

Be it known that I, BENJAMIN Y. BOYD, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrotherapeutic Instruments, of which the following is a full, clear, and exact specification.

My invention relates to instruments for treating the mucous cavities of the body, and, in the form shown, consists of an induction coil and a galvanic battery with suitable electrodes. In some respects my invention is independent of the induction coil, and may be embodied in a structure in which it is omitted and the galvanic current alone is provided for.

To illustrate my invention, I annex hereto a sheet of drawings, in which the same reference characters are used to designate identical parts in all the figures, of which,—

Figure 1 is an elevation of my complete apparatus in its preferred form, with the electrical circuits diagrammatically indicated thereon in dotted lines, and with the shading and insulating omitted so as not to interfere with the showing of the circuits; Fig. 2 is a vertical section through the stem and casing, the battery and induction coil, and their connections, the battery and coil however, being shown in elevation; Fig. 3 is a side elevation of the induction coil, removed from the casing and shown at another angle; Fig. 4 is a sectional view on the line A—A of Fig. 2; and Fig. 5 is a sectional view on the line B—B of Fig. 2.

The battery 10 may be of any desired form, but preferably takes the form of a dry cell having one pole at the contact 11 at one end, and the other pole at the contact 12 at the other end. It is preferably coated with a layer of insulating material so as to prevent the possibility of connecting the two metallic conducting strips 13 and 14 which extend the length of the cylindrical casing, and which are secured to the interior surface thereof at a suitable distance apart in any desired manner, preferably by dovetailing them therein. This cylindrical casing 15 is composed of some insulating material, such as hard rubber, and is used as the handle of the apparatus. At the upper end, this casing 15 is closed by a preferably metallic cap piece 16 screwed therein, the conical exposed surface of which I employ as one pole, where the split electrode construction is employed. This cap piece 16 is provided with a tubular extension 17, which may be integral therewith, and extends through the stem 18 of the instrument, which stem is composed of some insulating material, preferably hard rubber, and which is conveniently formed integral with the cylindrical-shaped body 19 of the electrode or pole-supporting member. The lower end of the metallic cap 16 has secured therein, prefer-

ably by screw threads, the insulating plug 20, in which is secured, preferably by a screw thread, the contact piece 21, the bottom of which engages the pole piece 11 of the cell 10. This piece 21 has connected therewith one end of the insulated wire 22, which extends through the channel 23 in the extension 17, and through the channel 24 in the member 19 until it reaches the threaded end of said member, and is electrically connected with the metallic pole piece or electrode 25 which is screwed onto the member 19, as clearly shown in Fig. 2, in any suitable manner, as by removing the insulation and bending over the end so that it will be caught between the body of the pole cap piece 25 and the end of the member 19. Another electrode 26, of the same polarity as the cap 16, is formed by the substantially semicircular cap having the threaded stem 27 screwed into the interiorly-threaded end 28 of the extension 17. These electrodes 25 and 26 are preferably of the shape and relative location shown, for the purpose of easy insertion and for securing the contact at the desired spots relative to certain nerve centers adapted to be affected by the current.

The contact piece 21 is provided with a plunger contact 29, which, as clearly shown in Fig. 2, is yieldingly mounted transversely in the lower end of the piece 21, the helically-coiled expanding-spring 30 being interposed between the shoulder of the plunger and the piece 21. This serves to hold the plunger yieldingly in contact with the conducting strip 13. The cap piece 16 has projecting downwardly therefrom the spring contact member 31, which is in engagement with the conducting strip 14 when the cap 16 is screwed into the proper position, which is indicated by the line 32 on the cap 16 coming into register with the line marked "on" of the two lines 33 on the exterior of the cylinder 15, the other line 33 being marked "off". The other pole 12 of the battery 10 rests against the U-shaped spring contact piece 34 secured to the rigid U-shaped connection 35 fast on the top of the induction coil 36 and electrically connected with the core 37. The spring contact piece 34 is employed to insure the battery being pressed in engagement with the contact piece 21 at the other end thereof. The induction coil 36 also has secured on the base of the U-shaped connection 35 the post 38, upon which is secured the end of the spiral leaf spring 39, the central free end of which carries the armature 40, which is adapted to be drawn into contact with the end of the pole piece 37 when the circuit is closed in the manner to be hereinafter described. This spiral vibrator constitutes an important part of my invention, as by its use I am enabled to obtain the necessary resilience from the vibrating member carrying the armature without the necessity of using either a long straight spring, such as

would be impracticable in the narrow cross section of the casing, or a coiled contractile spring, which would also be inconvenient.

The contact strip 13 is adapted to engage with the contact spring 41, which is electrically connected through a wire, not shown, except in the diagram, with one end of the primary induction coil 52. A bracket 42, which is insulated from the connections 35, is supported upon the top of the induction coil member 36 and is connected with the other end of the primary coil 52. This bracket carries the contact point 43, which is preferably formed on the end of a screw 44 adjustable in the bracket, and secured in the desired adjustment by the set nut 45. The induction coil is mounted on the cap 46, which is made of insulating material, preferably hard rubber, and which is provided with the threaded portion 47, by which the coil can be screwed and secured in place in the casing 15. The line 48 on the cap is brought into register with the line 49, marked "on" on the casing, when the spring contact 41 is brought into engagement with the conducting strip 13 and when a similar spring contact 50, also secured to the base of the induction coil, is brought in contact with the conducting strip 14. Another line, marked 51, is preferably employed, and the line 48 is brought into register with this when the connections are shifted to break the circuit and stop the operation of the apparatus. The contact 50 is connected with one end of the coil of fine wire 59, which makes up the secondary induction coil, the other end of said wire being connected to the contact 41. A sleeve of brass, surrounding the core 37, is preferably employed, and provided with the handle 53, by which it can be moved in and out to regulate the intensity of the current.

The operation of the apparatus thus described is as follows, reference being had especially to the diagrammatic showing of the wiring seen in Fig. 1: With the connections of the caps 16 and 46 in the "on" position on the casing 15, and with the spring contact 39 engaging the tip 43, the current from the battery passes from the connecting piece 21 through the plunger 29, through the conducting strip 13, through the contact 51, through the primary contact 52, through the contact 43, through the spring 39, through the post 38, through the connection 35, through the spring connection 34 to the terminal 12 of the battery, thereby completing the circuit and energizing the electromagnet formed by the core 37 and the coil 52, so that the armature piece 40 secured on the under side of the spring 39 is attracted, thereby breaking the circuit. The induced current in the coil 59 caused by the breaking of the circuit then passes from the coil 59 through the conducting strip 14 to the pole or electrode 16, which is connected with the companion electrode 26 by the extension 17, and from the electrode 26 and the electrode 16 (if the instrument be inserted far enough), the induced current passes through the tissues being treated to the electrode 25, thence by the wire 22 to the connection 21, and thence through the plunger 29, thence through the conducting strip 13, through the contact spring 41 which is connected to the other end of the coil 59. The breaking of the primary circuit at the contact 43 causes the armature 40 to be speedily released, and the spring 39 touches the contact, again completing the circuit

through the battery, and thus interrupted faradic current is caused to pass through the parts to be treated as long as the apparatus is in place. It will be apparent that when the instrument is not to be used, the cap 46 is rotated to the "off" position, so as to break the circuit, and by bringing the line 48 into register with the line 51, there is no possibility of the battery being left on a short circuit.

The advantages of my instrument will be readily apparent to those skilled in electro-therapy. By it I provide the complete mechanism of a faradic battery in an insulating tube, which protects the elements thereof from injury, and also from getting out of adjustment. If it is desired to reverse the polarity, the stem can be unscrewed, the cell taken out, reversed and replaced, without requiring any special technical skill or manual dexterity. The stem with its separated poles or electrodes is especially adapted to internal treatment of the mucous cavities, and the bi-polar split electrode, where it is employed, gives a wide diffusion or concentration of the current, as may be desired. Where the faradic current is not desired, I preferably omit the induction coil and increase the number of elements in the battery, to thereby strengthen the galvanic current, and provide any desired switching connections for opening and closing the circuit.

While I have shown and described my invention as embodied in the form which I consider best adapted to carry out its purposes, it will be understood that it is capable of modification, and that I do not desire to be limited in the interpretation of the following claims except as may be necessitated by the state of the prior art.

What I claim as new, and desire to secure by Letters Patent of the United States, is:

1. An electro-therapeutic instrument comprising a galvanic battery, an insulating cylinder inclosing said battery and constituting a handle for the instrument by which it may be grasped without bringing the hand into the circuit, a stem adapted for insertion in a mucous cavity of the body projecting from the cylinder having two poles, positive and negative, insulated from each other, whereby the current must pass through an object of treatment to complete the circuit, and suitable connections for transmitting current from the battery to the poles.

2. An electro-therapeutic instrument comprising a galvanic battery, an insulating cylinder inclosing said battery and forming a handle by which the instrument may be grasped without bringing the hand into the circuit, a stem projecting from the cylinder and having three poles, one of different polarity from the other two, each insulated from the others, whereby the current must pass through an object of treatment to complete the circuit, and suitable connections for transmitting current from the battery to the poles.

3. An electro-therapeutic instrument provided with a stem adapted for insertion in a mucous cavity of the body having a transverse member with the poles at either end thereof insulated from each other, whereby the current must pass through an object of treatment to complete the circuit, and with means for supplying current to said poles.

4. An electro-therapeutic instrument provided with a stem having an electrode at the base thereof, and also having a transverse member having the poles at the ends thereof, one pole being connected with the electrode at the base and the other insulated therefrom, whereby the current must pass through an object of treatment to complete the circuit, and with means for supplying current to said poles.

5. In a device of the class described, the combination with the stem provided with the plurality of poles, of the insulating casing to which it is attached forming a handle by which the instrument may be grasped without bringing the hand into the circuit, the cell in the casing having one terminal adjacent the stem, the induction coil adjacent the other terminal, an interrupter, and suitable connections between said elements whereby a faradic current may be induced to pass between the poles and through the portion of the body being treated.

6. In a device of the class described, the combination with the cylindrical insulating casing constituting a handle by which the instrument may be grasped without bringing the hand into the circuit and provided with the stem at one end having the plurality of poles, of the cell in said casing, the induction coil also inclosed therein, the spiral spring interrupter interposed between the cell and the induction coil, and suitable connections between said elements whereby a faradic current may be induced to pass between the poles and through the portion of the body being treated.

7. An electro-therapeutic instrument comprising a galvanic battery, an insulating cylinder inclosing said battery, an insulating stem projecting from the cylinder and having an insulating portion at its end extending substantially transversely thereto, two poles, positive and negative, located at the ends of said transverse portion and insulated from each other, whereby the current must pass through an object of treatment to complete the circuit, and suitable connections for transmitting current from the battery to the poles.

8. In a device of the class described, the combination with the cylindrical insulating casing forming a handle by which the instrument may be grasped without bringing the hand into the circuit of the stem carrying the plurality of electrodes at one end, the induction coil at the other end, the battery interposed between said stem and coil, suitable connections between said elements whereby a faradic current may be induced to pass between the poles and through the portion of the body being treated, said connections including the strips 13 and 14 extending the

length of the tube, and adapted when the stem and induction coil are in the proper position to connect the electrodes with the induction coil terminals.

9. In a device of the class described, the combination with the cylindrical insulating casing forming a handle by which the instrument may be grasped without bringing the hand into the circuit of the cap carrying the stem with the plurality of electrodes closing one end, the cap carrying the induction coil closing the other end, the cell interposed between the stem and the induction coil, and suitable connections between said elements whereby a faradic current may be induced to pass between the poles and through the portion of the body being treated, said connections including a yielding spring contact between the ends of the cell and an adjacent terminal of the induction coil apparatus.

10. In a device of the class described, the combination with the cylindrical insulating casing forming a handle by which the instrument may be grasped without bringing the hand into the circuit having one end closed by the cap carrying the stem provided with the plurality of poles, of the cap carrying the induction coil closing the other end, the cell in the casing having one terminal adjacent the stem and the other adjacent the induction coil, an interrupter, and suitable connections between said elements whereby a faradic current may be induced to pass through the poles and through the portion of the body being treated, said connections being adapted to be completed only when the cap carrying the induction coil is in a certain angular position.

11. As a new and useful article of manufacture, an electrode for rectal insertion, consisting of the insulating stem and transverse portion, with the poles at the ends of said transverse portion, and suitable insulated connections to said poles.

In witness whereof, I have hereunto set my hand and affixed my seal, this 5th day of January, A. D. 1907.

BENJAMIN Y. BOYD. [L. S.]

Witnesses:

JOHN HOWARD MCELROY,
M. S. REEDER.