

## **Improvements relating to electro-therapeutic apparatus / [Albert Williamson Courtney].**

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### **Publication/Creation**

Redhill : Printed for His Majesty's Stationery Office by Malcomson & Co., Ltd, 1901.

### **Persistent URL**

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Date of Application, 13th Mar., 1901—Accepted, 11th May, 1901

COMPLETE SPECIFICATION.

“Improvements relating to Electro-therapeutic Apparatus.”

I, ALBERT WILLIAMSON COURTNEY, of 147 Niagara Street, Buffalo, New York, Manufacturer of Medical and Electrical Specialities, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

5 This invention relates to the class of electric apparatus employed principally in the treatment of nervous diseases, and more especially to apparatus of this kind comprising a pair of hollow handles, one of which contains a small battery and the other an induction coil, flexible conductors connecting the primary coil with the battery, and a pair of body contacts or electrodes carried by the respec-  
10 tive handles and forming the terminals of the secondary coil.

Heretofore, the vibrator or circuit interrupter of the apparatus has been operated directly by the induction coil, but this construction is unsatisfactory because the action of the vibrator is comparatively weak and unreliable.

The object of my invention is to provide the apparatus with simple means for  
15 ensuring a powerful and reliable action of the vibrator at all times.

Referring to the accompanying drawings:—

Figure 1 is a sectional elevation of my improved apparatus.

Figure 2 is a diagram of the same showing a different position of the auto-  
matic switch or vibrator.

20 Figure 3 is a cross section on line 3—3, Figure 1.

Like letters of reference refer to like parts in the several figures.

A is an electric generator consisting preferably of a small battery of any  
suitable construction which is arranged in one of the hollow handles or shells B B<sup>1</sup>  
25 of the apparatus. These handles may be constructed of any suitable non-con-  
ducting material, such as hard rubber, or of metal covered with insulating  
material, and each of the same is provided on one side with a removable lid *b*.

*c c<sup>1</sup>* are the poles of the battery which bear respectively against a contact  
spring *c<sup>2</sup>* and a contact plate *c<sup>3</sup>* arranged in the front and rear portions of the  
handle B. The contact plate *c<sup>3</sup>* bears against a binding post *c<sup>4</sup>*, while the spring *c<sup>2</sup>*  
30 is connected by a wire *c<sup>5</sup>* with a binding post *c<sup>6</sup>*, these posts being both arranged  
at the inner end of said handle.

D is the induction coil which is arranged in the rear portion of the other  
handle B<sup>1</sup> of the apparatus. One end of the primary coil is connected with a  
binding post *d* arranged at the inner end of said handle and connected with the  
35 binding post *c<sup>4</sup>* by a flexible conductor *d<sup>1</sup>*. The other end of the primary coil is  
connected with a contact screw *d<sup>2</sup>* which passes through the side of the handle  
on the front side of the induction coil. One end of the secondary coil is con-  
nected with a binding post *e*, while its other end is connected by a wire *e<sup>1</sup>*, with  
a metallic plate or body contact *e<sup>2</sup>* arranged at the front end of the handle B<sup>1</sup>  
40 and having a facing *e<sup>3</sup>* of sponge or other absorbent material adapted to be mois-  
tened before using the apparatus. The binding post *e* is connected by a flexible  
wire or conductor *f* with a binding post *f<sup>1</sup>* arranged on the other handle B, and  
this binding post is in turn connected by a wire *f<sup>2</sup>* with a body contact *f<sup>3</sup>* arranged  
45 at the front end of the handle B. These body contacts form the terminals of the  
secondary coil and are adapted to be placed against the parts of the body through  
which the electric current is to be passed.

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G is an electro-magnet arranged in the same handle as the induction coil and comprising preferably two connected coils, as shown in Figure 3. One end of the magnet coil is connected by a wire *g* with a contact screw *h* passing through the side of the adjacent handle and arranged opposite the electro-magnet. The other end of the magnet coil is connected with the binding post *d* by a wire *i*. 5

*j* is an armature or vibrator arranged between the free end of the electro-magnet and the opposing end of the contact screw *h* and carried by a lever *j*<sup>1</sup> which is pivoted between its ends to a standard *j*<sup>2</sup>, as shown. This lever is preferably constructed of spring steel, so that its front arm, which carries the armature, acts as a spring which draws the armature away from the magnet when the latter is demagnetized. The rear arm of the armature lever *j*<sup>1</sup> bears at all times against the inner end of a contact screw *k* which extends through the wall of the hollow handle B<sup>1</sup>. This contact screw is connected by a wire *k*<sup>1</sup> with a binding post *k*<sup>2</sup> on the handle B<sup>1</sup>, and this post is in turn connected with the binding post *e*<sup>6</sup> by a flexible conductor *k*<sup>3</sup>. The armature carries elastic switch members or contacts *l*<sup>1</sup> adapted to bear against the contact screws *h* and *d*<sup>2</sup> respectively. These switch members are so arranged that when the member *l* bears against its companion contact-screw *h*, the other switch member *l*<sup>1</sup> is out of contact with its companion contact-screw *d*<sup>2</sup>, as shown in Figure 2, and so that when the switch member *l* is out of contact with the screw *h*, the switch member *l*<sup>1</sup> bears against the screw *d*<sup>2</sup>, as shown in Figure 1. The armature might be arranged to bear directly against the contact screw *h*, but it would have a tendency to rebound and make an imperfect contact. To insure a perfect contact, the armature is provided with the elastic switch member *l*. 10 15 20

It will now be understood that the induction coil D and the electro-magnet G are arranged in separate branches of the battery or generator-circuit and that the contact screws *d*<sup>2</sup> and *h* form the terminals of said branch circuits. The members *l*<sup>1</sup> of the armature form an automatic switch or make-and-break device which is actuated by the armature and which directs the battery-current alternately through the induction coil and the electro-magnet by contact with said branch terminals. 25 30

The contact-screw *k* is adjustable in the handle B<sup>1</sup>, so that the position of the spring arm which carries the armature can be properly adjusted. The contact-screws *d*<sup>2</sup> and *h* are likewise adjustable, so that the distance between their inner ends and the switch members *l*<sup>1</sup> can be properly regulated. 35

The three flexible conducting cords *d*<sup>1</sup>, *f* and *k*<sup>3</sup> are provided at their ends with the usual pins or plugs which are removably clamped in the binding posts of the two handles B B<sup>1</sup>. 40

The operation of the apparatus is as follows:

The upper switch member *l* of the armature *j* is normally caused to bear against the magnet-contact or terminal *h* by the elastic arm of the armature, while the connection between the switch member *l*<sup>1</sup> and the induction coil terminal *d*<sup>2</sup> is broken. Upon connecting the flexible conductors *d*<sup>1</sup>, *f* and *k*<sup>3</sup> with the proper binding posts, the electro-magnet *j* is energized by the current which latter passes from one pole of the battery through the contact spring *e*<sup>2</sup>, wire *e*<sup>5</sup>, binding post *e*<sup>6</sup>, conductor *k*<sup>3</sup>, binding post *k*<sup>2</sup>, wire *k*<sup>1</sup>, contact screw *k*, lever *j*<sup>1</sup>, switch member *l*, contact screw *h*, wire *g*, the electro-magnet G, wire *i*, binding post *d*, conductor *d*<sup>1</sup>, binding post *e*<sup>4</sup> and the contact plate *e*<sup>3</sup> to the other pole of the battery. At the instant that the armature is attracted, the switch member *l* leaves the contact screw *h* and the switch member *l*<sup>1</sup> is brought in contact with the terminal screw *d*<sup>2</sup>, thereby interrupting the magnet-circuit and switching the induction coil into the battery-circuit, the current now passing from one pole of the battery through the contact spring *e*<sup>2</sup>, wire *e*<sup>5</sup>, binding post *e*<sup>6</sup>, conductor *k*<sup>3</sup>, binding post *k*<sup>2</sup>, wire *k*<sup>1</sup>, contact-screw *k*, lever *j*<sup>1</sup>, switch member *l*<sup>1</sup>, contact-screw *d*<sup>2</sup>, the primary coil of the induction coil, binding post *d*, conductor *d*<sup>1</sup>, binding post *e*<sup>4</sup>, and contact plate *e*<sup>3</sup> to the other pole of the battery. Immediately after this circuit is established, the armature is retracted by its spring 45 50 55

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arm and the position of the switch members  $ll^1$  is reversed, again establishing the magnet-circuit, and so on as long as the coils remain connected with the battery.

5 By thus actuating the vibrator or circuit interrupter by a separate electro-magnet instead of directly from one end of the induction coil, the power of the battery is utilized to better advantage in operating the vibrator, rendering the latter reliable in action.

10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The combination of an electric generator, an induction coil and an electro-magnet, both included in the generator-circuit, and an automatic switch actuated by said electro-magnet and operating to direct the current alternately through said induction coil and said electro-magnet.

15 2. The combination of an electric generator, two branch circuits connected therewith and each provided with a terminal contact, an induction coil and an electro-magnet arranged in said branch circuits, respectively, an armature operated by said electro-magnet, an automatic switch vibrated by said electro-magnet and arranged to bear alternately against the terminal contacts of said branch circuits,  
20 and body contacts forming the terminals of the secondary coil of the induction coil.

3. The combination of an electric generator, an induction coil having one of the terminals of its primary coil connected with one pole of the generator, an electro-magnet having one of its terminals connected with the same pole of the  
25 generator, two contacts forming the other terminals of said electro-magnet and said primary coil, a vibrator comprising an armature moved in one direction by said magnet and in the opposite direction by a spring, and switch members carried by said armature and arranged to bear alternately against said terminal contacts, and body-contacts forming the terminals of the secondary coil of the  
30 induction coil.

4. The combination of an electric generator, an induction coil having one of the terminals of its primary coil connected with one pole of the generator, an electro-magnet having one of its terminals connected with the same pole of the  
35 generator, two contacts forming the other terminals of said electro-magnet and said primary coil, a vibrator comprising an armature moved in one direction by said magnet and switch members carried by said armature and arranged to bear alternately against said terminal contacts, an elastic lever carrying said armature and included in the generator circuit, and an adjustable contact also included in said circuit and bearing against said elastic lever.

40 Dated this 13th day of March 1901.

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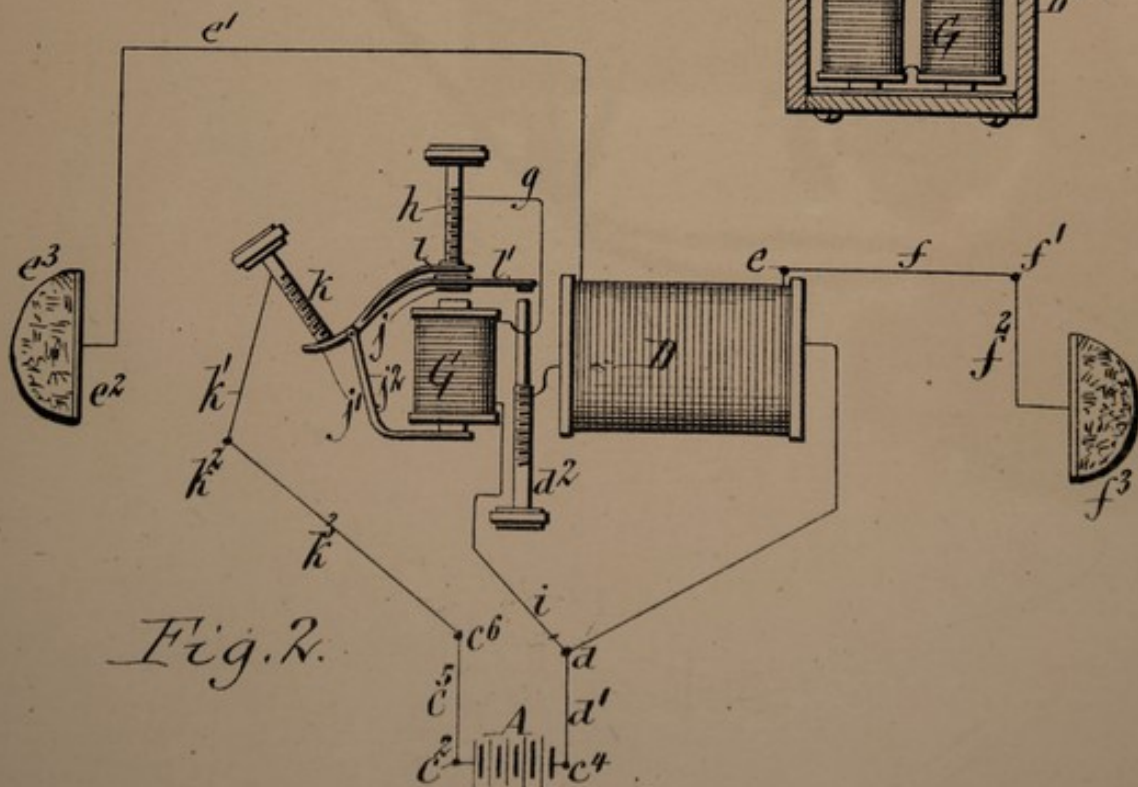
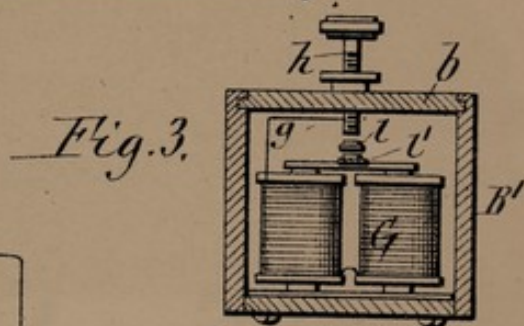
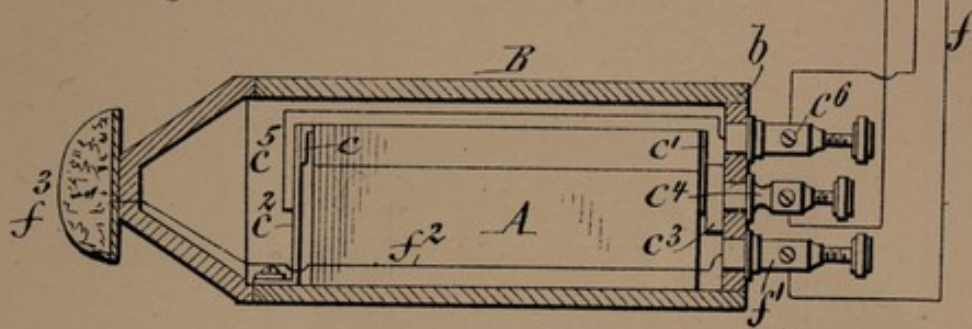
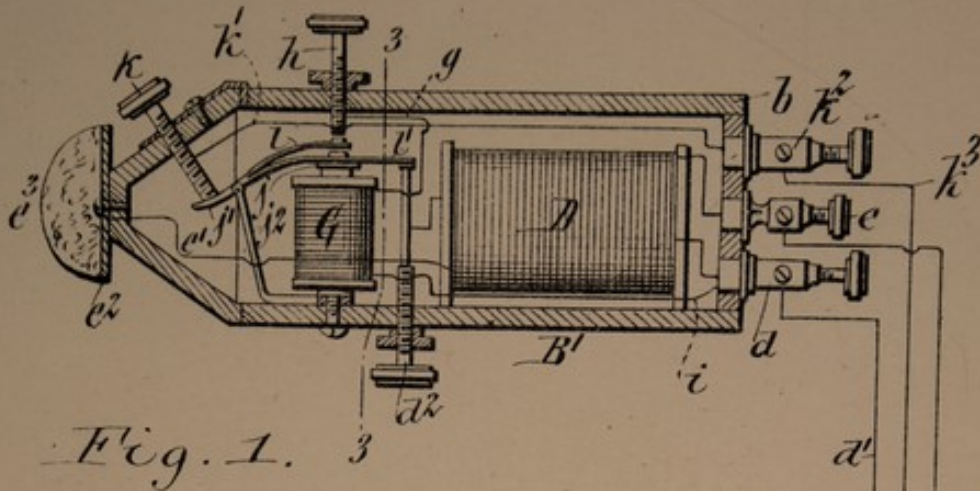
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