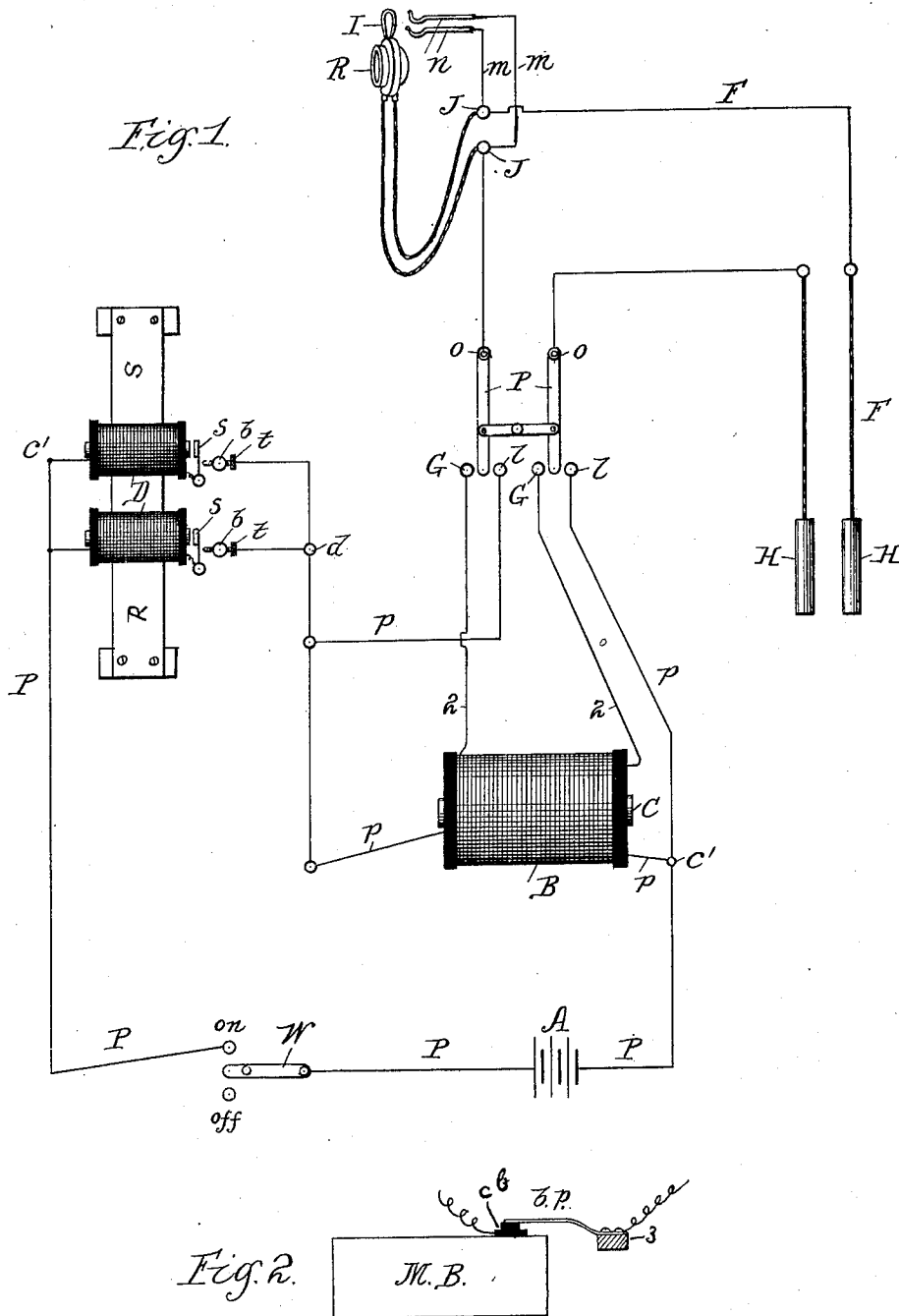


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## ELECTROTHERAPEUTIC APPARATUS.

(Application filed Nov. 19, 1899. Renewed May 14, 1900.)

(No Model.)



Witnesses.

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# UNITED STATES PATENT OFFICE.

FRED HARVEY BROWN, OF CHICAGO, ILLINOIS.

## ELECTROTHERAPEUTIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 651,777, dated June 12, 1900.

Application filed November 19, 1898. Renewed May 14, 1900. Serial No. 16,692. (No model.)

*To all whom it may concern:*

Be it known that I, FRED HARVEY BROWN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Electrotherapeutical Apparatus; and I do declare that the following is a full and clear description of the invention, which will enable others skilled in the art to which it appertains to use the same.

The object of the invention is to administer alternating electrical impulses and also interrupted impulses which are continuous in direction, at the same time interrupting the primary or inducing current with two or more vibrating springs or rheotomes, the said rheotomes or springs being so arranged that they are adapted to vibrate at different velocities or pitches, so that when the divided primary currents traverse through two or more of them simultaneously each spring will interrupt the current according to the pitch or degree of vibration to which each is attuned. By tuning these different springs higher or lower a musical chord will be given off. The electrical interruptions caused by these two or more differently-pitched springs will partake of the same different degrees of vibration as the several vibrating rheotomes and will pass through the patient in musical rhythm or, if desired, microphonic contact-pieces, as shown at *c P*, Fig. 2, can be used where it is desired to send the electrical impulses through a person in harmony with the vibrations of a music-box, as shown at *M B* in Fig. 2. The same arrangement can be used with the piano or other musical instrument by attaching the spring *c P*, by means of the block 3, Fig. 2, and the carbon block *c b*, to the vibrating instrument, the spring *c P*, with the carbons, being interposed in the latter circuit instead of the electromagnets or rheotomes, as shown in Fig. 1, and to make these musical electrical vibrations apparent and audible a small watchcase or other telephone-receiver is placed in the circuit which passes through the person. I attain these objects by the apparatus illustrated in the accompanying drawings, but do not wish to confine myself to this design alone, as it is evident that many modifications of the ap-

paratus can readily be made without departing from the spirit of my invention.

In the drawings similar letters and figures refer to similar parts throughout.

Figure 1 represents an outline or plan of the different parts and their connections. Fig. 2 represents a plan of a break-piece or variable contact of a form which is designed to be used when a musical instrument is used to vary the potential of the battery-circuit.

A is a battery, the current of which flows through the battery-wires P P P P.

B is an induction-coil, with a soft-iron core C, which is rendered magnetic by the current passing through the primary wire around the core. In making this coil I find that five layers of No. 22 insulated wire gives the best result. For practical purposes I find that a coil two inches long gives the best results, as a longer coil gives off too strong a current to be borne easily. About one hundred ohms of No. 36 silk-covered wire gives a sufficiently-strong current when wound on this coil as a secondary. This wire is shown as coming out of the coil B at 2 2. The primary wire P passes out of the primary of the induction-coil and divides at *d*. The current then goes in multiple through the two contact-screws carried by the standards *d d* and passes through these contact-screws and springs S S and through the coils of the two small electromagnets D. In the drawings I show but two of these electromagnets; but many more can be used, if so desired. In every case, however, they should be connected up in multiple and not in series. By adjusting the pressure of the two contact-screws *t t* so that they will press more or less hard against the vibrating springs S S they can be so tuned to one another that they will vibrate in harmony. These coils act as a harmonic interrupter of the magnetic moment of the core of the induction-coil D. The rhythmic variations of the magnetic potential of the core C are transformed into rhythmic electrical impulses synchronous in pitch with the vibrations of each and all the springs S S, be there two or more of them. When but one interrupter is used, as is generally the custom in most of the medical batteries now made, the shock is severe and hard to endure; but where two or more interrupters are

used the current is broken with a much higher degree of rapidity, and the shock of the current is correspondingly less severe. In fact, a current of a much higher potential can be received by a person with much less unpleasant sensation from the shock than with other instruments using but a single rheotome or interrupter.

R is a telephone-receiver interposed in the circuit, containing the two metallic handles H H, which are the two electrodes adapted to be held in the hands of the person receiving the current. The receiver R is interposed in the circuit F F. At the binding-post J J two other wires M M are also connected with these posts and to the rods *n n*. These two rods or wires are attached to the retaining box or case and are placed close together in parallel, though not touching each other. They form a hook upon which when desired the receiver R, by means of a ring I, may be hung upon a wire *n n*. When so hung up, the coil on the core of the receiver R, which consists of about eighty ohms of No. 36 silk-covered wire, is shunted out of the shocking-circuit, in which case a current of higher potential is received by the person holding the handles H H. At other times the receiver R is taken off from the wire *n n* and hung on a single dead-hook. This hook is not connected with any circuit and can be put in any suitable place on the outside of the inclosing case. The receiver when hung on a dead-hook has its coil then in circuit, and its diaphragm emits all the musical pitches given off by the vibrating springs S S, attached to the electromagnets D; also, a great many of the harmonics incident to the fundamental pitches of the springs S S will be heard in the receiver. These harmonious sounds, being continuous and quite loud, have a soothing and soporific effect on a person being treated, conducing very much to somnolence.

One peculiar and almost unaccountable effect produced with one instrument is as follows: With two vibrating rheotomes, as shown in Fig. 1, entirely out of tune with each other, when heard through the receiver fine harmony is produced, with no discord whatsoever.

P is a double-pointed switch connected at *o o* with the shocking and receiving circuit. This switch is adapted to be moved in contact with the two points G G, in which case an alternating current from the secondary of the induction-coil passes through the shocking and receiver circuit. By moving the points of the switch to *l l* impulses continuous in direction will be sent over the circuit F F. When the switch is in contact with *l l*, the secondary circuit of the coil is open at G G, and in this condition the two points *l l* are connected by wires *p p*, the other ends of which are bridged on the primary circuit *c c*.

When it is desired to use the instrument, the switch W is moved to the contact-point "on," when the currents will traverse the primary circuit and cause the springs to vi-

brate. By moving the spring W to the contact "off" the contact is shut off.

In practice I find the vibrating rheotomes or interrupters when rigidly attached to an inclosing case make so much mechanical music and of such volume as to smother the softer and sweeter music emitted by the receiver consequent upon the varying potentials of their magnetic cores. To obviate this in practice, I attach two or more small buzzers to a strip of soft elastic rubber R S, Fig. 1. Ends of this rubber strip are attached to two small wooden blocks. These blocks are then separated and attached to the inclosing case in such manner as to slightly stretch the strip of rubber. The vibrations of the buzzer are in this manner almost wholly taken up and deadened by the elastic rubber strip.

Fig. 2 shows another modification of my apparatus by means of which the interruptions or variations of potential of the battery-current are caused by the vibrations of a sounding-board of a music-box or other vibrating musical instrument. The brake-piece or variable contacts are shown at *c b*. One of these variable-contact pieces is rigidly attached to the inclosing case of the musical instrument, and the other variable-contact piece is attached to the end of the spring, as shown. This spring is also attached to the frame of the instrument. The vibrations of the inclosing case vary the pressure of the contact-pieces. These variations are in harmony with the variations of the music, and the electric impulses are synchronous therewith.

Having thus described my invention, what I desire to claim as my own is as follows:

1. In an electrotherapeutical apparatus the combination of an induction-coil, having primary and secondary circuits, a series of rheotomes or variable-contact pieces, tuned or adapted to vibrate in harmony with each other, switches for shunting the primary or secondary current at will into the circuit having the electrodes connected therewith substantially as described.

2. In an electrotherapeutical apparatus the combination of an induction-coil having primary and secondary circuits, a series of rheotomes or break-pieces, adapted to vibrate in harmony with each other, switches for shunting the primary or secondary current at will into a circuit having electrodes connected therewith, said rheotomes, or break-pieces, being attached to an elastic body adapted to absorb vibration.

3. In an electrotherapeutical apparatus, the combination of an induction-coil, having primary and secondary circuits, a battery to actuate the same, a series of current-interrupters, a telephone-receiver in the secondary or shocking circuit, substantially as described.

4. In an electrotherapeutical apparatus, an induction-coil having primary and secondary circuits, a battery to actuate the same, a bipolar switch adapted to engage the primary or secondary circuits, a telephone-receiver in

the shocking-circuit with suitable means for interrupting or varying the potential of the battery-circuit, rhythmically.

5 In an electrotherapeutical apparatus, an induction-coil having primary and secondary circuits, with battery to actuate the same, two electrodes forming terminals of a shocking-circuit, a switch adapted to connect the shocking-circuit to either the primary or secondary  
10 of said induction-coil, with suitable means for varying the potential or interrupting in multiple, the battery-circuit rhythmically.

6. In an electrotherapeutical apparatus an induction-coil, having primary and secondary  
15 circuits, with battery to actuate the same,

two electrodes forming terminals of a shocking-circuit, a switch adapted to connect the shocking-circuit to either the primary or secondary of said induction-coil with suitable means for varying the potential or interrupt- 20 ing in multiple the battery-circuit rhythmically, the said interrupters being attached to an elastic body adapted to absorb and deaden the vibrations caused by the vibrations of the interruption.

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Witnesses:

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