C. L. IRELAND.

ELECTROTHERAPEUTIC APPARATUS.

APPLICATION FILED MAY 24, 1920.

1,373,818.

Patented Apr. 5, 1921

2 SHEETS—SHEET 1.

Fig. 2.

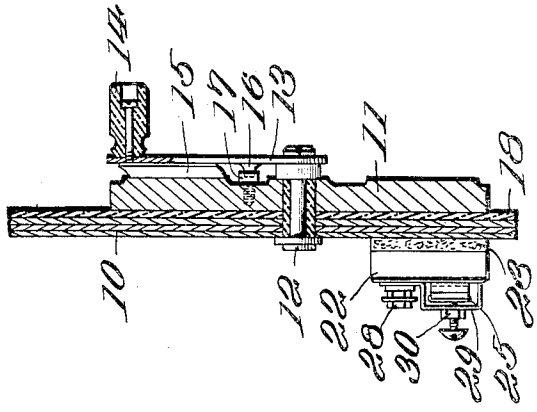
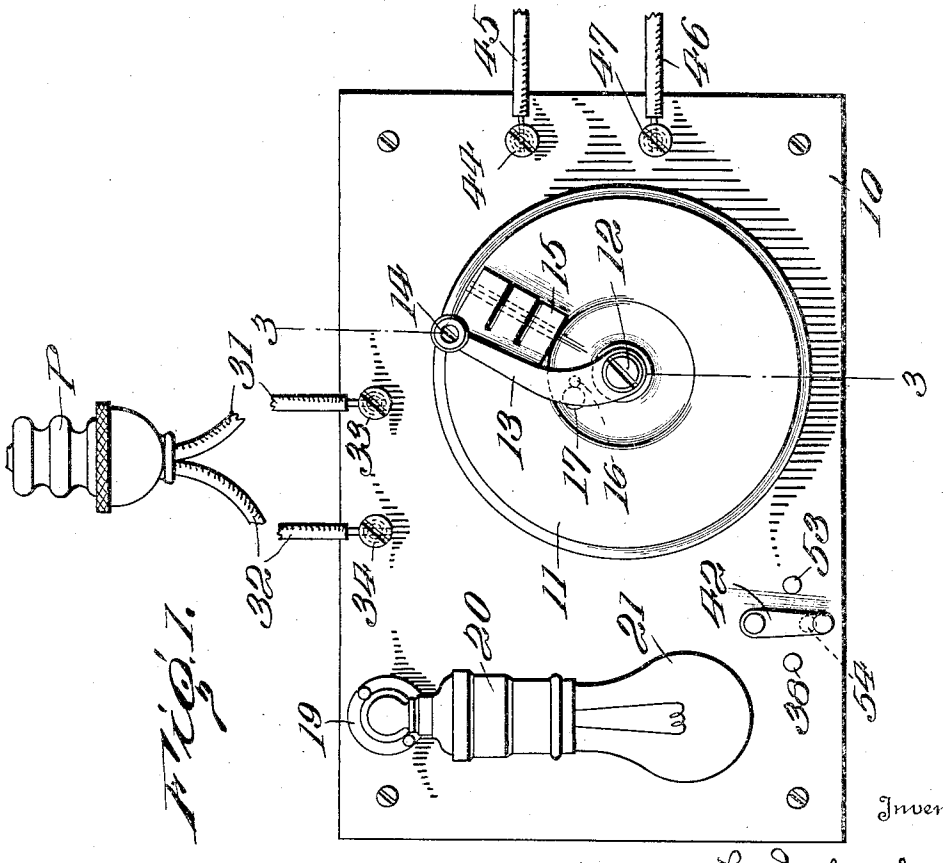


Fig. 1.



Inventor

Charles L. Ireland

By

Attorney

C. L. IRELAND.

ELECTROTHERAPEUTIC APPARATUS.

APPLICATION FILED MAY 24, 1920.

1,373,818.

Patented Apr. 5, 1921.

2 SHEETS—SHEET 2.

Fig. 4.

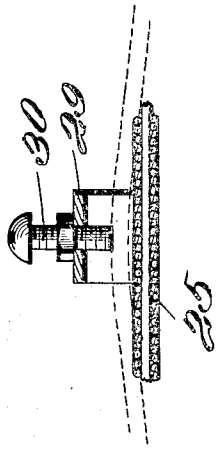
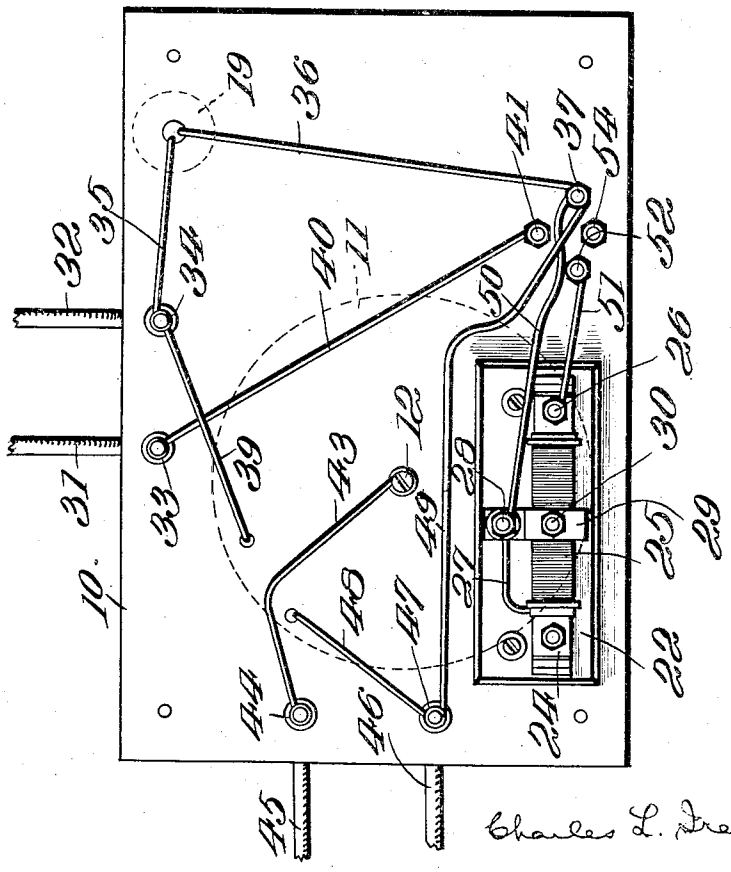


Fig. 2.



Inventor

Charles L. Ireland

By

Attorney

UNITED STATES PATENT OFFICE.

CHARLES L. IRELAND, OF FORT McPHERSON, GEORGIA.

ELECTROTHERAPEUTIC APPARATUS.

1,373,818. Specification of Letters Patent. Patented Apr. 5, 1921.

Application filed May 24, 1920. Serial No. 383,729.

To all whom it may concern:

Be it known that I, CHARLES L. IRELAND, a citizen of the United States, residing at Fort McPherson, in the county of Fulton and State of Georgia, have invented a new and useful Electrotherapeutic Apparatus, of which the following is a specification.

This invention is an apparatus for producing sinusoidal currents for electro-therapeutic purposes.

One of the objects of the invention is to provide an apparatus of the character mentioned, having means whereby rapidly interrupted sinusoidal, or continuous smooth sinusoidal currents may be selectively produced at the will of the operator. A further object is to provide an electro-therapeutic apparatus which may be operated from any standard type A. C. socket, from a D. C. current motor, from generators or batteries, or from an automobile magneto, and the like. A further object is to provide an apparatus which may be used with equal facility for electro-therapeutic and for photo-therapeutic purposes.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a top plan view illustrating an apparatus constructed in accordance with the invention. Fig. 2 is a bottom plan view thereof. Fig. 3 is a transverse sectional view on the line 3—3, Fig. 1. Fig. 4 is a detail view illustrating the operation of the thermostatic control device.

Referring to the drawing, 10 designates a base which may be of any desired material. In the drawing the same is illustrated as constructed of a plurality of laminæ of thin veneer. Secured in suitable manner to the base 10 is the base 11 of a rheostat, which may be of any standard make, provided with a central stud 12, on which is mounted a blade 13, provided with a handle 14, and a contact member 15. The blade 13 is provided with an abutment 16 positioned to engage a stop 17, whereby its travel may be limited. The stud 12 is insulated from the bases 10 and 11, and the handle 14 is covered with insulating material to protect the operator from shocks. A sheet 18 of fiber or similar material, is interposed between the base 10 and the base 11 of the rheostat.

Secured to the base 10 is a hollow support 19, the outer end of which is provided with means for sustaining a standard lamp socket 20, in a position extending parallel with the surface of said base. A standard lamp 21 is mounted in said socket. The lamp is not essential to the operation of the apparatus but is an aid in detecting the accuracy of operation.

On the underside of the base 10 is secured a thermostatic device for interrupting the flow of current through the apparatus. Said thermostatic device may be of any preferred construction, but as shown, the same comprises a base 22 of insulating material, secured to the base 10, with a sheet 23 of asbestos or similar material interposed between them. Secured at its ends to the base 22 is a thin metal bar 24, which is encircled by a coil 25 of very fine wire, one end of which is connected with a binding post 26 on the bar 24, the other end being connected with a terminal wire 27, leading to a binding post 28, carried by an overhanging bracket 29, which is secured to the base 22. Adjustably mounted in the bracket 29, is a contact screw 30, positioned to engage the coil 25, said bracket being located at a point between the ends of the coil. It is preferred, though not essential, to locate the bracket 29 approximately at the middle of the bar 24.

The circuit wires 31 and 32, are connected to binding screws 33 and 34, respectively, said wires being connected to the source of current in any desired manner, preferably by means of a standard plug P. From the binding post 34, a wire 35 leads to the lamp 21, the return wire 36 from said lamp leading to a binding post 37, attached to a contact 38. A second wire 39 leads from the binding post 34 to the rheostat contacts. A wire 40 leads from the binding screw 33 to a binding post 41, which serves as a pivot for a switch blade 42. Leading from the pivot stud 12 is a conductor wire 43, which is connected through the medium of a binding post 44, with one of the conductors 45, leading to the electrodes (not shown). The other electrode conductor 46 is connected with a binding post 47 in the base 10, and from said binding post a wire 48 leads to the rheostat contacts. A second wire 49 leads from the binding post 47 to the binding post 37. Said binding post 37 is also connected with the binding post 28, of the bracket 29, by a wire 50. The binding post

26 is connected by a wire 51, with a binding post 52, attached to a contact 53, the latter being in a position to be engaged by the switch blade 42. A neutral contact 54 for said switch blade is also provided.

In practice, the plug P is connected with any desired source of current, the circuit through the apparatus being controlled by the position of the switch blade 42. If an interrupted sinusoidal current is desired, the switch blade is moved into engagement with the contact 53. The current entering along the wire 32 divides at the binding post 34, a portion passing to the lamp 21 along wire 35, and thence to the binding post 37, through wire 36. The other portion of the current passes through wire 39 to the rheostat contacts, and thence through the blade 13, binding post 12, wire 43, binding post 44 and out through electrode conductor 45, returning through electrode conductor 46, binding post 47, wire 49, binding post 37. From the binding post 37 it normally follows wire 50, binding post 28, wire 27, coil 25, binding post 26, wire 51, binding post 52, switch blade 42, binding post 41, wire 40, binding post 33 and out along wire 31. As the current passes through the coil 25 the latter becomes incandescent, and the heat thereof causes the bar 24 to buckle until its middle portion is elevated sufficiently to bring the coil 25 into engagement with the contact screw 30. The instant that this engagement takes place, a large portion of the coil is short circuited by reason of the fact that the current then passes from the wire 50 and the binding post 28 through the bracket 29, contact screw 30, and that portion of the coil 25 between screw 30 and binding post 26, from whence it passes to wire 31 in the manner already described. Thus a large portion of the coil 25 is short circuited, resulting in a substantial cooling of the bar 24 and a consequent straightening thereof as the heat is dissipated. Just as soon as the bar cools sufficiently to move out of contact with the screw 30 the coil is no longer short circuited and the current will again travel the normal path, causing the coil to heat until it is once brought into contact with the screw 30, by the buckling of bar 24. This operation automatically continues as long as the switch blade 42 is on contact 53, the interruptions occurring at perfectly regular periods and being of uniform duration. If it is desired to change the period of duration of the interruptions, the same may be effected by adjusting the contact screw toward or away from the coil 25, according to whether the period is to be diminished or increased. The period of the interruption varies with the time required for the bar 24 in its travel to and from the screw 30. If a continuous smooth sinusoidal current is desired, the switch blade 42 is moved into engagement with the contact 38. The circuit is thereby shunted around the interrupting device, and will then be as follows:—The current entering along wire 32 is divided at the binding post 34, a portion passing to the lamp 21 along wire 35, from the lamp along wire 36, to the binding post 37, and thence through the switch blade 42, wire 40, binding post 33, and out through wire 31. The other portion of the current passes along wire 39 to the rheostat contacts, thence through blade 13, post 12, wire 43, binding post 44, and electrode wire 45, returning through electrode wire 46, binding post 47, wire 49, binding post 37, switch blade 42, binding post 41, wire 40, binding post 33 and wire 31. The intensity of the current is controlled by manipulation of the blade of the rheostat in a well known manner.

If it is desired to use the apparatus for photo-therapy work, it is only necessary to substitute lamps of the desired colors, for the lamp 21. Thus a ruby lamp may be used for stimulation, and a blue lamp for inhibition, in a manner well understood in the art.

From the foregoing it will be readily understood, that the invention provides a very simple and efficient apparatus, by means of which the operator may at will produce smooth and continuous currents or rapidly interrupted currents, as conditions may require. A particular advantage lies in the fact that the device may be connected to any suitable source of power, even including the magneto of an automobile. Thus being very compact, it may be conveniently carried by a physician and be available for immediate use where street currents, batteries and the like are not accessible. It will also be readily understood that the ease with which colored lamps may be connected with the machine, makes it extremely useful for photo-therapeutic purposes.

Having thus explained the nature of the invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what is claimed is:—

1. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a periodically actuated interrupter, means providing a circuit to said rheostat, and selective means by which said interrupter may be included in said circuit.

2. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, means providing a circuit to said rheostat, and a periodically actuated interrupter interposed in said circuit.

3. An electro-therapeutic apparatus of the

character described comprising a rheostat, electrode conductors in circuit therewith, and means providing a circuit to said rheostat, said circuit including means whereby smooth sinusoidal currents or interrupted sinusoidal currents may be caused to pass through the electrode conductors.

4. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, means providing a circuit to said rheostat, a periodically actuated interrupter interposed in said circuit, and means whereby said interrupter may be shunted.

5. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, wires leading to said rheostat and having means for connection with a source of current, an interrupter, circuit wires connected therewith, and means whereby the wires of the interrupter may be placed in circuit with the rheostat wires.

6. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, means providing a circuit to said rheostat, an interrupter interposed in said circuit, and thermostatic means controlling the operation of said interrupter.

7. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostatic member, a contact coöperating therewith, and in circuit with said rheostat, and means also in circuit with said rheostat for intermittently heating said thermostatic member.

8. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostatic member, a contact coöperating therewith, and in circuit with said rheostat, means also in circuit with said rheostat for intermittently heating said thermostatic member, and means for controlling the passage of current to said heating means.

9. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostatic member, a heating coil surrounding the same and in circuit with said rheostat, and a contact also in circuit with said rheostat and positioned to short circuit a portion of said coil when the thermostat member is in one extreme of its movement.

10. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, wires leading to said rheostat and having means for connection with a source of current, a thermostat member, a heating coil surrounding the same, a contact positioned to short circuit a portion of said coil when the thermostat member is in one extreme of its movement, and selectively operated means whereby said heating coil and said contact may be placed in circuit with the rheostat wires.

11. An electro-therapeutic apparatus comprising a rheostat, electrode conductors in circuit therewith, an interrupter, a contact in circuit with said interrupter, a second contact in circuit with said rheostat and also in circuit with said interrupter, and a switch blade connected with the outlet wire of the apparatus and positioned to engage either contact.

12. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostat member, a heating coil surrounding the same, a contact in circuit with said coil, a second contact in circuit with said rheostat and with said coil, a switch blade connected with the outlet wire of the apparatus and positioned to engage either contact, and means coöperating with the thermostat member for effecting intermittent interruptions of the current through said coil.

13. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostat member, a heating coil surrounding the same, a contact in circuit with said coil, a second contact in circuit with said rheostat and with said coil, a switch blade connected with the outlet wire of the apparatus and positioned to engage either contact, and a contact positioned to short circuit a portion of said coil when the thermostat is in one extreme of its movement.

14. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, means providing a circuit to said rheostat, and an interrupter interposed in said circuit, said interrupter having means by which the periods of duration of the interruptions may be regulated.

15. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostat member, a heating coil surrounding the same, a contact in circuit with said coil, a second contact in circuit with said rheostat and with said coil, a switch blade connected with the outlet wire of the apparatus and positioned to engage either contact, and an adjustable contact member positioned to short circuit a portion of said coil when the thermostat is in one extreme of its movement.

16. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, means providing a circuit to said rheostat, a periodically actuated interrupter in-

terposed in said circuit, and a lamp in said circuit.

17. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, means providing a circuit to said rheostat, said circuit including means whereby smooth sinusoidal currents or interrupted sinusoidal currents may be caused to pass through the electrode conductors, and a lamp in said circuit.

18. An electro-therapeutic apparatus of the character described comprising a rheostat, electrode conductors in circuit therewith, a thermostatic member, a contact cooperating therewith, and in circuit with said rheostat, means also in circuit with said rheostat for intermittently heating said thermostatic member, and a lamp in the circuit to said rheostat.

19. An electro-therapeutic apparatus of the character described comprising a base, a lamp support secured thereto, a rheostat mounted on said base, means providing a circuit to said rheostat, a lamp in said circuit and mounted in the lamp support, electrode conductors in circuit with said rheostat, a periodically actuated interrupter, and means by which the interrupter may be included as a part of said circuit.

20. An electro-therapeutic apparatus of the character described comprising a base, a lamp support secured thereto, a rheostat mounted on said base, means providing a circuit to said rheostat, a lamp in said circuit and mounted in the lamp support, electrode conductors in circuit with said rheostat, a periodically actuated interrupter, circuit wires leading thereto and provided with a contact, and a switch in the circuit to the rheostat and positioned to engage said contact, whereby said interrupter may be included in the rheostat circuit.

In testimony whereof I have hereunto set my hand.

CHARLES L. IRELAND.