(54) Title: ELECTRONIC STIMULATING DEVICE

(57) Abstract

The invention relates to an electronic stimulating device which produces low frequency pulsating signals generated by a relaxation oscillator (40). An antenna (60) is provided to facilitate delivery of the generated signals. The electronic circuit board is mounted within a lightweight portable housing to enable a user to conveniently carry the device at all times, if desired.
DESIGNATIONS OF "DE"

Until further notice, any designation of "DE" in any international application whose international filing date is prior to October 3, 1990, shall have effect in the territory of the Federal Republic of Germany with the exception of the territory of the former German Democratic Republic.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

| AT  | Austria       | ES | Spain       |
| AU  | Australia     | FI | Finland     |
| BB  | Barbados      | FR | France      |
| BE  | Belgium       | GA | Gabon       |
| BF  | Burkina Faso  | GB | United Kingdom |
| BG  | Bulgaria      | GR | Greece      |
| BJ  | Benin         | HU | Hungary     |
| BR  | Brazil        | IT | Italy       |
| CA  | Canada        | JP | Japan       |
| CF  | Central African Republic |
| CG  | Congo         | KP | Democratic People's Republic of Korea |
| CH  | Switzerland   | KR | Republic of Korea |
| CM  | Cameroon      | LI | Liechtenstein |
| DE  | Germany       | LK | Sri Lanka   |
| DK  | Denmark       | LU | Luxembourg  |
| MC  | Monaco        |
| MG  | Madagascar    |
| ML  | Mali          |
| MR  | Mauritania    |
| MW  | Malawi        |
| NL  | Netherlands   |
| NO  | Norway        |
| PL  | Poland        |
| RO  | Romania       |
| SD  | Sudan         |
| SE  | Sweden        |
| SN  | Senegal       |
| SU  | Soviet Union  |
| TD  | Chad          |
| TG  | Togo          |
| US  | United States of America |
ELECTRONIC STIMULATING DEVICE

This application is a continuation in part application of my co-pending application Serial No. 338, 312; Filed April 14, 1989, entitled "Electronic Stimulating Device", the disclosure of which is incorporated by reference herein.

BACKGROUND OF THE INVENTION

The present invention relates to a new and improved electrotherapeutic device. More specifically, the present invention relates to devices which utilize electrically generated pulses for balancing biological energy which moves to and from intestinal organs.

Acupuncture is an Oriental treatment which utilizes special needles, which are inserted into muscular tissues for treatment of various nerve-associated symptoms, such as for example, neuralgia pains.

There is also known a thermal acupuncture method which is called moxibustion which requires heating of the acupoints with a smoldering herb.

Still, there exists another method, acupressure, which provides for application of pressure by fingers of acupuncture points in order to stimulate or relax the organs. All of these methods are designed to achieve one purpose - to balance movement of bioenergy to and from the vital organs along pathways (meridians) which interconnect the organs and glands to form a network.

In the traditional Oriental viewpoint, the main reason for organ-related malfunctions in a body is an inharmonious (or imbalanced flow) of bioenergy from organ to organ.

The modern science has developed various methods and
complicated equipment for testing and evaluating energy balance in a human body.

Kinesiology sets as its purpose the study of the principles of mechanics and anatomy in relation to human movement. Modern testing devices allow testing of bioenergy of a human body, which is part of the study conducted by kinesiology experts.

The theory of energy healing, on which acupuncture or acupressure methods are based, teaches that in order to cure undesirable symptoms one has to stimulate the acupoints, thus balancing the flow of bioenergy in a human body. The acupoints have generally increased electrical potential which is measurable with today's sophisticated electronics. The acupoints are located along the meridians of energy.

The present invention concerns itself with an electronic device which is designed to balance a flow of bioenergy, thereby stimulating or relaxing the organs to provide therapeutic treatment to a person, suffering from symptoms of, for example, minor neurological discomfort.

It is, therefore, an object of the present invention to provide an electronic stimulating device designed to balance a flow of bioenergy for stimulation or relaxation of a human body.

It is a further object of the present invention to provide a lightweight portable electronic device which is inexpensive and easy to manufacture.

It is still a further object of the present invention to provide an electronic device which creates a pulsating electro-magnetic field of low frequency.

These and other objects of the invention will be more apparent from the following description of the invention.

SUMMARY OF THE INVENTION

The present invention achieves its objects in a simple and straightforward manner. The electronic stimulating device in accordance with the present invention has a lightweight portable housing which houses a relaxation oscillator, circuit and a battery for energizing the circuit. The low
frequency pulsating signals are generated by the relaxation oscillator, the waveform of the oscillator generated pulses can be sawtooth, positive pulse or negative square waveforms.

The device for producing the various waveforms provides for the use of a relaxation oscillator which utilizes a unijunction transistor, a plurality of resistors, at least one of which is a variable resistor, a capacitor for developing a voltage potential on the emitter of the unijunction transistor, with the capacitor discharging through one of the resistors in emitter and base one of the resistor.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference will now be made to the accompanying drawings, in which Fig. 1 is an exploded perspective view of the device according to this invention.

Fig. 2 is a schematic diagram of the relaxation oscillator of the present invention designed to generate sawtooth waveform.

Fig. 3 is a schematic diagram of the relaxation oscillator of the present invention designed to generate a positive pulse waveform.

Fig. 4 is a schematic diagram of the relaxation oscillator of the present invention designed to generate a negative square waveform.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings and more particularly to Fig. 1, the device in accordance with the present invention is generally designated by numeral 10. The electrotherapeutic device 10 comprises a portable, lightweight housing 12 which has a closed bottom and vertically extending walls attached to the bottom to form an interior chamber 18. The chamber 18 is divided into two compartments by a separation late 20, dividing the interior chamber into a circuit board chamber 22 and a battery, or power source chamber 24. The box 12 is shown to have a general parallelepiped configuration; however, the shape of the box can be changed
if necessary.
The box 12 is provided with a cover 26, sized and shaped so as to cover the open top of the box 12, along the perimeter of its walls. The cover 26 can be bolted to the box 12 or otherwise secured thereto, so as to be detachably affixed to the box 12. In the embodiment shown in Fig. 1, the cover 26 is secured to the box 12 by four screws 17 passing through apertures 19 made in the cover 26 which are aligned with respective apertures 21 formed in supports 15 secured at four corners in the box 12.

One of the vertically extending walls of the box 12, wall 28, is provided with an opening 29 therethrough, the purpose of which will become more apparent hereinafter. Mounted within the chamber 22 is a circuit board 30 carrying the electronic circuit of a relaxation oscillator 40 in accordance with the present invention.

Mounted within chamber 24 is a power source, such as 9-volt battery 32 supplying electrical power to the electronic circuit of the relaxation oscillator 40. The battery 32 and the relaxation oscillator are disengagingly connected by wires 25 extending from chamber 24 to chamber 22.

Reference will now be made to Figs. 2-4 illustrating some of the preferred embodiments of the electronic circuit of the relaxation oscillator in accordance with the present invention.

The relaxation oscillator illustrated in Fig. 2 is designed to produce a sawtooth waveform. A suitable electronic circuit for oscillator 40 comprises a transistor comprising emitter/base structure 42 connected to diode 44 and variable resistor 46. Connected to the diode 44 is a first resistor 48 and a second resistor 50. Connected in series to resistor 50 is a variable resistor 52, which in turn is connected in series to a capacitor 54.

An antenna 60 is provided to facilitate delivery of the signal generated by the relaxation oscillator 40 outside of the housing 12.

The light-emitting diode 44 is aligned with an aperture 29
in the wall 28 of the box 12, so that visual observation can be conducted of the operative mode of the relaxation oscillator and non-operation thereof can be visually detected which may be due to inability of the power supply to provide sufficient power to facilitate function of the electronic circuit.

The transistor 42 may be a unijunction transistor. The resistor 48 may be a 1 Kohm. Variable resistor 50 may be a 10 Kohms to a 50 Kohms variable pot, set on 4.1 Kohms. The capacitor 52 may have a capacitance of 10 microfarad, while variable resistor 46 has a resistance in the order of 0 ohms to 2000 ohms.

The relaxation oscillator used in the present invention is designed to take advantage of the frequency which is determined by a capacitor-resistor combination. This oscillator has distorted wave shapes, allowing various outputs such as square waves, trapezoidal waves, triangular waves and pulses of a very short duration. The use of the unijunction transistor in the relaxation oscillator was influenced by the existence of a negative resistance region in its emitter characteristic.

Fig. 2 illustrates a relaxation oscillator which produces "sawtooth" waveform. Fig. 3 illustrates a relaxation oscillator which produces positive pulse waveform and Fig. 4 illustrates a relaxation oscillator which produces negative pulse or negative square waveform.

Operation of the relaxation oscillator 40 will now be addressed in more detail.

The transistor 42 has a peak voltage Vp and a valley voltage Vv. Peak point voltage Vp controls firing of transistor 42 while valley voltage Vv controls the voltage point at which transistor 42 turns off.

The system time constant, that is the time required to transmit signals from input to output, can be determined by the value of the resistance and the capacitance, in this case by resistance of resistors 48, 50, 52 and capacitor 54. The resultant time constant value RC (in seconds) determines
frequency of the relaxation oscillator 40.

The timing circuit of the oscillator 40 can be modified, so that the on-off switching of the transistor 42 produces a rectangular wave at base 2 of the transistor 42.

Capacitor 54 charges through variable resistor 52, resistors 50 and 48 until it acquires a charge equal to the firing peak voltage Vp. At this point, the transistor 42 fires and the capacitor discharges through the variable resistor 46 and the emitter and base 1 circuit of the transistor 42. When the voltage across the capacitor decreases below valley voltage Vv of the transistor 42, the latter no longer conducts the signal. Then the capacitor 54 begins charging again, thus continuously repeating the cycle of operation.

The pulse waveform across the capacitor 54 (see Fig. 2) is sawtooth waveform. The voltage, after initial charge varies between peak point voltage Vp and minimal emitter voltage Ve(min). The minimal voltage Ve(min) is slightly less than the valley point voltage Vv, in order to allow the transistor 42 to turn off.

The width of the sawtooth pulse corresponds to the time constant RC.

The discharge time constant of capacitor 54 is determined by the resistance of variable resistor 46 and the emitter base 1 resistance of the transistor 42.

The discharge current of the capacitor 54 produces a positive voltage spike across the variable resistor 46 between emitter base 1 and ground.

The maximum width of the spike is determined by the discharge time constant of the capacitor 54. The D. C. level associated with this waveform is caused by the quiescent current flow between emitter base 1 and base 2, producing a constant voltage drop across the light-emitting diode 44 which lowers the potential of emitter base 2.

Consequently, a negative voltage spike is produced at emitter base 2 when the transistor 42 fires.

The electronic circuit 40 of the present invention
generates a low frequency current of about 7-10 cycles per second.

A pulsating electro-magnetic field with the cycle frequency of 7-10 per second creates a certain magnetic signal which is believed to provide a therapeutic effect on a human body by stimulating and balancing the flow of bioenergy along acupuncture meridians.

The variable resistor 46 is connected to base of the unijunction transistor 42. The preferable range of variable resistor 46 (zero to 2000 ohms) insure an accurate frequency band and will greatly speed up the time it takes to calibrate the unit. Depending on the type and the kind of the transistor used, the resistance of the variable resistor 46 will change from zero to two thousand ohms, in accordance with particular elements utilized in the relaxation oscillator circuit. If necessary, an on-off switch can be incorporated in the electronic circuit of the present invention to allow energizing of the circuit upon demand.

The relaxation oscillator of the present invention can operate at frequency from the range of 7-30 Hertz. It was found that such frequency range of after 30 Hertz demonstrates a more beneficial effect on a human body than frequency range of above 30 Hertz. It can be envisioned, however, that under certain circumstances, this frequency range may be increased depending on the particular type of reaction expected by creation of a high frequency gravitational field in close proximity to a human body.

Many modifications and changes in the embodiments described herein will be apparent to those skilled in the art. I, therefore, pray that my rights to the present invention be limited only by the scope of the appended claims.
I claim:

1. An electronic stimulating device, comprising:
   a lightweight portable housing means containing a
   relaxation oscillator circuit for producing
   distorted wave shapes and a power source for
   said circuit;
   said relaxation oscillator circuit comprising a light
   -emitting diode connected to the power source,
   a unijunction transistor connected through
   emitter base 1 to a resistor and through
   emitter-base 2 to the light-emitting diode, a
   variable resistor means connected in series to
   parallel to said light-emitting diode and to a
   capacitor; and an antenna connected between said
   resistor means and the capacitor to said
   transistor.

2. The device of claim 1, wherein said variable resistor
   means comprise a pair of variable resistors.

3. The device of claim 1, wherein said housing means
   comprise a parallelepiped-shaped housing having a closed
   bottom, open top, vertically extending walls and detachably
   securable cover means.

4. An electronic oscillator stimulating device,
   comprising:
   a lightweight portable housing means for containing
   a transistor and a battery for energizing said
   transistor;
   a capacitor for creating a voltage potential
   across an emitter base of the transistor;
   said capacitor discharging through the variable
   resistor means and an emitter and base 1 of the
   transistor;
   a diode connected in series to said transistor; and
   an antenna connected to said transistor between the
   variable resistor means and the capacitor.

5. The device of claim 4, wherein said housing means has
   a wall provided with an aperture therethrough, and said
diode is a light-emitting diode positioned in alignment with said aperture to allow visual determination of a charged condition of said transistor.

6. The device of claim 4, wherein said variable resistor means comprises a pair of variable resistors.

7. The device of claim 4, wherein said transistor is a unijunction transistor.

8. An electronic stimulating device, comprising:
   a lightweight portable housing means for containing a relaxation oscillator and a battery for energizing said oscillator;
   said oscillator comprising a transistor, a variable resistor means, a capacitor for creating a voltage potential across an emitter of the transistor said capacitor discharging through the variable resistor means and an emitter and base 1 of the transistor, a diode connected in series to said transistor, and an antenna connected to a base 1 of said transistor.

9. An electronic stimulating device, comprising:
   a lightweight portable housing means for containing a relaxation oscillator and a battery for energizing said oscillator;
   said oscillator comprising a transistor, a variable resistor means, a capacitor for creating a voltage potential across the emitter base of the transistor.
### INTERNATIONAL SEARCH REPORT

**International Application No:** PCT/US90/04092

#### I. CLASSIFICATION OF SUBJECT MATTER

According to International Patent Classification (IPC) or to both National Classification and IPC:

- **IPC(5):** A61N 1/00
- **US. Cl.:** 600/14

#### II. FIELDS SEARCHED

<table>
<thead>
<tr>
<th>Classification System</th>
<th>Classification Symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S.</td>
<td>600/9, 13, 14</td>
</tr>
<tr>
<td></td>
<td>128/421, 422, 907</td>
</tr>
</tbody>
</table>

**Documented searched other than minimum documented to the extent that such documents are included in the fields searched.**

#### III. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of Document, including, where appropriate, of the relevant passages</th>
<th>Relevant to Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US, A, 3,908,669 (MAN ET ALO 30 September 1975 see entire document.)</td>
<td>9</td>
</tr>
<tr>
<td>X</td>
<td>US, A, 4,121,594 (MILLER ET AL) 24 October 1978 see entire document.</td>
<td>9</td>
</tr>
</tbody>
</table>

* Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
  - "B" earlier document but published on or after the international filing date
  - "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
  - "O" document referring to an oral disclosure, use, exhibition or other means
  - "P" document published prior to the international filing date but later than the priority date claimed

* "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
* "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step
* "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
* "A" document member of the same patent family

#### IV. CERTIFICATION

**Date of the Actual Completion of the International Search:** 23 AUGUST 1990

**Date of Mailing of this International Search Report:** 10 DEC 1990

International Searching Authority: ISA/US

Signature of Authorized Officer: KENNEDY J. SCHAEZLE

Form PCT/ISA/210 (second sheet) (May 1986)