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ION THERAPY DEVICE COMPRISING A HAND ELECTRODE

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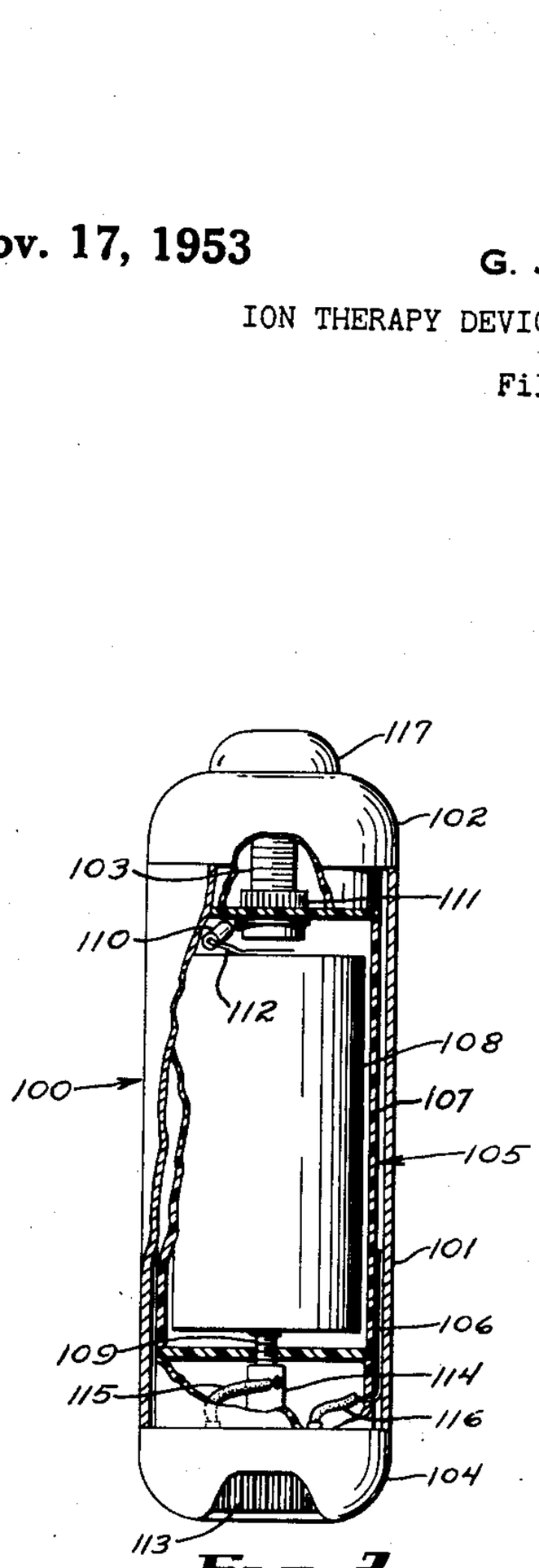

Fig. 2

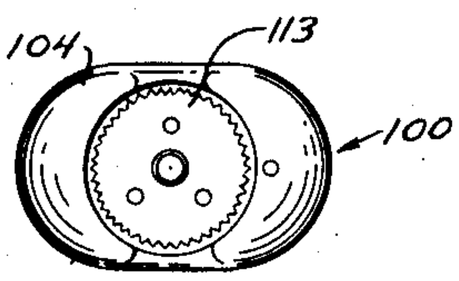

Fig. 3

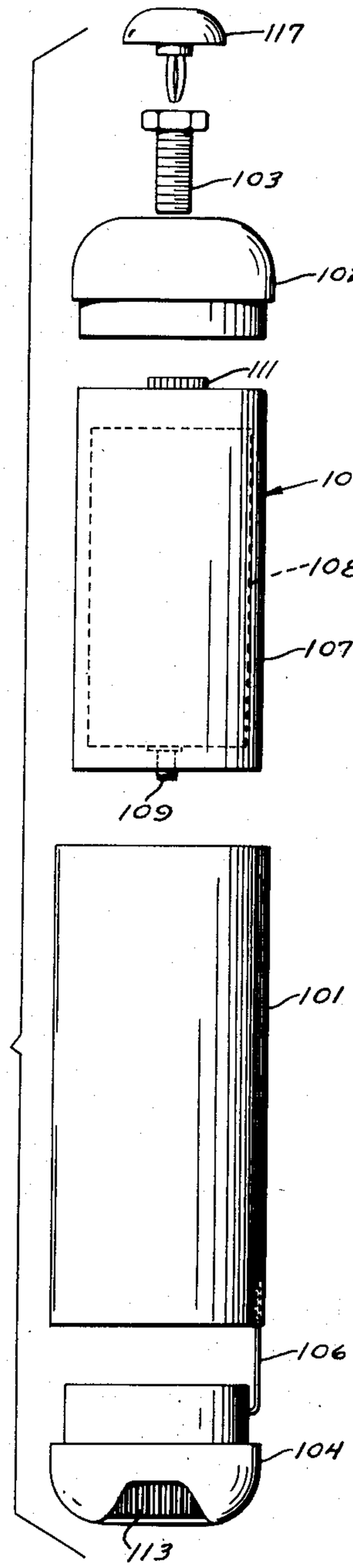

Fig. 1

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ION THERAPY DEVICE COMPRISING A HAND ELECTRODE

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This invention relates to ion-therapy, particularly to a portable applicator unit which is specially designed to provide the correct polarities of electropotential for normal corrective treatment, which portable unit is also automatically adapted for maintaining the current produced thereby within specific tolerances.

When an electric current is applied to an area of the body, ions are released by electrolytic dissociation and reduce the body resistance. Such ionization of the body components reduces the body electrical resistance and increases the therapeutic current. Such increased current correspondingly increases the ionization, or ion concentration in the area of treatment and permits further increase in the current. The ultimate effect and current are dependent upon current limiting conditions in the electric circuit. It is well known that the pH level of any system is affected by the ions present therein so that this ionization produced in the body and the concentration of same varies the pH of the body and such local change in the body by the therapeutic treatment produces appreciable physiologic effects if the pH level is raised or lowered beyond certain limited tolerances. Therefore it is of great importance that precise control be maintained over such factors, as, for example, electrode polarity which determines the electrical charge of the ion, the current density determining the local area ion concentration, and the pH level of the body and distribution of the current over the electrode system. Many times a slight artificial shift in the local pH level in a body area is sufficient to inhibit nervous hypertension, bacteria or fungi, etc., and thus facilitate or promote a recovery of a person suffering from many different localized pains or diseases. This manipulation of the pH can, as indicated above, be achieved by a proper application of ion therapy to the diseased area.

The general object of the present invention is to provide a novel, portable ion therapy device which is adapted to provide a limited current of a desired polarity for manual application to a diseased area.

A further object of the invention is to provide a special type of a battery device to facilitate association of the battery with the therapy unit in a predetermined manner for providing only a desired polarity of electrical energy.

Another object of the invention is to control the therapy current precisely within any percentage tolerance desired by the use of a specific high value electrical resistance in series with the

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potential source and circuit produced therethrough.

The foregoing and other objects and advantages of the invention will be made apparent as the specification proceeds.

Reference now is directed to the accompanying drawings for a better understanding of the present invention. In these drawings:

Fig. 1 is an exploded elevation of an embodiment of the invention;

Fig. 2 is an elevation, partly broken away and shown in section of the device of Fig. 1; and

Fig. 3 is a top plan of the device of Fig. 1.

An adjustable resistance unit in the therapy device is of any predetermined value and may vary from between 100,000 to 1,000,000 ohms, usually in order to limit the current flowing from the battery to a desired value. In some instances the resistance unit may have even a higher value, dependent upon the current tolerance desired. The ohmic value of the series current limiting resistor is determined by the following formula: R1 is equal to or greater than $(100/\%t \times R2) - R3$, when R1 is the limiting resistor, $\%t$ is the percentage tolerance of the therapy current, R2 is the resistance variance due to skin and body effects and R3 is the sum of all other steady state series resistances in the circuit including that of the batteries used for a potential source. It should be noted that the body resistance may vary from about 40,000 to 100,000 ohms under different ordinary operating conditions. I have established through various tests that it is desirable to retain the current flowing through the circuit through the device 10 to an extremely low value, such as between about 10 to 25 microamperes. 10 micro-amperes are equivalent to an electron flow of 2.34×10^{17} electrons per hour.

Figs. 1 through 3 of the drawings show an embodiment of the ion therapy device of the invention. This device is indicated generally by the numeral 100. The device 100 includes a handle electrode 101 which is of generally hollow, tubular or oval shape and which receives an insulator member 102 in one end thereof. The insulator 102 aids in positioning an applicator electrode connector socket 103 in the device of the invention whereas a second insulator member 104 is removably received in the remaining end of the handle electrode 101 and it usually has a spring contact 106 associated therewith. The handle electrode 101 receives a voltage unit indicated generally at 105 therein.

The voltage supply unit 105 is removably associated with the device 100 so that a new volt-

age supply source can be provided in the device when desired. Usually a suitable type of an insulator case extends around the voltage unit 105 and this case 107 receives a conventional type of a dry cell battery 108 therein. The battery 108 may have a special terminal, such as a male terminal 109 secured to one portion thereof and extending outwardly through the case 107. A resistance 110 of predetermined value, is connected between a female terminal 111 that is secured in or to one portion of the case 107 with a wire 112 connecting the resistance 110 in series between the remaining terminals of the battery 108 and the female terminal 111. Thus a pair of accessible or exposed terminals are provided for the voltage unit 105 with such terminals being of different physical contour and this greatly facilitates use of the device of the invention since it insures that correct polarity will be provided in the different electrodes of the device.

Fig. 2 of the drawings best shows that the applicator electrode connector socket 103 extends through the insulator member 102 and has a threaded shank that engages with the female terminal 111 in order to secure or position this portion of the device 100 in its desired assembled relationship. In fact, the applicator electrode connector socket 103 can be rotated externally of the device in order to assemble the different components of the device in position. The remaining insulator member 104 is normally only in telescoped engagement with the remaining end of the handle electrode 101. This insulator member 104 normally carries connector means with it for connecting the handle electrode to the male terminal 109 of the voltage supply unit. In this instance, a variable resistance member, or rheostat is provided between the voltage unit and the handle electrode. A suitable control knob 113 controls the setting of this resistance rheostat that is connected to a tapped sleeve 114 which can be engaged with the terminal 109 prior to positioning the voltage unit 105 within the handle electrode. A lead 115 connects the sleeve 114 to one terminal of the resistance rheostat whereas a further lead 116 connects the other terminal of the resistance rheostat to the spring contact 106 which in turn engages with the inner surface of the handle electrode 101 when the voltage unit is telescoped into engagement therewith. Suitable shoulders are provided on the insulator members of the invention to limit axially inward telescoping movement of the insulator members into the handle electrode. A separate plug-in applicator electrode 117 is provided and it inserts into the socket of the electrode connector 103.

It will be realized that in any embodiment of the invention any voltage cell may be used and it may have electrodes at one or both ends, as desired. The external shape of the entire device may be varied to any conventional contour. This cell may be of regular or of irregular shape dependent upon the resistance used and whether the resistance and cell are secured together into a unit. A conventional type of a resistance may be used when the battery 70 is present to limit the manner of association of the battery and the enclosing case. The resistance unit of the invention may be connected to either terminal of the voltage cell and it may be of any desired construction.

It has been noted that a negative curent, i. e., one from the cathode of a voltage cell, when applied to a body area will decrease the acidity in that local area of the body. The body processes tend to increase the acidity and by the use of a negative current one is able to control the acidity of a body in a given local area. This permits the chemical balance of a body to be corrected temporarily by an externally applied force and facilitates the healing functioning of the body since the bio-chemical activity of the body slows down on each side of a desired optimum pH value, and an unhealthy body area usually is acid.

The special resistance units of the invention usually have two opposed, parallel surfaces which may be considered the front and back of the unit while the sides of same form an irregular triangle. The same result, i. e., predetermined polarity in the applicator, could be obtained by other irregular shapes as long as the case, or end cap, is complemental to the shape of the exposed surfaces of the resistance unit, or an irregular shaped battery, dependent upon whether the battery or a resistance member secured to a battery is used as the special shaped polarity determining article.

From the foregoing it will be seen that an apparatus is provided by which a predetermined polarity current can readily be provided in an ion therapy device. The construction of the device is such that a layman can take out an exhausted battery unit and insert a new one therefor without any danger of misassembling the parts of the device. By use of the high resistance unit as outlined hereinabove, a current of a predetermined and desirable value can be obtained. The device of the invention is compact and can be easily manually applied and even carried about on the person at all times without any appreciable discomfort. Thus the objects of the invention are thought to be realized.

While a complete embodiment of the invention has been disclosed herein, it will be appreciated that modification of such particular embodiment of the invention may be resorted to without departing from the scope of the invention as defined by the appended claims.

Having thus described my invention, what I claim is:

1. An electro-therapy device comprising a case adapted to be received in a person's hand, said case having an electro-conductive surface over at least a portion of its surface, a voltage cell having two terminals provided thereon and positioned in said case, connector means extending between the conductive portion of said case and one terminal of said cell, an electric resistance unit of above .1 megohm, means connecting said resistance unit in a portion of an electric circuit adapted to be formed between the terminals of said cell, an applicator electrode, means connecting said applicator electrode in said circuit, and means securing said applicator electrode connecting means to said case, said applicator electrode connecting means being insulated from the conductive portion of said case.

2. An ion therapy device comprising a hollow handle electrode, an applicator electrode, a voltage cell received within said handle electrode, an electrical resistance of at least .1 megohm, and means connecting said voltage cell and resistance in series between said handle electrode and applicator electrode.

3. A device as in claim 2 wherein an insulating member is positioned in each end of said handle electrode, and a variable resistance member is carried by one of said insulating members and

is connected in said series circuit, said applicator electrode being operatively associated with said other insulating member.

4. An ion therapy device in accordance with claim 2, in which said voltage cell and said electrical resistance are combined as a unit in series connection between two external terminals on the unit, one of which said terminals is physically different than the other.

5. A device as in claim 4 wherein one of said terminals is a male member adapted to be connected to one of said electrodes, and the other of said terminals is a female member adapted to be connected to the other of said electrodes to insure a desired polarity of said electrodes.

6. An ion therapy device comprising a handle electrode; a voltage cell unit received within said handle electrode and including a voltage cell, an electrical resistance member, a pair of externally exposed terminal means, means connecting said electric resistance and voltage cell in series intermediate said terminal means, said terminal means being of different physical contour; an insulator member positioned in each end of said handle electrode; an applicator electrode member extending through the insulator member at one end of said handle electrode and engaging with the negative of said terminal means to secure such electrode to the device; means securing said second insulator member in the other end of said handle electrode; and connector means coupling said handle electrode to said positive terminal member.

7. An ion therapy device comprising a substantially tubular handle electrode; a voltage cell unit received within said handle electrode and including a voltage cell, an electrical resistance member, a pair of externally exposed terminal means, means connecting said electrical resistance and voltage cell in series intermediate said terminal means, said terminal means being of different physical contour; an insulator member positioned in each end of said handle electrode; an applicator electrode member having a shank extending through the insulator member at one end of said handle electrode and engaging with the negative of said terminal means to secure such electrode to the device; and means securing said second insulator member to said positive terminal member to position such insulator member in the other end of said handle electrode, said last named insulator member and securing means having a resilient connector member associated therewith coupling said handle electrode to said second terminal member.

8. An ion therapy device comprising a handle electrode; an electron source and regulating cell having a positive and a negative terminal, said cell being contoured to be received within the

inner contours of said handle electrode, means electrically connecting only the positive terminal of the cell to said handle electrode, said cell comprising an electric battery electron source and electron regulating resistor in series electrical connection between said terminals, a portion of said resistor being a variable element, said resistor ohmic value being sufficiently great to hold the electron flow substantially constant in any external circuit formed through the device; an insulating member on said handle electrode; an applicator electrode connector member extending through said insulating member, said applicator connector member making electrical connection to the negative terminal of said cell; an applicator electrode adapted to make electrical connection with said applicator connector member, said electrodes being adapted to make contact with separate points on the body to complete the external circuit of the device; the resistor value being selected to hold the electron flow substantially constant through the body at a selected level between 10_{17} and 10_{18} electrons per hour.

9. An electronic mechanism comprising a handle electrode; an electron source and regulating cell having a positive and a negative terminal, said cell being contoured to be received within the inner contours of the handle electrode, means electrically connecting only the positive terminal of the cell to said handle electrode, said cell comprising an electric battery electron source and electron regulating resistor in series electrical connection between said terminals, a portion of said resistor being a variable element of above .1 megohm resistance; and an applicator electrode in electrical connection with the negative terminal of said cell; said electrodes being adapted to make contact with separate points on the body to complete an external circuit.

10. A device as in claim 1 wherein said electric resistance unit includes a variable resistor, and said applicator electrode is connected to the negative terminal of said voltage cell.

11. A device as in claim 10 wherein a capping member is provided on said case, and said variable resistor is carried on said capping member and has an external control member thereon.

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