

Aug. 25, 1925.

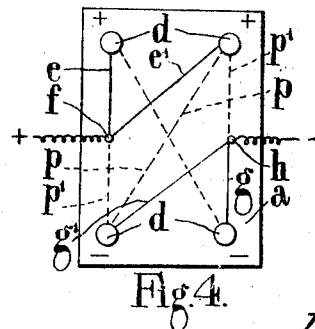
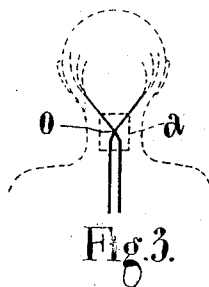
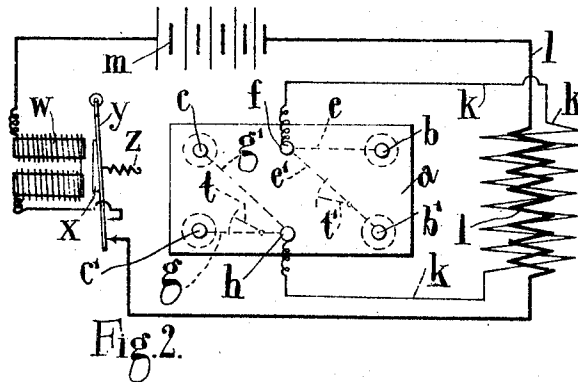
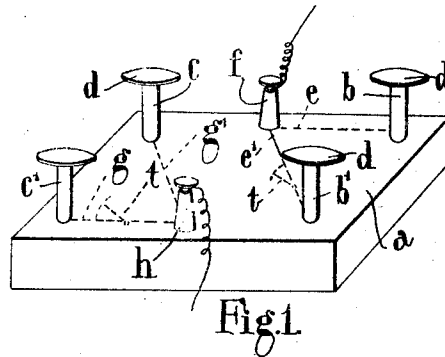
1,551,229

R. ARAYA

ELECTROTHERAPEUTIC APPARATUS

Filed March 5, 1923

2 Sheets-Sheet 1



Inventor:
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Aug. 25, 1925.

1,551,229

R. ARAYA

ELECTROTHERAPEUTIC APPARATUS

Filed March 3, 1923

2 Sheets-Sheet 2

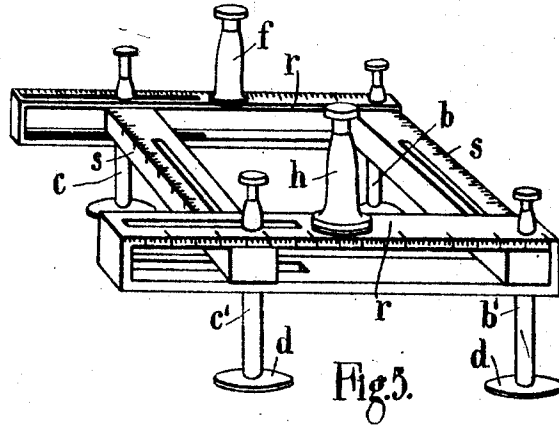


Fig. 5.

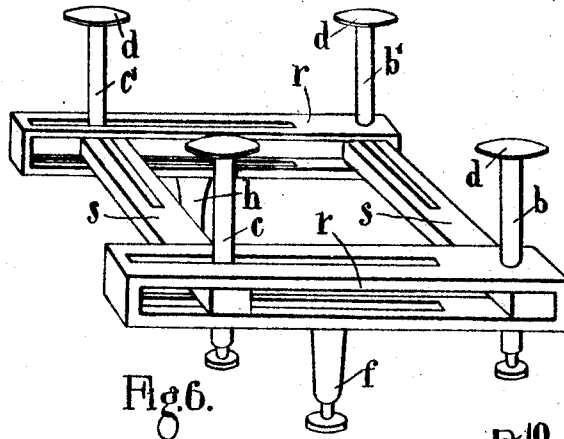


Fig. 6.

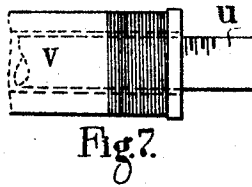


Fig. 7.

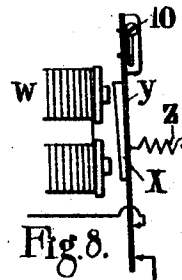


Fig. 8.

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Patented Aug. 25, 1925.

1,551,229

UNITED STATES PATENT OFFICE.

RAMON ARAYA, DECEASED, LATE OF SANTIAGO, CHILE; BY RAMÓN FRANCISCO ARAYA, NOVOA, LEGAL REPRESENTATIVE, OF LONDON, ENGLAND.

ELECTROTHERAPEUTIC APPARATUS.

Application filed March 3, 1923. Serial No. 622,686.

To all whom it may concern:

Be it known that RAMON ARAYA, deceased, late a citizen of the Chilean Republic, residing at Calle de la Catedral No. 1867, Santiago, Chile, did invent certain new and useful Improvements in Electrotherapeutic Apparatus, and I, RAMÓN FRANCISCO ARAYA, Novoa, executor, a citizen of the Chilean Republic, residing at 56 Victoria Street, London, S. W. 1, England, do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use.

This invention relates to electrotherapeutic apparatus for the cure of mental and nervous diseases. Such diseases are usually the result of an interruption in the nerve system or circulation, which like the circulation of the blood, is common to all human or animal beings.

In the practice of electric medical treatment as hitherto adopted, the current is applied in such a way as to produce only local exciting effects, which do not follow the direction of the nerve circulation, and therefore the treatment is sometimes not so successful as it should be. For example, in the case of neuralgia in the face, one current terminal plate is placed in contact with one side of the face, and the other current terminal is applied to the middle of the spine. Thus the current is forced, in order to complete an electrical circuit to pass through a considerable part of the body.

In other cases where a plurality of electrodes are arranged on a common insulated support, the effect of such is to produce merely a local exciting action on the patient, and the current being diffused outward in all directions.

I have discovered, however, that a great improvement is obtained by a re-arrangement or reconstruction of the terminal plates or members, such that the said plates or members are brought close together and applied as a self contained unit to the principal nerve ganglion of the body (that is the basal ganglion) or any of the minor or pseudo ganglions, whereby the electrical influence is strongly and directly concentrated on the principal or the subordinate nerve centres. By this means, instead of exciting the patient, a state of sleep or anaesthesia is produced, and the effect of the electrical im-

pulses and sleep combine to cure or at least alleviate the symptoms of the disease. For example, in the cited case of neuralgia in the face, the electroanæsthesia is the specific remedy. In this instance, the instrument is applied to the rachidian bulb, and the electroanæsthesia current is transmitted to the brain in waves, which follow the natural direction of the nervous system so reaching the affected part without excitation or danger of any kind, and curing the disease by re-establishing the normal circulation of the nervous fluid. The patient, immediately the electroanæsthesia reaches the brain, feels relieved.

To this end, the invention consists in an electro-therapeutic apparatus comprising a series of electrodes applicable to the patient's skin and forming the corners of a rectangle (or polygon) intended to receive within its area a nerve centre or ganglion, and in which the electrodes are so connected to the source of induced current, that when the electrodes are applied to the skin parallel and cross diagonal electric currents are obtained along which current impulses pass all in the same direction, whereby mutual attraction is set up within the space to obtain an intense concentration or current upon the enclosed nerve centre or ganglion. The electrodes can be so arranged that they are fixed or movable in a self contained appliance by any suitable mechanism.

The invention will now be described with reference to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved electrical appliance,

Figure 2 is a diagram showing the electrical circuits,

Figure 3 illustrates the application of the device to the neck of a patient,

Figure 4 is a diagrammatic view of the appliance showing the direction of the currents when applied to the skin.

Figures 5 and 6 are perspective views of the appliance which is adjustable to various sizes and showing scales of measurements,

Figures 7 and 8 are details hereinafter referred to.

In carrying the invention into effect according to one embodiment, Figures 1 to 4, and in which two pairs of buttons are used, the device consists of an insulating plate or support *a* mounted on or passing through

which are four stems b, b' and c, c' of conductive material such as copper. Each stem at one end carries a foot or button d , whilst its other end is fitted with any usual form of binding screw, shown in Figures 5 and 6, so that an electrical lead may be clamped thereto. Each button and stem forms an electrode and two of the stems b, b' are connected by branch leads e, e' , to one terminal f and the other two c, c' by branch leads g, g' to the other terminal h of the secondary winding k of an induction coil n of suitable form such as a Ruhmkorff coil and controlled by a make and break magnet w ; the armature x is carried on a spring tongue y that is normally drawn back by a spring z . The primary winding l of the coil is excited by a dry or other battery m in the usual way, see Figure 2.

The electrode buttons d are arranged so that they form together the corners of a rectangle, which when applied to the back of the patient's neck (Figure 3) not only will the circuit be completed, but the principal nerve ganglion, illustrated at o , will be enclosed within the rectangle.

All of the four electrodes being in contact with the skin, electrical current paths will be established between the pair of positive electrodes and the corresponding pair of negative electrodes during any one phase of the alternating induced current. Thus between each positive electrode and each corresponding negative electrode an electric current path is extended indicated diagrammatically by the lines p^1 . These current paths, which are substantially parallel, both moving in the same direction are mutually attractive and produce an electrical influence within the rectangle formed by the four electrodes. In addition to these, other current paths indicated diagrammatically at p are formed which extend diagonally from one positive electrode across to the negative of the other positive electrode, such diagonals intersecting one another at the centre of the rectangle. These impulses move in the same general direction as those of the parallel lines with the result that there is produced within the rectangle an intense concentration which acts upon the nervous fibre of the enclosed nerve ganglion. It is to be understood that the force of the current applied will depend upon the particular disease, the stage of progress of the cure and local conditions, and that state of sleep or anaesthesia need not necessarily be produced in all cases. Good results accompanied by anaesthesia have been produced in a case of epilepsy with a frequency of about 3,000 impulses per second, the intensity of the current being gradually lessened as the cure progressed, the treatment being applied for about thirty seconds per day.

The force of the current may be con-

trolled in any usual way. For example as shown in Figure 7 the position of an iron bar u forming the core v of the induction coil k, l may be adjusted according to the graduation marks shown. Although not usually necessary the frequency may be also varied if desired and a means for doing this is shown in Figure 8. The spring tongue y of the armature x is adapted to have a variable amplitude of oscillation depending upon the position of a fixing screw 10 and which may be adjusted to any position in the slot 11.

After a short application of the appliance to the principal junction of the nerve circulation the stimulating effect follows the direction of, and spreads over the entire nerve system, and tends to remove that which is interrupting or interfering with the nerve circulation. A state of sleep or anaesthesia is at the same time induced in the patient to further promote a cure, which in most cases will be progressive with periodic application of the appliance.

It is to be understood that the current applying member may take any suitable form so long as the electrode buttons form an open frame adapted to enclose, and concentrate the effect of the current upon, the part which is under treatment.

Any number of electrode pairs may be employed; if desired the carrier may be formed of slotted frames or holders r and s as shown in Figures 5 and 6, or any other suitable arrangement, so that the rectangle or other shape in which they are disposed may be varied in size. Such slotted frames may be provided with a scale or scales to assist adjustment of the parts, see Figure 5. Also as shown in Figure 1, a single pair of electrodes may only be used, the switches t or other suitable devices being provided for this purpose.

In some cases the minor nerve ganglions may be treated in addition to the main ganglion.

From the foregoing it will be understood that I have produced an electro-therapeutic device by which an intensive concentration and strong electrical influence may be applied directly to the nerve ganglions, with a result that the electrical pulsations will occur along lines parallel to the natural direction of the nerve circulation system and will produce an anaesthetic effect which is of great benefit in cases of mental and nervous disease. It is characteristic of the device that when the current is applied, the phenomena of the disease are temporarily re-produced, this re-production becoming less and less marked as the cure progresses.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:—

1. An electro-therapeutic device compris-

ing in combination, a plurality of positive and negative electrodes arranged in mutual parallel relation and spaced apart so as to form the corners of a rectangle (or polygon) intended to receive within its area a nerve centre or ganglion, a source of pulsating induced current including a primary and a secondary winding, an electric lead from one end of the secondary winding, branches therefrom to each positive electrode, and an electric lead from the other end of the secondary winding, branches therefrom to each negative electrode, whereby when all of the electrodes are applied to the patient's skin, parallel and cross diagonal electric current paths are obtained at each current phase from the positive to the negative electrodes

along which current impulses pass all in the same direction, so that the mutual attraction is set up within the space to obtain an intense concentration of current upon the enclosed nerve centre or ganglion. 20

2. The combination with an apparatus as claimed in claim 1, of an insulated base for supporting the electrodes comprising a series of slotted open interengaging frame members with dimensions marked thereon, whereby the electrodes may be spaced apart at variable distances. 25

In testimony whereof I have signed my name to this specification. 30

RAMÓN FRANCISCO ARAYA, NOVOA,
Executor of Ramon Araya, deceased.