

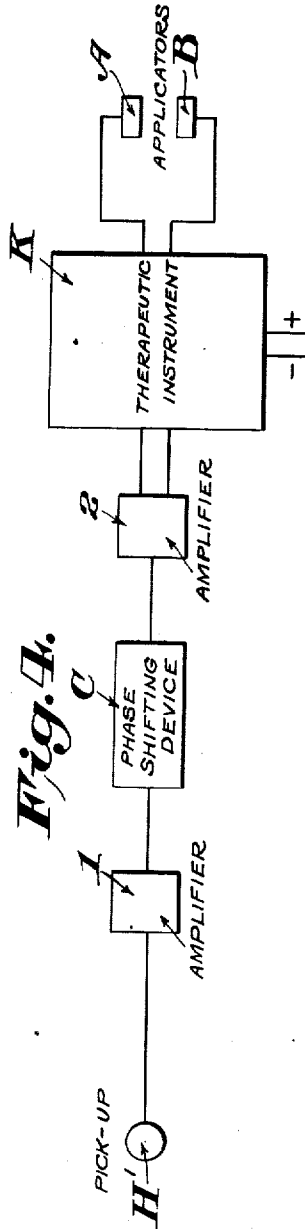
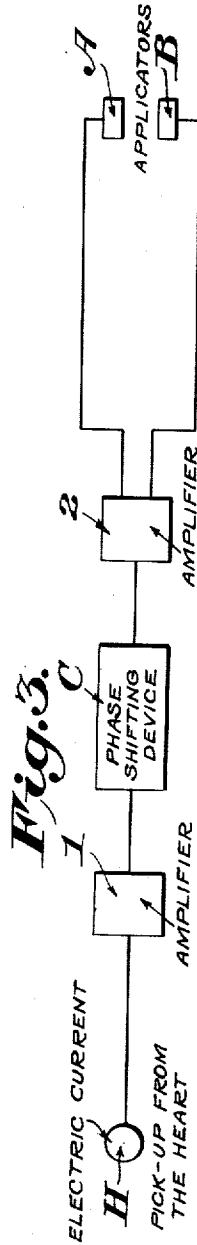
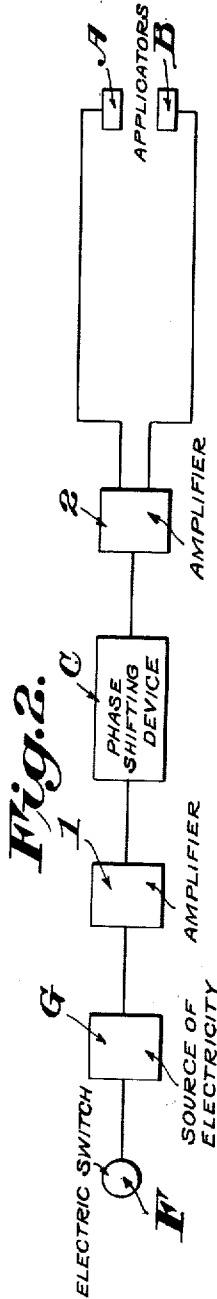
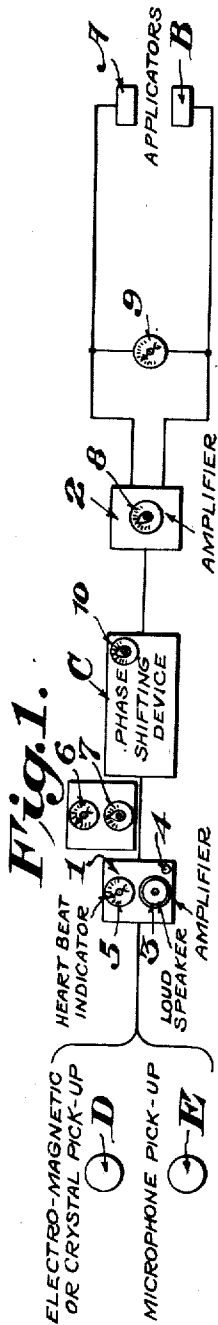
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2,368,207

METHOD OF AND MEANS FOR THERAPEUTIC TREATMENT

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METHOD OF AND MEANS FOR THERAPEUTIC TREATMENT

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9 Claims. (Cl. 128-422)

This invention is a method of and means for therapeutic treatment.

It is an object of the invention to provide for the application of therapeutic treatment in any selected relation with respect to the heart action of the patient under treatment.

It is a further object of the present invention to provide for regulating and/or controlling therapeutic treatment by means of heart impulses of the patient generated while the patient is under treatment, and also for applying therapeutic treatment to a patient in synchronism, staggered or out of phase relation with respect to the heart impulses of the patient.

The invention may be employed to stimulate, regulate, or otherwise affect the heart of a patient under treatment by and in relation to the heart action of another person.

The present invention will be described in connection with the accompanying drawing, in which

Figure 1 is a diagrammatic view illustrating one embodiment of the invention, employing either a crystal or electromagnetic pick-up or a microphone pick-up for picking up heart impulses and generating and supplying current, and controlling or regulating the treatment.

Figure 2 is a diagrammatic view of another embodiment of the invention, employing an electric switch actuated by heart impulses and thereby controlling a supply of electricity from a source to furnish electrical impulses.

Figure 3 is a diagrammatic view of another embodiment of the invention, wherein electric impulses generated by the heart are picked up and employed for controlling or regulating purposes.

Figure 4 is another embodiment of the invention showing how it may be employed to control therapeutic machines.

Referring to the embodiment of the invention, as shown diagrammatically in Figure 1, A and B designate the spaced members or contacts of any well known or preferred form of applicators as commonly used in treating a patient. These applicators are included in an electric circuit which also includes a phase shifting device C of any well known or preferred form or type which is designed to control the phase relation of the electric impulses to the applicators A—B, in leading or lagging relation to the electric impulses which are put into the circuit. Connected with the input side of device C may be a crystal or electromagnetic pick-up member D or a microphone member E, which members are designed

to generate electric currents when placed in contact with the human body of a patient under treatment in such manner and position as to be subjected to heart impulses or sound directly, or as it exists in the blood circulatory system of the patient generated while under treatment. The impulses of the electric current generated in either form of pick-up will be timed or synchronized with and by the physical heart impulses in the circulatory system of the patient. By introducing this heart generated current into the device C, and by proper adjustment of the latter, the impulses of current output to the applicators may be staggered, delayed or in phase shifted relation with respect to the heart impulses of the patient generated while undergoing treatment so that the pulsating action of the electric current applied through the applicators A—B to the patient may be timed to be in synchronism with or at any desired leading or lagging phase relation with the actual heart impulses of the patient undergoing treatment.

Current amplification may be employed as desired, as for instance, amplifiers 1 and 2 may be employed at the input and output sides respectively, of the phase shifting device C.

Another embodiment of the invention has been shown in Fig. 2, wherein F designates an electric switch of the type which will respond to the physical heart impulses of a patient, this switch being associated with a suitable source of electricity, such as the generator G which is connected through the amplifier 1, if desired, to the phase shifting device C. The difference between this embodiment of the invention and that disclosed in Fig. 1 is that in Fig. 1, the current is generated by either of the pick-up devices D and E, whereas in the embodiment shown in Fig. 2, there is a separate source of electric current G, the flow of current from which is controlled by the switch F. Switch F is actuated by the heart of the patient undergoing treatment. The application of the impulses to the patient, however, is modified by the phase shifting device C. Otherwise, the system, method and apparatus are the same as that disclosed in Fig. 1.

Still another embodiment of the invention has been shown in Fig. 3, wherein H indicates an electric current pick-up device designed to pick up current generated directly by the heart of the patient, such current of course being conducted to the apparatus as shown, and in the manner described in Fig. 1, through amplification or otherwise.

The invention may also be employed to con-

control a therapeutic instrument in the manner illustrated in Fig. 4, wherein K designates any well known or preferred form of therapeutic instrument connected to the output side of the phase shifting circuit device C, so that the therapeutic instrument is controlled by and in accordance with the heart impulses of the patient generated while undergoing treatment.

While the type of therapeutic instrument shown in Fig. 4 is that for applying electric impulses to a patient, I also contemplate the employment of my invention for controlling any other type of therapeutic instrument, such for instance, as that type which employs a mechanical suction or vacuum action for increasing blood circulation or otherwise stimulating the patient. Moreover the present invention may be employed for controlling the application of light treatments and heat treatments.

I also contemplate the control of the heart action of the patient from and by the heart action of another person which may be done by applying the applicators or a therapeutic instrument to the patient, and applying the pick-up device to another person, to the end that the patient's heart action may thus be stimulated by the heart action of said other person.

In the accompanying claims, I have used the term "heart impulses" to mean heart action or reaction the physical heart impulses, the visual or audible impulses and/or the electric impulses generated by the heart.

Heart reaction to the treatment may be indicated audibly by a loud-speaker 3, included in the treatment circuit. Also suitable socket connections 4 may be provided in connection with the amplifier 1, whereby ear-phones may be plugged in for listening to heart reaction to treatment.

The heart beat of a patient under treatment may be indicated by a suitable indicator 5, associated with the treatment circuit. The rate of heart beat may be indicated by means of an oscillation indicator 6, actuated by a variable oscillator electric circuit independent of the treatment circuit. By manually adjusting the control 7, the indicator 6 may be synchronized with the indicator 5, and by noting the rate of oscillation, as shown by the graduations provided in connection with the control 7, the rate of heart beat may be indicated.

Having noted the reaction of the treatment on the heart, if regulation of the treatment is desirable, the output of amplifier 2 may be varied in intensity by adjusting a suitable control 8. A suitable intensity meter 9 may be provided to indicate changes in intensity as the result of manipulation of the intensity control 8.

The indicators 5 and 6 indicate the heart action of the patient, while the output indicator 9 indicates, by comparison with the indicators 5 and 6, the in or out of phase relation between the heart action and the application of the therapeutic treatment. It will therefore be understood that by manipulation of the control 10 of the phase shifter C, the application of the treatment to the patient may be regulated at will to lag or lead or be in synchronism with the heart action of the patient.

Thus the impulses may be applied to the patient, through applicators A and B, or through a therapeutic instrument K, in any predetermined relation (staggered or otherwise) with respect to the heart impulses of the patient generated while said patient is undergoing treat-

ment. The predetermined relation of application will be automatically maintained, by the phase shifting device C, with respect to the actual heart impulses of the patient generated while under treatment regardless of any change or irregularity in the rate thereof, because the device C shifts the phase of the output therefrom always in predetermined relation to the phase of the input thereto which is of the same phase as the impulses of the heart of the patient generated while undergoing treatment.

While provision for various indications and controls have been shown in Fig. 1 only, it will of course be understood that such indications and controls may be employed in connection with the other embodiments of the invention illustrated in Figs. 2, 3 and 4.

I claim:

1. In the therapeutic treatment of a patient, the steps of generating electric impulses, shifting the time phase of said impulses in a predetermined relation to the heart impulses of the patient under treatment, and applying the time shifted electric impulses in the treatment.

2. In the therapeutic treatment of a patient, the steps of generating electric impulses, shifting the time phase of said impulses to lag with respect to the heart impulses of the patient generated while under treatment, and applying the time shifted impulses in the treatment.

3. In the therapeutic treatment of a patient, the steps of providing a source of electricity, picking up the heart impulses of the patient generated while under treatment, controlling by said picked up heart impulses the impulse output of said source of electricity, time phase shifting the electric impulses, and applying the time shifted electric impulses in the treatment.

4. In the therapeutic treatment of a patient, the steps of providing an electric current, converting said current into a current pulsating in synchronism with the heart impulses of the patient generated while under treatment, time shifting the phase of the pulsating current, and applying the time phase shifted current in the treatment.

5. In the therapeutic treatment of a patient by a therapeutic instrument, the steps of providing an electric current pulsating in synchronism with the heart impulses of the patient generated while under treatment, time shifting the phase of said current, conducting the time shifted current to said therapeutic instrument and by said conducted current controlling the operation of said instrument in a predetermined time phase shifted relation to the heart impulses of the patient generated while under treatment.

6. In the therapeutic treatment of a patient, the steps of picking up physical heart impulses of the patient generated while under treatment, converting said physical impulses into electrical impulses, time shifting the phase of the electrical impulses, and applying the time shifted electrical impulses to control therapeutic treatment of the patient while picking up said physical heart impulses.

7. In the therapeutic treatment of a patient, the steps of picking up the pulsating electric current generated by the heart of the patient while under treatment, amplifying said current, time phase shifting the said amplified current, and then utilizing the time phase shifted current to control therapeutic treatment of the patient while picking up said current.

8. A control device, comprising means for pro-

viding a pulsating electric current and including a heart-beat pickup member for synchronizing the said current with respect to the heart of the patient generated while under treatment, and time phase time shifting means for shifting the phase of the pulsating current.

9. A therapeutic apparatus comprising an electric therapeutic applicator, amplifying and intensifying control means connected with the means connected with the input side of the am-

plifying means for time shifting an electric current, means for conducting a current of electricity to the phase shifting means, and heart pulse pick-up means for application to a patient, said pick-up means being connected with the input side of the phase shifting means to control the supply of current to the phase shifting means in synchronism with the heart impulses of the patient generated while under treatment.

WARREN S. EATON.

CERTIFICATE OF CORRECTION.

Patent No. 2,368,207.

January 30, 1945.

WARREN S. EATON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 5, claim 8, after the word "phase" strike out "time" and insert the same before "shifting", same line; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 11th day of December, A. D. 1945.

Leslie Frazer

(Seal)

First Assistant Commissioner of Patents.

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