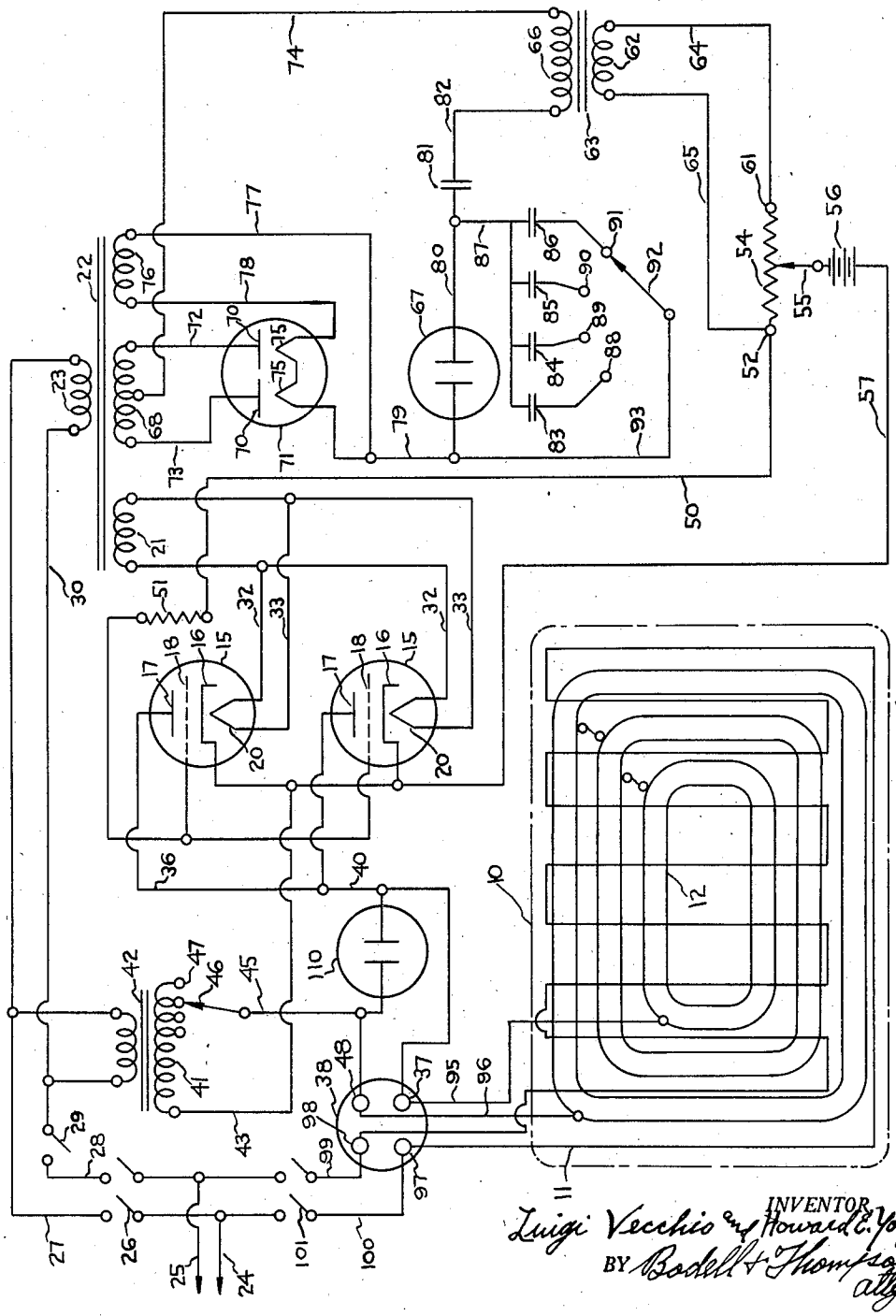
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ELECTROTHERAPEUTIC DEVICE

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ELECTROTHERAPEUTIC DEVICE

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This invention relates to an electro therapeutic device in the nature of a pad which may be applied to the patient and which contains a heating element and a vibrating element, the latter being connected to a device which is operable to cause the same to vibrate with considerable magnitude, the rate of vibration or the pulsations being varied to suit the condition required for the treatment of the patient.

The drawing is a schematic wiring diagram of the circuit employed in the pad and the control device.

The pad consists of an envelope or bag 10 of fabric or other suitable material, and a heating element 11 arranged in the envelope. The pad further includes a vibrating element consisting of a plurality of concentrically arranged coils 12 each containing a plurality of turns of wire, preferably aluminum or copper wire. The coils 12 are so arranged that they vibrate in response to a pulsating current connected thereto.

The purpose of the vibrating element 12 is to effect a substantial vibration of, or within, the pad which has been found to assist materially in the treatment of certain ailments, particularly nervous disorders, rheumatism, arthritis, and the like. That is, the pad, simultaneously with the desired application of heat, effects a slight massaging of the part being treated, which tends to stimulate the circulation of the blood and reacts favorably with the nervous system of the patient.

The vibrating element 12 is supplied with a pulsating current produced by a power supply unit which consists of one or more vacuum tubes 15 of the three electrode type, including a cathode element 16, a plate element 17, and a grid element 18. In the tubes illustrated, the cathodes 16 are heated by filaments 20 connected to a secondary coil 21 of a transformer 22, the primary coil 23 of which is connected to the conventional house circuit indicated by the conductors 24, 25, this connection being effected through a double pole switch 26, one blade of which is connected to a wire 27 extending to one side of the coil 23, and the other blade of the switch being connected through a wire 28, switch 29, wire 30, to the opposite side of the coil 23. The filaments 20 are connected to the coil 21 through wires 32, 33.

The plates 17 are connected together by wire 36 and to the contact 37 of a receptacle 38, through wire 40. The cathodes 16 are connected to one side of the secondary 41 of the transformer 42 through wire 43. The opposite side of the coil 41 is connected to wire 45 through switch 46 which is movable into engagement with any

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selected one of a plurality of taps 47. The wire 45 is connected to contact 48 of the receptacle 38.

The current of the output circuit 40, 45 is caused to pulsate by a control unit hereinafter described and which includes means adjustable to control the frequency of the pulsations in the output circuit.

A grid bias circuit is provided for the grids 18 and consists of a wire 50 connected thereto through a resistance 51. The wire 50 is connected to terminal 52 of a potentiometer 54, the movable contact 55 of which is connected to the negative pole of a battery 56, the opposite side of the battery being connected to wire 43, through wire 57. The contact 55, with the potentiometer, is adjusted to effect a negative potential on the grids 18 and when this situation exists no current flows through the tubes 15 from the cathodes 16 to the plates 17, as will be well understood.

The fixed terminals 52, 61, of the potentiometer 54, are connected to the secondary 62 of a transformer 63 through wires 64, 65. The primary 66 of the transformer is connected in a pulsating current circuit in series with a discharge device 67. This circuit is supplied through a secondary coil 68 of the transformer 22. The ends of the coil 68 are connected respectively to the plates 70 of a rectifying tube 71 through wires 72, 73. Wire 74 is connected to the central tap of the coil 68 and to one side of the coil 66 of transformer 63. The filaments 75 of rectifier 71 are connected to a secondary coil 76 of transformer 22, through wires 77, 78, and one side of the discharge device 67, which is here illustrated in the nature of a neon tube, is connected to the filament circuit referred to through wire 79, and the opposite side of the tube is connected to the opposite side of the coil 66, through wire 80, condenser 81, and wire 82. The discharge device 67 is shunted by one or more condensers 83, 84, 85 and 86, like sides of said condensers being connected to the wire 80, through wire 87. The opposite sides of the condensers are connected to contacts 88, 89, 90 and 91, which are engaged by a movable contact 92 connected to wire 79 through wire 93.

The leads 95, 96, of the vibrating unit 12 of the pad are connected to the contacts 37, 48 of receptacle 38. This receptacle is also provided with contacts 97, 98, which are connected to wires 99, 100, and which are, in turn, connected to the feed wires 24, 25, through double pole switch 101. The power unit and the control unit are mounted in a suitable cabinet with the actuating members of the switches 26, 29, 101, and

movable contacts 55, 92, being exposed on the face of the cabinet, and the receptacle 38 is arranged therein to receive a complemental plug attached to a cord made up of the pair of conductors leading from the heating element 11, and the conductors 95, 96, leading from the vibrating coil 12. That is, the receptacle 38 is provided with the four contacts 37, 48, 97, 98, to receive the complemental prong contacts of the plug connected to the cord from the pad 10, the plug and receptacle being of the conventional polarized type, whereby the prongs of the plug cooperate only with selected ones of the contacts of the receptacle.

With this arrangement, current is furnished to the vibrating element 12 through the tubes 15 and, with the grids 18 thereof biased negatively, there is no flow of current to the vibrating element. However, the selected one of the condensers 83, 84, 85, 86, is being charged by the circuit feed through the rectifying tube 71.

It will be observed that these condensers are connected in series with the condenser 81 which preferably is of the electrolytic type and which is so connected in the circuit that it serves as a leak to slowly charge condensers 83—86. The condensers 83, 84, 85 and 86 are each of different capacity and accordingly, each requires a different length of time to become charged to line voltage, or to a voltage sufficient to effect discharge through the discharge device 67. Upon this discharge, a current surge is caused to flow through the primary 66 of transformer 63 and accordingly, a current is induced in the secondary coil 62. The arrangement of the connections are such that the current induced in the coil 62 effects a positive potential on wire 50 and accordingly upon the grids 18, whereupon the tubes 15 pass current to the vibrating element 12.

There may be any number of condensers 83—86 and of varying capacity, so that the frequency of periods during which the tubes 15 pass current may be varied to suit the particular application. Also, the duration of these periods may be controlled by the setting of the movable contact 55 of the potentiometer 54 inasmuch as in the circuit described the potentiometer serves as a leak for the induced current from transformer coil 62.

A visual indicator may be connected in the power output circuit 40, 45, such as a neon tube 110 to visibly indicate the frequency at which the vibrating unit is vibrating.

What we claim is:

1. A therapeutic device comprising a pad adapted to be applied to the body of a patient, said pad including a heating element and a vibrating element comprising a plurality of loosely arranged coils capable of vibrating in synchromism to the frequency of a pulsating current supplied to said coils, a power circuit, a power unit having an output circuit connected to the coils of said vibrating element, and said power unit including control means operable to cause said power unit to produce a pulsating current in said output circuit, said control means being adjustable to vary the frequency of said pulsations, and switch means for selectively connecting said heating unit and said power unit to the power circuit.

2. A therapeutic device comprising a pad adapted to be applied to the body of a patient, said pad including a heating element and a vibrating element comprising a plurality of loosely arranged coils capable of vibrating in response to a pulsating current, a power circuit, a power unit having an output circuit connected to the coils of said vibrating element, a vacuum tube having the plate thereof connected to said output circuit, a grid bias for said tube to restrain the passage of current through the tube to said output circuit, a transformer, the secondary winding of said transformer being connected to said grid bias, the primary winding of said transformer being connected in series with a discharge device, a plurality of condensers connected in shunt with said discharge device, and means operable to selectively charge any one of said condensers, said discharge device being operable to discharge said selected condenser when the charge thereof has reached a predetermined value, said transformer being operable upon said discharge to negative said bias of the vacuum tube, all whereby a pulsating current is produced in said output circuit, and means for selectively connecting said heating element and said power unit to said power circuit.

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