

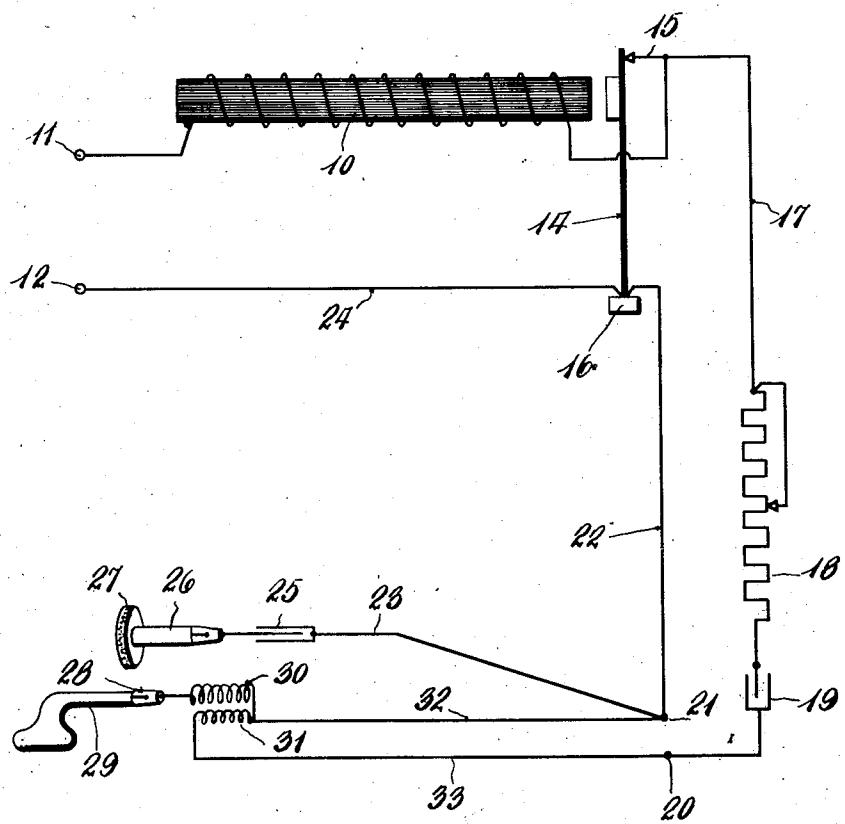
Feb. 8, 1927.

1,617,157

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ELECTROTHERAPEUTICAL DEVICE

Filed Aug. 31, 1922



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Patented Feb. 8, 1927.

1,617,157

# UNITED STATES PATENT OFFICE.

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## ELECTROTHERAPEUTICAL DEVICE.

Application filed August 31, 1922. Serial No. 585,391.

My invention relates to electrotherapeutical devices and pertains specifically to that class of said devices which employ high frequency electricity as the curative agent.

5 The principal object of my invention comprises producing means whereby the patient may, by self-treatment utilize both the direct and indirect methods of application and thereby realize the full advantages and benefits of high frequency treatment without requiring the assistance of an operator or second party.

10 I accomplish this by a novel applicator or electrode of relatively small current carrying capacity incorporated in the high frequency circuit of a high frequency generator, in such novel manner that the full potential generated in the secondary of the static transformer is manifested between my novel applicator and the regular applicator, as will be hereinafter fully described.

15 In the drawing which accompanies and forms a part of this specification, I have illustrated diagrammatically a common form 25 of high frequency generator, showing my device incorporated therein.

20 Referring now to the drawing, I employ an electromagnet 10 provided with a rheotome comprising the vibrating member or armature 14 secured to the fixed support 16, and the adjustable contact member 15. One 30 terminal of the winding of the electromagnet 10 is connected to the contact member 15, while the remaining terminal is connected to a binding post 11. The fixed support 16 is connected through conductor 24 with binding post 12, and the binding posts are intended to be connected to any convenient source of either D. C. or A. C. current supply. The action of the electromagnet 10 in 35 rapidly vibrating the rheotome is well known and needs no further explanation.

40 I further provide a static transformer comprising the primary winding 31 and the secondary winding 30. The primary 31 is connected through conductor 32 with a binding post 21, which is in turn connected through conductor 22 with the fixed support 16 of the rheotome. The remaining terminal 45 of the primary 31 is connected through conductor 33 with a binding post 20 which is in turn connected through condenser 19, adjustable non-inductive resistance 18 and conductor 17 to the adjustable contact 15 of the 50 rheotome. The condenser 19, primary of

55 static transformer, and adjustable resistance 18 are thus all connected in series and in a normally closed circuit which includes the two elements of the rheotome. The secondary 30 of the static transformer is connected through one terminal with one terminal of the primary 31, while the remaining terminal of the secondary is connected to a metal socket 28 adapted to receive a glass or metal electrode or applicator 29, such as is commonly used with high frequency generators of this type. The static transformer and electrode socket are usually contained in an insulating handle.

60 My novel applicator comprises, a condenser 25 of predetermined capacity connected at one terminal through conductor 23 with binding post 21, and at the other terminal to a metal electrode socket 26. An electrode 27 of the sponge type is adapted to 65 fit into the socket 26. The condenser 25, and electrode socket 26 are, of course, contained in an insulating handle.

70 It will be observed that, as the magnet 10 rapidly vibrates the rheotome, condenser 19 will be alternately charged and discharged, at a high rate of speed. Further as the discharge takes place through a path of low resistance and reactance, the discharge is oscillatory, and the discharge current alternates at an excessively high frequency. Therefore, as the action of the static transformer 30—31 consists in amplifying the voltage, there is manifest at the 75 terminal 28 of the secondary 30 a high frequency current of high tension suitable for application to the human body. This discharge may be regulated in intensity by means of the adjustable non-inductive resistance 18, which usually consists of a total 80 specific resistance of less than one ohm, and as small increments of resistance are added to the oscillatory circuit by means of this rheostat, the peaks of the condenser discharge are flattened to diminish the energy, 85 without diminishing the rate of oscillation.

90 In the common application of high frequency current, the patient places the glass electrode 29 upon the afflicted portion of the body and the current enters the body at this point, but does not penetrate deeply as it charges the surface of the body in much the same manner as a condenser is charged.

105 The other method of applying the current consists in substituting a metal electrode for 110

the glass electrode 29, and while the patient holds this electrode in the hand, an operator or second party massages the afflicted part. In this method of treatment, the current flows through the patient from the point of contact of the metal electrode to the point of contact of the operator with the patient, and the current can, therefore, be directed to any portion of the body and at the same time be forced to travel through the body at or near the afflicted portion thereof. This latter method is obviously the better, but it requires the assistance of a second party and it is to obviate this difficulty that my invention is directed.

It will be observed that if the patient holds electrode 29 or the metal substitute therefor and at the same time applies electrode 27 to the afflicted portion of the body, the two contacts with the body constitute the two terminals of the secondary 30 of the static transformer, and thus the full potential of this secondary is manifest between the two points of contact, to cause current to traverse the body between these selected points. The object of the condenser 25 is two-fold, in that it limits the current flow to a safe maximum, and at the same time renders the application safe through interposing an actual obstruction to the passage of excessive current means between the patient

and the source of supply connected to binding posts 11 and 12.

From the foregoing it will be readily observed that with my novel device, one may successfully and safely apply high frequency electricity in the most beneficial manner without requiring the assistance of an operator.

What I claim is:

1. An electrotherapeutical device comprising a generator of high frequency electricity including a static transformer, a first applicator connected to one terminal of the secondary coil of said transformer, and a second applicator connected through a condenser of relatively small capacity to the other terminal of the secondary coil of said transformer connected conductively with the source of high frequency electrical generations. 40 45 50

2. In an electrotherapeutical device, a static transformer, a first applicator connected to one terminal of the secondary of said static transformer a condenser of small capacity connected conductively with the source of high frequency electrical generations, and a second applicator connected through said condenser to the other terminal of the secondary of said static transformer. 55 60

In testimony whereof I affix my signature.  
WILLIAM J. HERDMAN.