

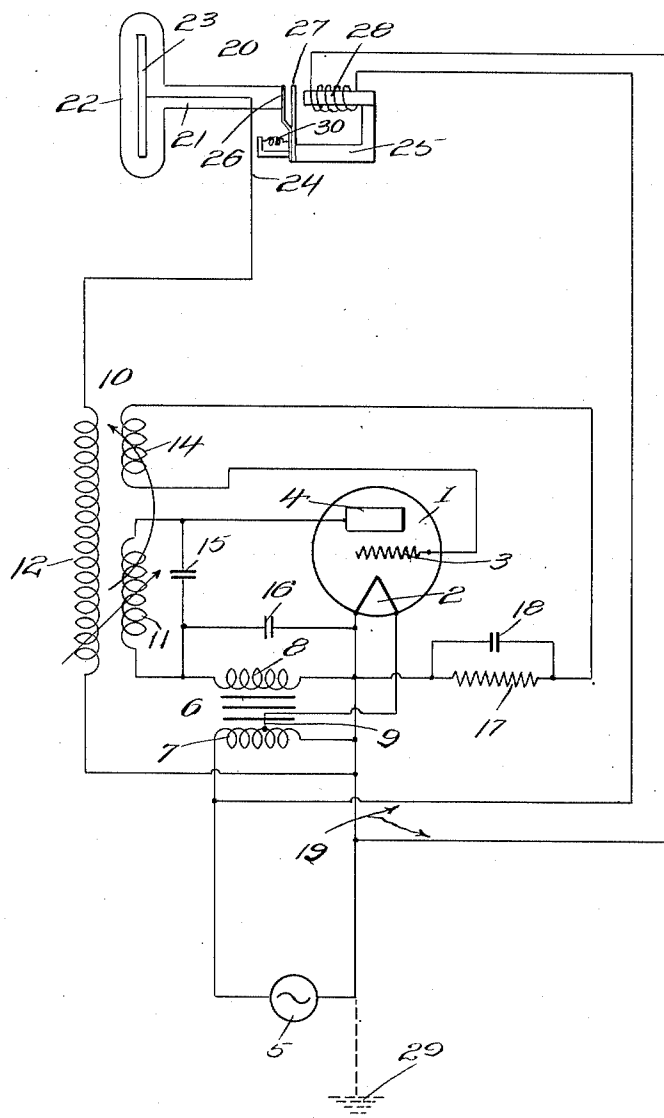
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HIGH FREQUENCY APPARATUS

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HIGH-FREQUENCY APPARATUS.

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My invention relates broadly to a combined electrotherapeutic apparatus and a mechanical vibratory system for imparting beneficial treatments to the human body.

One of the objects of my invention is to provide a high frequency treatment apparatus for subjecting the body to the beneficial effects of high frequency currents with means for simultaneously imparting mechanical vibrations to the body for securing the additional beneficial effects of rapid vibratory movement of the portions of the body under electrical treatment.

Still another object of my invention is to provide a compact apparatus unit which may be readily utilized in the home or office for treating part of the body electrically at the same time that the portions of the body under treatment are subjected to rapid mechanical vibration for increasing the beneficial effects of the electrical treatment thereon. The purpose of my invention is to provide a construction of apparatus unit which may be conveniently employed for subjecting the body to high frequency electrical treatment under conditions where the portions of the body treated are simultaneously rapidly vibrated.

In order to secure the high frequency electrical currents which are employed in the electrical treatment provided by the apparatus of my invention I utilize a constant frequency generator of the type set forth in Letters Patent 1,338,812 dated May 4, 1920, granted to Wendell L. Carlson and Earl C. Hanson. An electron tube oscillator is employed having its circuits arranged for the generation of a constant high frequency electrical current. The energy developed by the electron tube oscillator has a characteristic constant frequency which is far beyond that frequency which affects the nervous system of the body. The electron tube oscillator is conveniently arranged to have its several circuits supplied from a common source, such as the lighting system in the home or office, so that the apparatus becomes operative by merely plugging in a flexible connection from the apparatus unit to the electric lighting socket. The mechanical vibratory system is associated with the high frequency electrotherapeutic electrode or applicator. The vibratory system may be driven at desired intervals and is arranged to be operated simultaneously to actuate the electrotherapeutic applicator

with reference to the body in such manner that, simultaneously with the electrical treatment of the body, the portion of the body under treatment may be subjected to the beneficial effects of vibration. The vibratory effects imparted to the body bring about the desired circulation simultaneously with the electrical treatment and discharge of the high frequency currents over the vibrating portion of the body.

The apparatus of my invention will be more clearly understood by reference to the following specification and the accompanying drawing which diagrammatically illustrates the arrangement of the combined electrotherapeutic vibratory system.

Referring more particularly to the drawing, reference character 1 represents the electron tube high frequency generator. The electron tube contains a cathode 2, a control electrode or grid 3, and an anode or plate 4. The energy for operating the complete apparatus unit is derived from any suitable source, such as the electric lighting circuit which I have designated as comprising generally the alternating current generator 5. The energy for the plate circuit is obtained through transformer 6 having primary winding 7 and secondary winding 8 arranged in any desired ratio in order to impress the proper operating voltage upon the plate circuit. The cathode 2 is heated through a connection to the source of supply 5 and a connection to the midpoint 9 of the primary winding 7. In this way the cathode is heated uniformly on each half cycle in such manner that the oscillations developed will be smooth and uniform. The oscillating circuit includes a transformer 10 consisting of variably coupled windings 11, 12 and 14. Each winding is mutually variable in special relation to the other in order to secure the correct amplitude of the oscillating energy which is to be usefully employed by the applicator 20. The input circuit of the electron tube generator comprises the coupling coil 14 connected to grid 3 and the resistance 17 shunted by by-pass condenser 18. The output circuit of the oscillator includes the plate 4, the coupling coil 11 shunted by the frequency determining element or condenser 15, and the secondary winding 8 from which the high potential energy is obtained. A radio frequency by-pass condenser 16 is connected in shunt with the secondary winding 8.

The resistance 17 prevents excessive grid current when the grid becomes positive during the process of oscillating. The high frequency oscillations are developed in winding 12 and impressed upon the applicator 20. The applicator 20 includes the condenser electrode 21 containing a conducting plate 23 to which the high frequency energy is delivered through conductor 24. The conducting plate 23 is covered by dielectric material 22 such as for instance, bakelite, through which the high frequency discharge takes place. The mechanical vibratory system is secured to one end of the condenser electrode as represented at 26. A magnet 25 has an armature 27 secured to one side thereof arranged in relation to the operating electromagnet winding 28 in such manner that the alternating energy delivered through leads 19 from the source of supply 5 to the winding 28 causes periodic attraction of the armature 27 against the tension of the spring 30. Dependent upon the frequency of the source of supply 5, the vibrations imparted to the condenser electrode may be readily controlled.

The apparatus unit is placed in operation by merely connecting the equipment to a suitable source of supply. One side of the line is generally at ground potential, as represented at 29, so that the condenser electrode 20 when applied to the human body operates to impress high frequency energy from conducting plate 23 through the dielectric surface 22, returning through the ground circuit provided by the body and ground connection 29 or by electrostatic transfer of the high frequency electrical energy. The source of energy delivered by the line system which is utilized to drive the high frequency generator 1 may be the usual 60 cycle alternating current ordinarily employed in power and lighting systems. The arrangement of the electron tube oscillator is such that the usual frequency of 60 cycles delivered by the generator 5 is increased many thousands of times for impression upon the condenser electrode 20 in order to produce the therapeutic currents at a frequency far above that frequency which affects the nervous system of the body.

It will be observed that the electrotherapeutic treatment is conducted simultaneously with the mechanical vibrations imparted by the condenser electrode to the hu-

man body for securing the benefits of both the electrical treatment and the mechanical vibratory treatment.

While I have described my invention in a certain particular embodiment, I desire that it be understood that modifications may be made such as substituting some other source of high frequency energy for the vacuum tube generator herein disclosed, and that no limitations upon the invention are intended other than are imposed by the scope of the appended claims.

What I claim and desire to secure by Letters Patent of the United States is as follows:

1. A high frequency apparatus comprising an electron tube oscillator including grid, filament and plate electrodes with input and output circuits connected therewith, a source of low frequency alternating electrical energy, means for impressing said energy upon said output circuit, means for impressing a portion of said energy upon said filament, said input and output circuits including coupling coils arranged to impress high frequency electrical energy upon a third coil, a condenser electrode including a dielectric area, a conductive plate positioned within said dielectric area, a mechanical vibrator secured to said dielectric area, a connection between said third coil and said condenser electrode, an electromagnetic driver for said mechanical vibrator for imparting mechanical vibrations to said dielectric surface, said electromagnetic driver being actuated from the same source of energy that excites said filament and said output circuit.

2. An electrotherapeutic apparatus comprising an insulated tubular member, an enlarged head carried by one end of said member, a static electrode disposed in said head, an electromagnetic system comprising a U-shaped magnetic core with one side of said core coincident with the longitudinal axis of said tubular member, an armature member laterally extending between the sides of said U-shaped magnetic core and carrying said electrode thereon, said armature member being actuated by an electromagnetic winding disposed on the side of said core which is coincident with the axis of said insulated tubular member.

In testimony whereof I affix my signature.

WENDELL L. CARLSON.