C. W. DE MOOY.

HIGH FREQUENCY MACHINE.

APPLICATION FILED AUG. 20, 1917.

1,376,080. Patented Apr. 26, 1921.

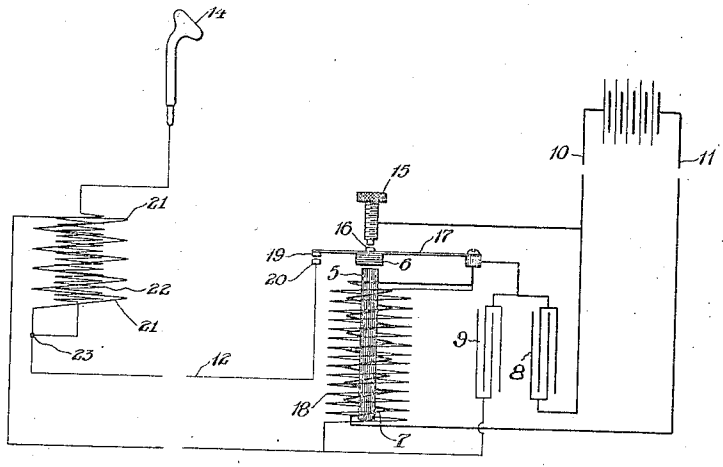


Fig. II

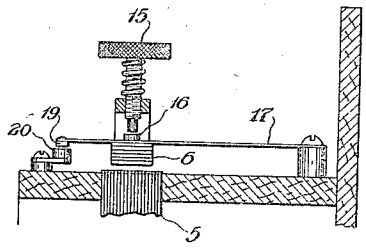
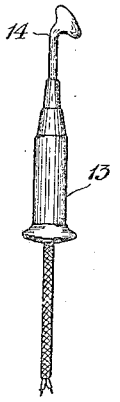


Fig. III



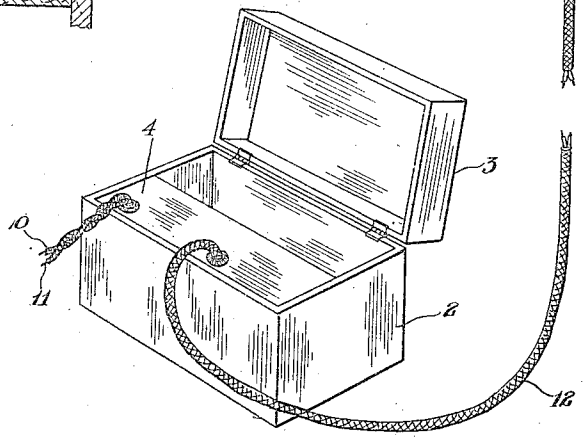
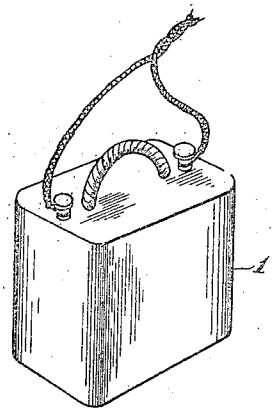


Fig. I



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by his atty

UNITED STATES PATENT OFFICE.

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HIGH-FREQUENCY MACHINE.

1,376,080. Specification of Letters Patent. Patented Apr. 26, 1921.

Application filed August 20, 1917. Serial No. 187,272.

To all whom it may concern:

Be it known that I, CHARLES W. DE MOOY, a citizen of the United States, residing at 1833 E. 55th St., city of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in High-Frequency Machines, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

My invention is an improvement in high frequency machines and particularly to electrical outfits of a portable character intended to be put to therapeutical use. Besides durability of structure and economy in operation, it is obviously desirable to have such a machine as compact as possible and still render effective service.

The objects I have held in mind as associated with patentability, are these:—

1. To furnish discharges adequate for the purpose intended with low voltage.

2. To provide a machine which will be very economical of electric current in proportion to the low voltage required.

3. To employ, in the kind of machine stated, two sets of contact points to be controlled by a single vibrator on opposite sides of which the same are situated.

4. To employ two condensers one being connected to the primary and one to the secondary winding of the induction coil.

5. To contrive to produce a varying spark gap, indeed, a gap varying in sympathy with the current available in the condenser.

6. To widen the range of operable spark gap so that the maximum may be about one-sixteenth as against the average in portable machines heretofore of perhaps five one thousandths of an inch.

With the foregoing and other objects in view the invention consists of the novel construction, combination and arrangement of parts as hereinafter more specifically described and illustrated in the accompanying drawings, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

Adverting to the drawing:—

Figure I is a perspective view of a self contained or portably boxed machine embodying my invention, the same being shown together with a unitary battery as its source of electric current.

Fig. II is a diagrammatic view of the complete electrical system.

Fig. III is an enlarged view of one particular feature.

The entire outfit excepting the dry cell unit 1 is to be contained in a suitable box 2 provided with a hinged cover 3. One side 4 of the box is to be occupied by the fixedly secured units of the system namely the resonator having a magnetic core 5 with its armature 6, an induction coil having a primary winding 7 thereabout and the pair of condensers 8 and 9. The remainder of the box is to accommodate the lead wires 10 and 11, cord 12, support 13 for another induction coil and glass dielectric bulb 14 plus any additional or alterative elements, not shown.

Current flow may be traced along the lead 10 through a spark gap adjusting screw contact 15 to its opposed contact 16 and along the vibrator 17, through the coil 7 and back along the lead 11. In the meantime the primary condenser 8 will functionate. To so place a condenser around the spark gap in the primary circuit is not new. As the current passes through the magnet it attracts and draws the armature 6 away and owing to the reaction of the break induces a current in the secondary winding 18 which must of necessity flow to the secondary condenser 9 to charge the same. This provision of a secondary condenser in the secondary winding of an induction coil is so far as I am aware novel to the art. As the vibrator 17 is actuated to make an impulsive current another secondary contact 19, on the side opposite to that on which the contact 16 is carried, presently approaches near enough to the companion contact 20 to so lower the resistance as to enable the spark to jump across and thus convey the current through the cord 12 to the primary winding 21 of the induction coil within the support 13. When the current becomes alternately broken in this primary coil 21 a high potential is induced in the secondary 22 and regularly discharged through the dielectric terminal 14. As should be apparent, owing to the fact that the high potential is not caused to flow through the cord 12 any disagreeable discharge therethrough is eliminated.

The provision of a double spark gap is not in itself new as the same has been used in rectifiers, but I do claim novelty for the idea of employing a primary and a secondary spark gap in conjunction with an induction coil. By this means of using the upper side of the vibrator for the primary or predetermined spark gap and the under side of its resilient extremity for the secondary and varying spark gap I am enabled to avoid the extremely sensitive adjustment till now required in the case of low voltage apparatus. I have succeeded in having the machine operate successfully with from six to twelve volts while having the spark gap relatively coarse, that is to say, wide.

The advantage of my arrangement of secondary spark gap is that while the current is being induced in the secondary winding, the secondary spark gap points are coming together and in consequence the gap is reduced according as the voltage charge in the secondary condenser diminishes. Thus, as will be readily understood, the resistance is progressively reduced as the charge in the secondary condenser decreases and therefore the latter is always nearly entirely discharged.

I think it broadly new moreover, to take off the secondary current by means of a vibrator thereby making the most effective use of a commonly weak vibrator.

The same arrangement may be made practicable for say, one hundred and ten volts by increasing the turns on the induction coil composed of the primary and secondary coils 7 and 18 respectively.

It will be seen upon inspection of Fig. II that the primary and secondary coils 21 and 22 are grounded at 23 in this wise preventing leakage or conserving all the current to the high frequency discharges intended.

I claim:—

1. A high frequency machine comprising in electrical circuit; a source of current, an induction coil including primary and secondary windings, an armature, a condenser connected with each of said windings, and a device including a secondary spark gap controlled by the movement of said armature for delivering high frequency discharges.

2. A high frequency machine comprising in electrical circuit; a source of current, a resonator, an induction coil having primary and secondary windings, a pair of condensers connected with with the windings of said coil respectively, a vibrator, and primary and secondary spark gap contacts on opposite sides of said vibrator, a second induction coil having primary and secondary windings, said secondary contact being adapted to transmit current flow from said secondary condenser to the primary winding of said last mentioned induction coil.

3. A high frequency machine comprising in electrical circuit; a source of current, an induction coil having primary and secondary windings, a vibrator, two sets of contacts similarly controlled alternately by the movement of said vibrator in opposite directions and operatively connected with the primary and secondary windings of said coil respectively, and a device connected with one set of said contacts for delivering high frequency discharges.

4. A high frequency machine comprising in electrical circuit; a source of current, an induction coil including primary and secondary windings, an armature, primary spark gap contacts, two condensers connected with said windings respectively, and a device including secondary spark gap contacts controlled by the movement of said armature for delivering high frequency discharges, said device being connected at the extremity of a flexible cord, said high potential current jumping across said secondary contacts, whereby the cord may be handled without discharge therethrough.

5. A high frequency machine comprising in electrical circuit; a source of current, an induction coil including primary and secondary windings, an armature, primary spark gap contacts, two condensers connected with said windings respectively, and a device including secondary spark gap contacts controlled by the movement of said armature for delivering high frequency discharges, said secondary spark gap being reduced according as the voltage charge in the secondary condenser diminishes.

Signed by me, this 17 day of August, 1917.

CHARLES W. DE MOOY.