

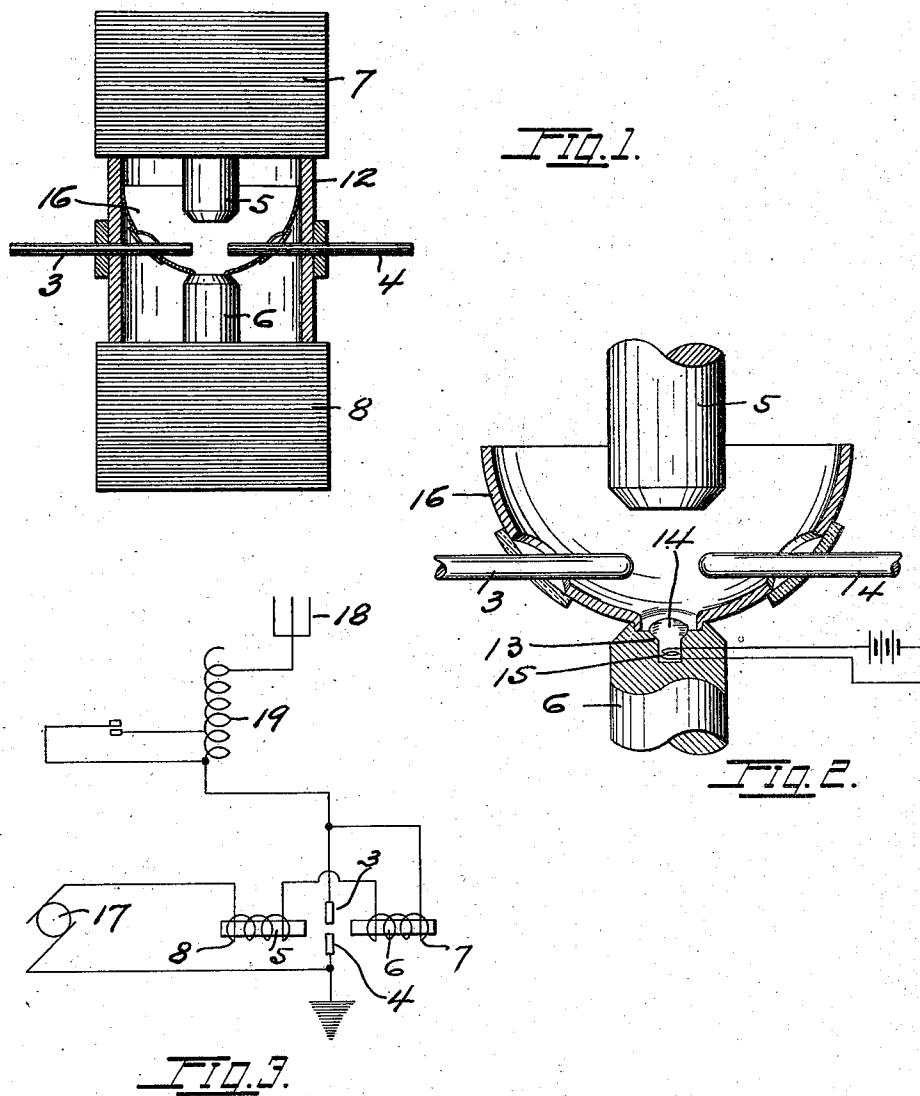
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APPARATUS FOR PRODUCING CONTINUOUS ELECTRICAL OSCILLATIONS

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WITNESS  
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# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR PRODUCING CONTINUOUS ELECTRICAL OSCILLATIONS.

Application filed August 2, 1920. Serial No. 400,763.

To all whom it may concern:

Be it known that I, SYDNEY NORTON BARUCH, a citizen of the United States and a resident of Palo Alto, county of Santa Clara, and State of California, have invented a certain new and useful Apparatus for Producing Continuous Electrical Oscillations, of which the following is a specification.

10 The invention relates to an apparatus for producing continuous or sustained electrical oscillations and particularly oscillations of radio frequency.

An object of the invention is to provide 15 an electrical oscillation generator of the arc type, which produces oscillations of substantially constant frequency.

Another object of the invention is to provide 20 an arc radio generator in which the use of hydrogen or other combustible material is eliminated.

A further object of the invention is to provide 25 an arc radio generator which requires no replenishing of the atmosphere in which the arc burns.

The invention possesses other advantageous features, some of which, with the foregoing will be set forth at length in the following description, where I shall outline in 30 full, that form of the invention which I have selected for illustration in the drawings accompanying and forming part of the present specification. In said drawings I have shown one form of apparatus of my invention, but it is to be understood that I do not limit myself to such form, since the invention as expressed in the claims, may be embodied in a plurality of forms.

Referring to said drawings:

40 Fig. 1 is an elevation, somewhat diagrammatic, of the generator of my invention, the arc chamber casing being shown in section.

Fig. 2 is a vertical section through the lower pole piece, showing diagrammatically, 45 one method of preliminarily heating the mercury.

Fig. 3 is a diagrammatic representation of a radio telegraphy signaling system embodying the generator of my invention.

50 In accordance with my invention, I provide an atmosphere of mercury vapor in the chamber in which the arc is formed, causing electrical oscillations in an oscillating circuit connected across the arc. The arc is formed between the electrodes 3-4, the anode being preferably metallic and the

cathode preferably carbon. The arc gap between the electrodes is subjected to a strong transverse magnetic field formed between the poles 5-6 by the pole windings 60 7 and 8 which are preferably arranged in series with the arc. The poles and the electrodes are enclosed in an air tight casing 12 and the poles are preferably vertically disposed. 65

Means are provided for producing a mercury vapor atmosphere in the chamber. This may be accomplished in several ways, the method shown in the drawings being suitable to efficient operation. The lower 70 pole 6 is provided on its upper surface with a cup or depression 13 in which a suitable quantity of mercury 14 is contained. In starting the arc, the liquid mercury may be vaporized by heat from the arc, the electrodes being longitudinally adjustable so that the arc may be formed without the presence of mercury vapor and subsequently 75 adjusted to the proper oscillating spacing after the mercury vapor atmosphere is 80 formed. Instead of initially vaporizing the mercury in this manner, a heating coil 15 may be arranged in the cup 13 to initially vaporize the mercury after which the vapor is maintained by the heat of the arc. 85

Means are also provided for returning the mercury to the cup when the arc is discontinued and the mercury condenses. Engaging the upper face of the lower pole and forming a tight contact with the casing 12, 90 is a shield or collector 16 which collects the condensed vapor and causes it to return to the cup in the face of the pole. In this manner no mercury is lost and upon condensation is returned to the container where- 95 in it may be subsequently heated and vaporized.

The collector 16 is preferably made of insulating material or it may be made of non-magnetic material and fully insulated from 100 the electrodes.

The arc is formed between the adjustable electrodes and does not spring from the mercury, thus producing a steady arc and permitting very close tuning.

105 Direct current is supplied to the arc by a generator 17, and one side of the arc is grounded and the other side is connected to the antenna 18 through the inductance 19, the arc being thus included in a circuit containing inductance and capacity.

I claim:

1. An apparatus for producing continuous electrical oscillations comprising horizontal electrodes between which an arc is formed, means for supplying electric current to the arc, vertically disposed magnetic poles arranged to produce a field transversely of the arc, a quantity of mercury carried by the lower pole and a casing enclosing the arc and the mercury.

10 2. An apparatus for producing continuous electrical oscillations comprising horizontal electrodes between which an arc is formed, means for supplying electric current to the arc, vertically disposed magnetic poles arranged to produce a field transversely of the arc, a quantity of mercury carried by the lower pole, a casing enclosing the arc and the mercury and a collector

15 for returning condensed mercury vapor to the lower pole.

3. An apparatus for producing continuous electrical oscillations comprising horizontal electrodes between which an arc is formed, means for supplying electric current to the arc, vertically disposed magnetic poles arranged to produce a field transversely of the arc, the face of the lower pole being provided with a depression, a quantity of mercury in said depression adapted to be vaporized to subject the arc 25 to an atmosphere containing mercury vapor and a collector for returning condensed mercury vapor to the said depression.

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In testimony whereof, I have hereunto set my hand.

SYDNEY NORTON BARUCH.