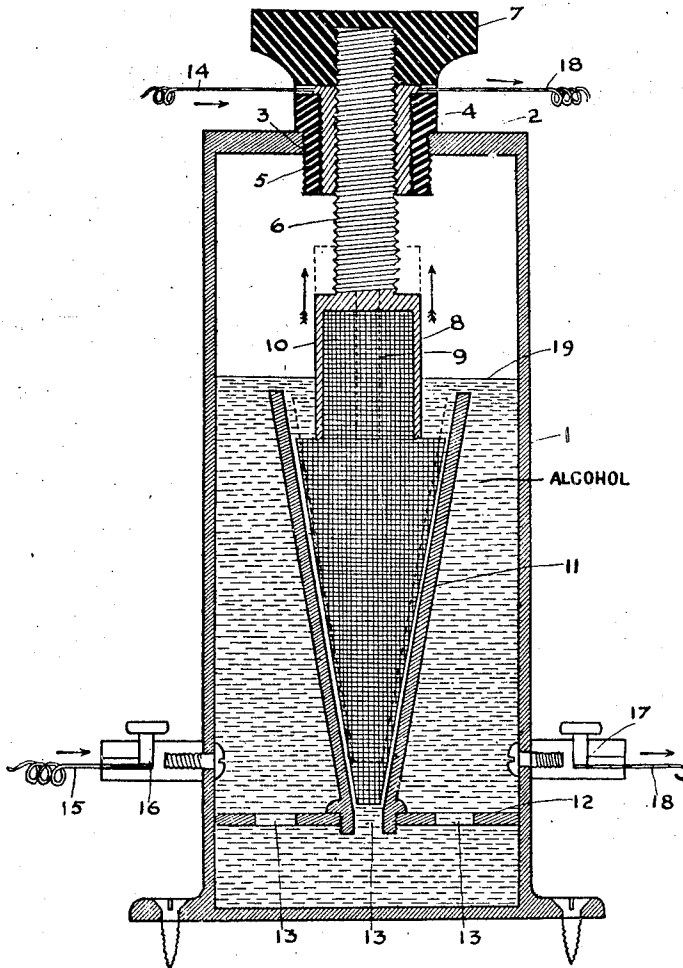


A. A. JAHNKE.
HIGH FREQUENCY OSCILLATOR.
APPLICATION FILED FEB. 25, 1910.

1,047,643.

Patented Dec. 17, 1912.



Witnesses
N. B. Keating
Sam Miller

Inventor
A. A. Jahnke,
by F. M. Wright,
Attorney

UNITED STATES PATENT OFFICE.

ALBERT A. JAHNKE, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO NATIONAL WIRELESS TELEPHONE & TELEGRAPH CO., A CORPORATION OF ARIZONA TERRITORY.

HIGH-FREQUENCY OSCILLATOR.

1,047,643.

Specification of Letters Patent.

Patented Dec. 17, 1912.

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To all whom it may concern:

Be it known that I, ALBERT A. JAHNKE, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in High-Frequency Oscillators, of which the following is a specification.

This invention relates to improvements in means for producing oscillatory currents of high frequency.

In the accompanying drawings, the figure is a sectional view of the apparatus, certain parts being shown diagrammatically.

Referring to the drawing, 1 indicates a metallic vessel, having a closure 2, with an aperture 3 therein. Into said aperture is screwed a sleeve 4 of insulating material, and into said sleeve is screwed a bushing 5 of brass or similar conducting material. Through said bushing 5 is screwed a metallic stem 6 having a rubber head 7, thus constituting a binding post. Said stem carries at its lower end a metal thimble 8, the sides of which are sufficiently thin to be flexible and resilient, for which purpose also it is slotted vertically, as shown at 9. The object in making it resilient is to enable it to hold the carbon electrode 10, the lower portion of which is conical and tapers downward. Around the carbon electrode extends a hollow conical metallic electrode 11 apertured at its apex and of the same angularity as the carbon electrode, said electrodes being arranged in proximity to one another. The small end of the metallic electrode is screwed into a central hole in a web 12 extending across the vessel at a short distance from the bottom having apertures 13.

14, 15, indicate the wires from the direct current generator (not shown), the upper one, 14, of which connects with the upper binding post, and the lower 15 with a binding post 16 secured upon the side of the vessel. To the other side thereof is secured a similar binding post 17 and from said upper and lower binding post lead wires 18 to a condenser and aerial.

In using the above apparatus the vessel is filled with alcohol, as shown at 19, to a height above the electrodes. The electrodes then serve as a shunt between the wires leading to the aerial and produce an extremely rapid oscillation of the current

from the direct current generator. Prior oscillators have been defective, in that the distance between the electrodes rapidly became larger by the use of the apparatus. The distance between the electrodes should remain constant in order to produce the same results at all times and for like currents. This result is accomplished in my invention by reason of the large surface of the electrodes which are in close proximity to, and at the same distance from, each other. The alcohol assists in obtaining this result by decreasing the resistance to be overcome by the discharge. The discharge tends to pass from one electrode to the other where the alcohol is coldest, cold alcohol being a better conductor than hot. When a discharge passes, it heats the alcohol in its vicinity, and therefore it does not pass again at the same point, but seeks a cooler region through which to discharge. In this way the point of discharge is continually changing its position, always seeking the region of coldest alcohol. The alcohol when heated rapidly flows upward between the two electrodes and its place is replaced by cold alcohol coming in from the outside of the electrode 11 through the web and through the bottom hole of the metallic electrode. The alcohol passing rapidly upward between the two electrodes cools them both, this being especially important for the carbon electrode, the metallic electrode being also cooled by the alcohol on the outside. By providing a great number of different positions at which the discharge can pass instead of limiting the point of discharge to a single position as in the ordinary device of this character, I am enabled to produce an oscillating current of very high frequency.

The electrodes are given the conical form, as shown for the purpose of permitting the heated alcohol to escape rapidly upward and its place to be supplied by cold alcohol. This form also permits of easy adjustments of the electrodes to start the discharge and also to compensate for the increase of distance apart due to use. Also with this form when a discharge takes place and a consequent heating of the alcohol, the movement of the alcohol is in an upward direction, the downward movement being resisted by the smallness of the aperture at the point of the cone.

I claim:—

1. A high frequency oscillatory spark gap device comprising a vessel, alcohol held by said vessel, a carbon electrode suspended in the vessel, a web in the vessel, and a metallic electrode carried by the web, said electrodes having parallel opposed terminal surfaces and the web being apertured for the circulation of the alcohol between and around the electrodes.

2. A high frequency oscillatory spark gap device embodying electrodes having extended substantially parallel opposed terminal surfaces, a container, an imperfectly conducting liquid therein in which the electrodes are submerged, a direct current and oscillatory current conductors connected with the electrodes, said electrodes constituting oscillatory circuit terminals.

3. A high frequency oscillatory spark gap device embodying concentric interspaced electrodes, an imperfectly conducting liquid in which said electrodes are submerged, direct and oscillatory current connections with each electrode, and means whereby the liquid is supported and permitted to circulate between the electrodes.

4. A high frequency electrical oscillator spark gap device, consisting of concentric, conical, interspaced electrodes having a vertical axis and constituting oscillatory circuit terminals, a chamber containing an imperfectly conducting liquid within which the electrodes are submerged, connections between the electrodes, a web to which the lower end of the outer electrode is fixed, and

means to suspend the inner electrode from above, said web having openings exterior to and within the outer electrode, whereby a circulation of the liquid between and around the electrodes is effected by a change in its temperature.

5. A high frequency electrical oscillator spark gap device, consisting of vertical, concentric, conical, interspaced electrodes constituting oscillatory circuit terminals, a casing with a contained, imperfectly conducting liquid in which the electrodes are submerged, a disk or web support for the exterior electrode, and a vertically adjustable suspension for the interior electrode whereby the distances between the electrodes may be changed and regulated.

6. A high frequency electrical oscillator spark gap device, consisting of vertical, concentric, conical, interspaced electrodes of different material constituting oscillatory circuit terminals, a container and a liquid in which the electrodes are submerged, means to regulate the distance between said electrodes, and supporting elements for said electrodes permitting a continuous circulation of the liquid between and around the electrodes.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ALBERT A. JAHNKE.

Witnesses:

F. M. WRIGHT,
D. B. RICHARDS.