

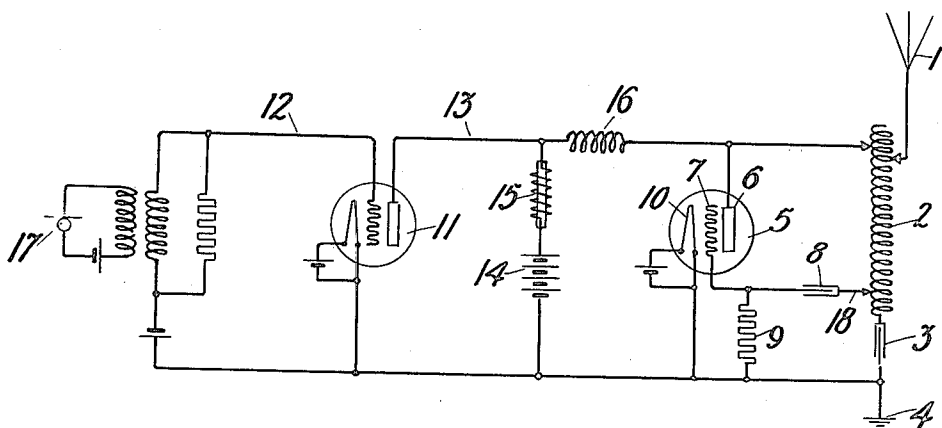
Apr. 17, 1923.

J. F. FARRINGTON

1,452,032

OSCILLATION GENERATOR FOR SIGNALING SYSTEMS

Filed April 30, 1918



Inventor:
John F. Farrington
by J. G. Roberts Att'y

UNITED STATES PATENT OFFICE.

JOHN F. FARRINGTON, OF NEW YORK, N. Y., ASSIGNOR TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

OSCILLATION GENERATOR FOR SIGNALING SYSTEMS.

Application filed April 30, 1918. Serial No. 231,603.

To all whom it may concern:

Be it known that I, JOHN F. FARRINGTON, a citizen of the United States, residing at New York, in the county of Bronx and State of New York, have invented certain new and useful Improvements in Oscillation Generators for Signaling Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to oscillation generators, and more particularly to those of the vacuum tube type, and radio systems employing such generators.

An object of the invention is to provide means for oscillation generators of the kind herein described whereby the feed-back coupling and hence the amplitude of oscillations can be adjusted without changing the frequency of the generated oscillations. In a transmitting station this is of importance, as the necessary adjustment of the oscillator can be made without changing the transmitted wave length. For purposes of illustration, an oscillation generator of the audion or three-electrode vacuum tube type is employed.

The invention will be more fully understood by reference to the accompanying drawing wherein an embodiment thereof is diagrammatically shown in connection with other means constituting a transmitting station.

The oscillating tube 5 is associated with an antenna circuit consisting of aerial 1, coil 2, condenser 3 and ground 4. Anode 6 of the tube 5 is variably connected with the coil 2, while the control electrode 7 thereof is also variably connected at 18 to the coil 2 through the stopping condenser 8. A leak resistance 9 connects the control electrode 7 with the cathode 10. The tube 5 has associated therewith a modulating tube 11 having a microphone controlled input circuit 12 and an output circuit 13. Space current is furnished for both tubes by means of the source 14 through the choke coil 15 which is designed to tend to keep the sum of the space currents of the two tubes constant. Inductance coil 16 prevents short circuit from filament to plate for high frequency and insures counteraction of capacity effects of the coil 15 at high frequencies. If the tube 5 is oscillating and sounds are produced in front of the microphone 17, the oscillations of the tube 5 will be varied in

amplitude according to the sounds acting upon the microphone.

Heretofore in systems of this sort, there has been used a variable condenser in the location of the condenser 3 in order to adjust the potential fed back upon the control electrode 7 of the oscillating tube, so that the tube could be set to oscillating with the proper amplitude, and if on account of any changes of battery potential or other causes the tube was not oscillating properly, due to improper feed-back potential, it would be caused to operate properly by varying condenser 3. Since, however, the condenser 3 is included in the oscillation circuit 1, 2, 3, 4 and also forms part of the plate coupling, any change in it will change the generated wave length and also change the plate coupling, which is highly undesirable as, in practical operation, several readjustments for wave length, plate coupling and input voltage are often necessary in order to secure proper conditions. By "plate coupling" is meant the coupling between the plate circuit of the tube and the oscillatory antenna circuit whereby high frequency energy is transferred to the antenna circuit; by "grid" or "input coupling" is meant the coupling between the antenna circuit and the grid circuit of the tube whereby the necessary high frequency energy is fed back to the grid circuit to apply a proper high frequency potential to the grid.

Means for obviating these difficulties are described herein and consist of means for making the grid lead variable along the coil 2 as indicated at 18, leaving the condenser 3 fixed in value. The feed-back potential is thus secured across a combination of capacitive and inductive reactance thereby permitting variation of input voltage without altering constants of the oscillating circuit 1, 2, 3, 4. The capacity of the condenser 3 should be made somewhat smaller than is necessary for ordinary operation, thereby making available a higher potential than is needed. The reduction in feed-back voltage is secured by including some of inductance 2 in the input coupling by means of adjustable connection 18. By changing the grid input voltage in this manner neither the generated wave length nor the plate coupling is changed, hence the difficulties above referred to are eliminated.

The oscillation circuit 1, 2, 3, 4 may be

regarded as consisting of inductance 2, capacity 3 and a second capacity between the aerial 1 and ground 4. The cathods 10 may be considered as connected between the two

5 capacities.

The present invention is generally applicable to oscillation generators having a capacity or electrostatic feed-back to the input circuit.

10 Novel combinations inherent in my invention are defined in the appended claims.

What is claimed is:

1. In combination, an antenna circuit including a capacity and an inductance, a vacuum tube for generating oscillations in said antenna circuit, an input circuit for said tube, said input circuit being connected across said capacity, and a variable connection to said inductance included in said input circuit for varying the input potential.

2. In a radio system, an antenna circuit including a capacity and an inductance, a discharge tube, an input circuit for said tube, said input circuit including said capacity and a variable part of said inductance.

3. In an oscillation generator, a three-electrode discharge device for generating electrical oscillations, an oscillation circuit, a capacitatively reactive feed-back coupling connecting said device to said circuit, and means including a variable inductance for varying said coupling.

4. In a three-electrode vacuum tube oscillation generator, an oscillation circuit, a source of feed-back potential difference for the tube including a capacity in said circuit, and an inductive means for reducing the feed-back potential difference.

5. In a transmitting system, a discharge device, a cathode, an anode and a control element for said device, an oscillation circuit, an inductance and a capacity included therein, said anode and control element each having a separate variable connection to said inductance, and said cathode having a connection to said circuit remote from said inductance.

6. In a three-electrode vacuum tube oscillation generator, an oscillation circuit, a capacitatively reactive feed-back coupling between said circuit and said tube, and means for varying said coupling while maintaining constant the constants of said circuit.

7. In an oscillation generator, a discharge device, an oscillation circuit therefor, a capacitatively reactive feed-back between said circuit and said device, and means for varying said feed-back while maintaining constant the natural period of said circuit.

8. In an oscillation generating system, an amplifying device, an oscillation circuit, a capacitatively reactive feed-back coupling between said circuit and said device, and means for varying said coupling while maintaining constant the period of said circuit.

9. An oscillation generator comprising a thermionic repeater, a tuned frequency determining circuit, an input circuit for said repeater, a capacitatively reactive coupling between said tuned and input circuits, and devices for varying said coupling while maintaining the tuning of said tuned circuit constant.

In witness whereof, I hereunto subscribe my name this 26th day of April, A. D., 1918.

JOHN F. FARRINGTON.