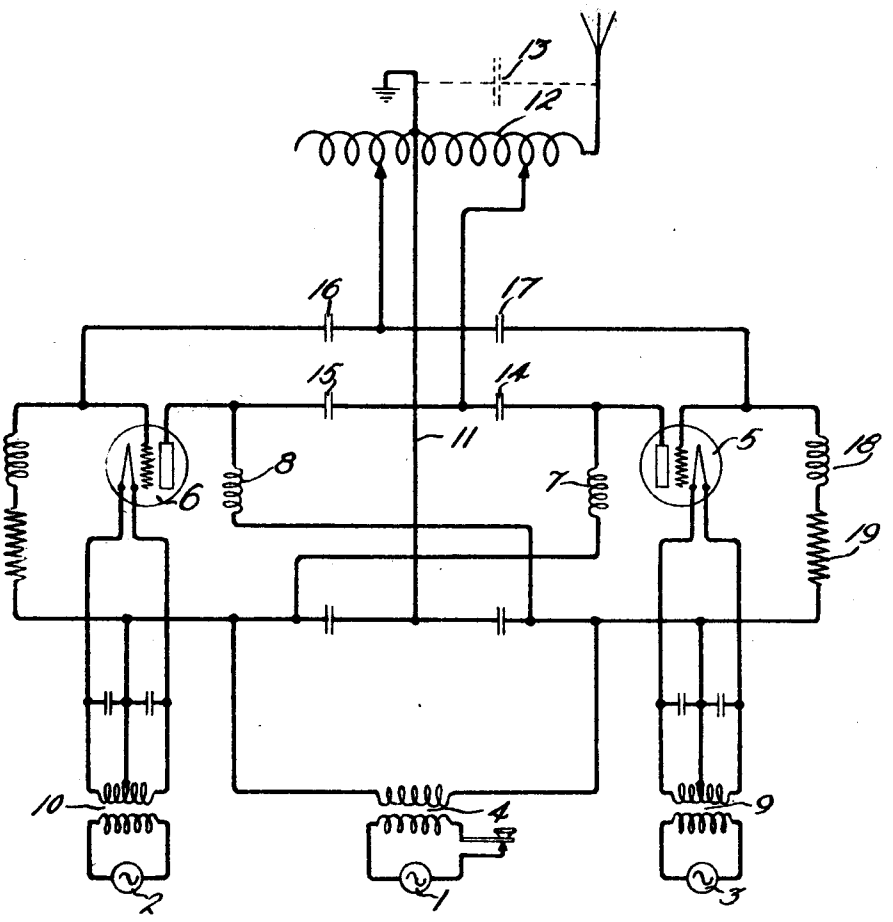
May 17, 1927. 1,629,001

J. C. SCHELLENG

OSCILLATION GENERATOR

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Inventor:
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OSCILLATION GENERATOR.

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The present invention relates to self-rectifying discharge tube oscillators.

An object of the invention is to reduce the voltage required of the power transformer.

A further object is to simplify the circuit in an oscillating system of the type employing a separate discharge tube for each half-cycle of the power current.

Further objects and the various features of the invention will appear from the following description in connection with the accompanying drawing, which is a schematic circuit diagram of one form which the invention may take.

The example chosen for illustrating the principles of the invention employs a source of single phase alternating current for the power supply. It will be obvious to extend the circuit to any number of phases of power supply and to a correspondingly large number of tubes. In the case of single phase power supply, as illustrated, the power transformer comprises but one primary and one secondary winding and the manner of connecting the tubes is such that the full voltage developed in the secondary winding is impressed on each oscillator tube but oppositely in phase.

In the drawing, the single phase alternating current power source is indicated at 1. This may have any desired frequency such as 25 or 60 cycles per second, but in a radio transmitting system it is usual to employ a 500 cycle power source or one of even higher frequency. This source supplies the power transformer 4 of which the secondary has its opposite terminals connected to the anodes of the respective discharge tubes 5 and 6 through the choke coils 7 and 8. These choke coils are of the proper inductance to block the passage of currents of the frequency generated by the tubes, but to permit the currents from the source 1 to pass readily to the anodes.

The terminal of transformer 4 connected to the anode of tube 6 is also connected to the filament of tube 5 by virtue of its connection to the mid-point of the secondary of transformer 9. The opposite terminal of the secondary of power transformer 4 is similarly connected to the filament of tube 6 through the two halves of secondary of transformer 10. The halves of the secondaries of transformers 9 and 10 are shunted by condensers in the manner and for the purpose disclosed in U. S. patent to Heising, No. 1,432,022 dated October 17, 1922.

The secondary of transformer 9 is shunted by two small condensers of the proper dimension to offer high impedance to current of the frequency of source 1 but to pass readily the currents of the high frequencies generated by the tubes. The connection 11, therefore, is practically connected to the filaments of the tubes 5 and 6 as regards the high frequency currents, since the condensers bridging the secondaries of transformers 4, 9 and 10 are of very low impedance at the high frequency.

The oscillatory circuit in which the high frequency waves are produced comprises inductance 12 and condenser 13, either or both of which may be variable in order to control the frequency of the generated waves. This circuit may be coupled to any desired load as, for example, by connecting across the condenser, or by coupling a coil inductively to the coil 12, or in any other suitable manner. The circuit 12, 13 may also be the load itself, as for example an antenna with a loading coil, 13 being then the antenna-to-earth capacity.

Condensers 14, 15 are inserted between the anodes of the tubes 5 and 6 and a point in the inductance 12. Condensers 16, 17 similarly connect the respective grids to a different point on inductance 12. Each of these condensers is small, but is of sufficiently large capacity to offer very low impedance to the passage of the high frequency currents and to have negligible effect on the tuning. These condensers have very high impedance for currents of the frequency of the power source, so that the power currents are effectively prevented from passing directly from the electrodes of one tube to the electrodes of the other.

Each tube is provided with an inductive grid leak, that for tube 5 consisting of an inductance 18 in series with a resistance 19.

In practice the tubes 5 and 6 might be of any power rating and in the case of large power tubes they would preferably have provision for cooling the anodes by circulating some cooling fluid around or through them in a manner well understood in the art. The filaments are heated by current from sources 2 and 3, applied through the transformers 10 and 9, respectively. Generators 1, 2 and 3, which are indicated in conven-

tional manner as separate sources, might in practice be a single source.

The operation of the circuit will be clear from the description of the elements that have already been given. During the half cycle when a particular one of the anodes is positive with respect to its filament the entire voltage developed between the secondary terminals of power transformer 4 is impressed on that tube and the resulting oscillations are supplied to circuit 12, 13 and the load. During the next half cycle the entire secondary voltage is applied to the anode and cathode of the other tube and that tube in turn is active in producing oscillations.

For signaling purposes a key may be inserted at any suitable point in the circuit, such as in the lead of source 1, as illustrated.

The system that has been diagrammatically illustrated and described in detail is to be taken by way of example only and not as limiting the invention, the scope of which is defined in the claims.

What is claimed is:

1. In an oscillation generating system a pair of electric discharge tubes each having a cathode and an anode, an oscillatory circuit common to said tubes, a source of alternating current voltage for said tubes, connections for applying the entire voltage of said source across the anode and cathode of each tube in opposite sense, a connection from the cathodes in common to said oscillatory circuit, a connection from the anodes in common to said oscillatory circuit, and means for preventing the flow of current of the frequency of said source from one cathode to the other or from one anode to the other while permitting current of the frequency generated to pass readily between either cathode or either anode and the oscillatory circuit.

2. In an oscillation generating system, a pair of electric discharge tubes each having an anode and a cathode, a power source of alternating voltage common to said tubes, said source having one terminal connected to the anode of one of the tubes and to the cathode of the other and having its other terminal connected to the remaining anode and cathode, an oscillatory circuit common to the tubes, means to supply to the oscillatory circuit from both tubes currents of frequencies high compared to the frequency of the alternating voltage of said power source, means connected between each anode and the oscillatory circuit and between each cathode and the oscillatory circuit for freely passing currents of the high frequency but offering high impedance to the passage of currents of the frequency of the power source, and other means connected between the power source and each anode for preventing passage of currents of the high frequency while freely passing currents of the frequency of the power source.

3. In an oscillation generating system, a pair of electric discharge tubes each having an anode and a cathode, a source of alternating current power for said tubes, an oscillatory circuit determining the frequency of the oscillations generated, a connection from one terminal of the power source to the anode of one tube and the cathode of the other, a connection from the opposite terminal of the power source to the remaining anode and cathode, connections for supplying currents of the frequency of the oscillations to be generated between each cathode and anode and the oscillatory circuit, said connections each including means offering high impedance to currents of the frequency of the power source.

4. In an oscillation generating system, an oscillation circuit determining the frequency of the oscillations generated, a pair of electric discharge tubes each having an anode and a cathode, a source of alternating current power supply having one pole connected to the cathode of one tube and to the anode of the other tube and the opposite pole connected to the remaining cathode and anode, a connection for supplying generated oscillations from each anode to the oscillation circuit, and a capacity in each connection for freely permitting passage of currents of the frequency of the oscillations generated and preventing passage between the anodes of currents of the frequency of the power supply.

In witness whereof, I hereunto subscribe my name this 5th day of September, A. D. 1923.

JOHN C. SCHELLENG.