

L. DE FOREST.
SPACE TELEPHONY.
APPLICATION FILED JULY 8, 1907.

1,006,636.

Patented Oct. 24, 1911.

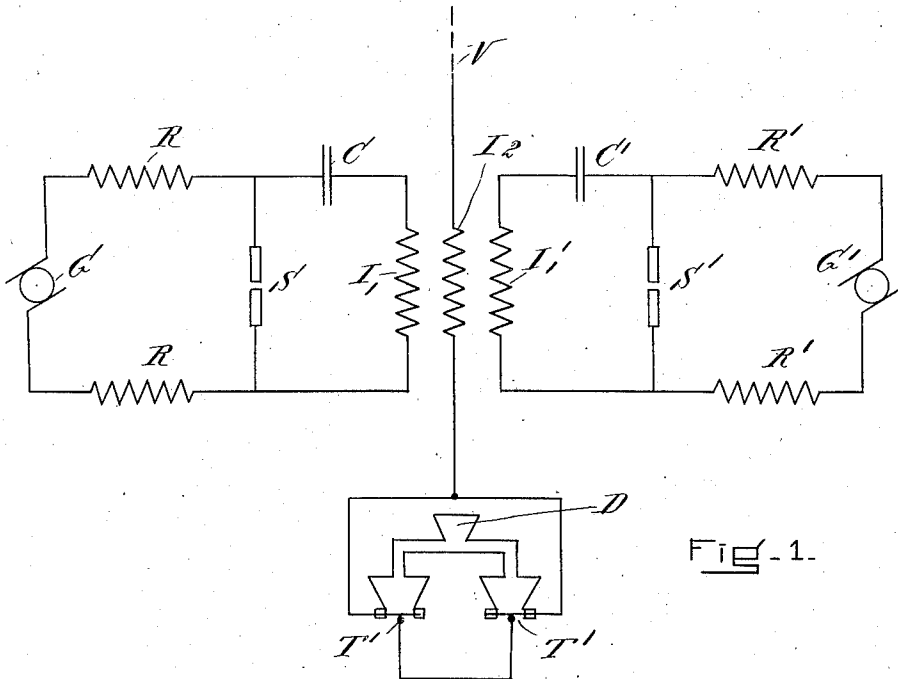


Fig-1.

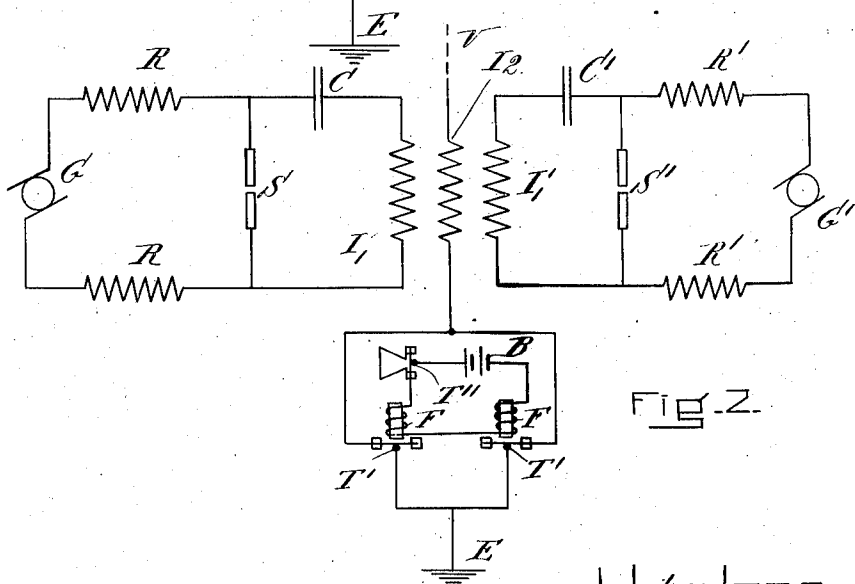


Fig-2.

WITNESSES:
G. A. Higgins
E. B. Tomlinson

INVENTOR:
Lee de Forest
by Geo. Woodworth

UNITED STATES PATENT OFFICE.

LEE DE FOREST, OF NEW YORK, N. Y., ASSIGNOR TO DE FOREST RADIO TELEPHONE CO.,
A CORPORATION OF NEW YORK.

SPACE TELEPHONY.

1,006,636.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed July 8, 1907. Serial No. 382,676.

To all whom it may concern:

Be it known that I, LEE DE FOREST, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented a new and useful Improvement in Space Telephony, of which the following is a specification.

My invention relates to space telephone transmitting systems, and its objects are to increase the distance over which transmission may take place and, in general, to improve the efficiency of such systems.

The drawings which accompany and form a part of this specification represent in diagram several arrangements of apparatus and circuits whereby said objects may be realized; but it will be understood that I do not limit myself specifically to the particular embodiments of my invention therein illustrated inasmuch as many modifications may be made both in the apparatus and in the circuit arrangements without departing from the principle of my invention.

In the drawings, Figures 1 and 2 represent space telephone transmitting systems constructed in accordance with the present invention.

In the figures, G is a source of electrical energy herein shown as a direct current generator.

R R' are resistances or impedances.

C C' are condensers.

S S' are dischargers for the condensers C C', and in the present instance are shown as gaps in which electric arcs may be created.

I₂ is the secondary of an oscillation transformer, of which the primaries are I₁ and I₁'.

T T' T'' are transmitting devices which may be of any suitable construction and which are shown herein as microphones or variable resistance devices.

The circuits C S I₁ and C' S' I₁' are oscillation circuits, each adapted to develop high frequency electrical oscillations having the same time period. These circuits are initially designed and adjusted to the same time period, and into step with each other and with the natural period of the antenna, and thereafter they naturally and automatically retain their condition of step or phase relation with respect to each other, just as two alternating current generators, if adjusted to coincident

phase relation, when used to energize the same coil of a transformer, naturally tend to remain in step with each other. The oscillations developed by these circuits may have a spark-frequency higher than the more essential frequencies accompanying articulate speech, or a spark-frequency higher than the limit of audibility, or as shown, each circuit may be a continuously oscillating circuit or a "singing-arc" circuit of any approved type. Inasmuch as there is a limit to the amount of energy that may be employed with a singing-arc circuit, I employ a plurality of such circuits, herein shown as two, each associated in any suitable manner with a transmitting antenna V which may be connected to earth at E through a plurality of branches. The number of said branches may be equal to the number of oscillation circuits employed, although I do not limit myself to this particular arrangement, and, inasmuch as there is a limit to the amount of energy that may be passed through a telephone transmitting device, I employ a plurality of such devices, one for each of said branches. In this case, as will be obvious, the energy delivered by the oscillation circuits to the antenna is divided into as many portions as there are branches to earth and each portion passes through a different one of the transmitting devices T T'. I prefer as shown to connect said transmitting devices in the earth connector of the antenna so that each will be at a point having practically zero potential to earth. Controlling means common to said transmitting devices are provided, the controlling means shown in Fig. 1 consisting of the megaphone arrangement D whereby sound waves may be directed to both transmitters T T', and that shown in Fig. 2 consisting of the master transmitter T'', which may be a microphone transmitter and which by varying the resistance of the circuit of the battery B causes the electromagnets F F' to actuate the transmitters T T'.

I claim:

1. In a space telephone transmitting system, a transmitting antenna, a plurality of independent oscillation circuits having the same period associated therewith, a plurality of transmitting devices included in circuit with the antenna, and operating to modify the oscillations generated therein by the oscillation circuits, and means common

to all of said transmitting devices for simultaneously controlling the same.

2. In a space telephone transmitting system, a transmitting antenna, a plurality of
5 oscillation circuits associated therewith and having the same periods and adjusted to be in step with each other, and cooperating to generate oscillations in the circuit of said antenna, a plurality of transmitting de-
10 vices, each included in circuit with the antenna, and operating to modify the oscillations therein, and means common to all of said transmitting devices for controlling the same, said controlling means including
15 means for directing sound waves simultaneously to all of said transmitting devices.

3. In a space telephone transmitting sys-

tem, a transmitting antenna, a plurality of oscillation circuits having the same time period associated therewith, and operating
20 to produce electrical oscillations in said antenna, a plurality of transmitting devices arranged in circuit with the antenna and at points having practically zero potential, and
25 operating to modify the oscillations in said antenna, and means common to all of said transmitting devices for simultaneously controlling the same.

In testimony whereof, I have hereunto subscribed my name this 3d day of July 1907. 30

LEE DE FOREST.

Witnesses:

ROSCOE KENT,

THOMAS I. GALLAGHER.