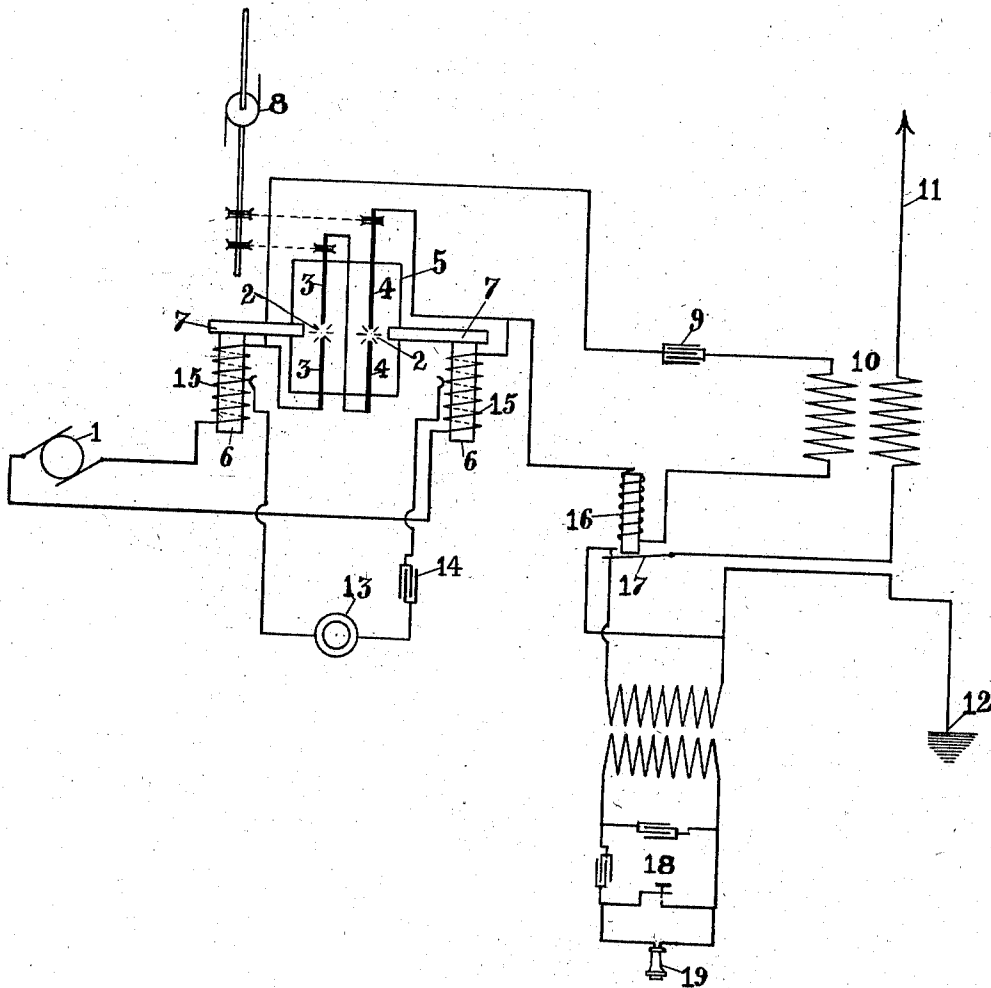


V. H. LAUGHTER.
TRANSMITTING SYSTEM FOR SPACE TELEPHONY.
APPLICATION FILED JULY 10, 1909.

957,852.

Patented May 10, 1910.



Witnesses

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VICTOR H. LAUGHTER, OF DETROIT, MICHIGAN.

TRANSMITTING SYSTEM FOR SPACE TELEPHONY.

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Specification of Letters Patent.

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Application filed July 10, 1909. Serial No. 506,954.

To all whom it may concern:

Be it known that I, VICTOR H. LAUGHTER, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Transmitting Systems for Space Telephony, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to space telephony, and more especially to an arrangement thereof whereby a transmitter and receiver are automatically thrown in and out of action by the operator's voice.

The general arrangement of the apparatus for transmitting a message may be the same as that described in my application for transmitting system for space telephony Serial No. 492,763, filed April 28, 1909, and must include an energizing circuit that has a condenser and means for producing an electrical arc, or as commonly known, a "singing arc circuit" in which advantage is taken of the influence a magnetic field has upon oscillations across separated electrodes surrounded by a sensitive gaseous medium, and by the change of stress imposed upon the arc or space gap by a magnet whose force is variable.

The invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims.

The drawing indicates diagrammatically an arrangement of apparatus embodying features of the invention.

Referring to the drawing, a suitable generator 1 is in series with spark gaps 2 formed by electrodes 3 and 4 in a closed casing 5 filled with steam, hydrogen, or other suitable gaseous medium, and the solenoids of blow-out magnets 6 whose armatures 7 are adjustably secured behind each arc. One or both of the electrodes of each arc may be rotated as by a motor 8 either electrically or mechanically. A condenser 9 and transformer 10 with transmitting antenna 11 and ground connections 12 in shunt across the arcs complete the secondary portion of the transmitting system. A transmitter 13 of any preferred type in series with a condenser 14 is placed in shunt across the magnet solenoids 15, the respective layers of the latter being tapped out, as indi-

cated, or arranged so that the number of turns in circuit may be varied to change the magnetic field if desired.

In the operation of this part of the system the condenser 14 prevents the current from the generator from burning out the telephone transmitter, while the sound waves of the voice on the transmitter vary its conductivity in the usual manner, and set up oscillations which are impressed upon the current passing through the arcs and over the blow-out magnetic fields, thus doubly influencing the main circuit and inducing in the secondary circuit like oscillations which pass from the antenna to the ether in the usual manner.

It has been found in practice that when the voltage and current supply exceed or fall below a certain point, the arcs no longer send out or cause oscillations which are impressed upon the secondary or antenna circuit. The arcs when in this condition are known as "inactive" and the point at which they change from "active" to "inactive" is known as the "critical" point. When the apparatus is adjusted so that the arcs closely approach this critical point from the "inactive" side, it is found that speaking into the transmitter so changes conditions that the arcs become "active" as long as the sound waves are impressed upon the circuit, and thus the antenna circuit is energized. When the voice waves cease, the arcs and circuit are again "inactive." This fact is taken advantage of by placing an electromagnet 16 in the primary circuit in position to attract a switch 17 which is in series between the secondary coil of the transformer 10 and the ground 12 and is adapted when so attracted by the magnet to connect the antenna directly to the ground 11. When the switch 17 is released by the magnet when the circuit and arc become "inactive" as happens when the voice waves do not affect the receiver 13, the switch brings the secondary coil of a transformer of a set of receiving instruments indicated at 18 with receiver 19 into series with the antenna and ground or otherwise throws the receiving set into operative relation to the antenna or aerial circuit. As a result, an operator may hold direct conversation with another station, the receiving set being cut in and out automatically by the action of the operator's

voice upon the transmitter, without fear of injury to the delicate instruments of the receiving set from the current of the transmission circuit.

5 While the apparatus indicated is preferable, it is to be understood that any form of transmitting apparatus may be used in which the means for impressing oscillations upon a circuit by sound waves may be brought or "tuned" to a point where it only becomes active when variations are set up in the exciting circuit, and the receiving set may be likewise of any suitable type. This arrangement obviates the necessity of throw-over or circuit-opening switches, with their attending difficulties of operation and consequent loss of time, the operator working as readily as with the ordinary conductor telephone system now in common use.

20 Obviously details of construction, form of apparatus used and the arrangement thereof may be altered without departing from the spirit of the invention, and I do not limit myself to any particular form or arrangement of parts.

25 Having thus fully described my invention what I claim is:

1. Space telephony apparatus comprising 30 a transmitting set including in the circuit oscillation-inducing means adapted to be adjusted to a state of inactivity close to the critical point, and means adapted when influenced by sound waves to bring the oscillation-inducing means to the critical operative point, a receiving set, and means in 35 circuit with the transmitting set adapted to throw the receiving set into operative relation with the aerial limb of the transmitting set when the oscillation-inducing means is 40 inactive and to cut out said receiving set when the inductor is rendered active.

2. Space telephony apparatus comprising 45 a transmitting set including in the primary circuit an oscillation-inducing means adapted to be adjusted to a state of inactivity close to the critical point, and means adapted when impressed by sound waves to bring the oscillation-inductor to the critical point, 50 and a secondary circuit including antenna and ground connections, a receiving set using the said secondary circuit in common with the transmitting set, and means in the primary circuit adapted to throw the receiving set into operative relation with the 55 secondary circuit when the oscillation inductor is inactive, and to cut it out when the inductor is active.

3. Space telephony apparatus comprising 60 a transmitting set including in the primary circuit oscillation-inducing means adapted to be adjusted to a state of inactivity close to the critical point, an electro-magnet, and the primary coil of a transformer, a transmitter in shunt to the primary circuit and 65

in the secondary circuit an antenna, a ground connection and the secondary coil of the transformer, a receiving set including in its primary circuit a receiver, the secondary coil of a transformer whose primary coil is in series with said antenna and ground, and a switch operated by the electro-magnet and adapted to open the receiving primary circuit when the oscillation-inducing means is active and to close it 75 when the latter is inactive.

4. Space telephony apparatus comprising a transmitting set including in series in the primary circuit a generator, oscillation-inducing means adapted to be adjusted to a state of inactivity close to the critical point, 80 an electro-magnet, and the primary coil of a transformer, a transmitter in shunt to the primary circuit adapted to be actuated by sound waves to influence the oscillation inducing means, and in the secondary circuit 85 an antenna and ground connections in series with the secondary coil of the transformer, a receiving set including a transformer whose primary coil is in series with the 90 antenna and ground and whose secondary coil is in series with a receiver, and a switch operated by said electro-magnet and adapted to open the circuit of the receiving set when the oscillation-inducing means is active. 95

5. Space telephony apparatus comprising a transmitting set including in the circuit a singing arc adapted to be adjusted to a state of inactivity close to the critical point, 100 an electromagnet in series with the arc and having conventional antenna and ground connections, and a receiving set operatively connected to the said antenna and ground connections, and provided with a cut out 105 switch adapted to be opened by the electro-magnet when the singing arc becomes active.

6. Space telephony apparatus comprising a transmitting set including a transmitter adapted to be influenced by sound waves 110 and an oscillation-inducing means that is active only when the transmitter is in operation, and an electro-magnet in series with the oscillation-inducing means, a receiving set operatively connected to the aerial limb 115 of the transmitting set, and a cut out switch operated by the electro-magnet and adapted to open the receiving set circuit when the transmitter is in operation.

7. Space telephony apparatus comprising 120 a transmitting set consisting of an energizing circuit containing an adjustable arc gap surrounded by a sensitive gaseous medium, means for impressing electric oscillations on the medium, means for maintaining 125 magnetic stress on the medium, means controlled by sound waves adapted to vary the intensity of the oscillations and the magnetic stress, a secondary transmitting antenna circuit, a receiving set consisting of a receiver 130

operatively connected to the antenna circuit, an electro-magnet in the energizing circuit adapted to be operative only when the arc is operating, and a switch operated by the electro-magnet and adapted to cut out the receiver when the arc is active, the arc being adapted to be adjusted to a point close to the critical point where it becomes active only when the sound-controlled means is operating.

8. Spacing telephony apparatus comprising a transmitting set consisting of an energizing circuit containing a receptacle inclosing gaseous medium, means for impressing electric oscillations on the medium, means for maintaining magnetic stress on the medium, a secondary transmitting antenna circuit responsive to the energizing circuit, means controlled by the sound waves adapted to vary the intensity of oscillations and the magnetic stress, a receiving set consisting of a receiver operatively connected to the antenna circuit, an electro-magnet in the energizing circuit adapted to be operative only when the oscillation impressing means is operative, and a switch operated by the electro-magnet adapted to cut out the receiver when the oscillation impressing means is active, the latter being adapted to be adjusted to a point close to the critical

point whereby it becomes active only when the sound-controlled means is operating.

9. Space telephony apparatus comprising an energizing circuit including in series a generator, arcs surrounded by a sensitive gaseous medium and magnets adapted to impose magnetic stress on the medium, means in shunt across the magnet actuated by sound waves and adapted to vary the intensity of oscillation in the energizing circuit, and a second transmitting antenna circuit responsive to the energizing circuit, a receiving set consisting of a receiver operatively connected in conventional manner to the antenna circuit, an electro-magnet in the energizing circuit adapted to be operative only when the arc is operating, and a switch operated by the electro-magnet and adapted to cut out the receiver when the arc is active, the arc being adapted to be adjusted to a point close to the critical point whereby it becomes active only when the sound-controlled means is varying the intensity of the oscillations in the energizing circuit.

In testimony whereof I affix my signature in presence of two witnesses.

VICTOR H. LAUGHTER.

Witnesses:

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A. M. SHANNON.