No. 749,370. PATENTED JAN. 12, 1904.

C. D. EHRET.

WIRELESS SIGNALING SYSTEM.

APPLICATION FILED NOV. 15, 1902.

NO MODEL.

Fig 1.

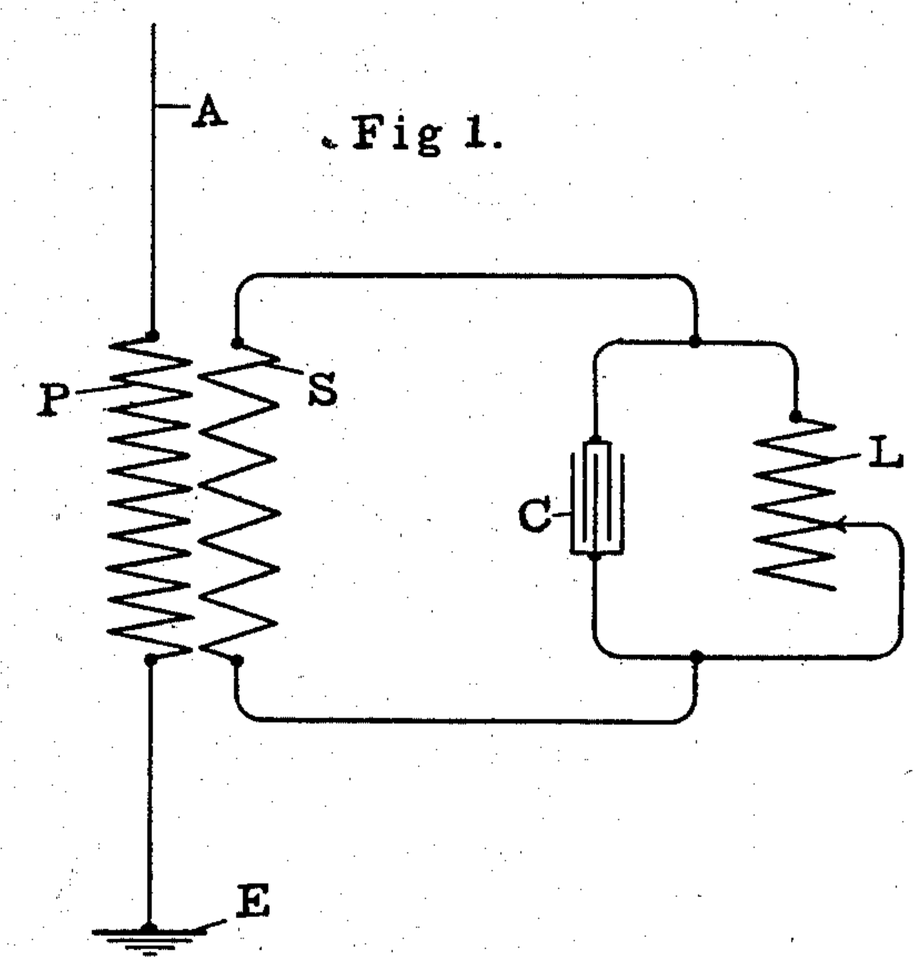
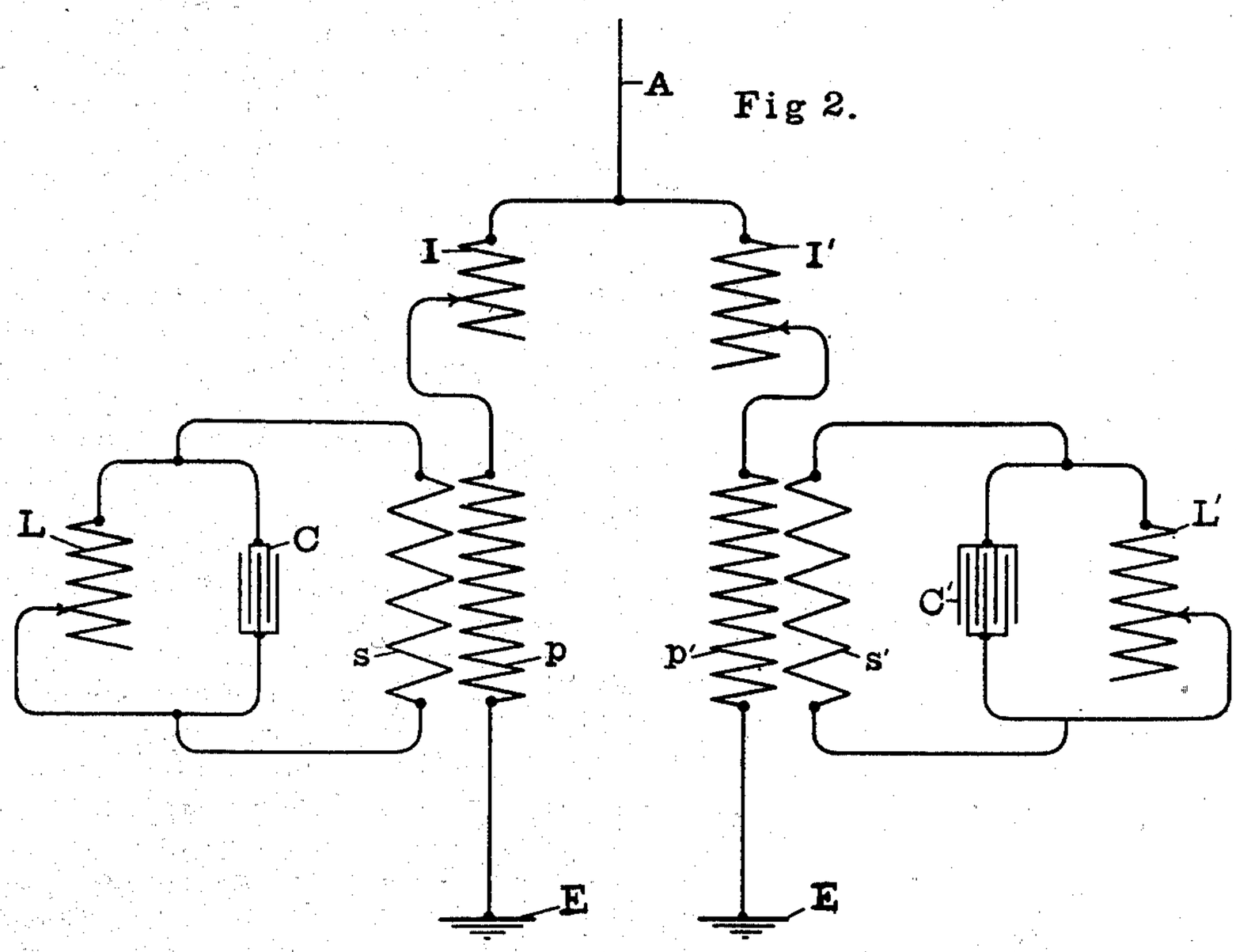


Fig 2.



WITNESSES:

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INVENTOR

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No. 749,370. Patented January 12, 1904.

UNITED STATES PATENT OFFICE.

CORNELIUS D. EHRET, OF ARDMORE, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO INTERNATIONAL WIRELESS TELEGRAPH COMPANY, A CORPORATION OF NEW JERSEY.

WIRELESS SIGNALING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 749,370, dated January 12, 1904.

Application filed November 15, 1902. Serial No. 131,484. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS D. EHRET, a citizen of the United States, residing at Ardmore, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Wireless Signaling Systems, of which the following is a specification.

My invention relates to wireless signaling systems in which the energy representing the signal or message is in the electroradiant form and is transmitted through the natural media.

My invention consists of a method of transmitting intelligence by means of electrical energy in electroradiant form, such method having reference particularly to the translation of the transmitted energy into a signal or message at the receiving-station.

My invention consists in increasing the current component of the received electroradiant energy after having been transformed into the energy of currents in the receiving-circuits.

My invention consists also in increasing the current component of the current energy produced in the receiving-circuit by the transmitted energy, this increase being effected by the employment of a closed tuned circuit so adjusted as to its electrical constants as to be sharply resonant for currents of a frequency equal to that of the transmitted electroradiant energy.

My invention consists in increasing the current component of a current energy produced in the receiving-circuit by the transmitted energy by the employment of a closed tuned circuit and employing such increased current component for producing a signal in a device either of the electrostatic type or else the magnetic type, such device or translating device forming a part of or an entire frequency-determining element of the closed tuned circuit.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a diagrammatic representation of the circuits at a receiver suitable for carrying out the herein-described method. Fig. 2 is a diagrammatic view of the circuit of a receiver whereby a plurality of messages may be simultaneously received, the electroradiant energy representing each message being subjected to the series of steps above outlined.

In Fig. 1, A represents the usual aerial conductor of a wireless signaling system, between which and the earth connection E is the primary winding P of a transformer whose secondary is indicated at S. This transformer is shown as a step-down transformer—that is, the current in the secondary circuit is greater than that in the primary, though the potential of the secondary is less than that of the primary. C and L are an adjustable condenser and adjustable inductance, respectively. They are connected in parallel with each other, but in series with a secondary circuit. The electroradiant energy received upon the aerial conductor A is of a fixed and definite frequency. The frequency of the currents in the secondary circuit are of precisely the same frequency, and by adjusting the condenser C and inductance L the local circuit embracing said condenser C and inductance L only may be made resonant with the currents of the critical frequency existing in the secondary circuit. It is of the essence of my invention that the condenser C and inductance L be adjusted to exact and precise resonance with the frequency of the transmitted electroradiant energy, and therefore of the currents in the secondary circuit. Any departure, however slight, from this exact and precise adjustment would greatly alter the effects produced in the antiresonant circuit in the direction of greatly reducing the beneficial results. It is possible with improper adjustment to approximate more or less closely the results I attain by my method; but it is my invention to adjust the antiresonant circuit to precise resonance, whereby the maximum and best effect is procured.

As the translating device for reproducing the signals or messages may be employed, for example, an electrostatic telephone—that is, a condenser-telephone, such as is well-known in the arts. The condenser of the telephone-

receiver is made adjustable and is, in fact, then the condenser C of the closed tuned circuit, or the translating device may be of the electromagnetic type—such for example, as a telephone-receiver comprising two flat coils connected in series, one of the coils being secured to the body of the telephone-receiver, while the other is secured to the diaphragm. In this case the two coils in series would supplant the inductance L of the closed tuned circuit, or both an electrostatic telephone-receiver or other device and an electromagnetic telephone-receiver or other device may be used simultaneously in the closed tuned circuit. With such arrangement the electrostatic telephone-receiver might be held to one ear, while the electromagnetic telephone-receiver might be held to the other ear.

Though I have shown the closed tuned circuit as included in the secondary of a transformer, I may include the same directly in the aerial circuit.

In Fig. 2, A represents the usual aerial conductor, and associated therewith are the two branch circuits, including adjustable inductance I and primary p and the adjustable inductance I′ and the primary p', respectively. The aerial conductor A, taken in conjunction with each one of these branch circuits, forms a receiving aerial circuit selective of a predetermined frequency of electroradiant energy. By this means a plurality of energies of different frequencies may be simultaneously received and properly selected to the desired recording-circuit. The inductances I and I′ are made adjustable for the purpose of properly tuning the aerial circuit. The primaries p p' afford a portion of the inductance for each branch circuit. At s is shown the secondary of the transformer whose primary is p, there being included in the circuit of this secondary the closed tuned circuit, including the adjustable inductance L and adjustable condenser C, which are so adjusted with respect to each other that they will form a closed local circuit sharply resonant with the frequency of the energy selected to the branch circuit, including the primary p. Similarly at s' is shown the secondary of the transformer whose primary is p'. In the circuit of this secondary is included the second antiresonant circuit, including inductance L′ and condenser C′, both adjustable. The closed tuned circuit C′ L′ is adjusted to sharp resonance with the frequency of the energy selected by the branch circuit, including the primary p'.

By the arrangement shown in Fig. 2, therefore, the plurality of messages may be simultaneously received and recorded, such messages being represented by energy of characteristic frequency.

When the closed tuned circuits herein shown and described are properly adjusted to precise resonance, there will circulate in them currents of a magnitude far in excess of the actual current in the secondary circuit or the circuits in which the closed tuned circuits are included in series. In order, however, that this current shall be a maximum—that is, that the current component of the current energy in the secondary or other circuits shall be increased to a maximum—the adjustments of the capacity and inductance of the closed tuned circuits must be such as to secure exact resonance.

This application discloses subject-matter shown and described in my application, Serial No. 84,514, filed December 3, 1901.

What I claim is—

1. The method of rendering intelligible electroradiant energy transmitted through the natural media, which consists in transforming the electroradiant energy into the energy of electric currents, and increasing the current component of said energy of electric currents by supplying said energy to a circuit including a closed resonant circuit comprising capacity and inductance arranged in branches which are in parallel with each other.

2. The method of rendering intelligible electroradiant energy transmitted through the natural media, which consists in transforming said electroradiant energy, into the energy of electric currents, increasing the current component of said energy of electric currents by supplying it to a circuit including a closed resonant circuit comprising capacity and inductance arranged in branches which are connected in parallel with each other, and causing said increased current component to actuate or control a signal-producing device.

3. The method of rendering intelligible electroradiant energy transmitted through the natural media, which consists in transforming said electroradiant energy into the energy of electric currents, increasing the current component of said energy of electric currents by a step-down transformer, and further increasing the current component by supplying said energy to a circuit including a closed resonant circuit comprising capacity and inductance arranged in branches which are connected in parallel with each other.

4. The method of rendering intelligible electroradiant energy transmitted through the natural media, which consists in transforming the electroradiant energy into the energy of electric currents, and increasing the current component of said energy of electric currents by supplying it to branches connected in parallel with each other and including respectively inductance and capacity so adjusted and proportioned as to render the closed circuit formed by said branches resonant with respect to the transmitted electroradiant energy.

5. The method of rendering intelligible electroradiant energy transmitted through the natural media, which consists in transforming the electroradiant energy into the energy of

electric currents, increasing the current component of said energy of electric currents by supplying it to branches connected in parallel with each other and including respectively inductance and capacity so adjusted and proportioned as to render the closed circuit formed by said branches resonant with respect to the transmitted electroradiant energy, and utilizing a frequency-determining element as a signal-producing means.

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Witnesses:
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