No. 699,158. Patented May 6, 1902.

C. D. EHRET.

WIRELESS TELEGRAPH SYSTEM.

(Application filed Dec. 3, 1901.)

(No Model.)

Fig I

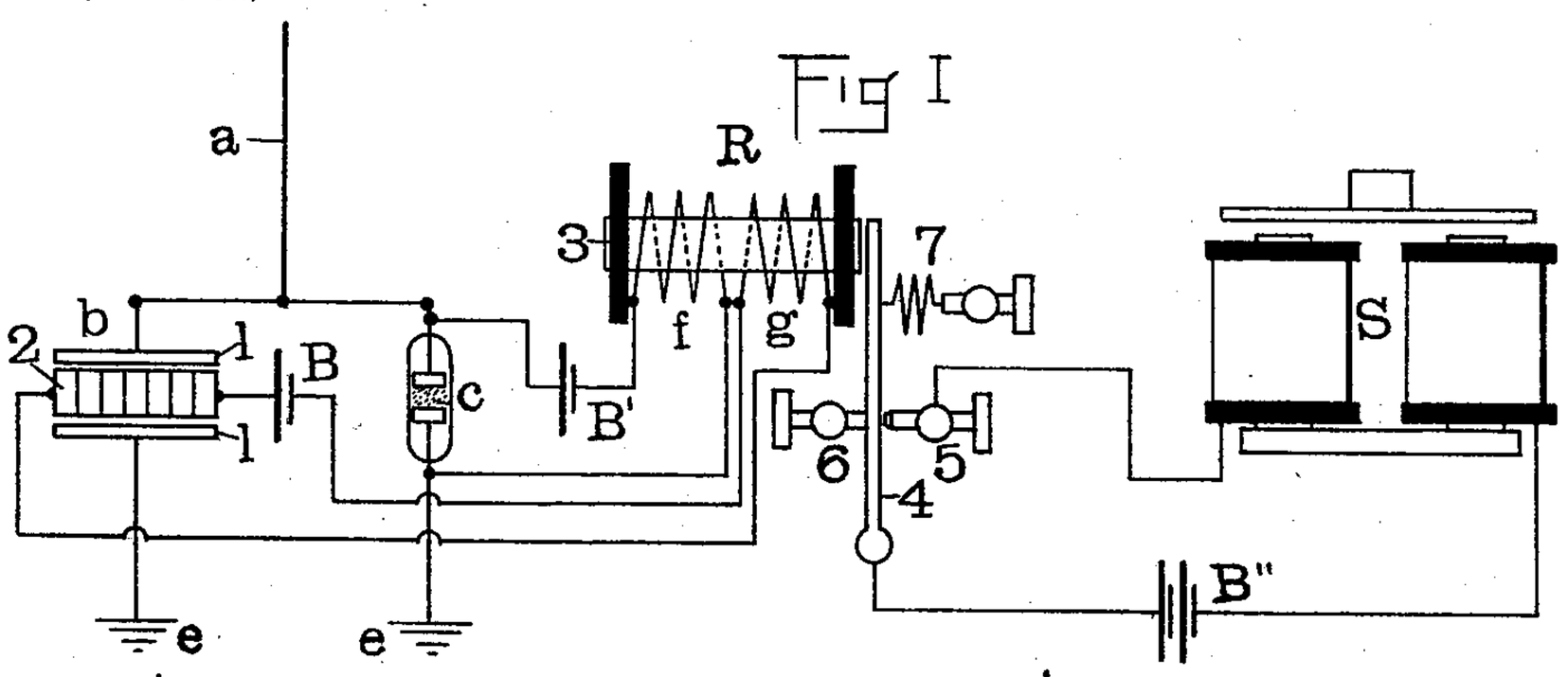


Fig II

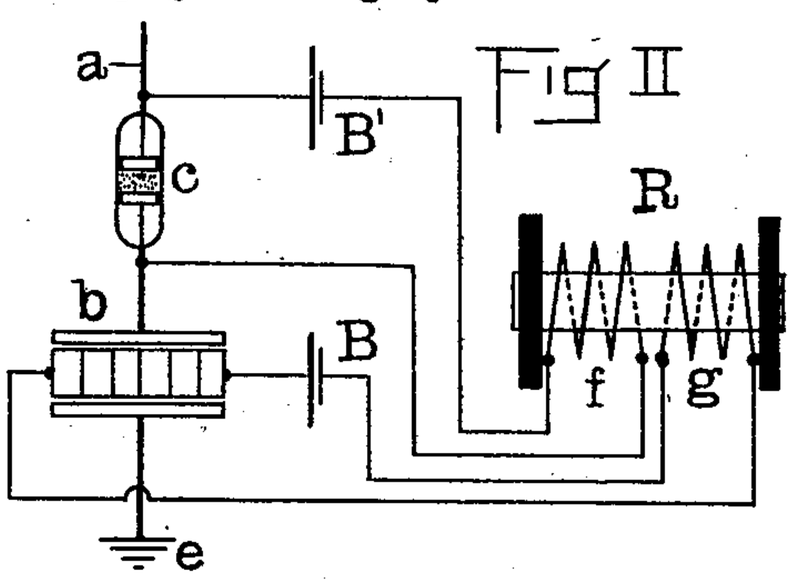


Fig III

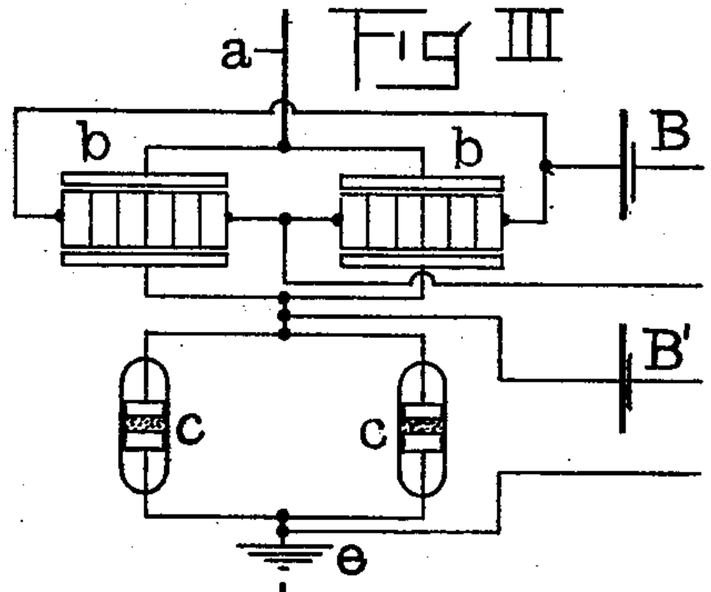


Fig IV

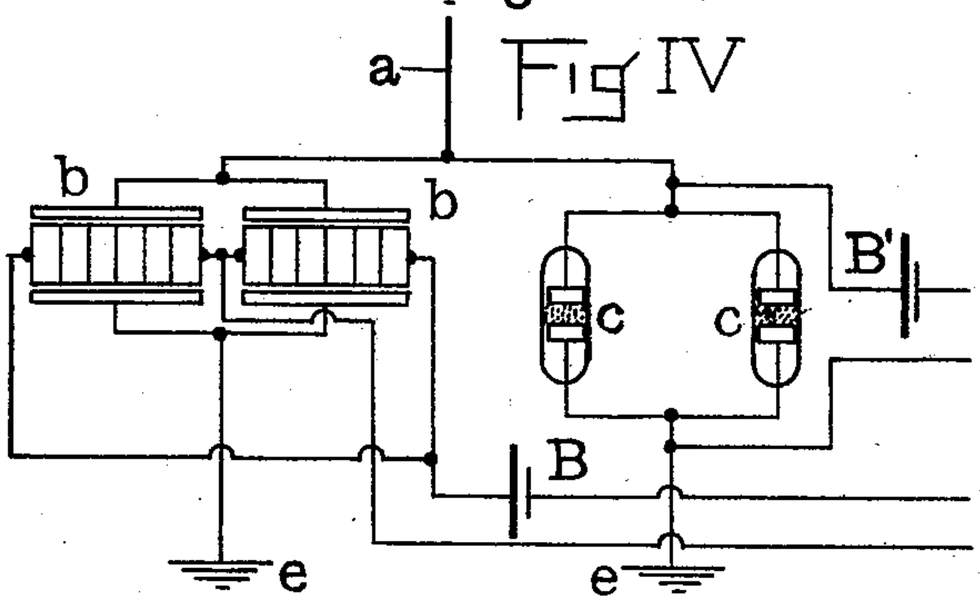


Fig V

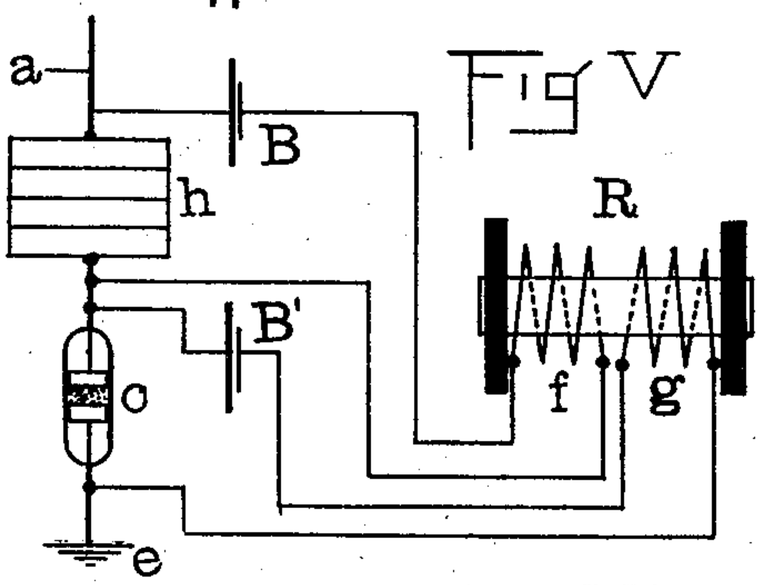


Fig VI

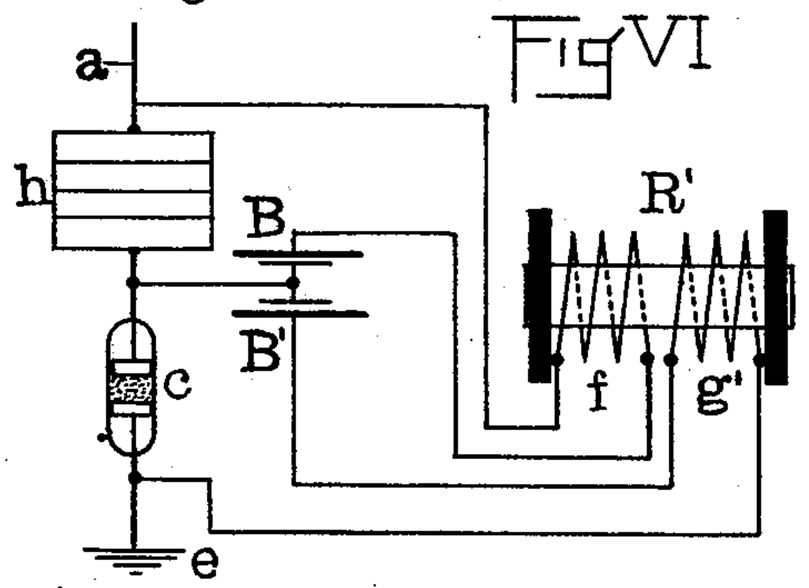
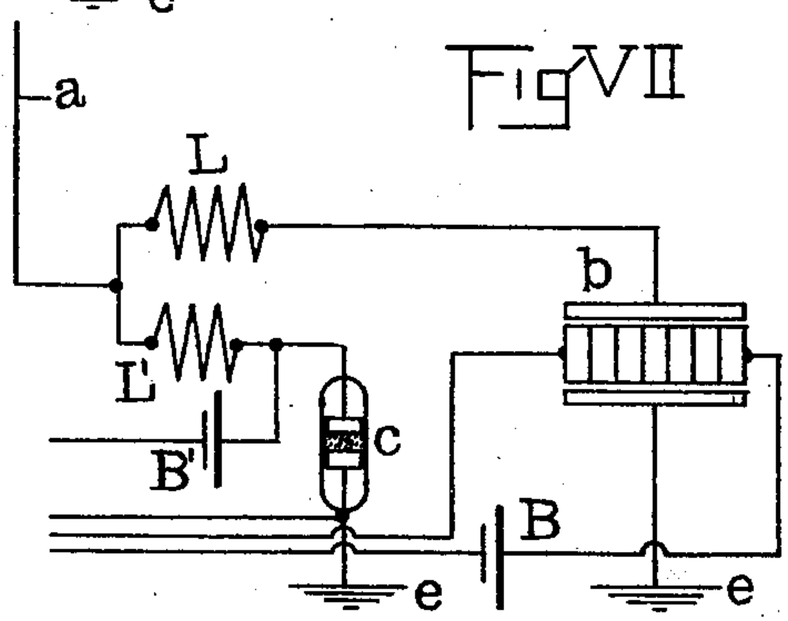


Fig VII



Witnesses
R. H. Strother
L. A. Fenning

Inventor
Cornelius D. Ehret.

UNITED STATES PATENT OFFICE.

CORNELIUS D. EHRET, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO AMERICAN WIRELESS TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF ARIZONA TERRITORY.

WIRELESS-TELEGRAPH SYSTEM.

SPECIFICATION forming part of Letters Patent No. 699,158, dated May 6, 1902.

Application filed December 3, 1901. Serial No. 84,513. (No model.)

To all whom it may concern:

Be it known that I, CORNELIUS D. EHRET, a citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful Improvements in Wireless-Telegraph Systems, of which the following is a specification.

My invention relates to wireless telegraphy, and more especially to the apparatus at the receiving-station.

It comprises, essentially, two dissimilar wave-responsive devices which jointly control local circuits to produce the signals.

It further comprises a wireless-telegraph receiver which is operated by the simultaneous reception of electromagnetic waves of different frequencies, the waves of different frequencies operating upon dissimilar wave-responsive devices, such devices being in local circuits by which are produced the signals.

So far as I am aware up to the present time but one type of wave-responsive device has been used in any receiving instrument, such device comprising either the well-known filings-coherer, which has the property of losing its resistance under the influence of waves, or the anticoherers, which have the property of increasing their resistance under the influence of waves. I propose to use in a single receiving device wave-responsive devices of both types, thereby securing, in effect, greater sensitiveness and longer range in the use of wireless-telegraph apparatus.

For a detail description of my invention reference is to be had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view showing a wireless-telegraph receiving-station embodying dissimilar wave-responsive devices. Figs. 2, 3, 4, 5, and 6 are modifications showing different arrangements of the wave-responsive devices. Fig. 7 is a diagrammatic view of a system in which waves of two frequencies are received and each of the dissimilar wave-responsive devices is operated upon by the waves of each frequency.

a is the usual aerial conductor of a wireless-telegraph system, which is connected to earth through the wave-responsive devices *b* and *c*.

b comprises an anticoherer, of which the members 1 are sheets of tin-foil separated by small gaps from the sheet of tin-foil 2, which has numerous extremely-narrow slits running transversely thereof. The device *c* is the usual filings or equivalent coherer. To the terminals of the sheet 2 is connected the battery B, which supplies current to coil *g* on the relay R. Battery B′ is in the local circuit embracing the coherer *c* and remaining coil *f* of the relay R. The core 3 of the relay R is polarized and normally tends to attract armature 4 against stop 6 in opposition to the tension of the spring 7.

The device *b* is normally conducting and permits a current from battery B to continuously circulate through coil *g*, which is wound in such a direction as to aid the permanent magnetism of the core 3. The coil *f* and its associated battery B′ are so disposed as to produce ampere-turns in opposition to the coil *g*. Normally, however, there is no current in coil *f*.

Upon the reception of Hertzian waves upon the aerial conductor *a* coherer *c* becomes conductive, and the device *b* increases greatly in resistance and practically opens the circuit of the coil *g*. The result is that the pull upon the armature 4 is diminished, due to the loss of magnetism normally produced by coil *g*, and the magnetism of core 3 is in addition reversed by coil *f*, resulting in the release of armature 4 to the pull exerted by spring 7, which causes armature 4 to make contact with screw 5 and close the local circuit through recording device S and battery B″, producing a signal.

As a modification core 3 may be made of soft iron, in which case armature 4 should be polarized in such manner that normally it is attracted against stop 6, due to the effect of coil *g* and its own magnetism.

In Fig. 1 the receiving devices *b* and *c* have been shown connected in parallel. In Fig. 2 I have shown them connected in series and as controlling local circuits precisely as in Fig. 1, such circuits including the coils *f* and *g* of the relay R, which is similar in every particular to that of Fig. 1.

In Fig. 3 I have shown two devices *b* in par-

allel connected in series with two coherers *c*, which are in parallel.

In Fig. 4 I have shown two devices *b* in parallel with each other and in parallel with two coherers *c*, which are in parallel with each other.

It is to be understood that the disposition of the batteries B and B′ in Figs. 3 and 4 is such that in combination with the coils *f* and *g* they produce the result described in Fig. 1—that is, the coils *f* and *g* always act in opposition to each other, whether wound in opposition to each other or not.

In Fig. 5 I have shown in series with the aerial conductor *a* the wave-conducting device *h* and coherer *c*. The device *h* is a sheet of thin metal transversely slitted corresponding to the member 2 of device *b*. Here again the coils *f* and *g* of the relay R oppose each other to the same end as described in Fig. 1.

Fig. 6 is similar to Fig. 5, with the exception that a split battery B B′ is used. In this case the coils *f g* are wound in the same direction; but from the arrangement of the split battery shown their magnetizing effects are opposed to each other.

In Fig. 7, *a* is the usual aerial conductor, having a certain capacity, and in series with it are the inductances L L′, which are in parallel with each other and which connect to earth through *b* and *c*, respectively. The conductor *a* and inductance L form together a circuit which is selective of one of the frequencies received, while *a* and the inductance L′ is selective of the other frequency. The devices *b* and *c*, with their associated batteries B and B′, control a relay in the same manner as described in connection with Fig. 1—that is, the coil controlled by *c* is opposed to the coil controlled by *b*.

Other devices than the slitted foil detectors *b* and *h* may be used in their stead, it being understood that for *b* or *h* may be substituted any anticoherer, many forms of which are known in the art of wireless telegraphy, such as the electrolytic anticoherer.

Likewise the device *c* may be one of many forms of wave-responsive devices well known in the art, which have the property of diminishing in resistance under the influence of Hertzian waves.

It is preferable in cases where the two dissimilar wave-responsive devices are in series relation to have the one which loses its resistance connected in the circuit next to the aerial conductor itself and the anticoherer next to the ground connection.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a signaling system, the combination of dissimilar wave-responsive devices conjointly controlling a translating device.

2. In a signaling system, the combination of dissimilar wave-responsive devices each having associated therewith a local circuit, said circuits being conjointly operative to produce a signal.

3. In a signaling system, the combination of dissimilar wave-responsive devices, and means controlled by each type of device, said means operating conjointly to produce a signal.

4. In a signaling system, the combination of dissimilar wave-responsive devices, and separate means controlled by each type of device, said means operating conjointly to produce a signal.

5. In a signaling system, a receiver selective of waves of two or more periodicities; dissimilar wave-responsive devices influenced by the waves of different frequencies; and separate means controlled by said wave-responsive devices, said means operating conjointly to produce a signal.

6. In a signaling system, the combination of dissimilar wave-detecting devices, and local circuits controlled by said devices, each of said circuits including a coil of a relay, said coils operating differentially on the magnetic circuit of said relay, substantially as described.

7. In a receiver, the combination of a coherer and an anticoherer conjointly controlling a translating device.

8. In a receiver, the combination of a coherer and an anticoherer, a local circuit associated with each, and means for producing a signal controlled by said local circuits.

9. In a receiver, a coherer and an anticoherer, means controlled by each, said means operating conjointly to produce a signal.

10. In a receiver, the combination of a coherer and an anticoherer, a separate means controlled by each, said means operating conjointly to produce a signal.

11. A receiver selective of energies of different frequencies; a coherer and an anticoherer influenced respectively by the different energies, and means, conjointly operative to produce a signal, controlled by the coherer and anticoherer.

12. In a receiver, the combination of a coherer and an anticoher, a local circuit controlled by each, a coil of a relay included in each circuit, said coils operating differentially on the magnetic circuit of said relay, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CORNELIUS D. EHRET.

Witnesses:
R. H. STROTHER,
F. A. FENNING.