No. 790,179. PATENTED MAY 16, 1905.

F. BRAUN.

WIRELESS TELEGRAPHY.

APPLICATION FILED NOV. 4, 1904.

Fig. 1.

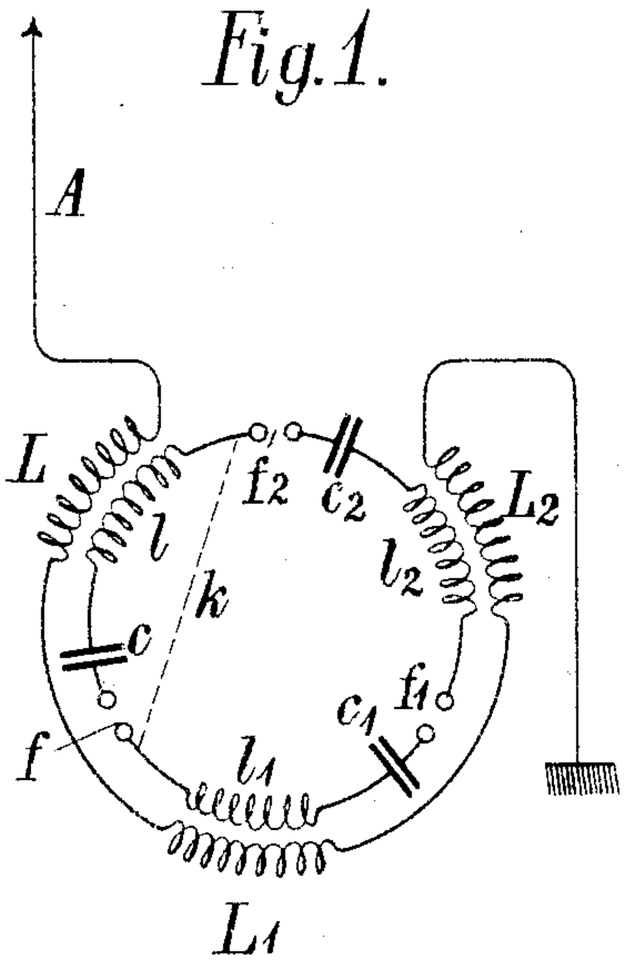
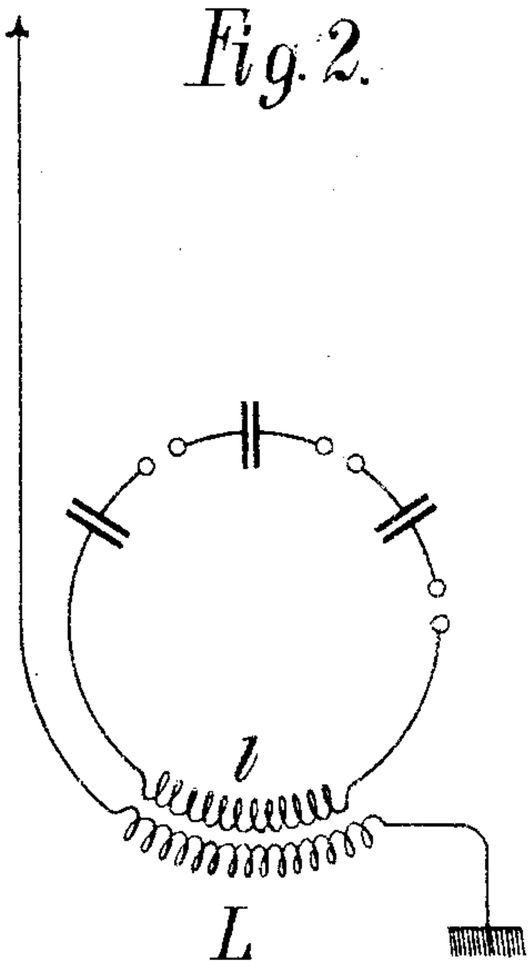


Fig. 2.



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UNITED STATES PATENT OFFICE.

FERDINAND BRAUN, OF STRASSBURG, GERMANY.

WIRELESS TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 790,179, dated May 16, 1905.

Application filed November 4, 1904. Serial No. 231,360.

To all whom it may concern:

Be it known that I, FERDINAND BRAUN, doctor of philosophy and professor, a subject of the German Emperor, residing at Strassburg, Alsace, Germany, have invented a certain new and useful Improvement in Wireless Telegraphy, of which the following is a full, clear, and exact description.

In the specification of a former application, filed April 22, 1904, Serial No. 204,352, a transmitter for wireless telegraphy is described in which several separate spark-gaps are contained in the oscillating system and in which by a disposition of means parallel to the spark-gaps a distribution of the charge potential adaquate to the length of the spark-gaps is reached. By this way the damping of the oscillating system is considerably diminished or the exciting energy is highly increased.

By this invention another way is shown which in certain cases has proved very efficient.

In the description of the former application the influence of the length of the spark-gap over the damping of the oscillating system has been fully explained. In order to diminish this damping, it has been found preferable to employ instead of one large spark-gap several small ones, over which the charge potential is distributed adaquate to the length of the several spark-gaps. The present invention also makes use of this means. According to this invention the essential distribution of the charge potential over the separate spark-gaps, however, is reached by a suitable distribution of the whole capacity of the oscillating system over the circuit-conductors between the separate spark-gaps.

Reference is had to the accompanying drawings, in which—

Figure 1 is a diagrammatic view of a transmitter in combination with a closed exciting-circuit. Fig. 2 is a diagrammatic view of the modification of the transmitter shown in Fig. 1.

In the transmitter shown in Fig. 1 an aerial conductor is excited by means of the transformer $L\ l\ L'\ l'\ L^2\ l^2$ from a common oscillating circuit in which the three spark-gaps $f\ f'\ f^2$ are connected by equal or nearly equal amounts of self-induction and capacity $c\ c'\ c^2$. The separate induction-coils and condensers are such that each separate circuit, (for instance, the circuit $c\ l\ f$,) when discharged through a short-circuit yoke k (shown in dotted lines) yields the desired wave length. By the connection in series of the separate circuits, omitting this short-circuit yoke, the length of the waves remains unaltered in consequence of the diminution of the capacities by connection in series and the simultaneous increase of the self-inductions. If the separate condensers $c\ c'\ c^2$ are charged in parallel from the inductor or transformer, utilizing ohmic resistances or choking-coils of suitable character, the energy is threefolded in regard to one of the circuits $c\ l\ f$; but the length of waves is unchanged. For practical purposes it is preferable and electrically equivalent to combine the self-inductions $l\ l'\ l^2$, which are distributed in a method of connection such as is shown in Fig. 1, into a resultant coil, Fig. 2. Instead of the inductive excitation of the aerial conductor shown in Fig. 2 conductive excitation may be employed by connecting the aerial conductor and the earth connection directly with the ends of the induction-coil. The charging of the condensers in this arrangement is only possible by connecting the condensers in parallel with the source of energy.

Through the disposition of the condensers between the separate spark-gaps each spark-gap is supplied with the tension of the separate condensers, so that therefore at a corresponding assumption of the unit spark-gap each of the same is supplied with a tension which corresponds with its sparking length. Through the use of n-unit spark-gaps in the desired way it is therefore achieved that if C is the capacity and V the starting tension an amount of energy $E = n^2CV^2$ is converted with the economy of an ordinary vibration-circuit of the capacity of n times C and of approximately the same natural period. In this way the n-folding effect of the heretofore useful vibration-circuit is obtained.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. In a transmitter for wireless telegraphy an oscillating system containing several spark-gaps in series and condensers between the electrodes of neighboring spark-gaps.

2. In a transmitter for wireless telegraphy an aerial conductor excited by a closed oscillating circuit containing several spark-gaps in series and condensers between the electrodes of the neighboring spark-gaps.

3. In a transmitter for wireless telegraphy an aerial conductor excited by a closed oscillating circuit containing several spark-gaps in series and condensers and self-induction coils between the electrodes of the neighboring spark-gaps.

In witness whereof I hereunto subscribe my name this 12th day of October, A. D. 1904.

FERDINAND BRAUN.

Witnesses:

MATHIAS CANTOR,

GUSTAV SCHWEISS.