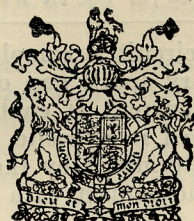


N° 7610



A.D. 1913

Date of Application, 31st Mar., 1913

Complete Specification Left, 31st Oct., 1913--Accepted, 26th Mar., 1914

PROVISIONAL SPECIFICATION.

Improvements in Transmitting Apparatus for use in Wireless Telegraphy and Telephony.

We, GUGLIELMO MARCONI, LL.D., D.Sc., and CHARLES SAMUEL FRANKLIN, Electrical Engineers, both of Marconi House, Strand, London, W.C., do hereby declare the nature of this invention to be as follows:—

5 The Specification of Patent No. 4593 of 1907 describes an arrangement in which a working condenser connected to the middle of a split condenser is charged alternately in opposite directions by means of a rapidly rotating toothed disc.

10 The object of this invention is to provide a transmitter for use in wireless telegraphy and telephony in which the same broad principles shall be utilised without the necessity of the whole power employed passing through the disc and which shall therefore be more suitable for use with the very high powers required for long distance work.

15 According to this invention we employ for actuating the aerial a condenser circuit which is connected to the main power supply and comprises spark gaps of such a type that they will only allow very few oscillations to take place during either charging or discharging and preferably will only allow current to pass in one direction. The main current is normally unable to pass these gaps and we enable the current to pass at regular intervals by means of sparks produced at or near the spark gaps by an auxiliary circuit which is traversed
20 by a current of small power and contains as a timing arrangement either a toothed disc a commutator or a high frequency alternator. In practice we prefer to use as our spark gaps mercury vapour rectifiers but other types of spark gap may be employed.

25 With this arrangement the main circuit is controlled by the auxiliary circuit and therefore for signalling it is only necessary to employ a small switch in the auxiliary circuit.

The preferable arrangement is as follows:—

30 To the main power supply is connected a split condenser (or pair of condensers) to the middle point of which is connected a working condenser while each outer plate of the first condenser is connected to the working condenser through a mercury rectifier and an inductance the two rectifiers being oppositely arranged as regards the working condenser. The inductance acts as the primary of a transformer by which the circuit is coupled to the aerial or to an intermediate circuit. The auxiliary spark gap in each rectifier is connected in a
35 circuit comprising a condenser and the secondary of a Tesla or like induction coil. Or the secondary of the induction coil may be connected in series between the split condenser and the spark gap. The primaries of these induction coils are connected in the auxiliary circuit which comprises a toothed disc, a working condenser and a split condenser, the latter being connected to an auxiliary
40 source of current.

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Each time that the auxiliary circuit is completed by the teeth of the disc, a spark takes place at the auxiliary spark gap of one or other of the rectifiers with the result that the main current is enabled to pass the rectifier. The working condenser is thus charged in opposite directions alternately and regularly at a frequency which is determined by the speed and number of teeth of the disc and is of course in synchronism with the natural time period of the aerial.

In some cases as in Specification No. 4593 of 1907 the working condenser may be omitted from either circuit or the split condenser may be omitted if a split battery be employed as the source of power.

It is sometimes preferable to employ two or more working condenser main circuits in which case in place of the single working condenser in the auxiliary circuit it may be well to employ a series of working condensers such as is described in Provisional Specification No. 2918 of 1913.

Dated the 31st day of March, 1913.

CARPMAEL & Co.

COMPLETE SPECIFICATION.

Improvements in Transmitting Apparatus for use in Wireless Telegraphy and Telephony.

We, GUGLIELMO MARCONI, LL.D., D.Sc., and CHARLES SAMUEL FRANKLIN, Electrical Engineers, both of Marconi House, Strand, London, W.C., do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The Specification of Patent No. 4593 of 1907 describes an arrangement in which a working condenser connected to the middle of a split condenser is charged alternately in opposite directions by means of a rapidly rotating toothed disc.

The object of this invention is to provide a transmitter for use in wireless telegraphy and telephony in which the same broad principles shall be utilised without the necessity of the whole power employed passing through the disc and which shall therefore be more suitable for use with the very high powers required for long distance work.

It has before been proposed to employ for actuating the aerial a condenser circuit which is connected to the main power supply and comprises spark gaps of such a type that they will only allow very few oscillations to take place during either charging or discharging and also will only allow current to pass in one direction. The main current is normally unable to pass these gaps and the current is enabled to pass at regular intervals by means of a discharge produced in or near the spark gaps by an auxiliary circuit which is traversed by a current of small power.

According to this invention we employ such an auxiliary circuit which is preferably a circuit such as is described in our specification already mentioned to cause discharges of the main condenser in such a direction and at such times that the impulses imparted to the aerial are in phase with the oscillations produced in it by the previous impulses which are thereby maintained and rendered continuous.

One arrangement is as follows:—

To the main power supply is connected a split condenser (or pair of condensers) to the middle point of which is connected a working condenser while

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each outer plate of the first condenser is connected to the working condenser through a mercury rectifier and an inductance the two rectifiers being oppositely arranged as regards the working condenser. The inductance acts as the primary of a transformer by which the circuit is coupled to the aerial or to an intermediate circuit. The auxiliary spark gap in each rectifier is connected in a circuit comprising a condenser and the secondary of a Tesla or like induction coil. Or the secondary of the induction coil may be connected in series between the split condenser and the spark gap. The primaries of these induction coils are connected in the auxiliary circuit which comprises a toothed disc, a working condenser and a split condenser, the latter being connected to an auxiliary source of current.

Each time that the auxiliary circuit which should be tuned to a frequency much greater than that of the main circuit is completed by the teeth of the disc, a spark takes place at the auxiliary spark gap of one or other of the rectifiers with the result that the main current is enabled to pass the rectifier. The working condenser is thus charged in opposite directions alternately and regularly at a frequency which is determined by the speed and number of teeth of the disc and is of course in synchronism with the natural time period of the aerial.

In some cases as in Specification No. 4593 of 1907 the working condenser may be omitted from either circuit or the split condenser may be omitted if a split battery be employed as the source of power.

It is sometimes preferable to employ two or more working condenser main circuits in which case in place of the single working condenser in the auxiliary circuit it may be well to employ a series of working condensers such as is described in Provisional Specification No. 2918 of 1913.

The drawing shows one form of transmitter constructed in accordance with our invention.

The main power supply is connected to a split condenser K K¹; the middle point of which is connected to one plate of a working condenser C, while the outer plates are connected through mercury rectifiers R and R¹, and an inductance I to the other plate of the condenser C, the rectifiers being oppositely arranged as regards this latter condenser.

The inductance I acts as the primary of a transformer of which the secondary S is in the aerial circuit.

The circuits comprising C, I, R, K and C, I, R¹, K¹ should both be tuned to the natural time period of the aerial circuit.

The auxiliary spark gaps s s¹ in the rectifiers R R¹ are connected across the secondaries of transformers T T¹, the primaries of which are connected in the auxiliary circuit which comprises a toothed disc D, a working condenser F and a split condenser H H¹ connected to an auxiliary supply.

As the disc D rotates, sparks are produced alternately and regularly at the spark gaps s s¹ thus allowing the main current to pass the rectifiers R R¹ and to charge the condenser C in opposite directions alternately, at a frequency which is determined by the speed and number of teeth in the disc, and is so adjusted that the aerial receives impulses in such a direction and at such times as to increase or maintain the oscillations produced in it by the previous impulses.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is;—

1. A transmitter for wireless telegraphy and telephony in which the main discharges are timed so that they occur in correct relation to the phase of the current in the aerial by means of auxiliary discharges substantially as described.

2. In a transmitter for wireless telegraphy and telephony the combination

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of a main circuit comprising a condenser which is alternately charged and discharged in opposite directions, spark gaps in that circuit which the main current is normally unable to pass and an auxiliary circuit comprising a toothed disk interrupter and a condenser which is also alternately charged and discharged in opposite directions and by its discharges enables the main current to pass the spark gaps substantially as described.

3. A transmitter for wireless telegraphy and telephony substantially as described and illustrated in the drawing.

Dated this 31st day of October, 1913.

CARPMAEL & Co.,

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[This Drawing is a reproduction of the Original on a reduced scale.]

