

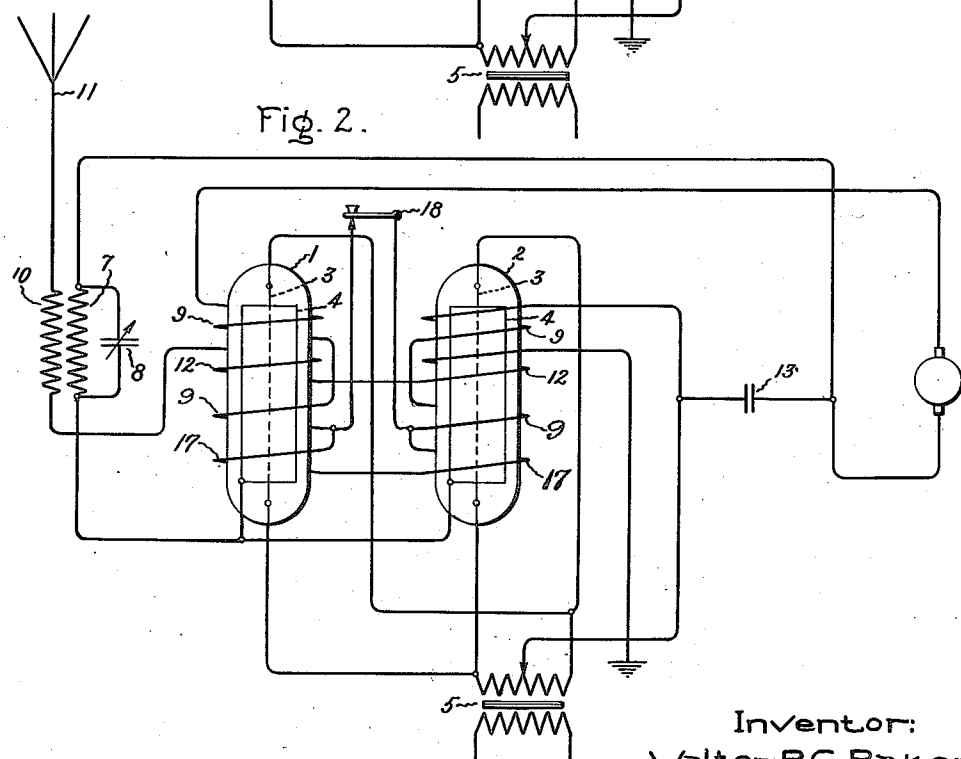
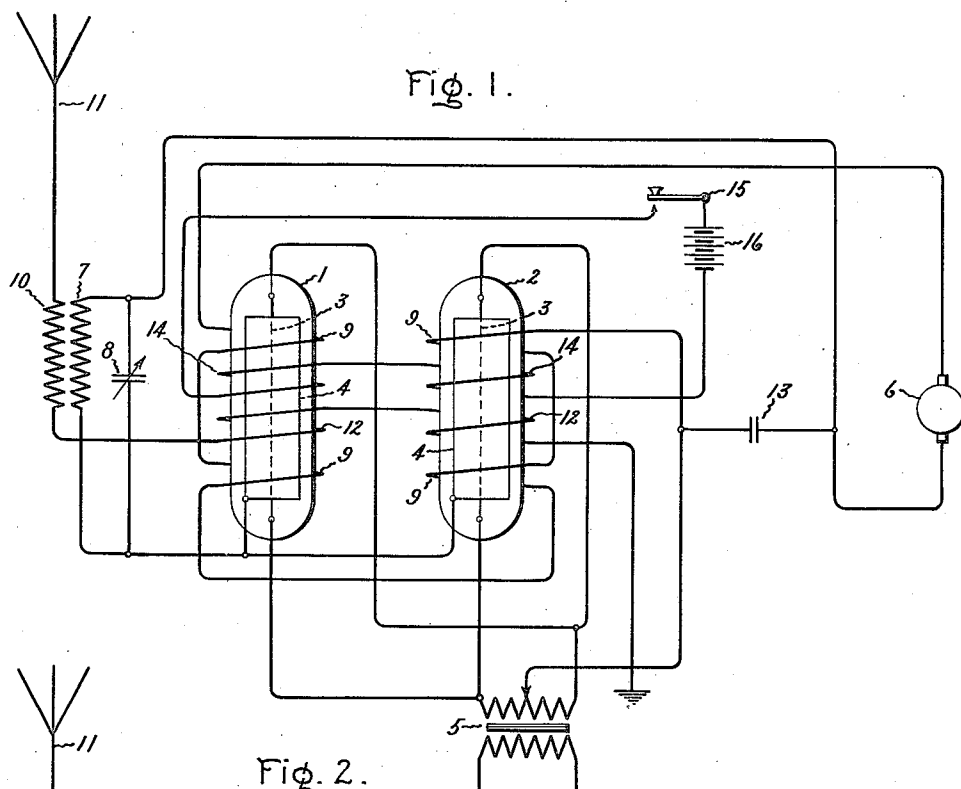
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W. R. G. BAKER

SIGNAL TRANSMITTING SYSTEM

Filed June 9, 1922



Inventor:  
Walter R. G. Baker;  
by *Arthur H. Davis*  
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# UNITED STATES PATENT OFFICE.

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## SIGNAL-TRANSMITTING SYSTEM.

Application filed June 9, 1922. Serial No. 567,029.

*To all whom it may concern:*

Be it known that I, WALTER R. G. BAKER, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Signal-Transmitting Systems, of which the following is a specification.

The present invention relates to means for transmitting telegraphic signals by high frequency currents generated by means of a vacuum device in which an electron current is controlled by means of a magnetic field.

In carrying my invention into effect I employ devices known as magnetrons, such as are fully described in an article on "The magnetron" by Albert W. Hull, published in the Journal of the American Institute of Electrical Engineers, September, 1921, page 715.

The object of my invention is to provide a simple and efficient means for controlling the generation and transmission of high frequency currents for telegraphic signaling.

While various methods have been employed for controlling the transmission of high frequency oscillations produced by other sources, it is in general necessary to provide for each particular form of high frequency generator a particular method of controlling the transmission of the oscillations generated, which method will depend largely upon the characteristics of the particular source. I have found that when a magnetron is employed for producing high frequency oscillations for telegraphic signaling purposes the most efficient and reliable method for controlling the signaling currents is to provide a magnetic field of sufficient strength both to interrupt the production of oscillations and to reduce the current through the magnetron to substantially zero during the intervals between the dots and dashes of the usual telegraphic signals.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims; my invention itself, however, both as to its organization and method of operation will best be understood by reference to the following description taken in connection with the accompanying drawings in which Figs. 1 and 2, respectively show diagrammatically

two different ways by which my invention may be carried into effect.

As indicated in the drawing I employ magnetrons 1 and 2, each of which is preferably of tubular form and contains a filamentary cathode 3 and an anode 4 of cylindrical form surrounding the cathode. A source of alternating current for heating the cathodes is provided by a transformer 5, the cathodes being connected parallel to the terminals of the secondary of this transformer. An external circuit between the cathodes 3 and anodes 4 includes a source of direct current 6 and inductance 7, a tuning condenser 8 in shunt to the inductance 7 and magnetizing coils 9 surrounding the magnetrons 1 and 2. The current which flows between cathode 3 and anode 4 through these coils 9 produces a constant polarizing magnetic field in the space between the electrodes which is in a direction parallel to the axis of the tubes, or at right angles to the electrostatic field between the electrodes. Coils 9 and source 5 are so proportioned that this constant magnetic field will have a predetermined desired value. The inductance 7 is coupled to an inductance 10 in series with the antenna 11 and coils 12, which are also in series with the antenna, surround the magnetrons 1 and 2. The coils 12 produce a second magnetic field in the magnetrons which is superimposed upon the constant magnetic field produced by the coils 9. When the circuit is connected in the manner shown high frequency oscillations will be produced in the antenna 11 by reason of the coupling between coils 7 and 10, and the effect of the magnetizing field of coils 12. The current between the electrodes 3 and 4 will thus vary. The current flowing in the external circuit, however, which is commonly called the plate circuit, may be considered as a constant direct current having an alternating current super-imposed thereupon. Coils 9 having high inductance offer a high impedance to the flow of the alternating current which is bypassed through the condenser 13. As a result the current flowing in coils 9 will be substantially constant and therefore will maintain a constant polarizing field desired in the magnetrons.

In order to interrupt the production of oscillations in accordance with telegraphic

signals, I provide additional coils 14 around the magnetrons in the arrangement shown in Fig. 1 to supply the coils with current through a telegraph key 15 from a source

5 16. If desired the field produced in this way may be comparatively weak, but sufficient to stop the production of oscillations without entirely interrupting the current in the plate circuit. Preferably, however,  
10 the field produced in this way should be made strong enough to entirely interrupt the current in the plate circuit.

In the arrangement shown in Fig. 2 additional windings 17 around the magnetrons  
15 are employed which are in series with the windings 9. These windings are so proportioned that normally the magnetizing field produced will be so great as to prevent oscillations from being produced. When the  
20 telegraph key 18, however, is closed, windings 17 are short circuited and the magnetic field is thereby reduced to such an extent that oscillations will be produced and supplied to the antenna as long as the key  
25 18 is closed.

While I have shown and described the preferred embodiments of my invention it will be understood that many modifications in the circuit arrangements employed and the  
30 form of apparatus used may be made without departing from the scope of my invention as set forth in the appended claims.

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

35 1. The combination in a signal transmitting system of a magnetron, an oscillatory circuit associated with the electrodes of said magnetron, a source of current for supplying current to said oscillating circuit and  
40 for producing a magnetic field for controlling the current through said magnetron, a transmitting circuit which is supplied with current from said oscillating circuit and which also includes a winding for producing  
45 a magnetic field for controlling the current through said magnetron and causing the production of oscillations and means for producing a supplemental field of sufficient value to interrupt the production of oscillations in accordance with telegraphic signals.  
50

2. The combination in a signal transmitting system of a magnetron, an oscillatory circuit associated with the electrodes of said

magnetron, a winding surrounding said 55 magnetron, means for supplying current to said oscillatory circuit and to said winding to produce a polarizing magnetic field, a transmitting circuit which is coupled to said oscillatory circuit and which also includes a 60 winding surrounding said magnetron for controlling the current therethrough and producing oscillations, a third winding surrounding said magnetron and means for producing by said third winding a magnetizing 65 field of sufficient value to interrupt the production of oscillations in accordance with telegraphic signals.

3. The combination in a signal transmitting system of a magnetron, an oscillatory 70 circuit associated with the electrodes of said magnetron, a source of current for supplying current to said oscillating circuit and for producing a magnetic field for controlling the current through said magnetron, a 75 transmitting circuit which is supplied with current from said oscillating circuit and which also includes a winding for producing a magnetic field for controlling current through said magnetron and causing the 80 production of oscillations and means for producing a supplemental field of sufficient value to interrupt the production of oscillations in accordance with telegraphic signals, and cause the current through said 85 magnetron to fall to substantially zero.

4. The combination in a signal transmitting system of a magnetron, an oscillatory circuit associated with the electrodes of said magnetron, a winding surrounding said 90 magnetron, means for supplying current to said oscillatory circuit and to said winding to produce a polarizing magnetic field, a transmitting circuit which is coupled to said oscillatory circuit and which also includes 95 a winding surrounding said magnetron for controlling the current therethrough and producing oscillations, a third winding surrounding said magnetron and means for producing by said third winding a magnetizing 100 field of sufficient value to interrupt the production of oscillations in accordance with telegraphic signals, and cause the current through said magnetron to fall to substantially zero. 105

In witness whereof, I have hereunto set my hand this 8th day of June, 1922.

WALTER R. G. BAKER.