J. MURGAS.

WIRELESS TELEGRAPHY.

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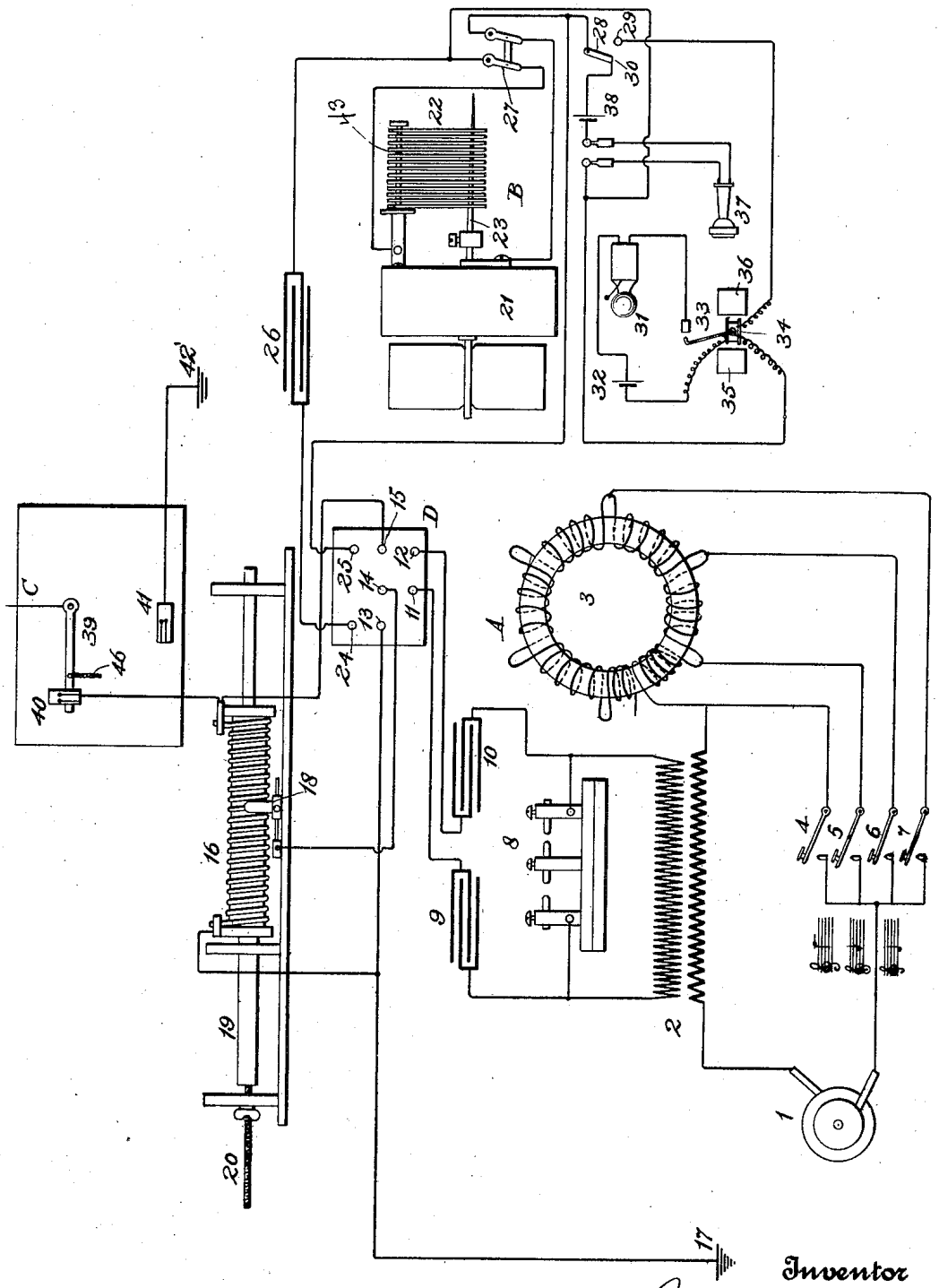
917,103. Patented Apr. 6, 1909.



Witnesses

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WIRELESS TELEGRAPHY.

No. 917,103. Specification of Letters Patent. Patented April 6, 1909.

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To all whom it may concern:

Be it known that I, JOSEPH MURGAS, a citizen of the United States, residing at Wilkes-Barre, Luzerne county, State of Pennsylvania, have invented certain new and useful Improvements in Wireless Telegraphy, of which the following is a specification.

This invention relates to means for transmitting intelligence through disturbances in the ether and dispensing with wires.

The art to which the invention belongs is commonly designated as wireless telegraphy.

In Patents Nos. 759,825 and 759,826 granted to me May 10th, 1904, a method and means are set forth whereby messages may be transmitted with greater rapidity than previously obtainable. According to the system therein described, tones of different pitch are employed in place of the dot and dash of the well know Morse system. This is accomplished by causing different spark gap frequencies at the sending station corresponding to the different tones, and these frequencies are produced by a plurality of interrupters, any one of which may be included at will in the circuit of a source of direct current. This means of producing sparks of the desired frequencies has disadvantages; among which may be mentioned those which are well known to be attendant upon the rupture of an electric circuit, such as arcing at the interrupter terminals and consequent destruction of those terminals, especially where large amounts of energy are employed, as well as the disadvantages attendant upon moving parts.

It is the main object of the present invention to produce different spark frequencies from a source of current without the employment of interrupters.

Ancillary and other objects of the invention will appear hereinafter.

In the accompanying drawing, which illustrates the invention, the drawing is a diagram showing the apparatus of one station and the connections thereof.

The transmission of a message presupposes the existence of two stations, one sending and the other receiving, but as the apparatus at the two stations is identical, an illustration of the apparatus at one is sufficient for the purposes of description.

Referring to the drawing, a station comprises sending apparatus A, receiving apparatus B, the usual antennæ or aerial wire C and switching means D for connecting either the sending or the receiving apparatus to the antennæ at will.

The sending apparatus comprises a source 1 of alternating current, one terminal of which is connected to a terminal of the primary of the transformer 2. The other terminal of the primary is connected to one end of an inductance 3 and also to one terminal of a normally open switch or key 4, the other terminal of the switch being connected to the other terminal of the alternating current source. Other keys 5, 6 and 7 similar to the key 4, are also connected to the last mentioned terminal of the source 1 and to taps taken from different points of the inductance 3 so that by closing the proper key the source may be connected directly to the terminals of the transformer primary or any one of several portions of the inductance may be connected in circuit therewith. A spark gap 8 is connected across the secondary of the transformer. The gap as a whole may consist of a plurality of breaks as shown or may consist in but a single break. The terminals of the gap are preferably made adjustable as shown. The terminals of the gap are respectively connected, through the condensers 9 and 10, with the contacts 11 and 12 of the switch D.

The switch D may be of the well known three pole double throw type. The middle contacts 13, 14 and 15 of the switch are, in the order named, connected one to one end of the inductance 16 and to the earth at 17, another to the sliding contact 18 adapted to contact with the coils of the inductance 16, and the other to the other end of the inductance 16 and to the antennæ C. It will now be seen that when the switch D is thrown downwardly, the transformer secondary and spark gap connected in parallel are connected through condensers in shunt with an inductance interposed between the antennæ and ground. The amount of the inductance included between the terminals of the secondary circuit may be regulated by sliding the contact 18 in one direction or the other as may be required to include a greater or less number of turns. To effect a further and nicer adjustment of the inductance, means may be provided for varying the distances between its turns. This may be accomplished by means of a plunger 19 bearing against the end of the inductance

coil and moved in one direction or the other by a suitably mounted screw 20. When the screw is turned in one direction the coil will be compressed, while when the screw is turned in the other direction the coil will be lengthened.

The apparatus of the secondary circuit described, containing the secondary of the transformer, the spark gap, the condensers and the inductance, constitute an oscillatory circuit well known in the art and which may be adjusted in a well known manner to produce the desired results.

When messages are to be sent by means of tones as set forth in the patents before referred to, the alternator is adjusted to run at a suitable frequency which may be fixed. The spark frequency depends upon the length of the gap, being less when the spark gap is greater and vice versa, and the gap is adjusted so that when the key 4 is closed (the alternator connected directly across the transformer primary) a spark frequency corresponding to the frequency of the alternator and a tone is produced. It will be understood that the inductance capacity and resistance of the oscillator will be adjusted in a well known manner to produce the desired oscillatory effects. To secure another tone, the spark frequency may be lowered by inserting inductance in the primary circuit. This may be accomplished by depressing the key 5 which is connected to a point in the inductance 3 such that sufficient inductance will be included in the primary circuit to produce a spark frequency corresponding to a lower tone. This tone may differ by an octave or octaves from the first and the point at which the key is to be connected to include the proper amount of inductance may be ascertained by gradually inserting inductance until the tone is produced. The keys 4 and 5 and connected apparatus are sufficient for the purposes of sending a message, since two tones will fulfil that purpose, but if other tones are desired additional keys as 6 and 7 can be connected to other points of the inductance 3 corresponding respectively to other tones. The points at which the additional keys are to be connected may be ascertained as before described and the several tones will differ from each other by an octave or octaves. It will now be obvious that a message is sent by depressing the keys in the proper order to produce tones as required by the code employed.

The receiving apparatus comprises an imperfect contact driven by the motor 21, as in my patents referred to, and the contact itself may be as therein described, but is here shown as a number of carbon bars 22 bearing at one end upon a polished steel shaft 23, driven by the motor, and at the other end upon a platinum support 43. The terminals of the contact are connected to the upper terminals 24 and 25 of the switch D, and when that switch is thrown upwardly, these terminals are connected respectively to the antennæ and ground. A condenser 26 is inserted in one of the connections. A switch 27 may be provided for disconnecting the imperfect contact when sending, as strong discharges through the contact have been observed when oscillating waves were produced in the spark gap. A switch 28 when bearing upon one contact 29 connects in calling apparatus, and when upon another contact 30 connects in receiving apparatus.

The call receiving apparatus comprises a bell 31 connected in circuit with a battery 32 and a switch 33. The movable member of the switch is carried by a movable coil 34 mounted to turn in the field of the magnets 35 and 36. When the switch 28 is upon the contact 29, the coil 34 is connected across the imperfect contact and upon receipt of an impulse at the station, the coil 34 is energized and moves in the magnetic field thereby closing the circuit through the battery 32 and bell 31 whereupon the bell rings.

The message receiving apparatus comprises a telephone receiver 37 and a battery 38. When the switch 28 is upon the contact 30 the receiver and battery are connected across the terminals of the imperfect contact and messages are received, as described in my patents referred to.

Preferably a switch 39 is provided which when engaging contact 40 connects the antennæ to the sending or receiving apparatus, and when engaging contact 41 disconnects the antennæ from the apparatus and connects it directly with the ground as at 42. By this means the antennæ may be disconnected from the station apparatus and connected with the ground in time of storm or at other times. A rope 46 may be connected with the switch 39 or other suitable means may be provided whereby the switch may be operated without rendering it necessary for the operator to place himself in dangerous proximity thereto.

It is to be understood that various constructions and arrangement of apparatus may embody the invention, and it should not, therefore, be limited to the structure and arrangement shown.

What I claim is,—

1. In a wireless telegraph system, an apparatus for transmitting messages made up of signal elements each differing from the others in spark frequency, comprising a spark producing circuit, a single source of alternating current adapted to impress energy thereon and produce a spark frequency corresponding to a signal element, and means for changing said spark frequency to produce a different signal element.

2. In a wireless telegraph system, an apparatus for transmitting messages made up of

signal elements each differing from the others in spark frequency, comprising a spark producing circuit, an inductance, a single source of alternating current adapted to impress energy upon said circuit and produce a spark frequency corresponding to a signal element with said inductance in circuit therewith, and means for changing said inductance to produce a different spark frequency corresponding to a signal element.

3. In a wireless telegraph system, an apparatus for transmitting messages made up of signal elements each differing from the others in spark frequency, comprising a spark producing circuit, an inductance, a single source of alternating current adapted to impress energy upon said circuit and produce a spark frequency corresponding to a signal element with said inductance in circuit therewith, and means for cutting said inductance out of circuit.

4. In a wireless telegraph system, the combination with an apparatus for transmitting messages made up of signal elements each differing from the others in spark frequency, comprising a spark producing circuit, a single source of alternating current adapted to impress energy thereon and produce a spark frequency corresponding to a signal element, and means for changing said spark frequency to produce a different signal element.

5. In a wireless telegraph system, an apparatus for transmitting messages made up of tones differing from each other in spark frequency, comprising a spark producing circuit, a single source of alternating current adapted to impress a frequency thereon with tone characteristic, and means for changing said frequency to produce a different tone characteristic.

6. In a wireless telegraph system, an apparatus for transmitting messages made up of signal elements each differing from the other in spark frequency, comprising a spark producing circuit, a single source of alternating current, and means for operatively associating said source with said circuit, said means comprising a plurality of connections having different inductances and means for effecting the association of said source with said circuit through any one of said connections at will.

7. In a wireless telegraph system, an apparatus for transmitting messages made up of signal elements each differing from the other in spark frequency, comprising a spark producing circuit, a transformer, the secondary of said transformer being included in said circuit, a source of alternating current, and means for connecting the terminals of said source to the primary of said transformer, said means comprising a plurality of connections having different inductances and means for connecting said source with said primary through any one of said connections at will.

8. In a wireless telegraph system, an apparatus for transmitting messages made up of signal elements each differing from the other in spark frequency, comprising a spark producing circuit, a source of alternating current, an inductance comprising a coil, taps from said coil, and means for operatively associating said source with said circuit, said means comprising means for connecting any of said taps with said source at will.

9. In a wireless telegraph system, an apparatus for transmitting messages made up of signal elements each differing from the other in spark frequency, comprising a spark producing circuit, a transformer, the secondary of said transformer being included in said circuit, a source of alternating current having one terminal connected with a terminal of the primary of said transformer, means for connecting the other terminal of said source with the other terminal of said primary at will, an inductance comprising a coil, one terminal of said coil being connected with one terminal of said primary, taps from said coil, and means for connecting any one of said taps with a terminal of said source at will.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH MURGAS.

Witnesses:
W. L. RAEDER,
K. E. FERRY.