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MEANS FOR KEYING IN WIRELESS TELEGRAPHY

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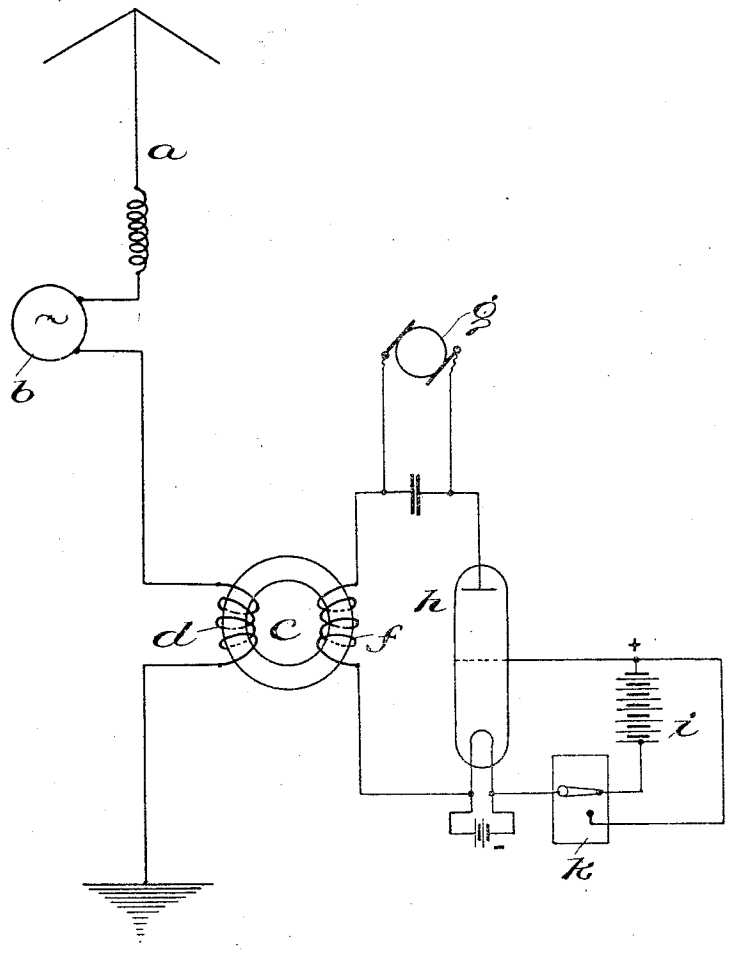

WITNESSES

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MEANS FOR KEYING IN WIRELESS TELEGRAPHY.

Original application filed August 23, 1921, Serial No. 494,516, and in Germany July 15, 1919. Patent No. 1,581,264, dated April 20, 1926. Divided and this application filed January 31, 1925. Serial No. 6,020.

This invention relates to improvements in transmission apparatus for wireless telegraphy.

The present application is a division of our copending application, Serial No. 494,516, filed August 23, 1921, now Patent No. 1,581,264, dated April 20, 1926.

It has become known to use in wireless telegraphy transmission antenna circuits coils with iron cores which, in the high frequency circuit normally suppress oscillations in said circuit, or allow oscillations of full strength to be produced when the coil is magnetized with continuous current to saturation by means of an auxiliary winding. In obtaining great efficiencies the self-induction of the magnetization winding becomes of corresponding high value. When the arrangement has to be used for automatic rapid sending the signals are distorted by the high self-induction of the winding. The operating speed of the keys for sending signals is thus limited. It has already been proposed to avoid in such cases the prejudicial influence of the self-induction by inserting resistances into the circuit of the self inductance and increase the continuous current accordingly. This method has however the disadvantage that the current to be interrupted at the operation of the key becomes essentially greater, so that multiple type relays are required, whereby, owing to the mechanical inertia thereof the advantages which are produced by the diminution of the effects of the magnetic inertia are lost.

According to this invention these disadvantages are avoided by using as series-resistance in the circuit of the auxiliary winding a thermionic (cathode) tube which is utilized at the same time for the operation of the key by bringing its grid alternately to a high potential. The magnetization winding of the coil has to be designed in such a manner that the anode current of the tube is sufficient for complete saturation of the magnetization coil.

The tube acts like a very great resistance (of several thousands of ohms) in the circuit of the auxiliary magnetization winding. Notwithstanding the relatively high number of turns of the auxiliary winding the effect of the self-induction is of secondary importance at the number of periods in question with regard to the resistance of the tube. The magnetic inertia of the system will scarcely appear. On the other hand the effect taken up by the grid is so small that the rapid sender keying circuit can be connected directly with the grid without any intermediary relay. In this manner great antenna efficiencies can be keyed with great rapidity without production of disturbances by mechanical or electric inertia.

An embodiment of the invention is shown by way of example in the accompanying drawing.

Referring to the drawing more particularly, *a* is the antenna, *b* the source of high frequency current, e. g. a high frequency machine, and *c* the iron core of a coil which consists of a high frequency winding *d* and of a winding *f* for the auxiliary magnetization. A machine *g* is provided for supplying the anode or plate voltage of the tube *h* and battery *i* provided for supplying grid voltage of said tube. A rapid sender *k* is connected between the battery *i* and cathode of tube *h*. The rapid sender is connected to alternately connect the grid of tube *h* to the positive side of battery *i* and the negative side of filament battery as shown.

The magnetization current, which is also at the same time the anode current of the tube, is varied between a very small value and a maximum value. The flux of continuous current will consequently either disappear or the iron of the coil *d* will be magnetized up to saturation. The high frequency current in the antenna is thus completely suppressed or it adopts its normal value.

As the anode current of the tube with the zero potential of the grid does not reach a zero value, it is advisable to connect the grid during the zero interval of said current a corresponding negative potential so that the rapid sender reverses the grid to this potential or to a higher positive potential. In this manner the greatest fluctuations of current can be attained. The positive potential is naturally not selected higher than the potential which corresponds to the saturation current of the tube. For

greater magnetization currents more tubes can be used in parallel connection.

When there exist circuits in which high frequency current continues to circulate whilst the current in the antenna is zero (for instance with machines with static frequency changers) a high frequency voltage could be used also as anode voltage for the tube.

We claim—

1. In combination, an oscillatory circuit, a coil therein having a magnetic core, a thermionic tube, having grid, filament and plate electrodes, means whereby maximum current can be caused to intermittently flow through the tube by subjecting said grid electrode to a selected polarity, means whereby said current can be utilized for magnetizing the core of said coil in the oscillatory circuit, and means for impressing energy of opposite polarity for limiting the current flow in the plate-cathode circuit of the tube to a minimum during the intervals between maximum flow of current.

2. In combination, an oscillatory circuit, a coil therein having a magnetic core, a three electrode tube, means whereby the grid of said tube may be alternately subjected to a positive potential to cause a maximum flow of current in the plate-cathode circuit of the tube and a negative potential for suppressing the current flow, and means whereby said current flow is utilized for magnetically saturating the magnetic core of the coil in said oscillatory circuit.

3. In combination, an oscillatory circuit, a coil therein having a magnetic core, a three electrode tube, means whereby the grid of said tube may be intermittently subjected to a positive potential to cause a maximum flow of current in the plate-cathode circuit of the tube, means whereby said maximum current flow in the plate-cathode circuit is utilized for magnetically saturating the core of the coil in said oscillatory circuit, and means to subject the grid of the tube to a negative potential during intervals between subjecting the same to a positive potential and thereby reduce the flow of current through the tube to a minimum.

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