Oct. 19, 1926. 1,603,491

M. OSNOS

MODULATING ARRANGEMENT

Filed Oct. 20, 1925

Fig. 1

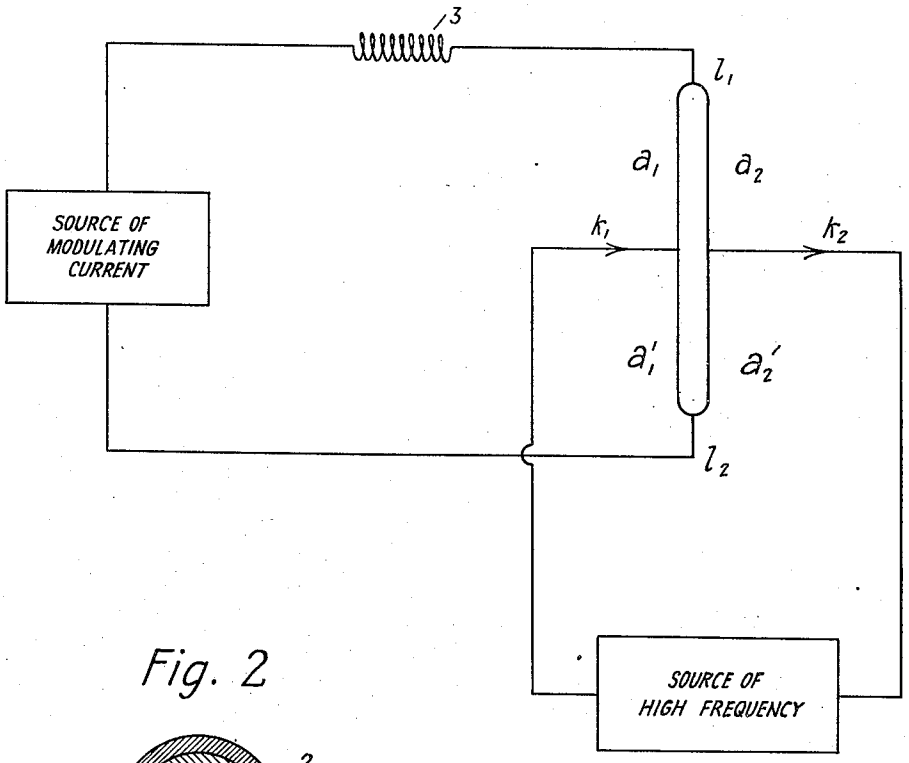
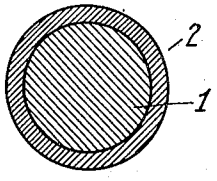


Fig. 2



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Patented Oct. 19, 1926. 1,603,491

UNITED STATES PATENT OFFICE.

MENDEL OSNOS, OF BERLIN, GERMANY, ASSIGNOR TO GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M. B. H. HALLESCHES, OF BERLIN, GERMANY.

MODULATING ARRANGEMENT.

Application filed October 20, 1925, Serial No. 63,618, and in Germany September 12, 1924.

The invention relates to an arrangement for communicating intelligence by varying the amplitude of a high frequency oscillation according to the desired intelligence. This has become known in the art as modulation.

More particularly, the invention relates to a modulating arrangement which employs a set of conductors suitably arranged, each conductor being made up of a strand of conducting material, enveloped by a layer of magnetic material.

An object of the invention is to provide an arrangement of the above kind which will modulate faithfully, be cheap to make, and reliable and efficient in operation.

Other objects will be apparent from the following description and claims when considered with the accompanying drawing, in which,

Fig. 1 represents a circuit arrangement of the conductor according to the invention, and

Fig. 2 is a cross-section of one form of conductor which may be used.

This application is an improvement over German patent application No. T-29,264, filed in Germary September 5, 1924, which application was filed in the United States on October 20, 1925, under Serial Number 63,317.

In the parent patent a conductor for electric current adapted to high frequency work has been described which can advantageously be used as a choke coil, frequency changer, or the like. This conductor consists of a material possessing high conducting power for electricity, most preferably copper (in the form of a wire, rod or high frequency strand) which is enveloped by a layer of ferro-magnetic material (especially iron), with, or, preferably, without, an intermediate layer of insulation. The conductor thus composed, with the end in view of reducing the magnetic flux (stray flux) not passing through iron, is arranged in bifilar, zig-zag fashion, or else in a combination of bifilar and zig-zag fashions.

The present invention relates to the control (modulation) of the output of the said conductor, for the purpose of telegraphy, telephony, or the like. According to the invention, such modulation is effected by supplying the current conductor in question, apart from the high frequency current to be controlled, with controlling currents which may be currents of lower frequency, or else direct current.

Referring to the drawing, the conductors, a_1, a_2, $a^1{}_1$ and $a^1{}_2$ may each be made in any of the manners set forth above and in the parent application. However, for purposes of illustration, they are shown as made up of a core 1 of copper coated with a thin layer 2 of iron of the order of one-tenth of a millimeter in thickness. The conductors are arranged generally in the form of a Wheatstone bridge.

The high frequency current to be modulated flows by way of leads K_1, K_2, both through the branches a_1, a_2 arranged in bifilar fashion as well as the branches $a^1{}_1$, $a^1{}_2$ arranged in parallel to the former and also arranged in bifilar fashion. The modulating currents are most preferably fed at points 1_1 and 1_2 which are at equal potential with reference to the high frequency currents to be modulated. However, this condition is not absolutely imperative; for if the circuit passed by the modulating currents itself offers an adequately high impedance to the flow of the high frequency currents, or if for the same object a sufficiently large protective inductance coil 3 is inserted in the controlling circuit, the leads 1_1 and 1_2 may be connected at any convenient points of the high frequency conductors a_1, a_2, $a^1{}_1$ and $a^1{}_2$.

The modulating currents themselves, by any of the well known methods of telegraphy or telephony, are varied or chopped (interrupted) either directly by the aid of a convenient device inserted in the circuit such as a key, telephone, or the like, or else indirectly by way of an amplifier circuit.

Having described my invention, I am entitled to all modifications thereof, as fall fairly within its spirit and scope, as defined by the following claims:

1. In combination, a conductor having a magnetic material portion, a source of high frequency to be modulated, a source of modulating current, and means for permitting current from both said sources to traverse said conductor, and influence the magnetic material portion thereof whereby said high frequency is modulated by said modulating current.

2. In combination, a conductor having a core of conducting material and a layer of

magnetic material whereby the flux produced by current flowing thru the conducting material traverses the said conductor only, a source of high frequency to be modulated, a source of modulating current, and means for permitting current from both said sources to traverse said conductor, whereby said high frequency is modulated by said modulating current.

3. In combination, a plurality of conductors, each having a core of conducting material and a layer of magnetic material whereby the flux produced by current flowing thru the conducting material traverses the patricular conductor only, said conductors being arranged in bifilar fashion with adjacent ends connected together, a source of high frequency to be modulated connected to said conductors intermediate the ends thereof, a source of modulating current connected to said adjacent ends.

4. In combination, a plurality of conductors, each having a core of conducting material and a layer of magnetic material whereby the flux produced by current flowing thru the conducting material traverses the particular conductor only, said conductors arranged to form a Wheatstone bridge, a first circuit containing a source of high frequency to be modulated connected across a pair of opposite corners of said bridge, a second circuit containing a source of modulating current connected across the other pair of diagonally opposite corners of said bridge.

5. In combination, a plurality of conductors, each having a core of conducting material and a layer of magnetic material whereby the flux produced by current flowing thru the conducting material traverses the particular conductor only, said conductors being arranged in pairs, each pair arranged bifilar fashion, the pairs being connected to form a Wheatstone bridge, a first circuit containing a source of high frequency to be modulated connected across a pair of opposite corners of said bridge, a second circuit containing a source of modulating current connected across the other pair of diagonally opposite corners of said bridge, and means for keeping high frequency out of said second circuit.

6. In combination, a plurality of conductors, each having a core of conducting material and a layer of magnetic material whereby the flux produced by current flowing thru the conducting material traverses the particular conductor only, said conductors being arranged in pairs, each pair arranged bifilar fashion, the pairs being connected to form a Wheatstone bridge, a first circuit containing a source of the high frequency to be modulated connected across a pair of opposite corners of said bridge, a second circuit containing a source of modulating current connected across the other pair of diagonally opposite corners of said bridge, said last-mentioned corners being at equal potential with respect to said first circuit.

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