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M. OSNOS

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CONTROLLING MEANS ON CURRENT CONDUCTORS FOR HIGH FREQUENCY PURPOSES

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Fig. 1

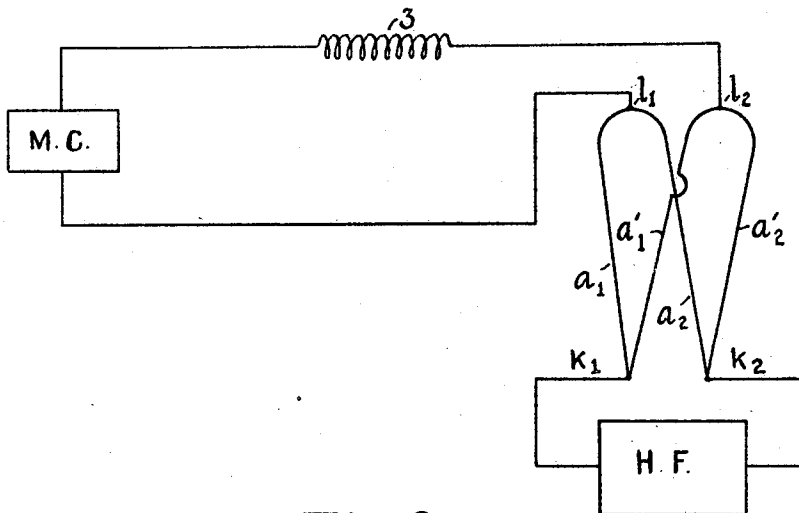


Fig. 2

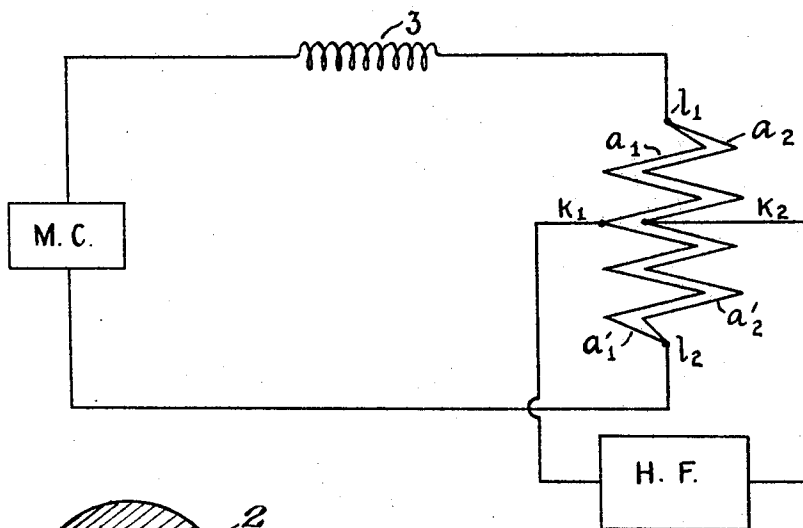
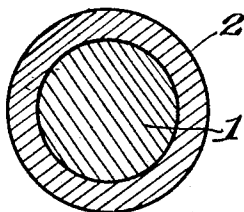


Fig. 3.

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CONTROLLING MEANS ON CURRENT CONDUCTORS FOR HIGH-FREQUENCY PURPOSES

Application filed October 23, 1925, Serial No. 64,338, and in Germany October 29, 1924.

This invention relates to an arrangement for communicating intelligence such as is disclosed in U. S. Patent No. 1,603,491, relating to a modulating arrangement, and issued to me on October 19, 1926. In my said prior application I have disclosed a means to modulate a high frequency current by means of a modulating current of comparatively low frequency or alternately by means of a direct current.

In the telephone art it is highly desirable to eliminate the inductance of the circuit carrying the modulated current, in order to obtain a non-distorted reproduction of the timbre. It is an object of this invention to eliminate, as far as possible, the inductance of the controlling circuit for the purpose described. Other objects of my invention will be apparent over the following description and claims when considered with the accompanying drawing in which:

Fig. 1 is a diagrammatic view, showing the arrangement of the high frequency current source and the means for modulating this high frequency current.

Fig. 2 is a modification of the form shown in Fig. 1.

Fig. 3 shows a cross section of the type of conductor preferably used in conjunction with an arrangement of the type shown by Figs. 1 and 2.

In my U. S. Patent No. 1,603,491, above referred to, there has been disclosed a controlling device which is substantially reproduced in the accompanying drawing with the following variation:

In the prior application the conductors which lead the modulating current are not arranged in bifilar relation. In the operation of the system disclosed in said copending application, the high frequency currents flow through the high frequency conductor along the axis k^1, k^2 (preferably in bifilar arrangement), whereas the controlling or modulating currents which may consist of either direct or alternating current of low frequency or speech currents, are supplied in another axis; for example, axis L^1 on L^2 . According to the present invention, the arrangement is still further improved by ar-

ranging the conductors of the controlling or modulating currents in a bifilar manner as shown in the drawings. This can be accomplished, for instance, by bending over one-half of the arrangement shown in my prior application about the axis k^1, k^2 , approximately 180° .

Referring to the drawings, the high frequency current to be modulated flows by way of the leads k^1, k^2 , both through the branches a_1, a_2 , arranged in bifilar fashion, as well as in the branches a'_1, a'_2 , arranged in parallel to the former and also arranged in bifilar fashion.

In the modification shown in Fig. 1, the modulating current leads are connected to the high frequency conductors in bifilar fashion in the points L^1, L^2 , which are arranged to lie substantially in the same plane. The potential of the modulating current source is kept substantially equal to that of the high frequency circuit. An inductance coil 3 may be provided to regulate this potential.

In the modification shown in Fig. 2, I have arranged the conductors for the modulating current in bifilar fashion, also by forming them in zig zag fashion instead of folding them upon themselves as in the modification shown in Fig. 1.

The conductors a_1, a_2, a'_1 and a'_2 are of the type disclosed in my above named Patent No. 1,603,491 and are preferably as shown by Fig. 3 of the accompanying drawings, and consist of a copper core 1 and a thin coating of iron 2.

Other arrangements for making the conductors of the modulating current bifilar as are the conductors of the high frequency current will readily suggest themselves to one skilled in the art and it is, therefore thought that the present methods shown are sufficient for the purpose of illustrating this invention.

Having thus described my invention I am entitled to all modifications thereof as fall fairly within the scope of the following claims:

1. An arrangement for modulating high frequency currents which comprises, a source of modulating control current, a conductor having a magnetic material portion connect-

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ed with said source, said conductor being arranged bifilar fashion with respect to said control current, whereby the inductance of said conductor due to stray fluxes produced by said control current is reduced, and a controlled high frequency current connected with said conductor and adapted to be modulated by variations in magnetic saturation produced in said conductor by means of said control modulating current.

2. An arrangement for modulating high frequency currents which comprises, a source of modulating current, a source of high frequency current, a single loop conductor having a magnetic material portion connected bifilar fashion with respect to each of said sources, and means for permitting current from both of said sources to traverse said conductor, and means for permitting said control current to influence the magnetic material portion of said conductor, whereby said high frequency current is modulated by said modulating current.

3. The method of controlling the modulation of high frequency currents by a modulating current which includes connecting both of said currents to traverse a common conductor having a magnetic material portion, utilizing the said modulating current to control the magnetic saturation of said conductor, arranging said conductor in bifilar fashion with respect to both the said modulating and high frequency currents whereby the inductance due to stray fluxes produced by said currents in said conductor is neutralized and the high frequency current modulated by variations in the magnetic saturation of said conductor produced by said modulating currents.

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 through the conducting material traverses the particular conductor only, each of said conductors being connected at their ends, a source of high frequency energy to be modulated connected at the mid-point of each of said conductors whereby said high frequency current traverses a path bifilar with respect to said conductor, a modulating current connected to the ends of said connected conductor and traversing parallel paths therethrough, said conductor being arranged zig-zag fashion with respect to said modulating current whereby said modulating current also traverses a path bifilar with respect to said conductor and modulates the said high frequency currents flowing in said conductor.

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