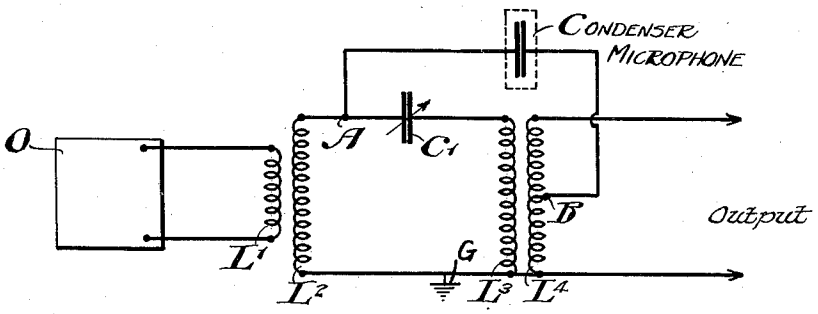
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MODULATION SYSTEM

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MODULATION SYSTEM

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4 Claims. (Cl. 179—171)

This invention relates to a system for modulating high frequency currents with circuit arrangements as shown in drawing resulting in greatly increased sensitivity or output for condenser type microphone. These circuits provide a method whereby the change in capacity of an electrostatic transmitter due to sound waves striking its diaphragm, is utilized to disturb the balance of phase and potential which they provide by their particular arrangement. This disturbance in balance causes a circulating current of high frequency to flow in the output circuit which is modulated according to the original sound input to the condenser type microphone. This modulated high frequency current may be fed to a detector designed for distortionless rectification, the audio frequency output of this detector may be fed directly into an amplifier to modulate a radio transmitter or the modulated high frequency current output of the circuits shown may be fed into a radio frequency amplifier and brought up to the proper power level for radiation. In the latter case the carrier frequency is absent or suppressed during periods of no microphone excitation. The figure is a diagrammatic view illustrating the arrangement for securing this increased microphone sensitivity.

The circuit may be considered as consisting of an input portion comprising the transformer L_1—L_2, and an output portion comprising the transformer L_3—L_4. These two portions are coupled to each other through the condenser C_1. Normally, a voltage present in the input circuit, from the oscillator or source of carrier frequency O, will be fed through the coupling condenser to the output circuit L_3—L_4; now if a voltage of opposite phase to that normally present in the input circuit L_2, and of suitable amplitude, be impressed back upon the circuit L_2, neutralization will occur and no current will flow through this circuit, creating a condition of balance with no voltage across the ouput secondary L_4.

The portion of the winding L^4 which furnishes the neutralizing voltage is connected to the input circuit L^2, one end directly, the other end point B through capacity C^2, consisting of a condenser type microphone; the electromotive force induced in this portion of L^4 will, similarly, be impressed on the input circuit L^2; and if the connection polarity of the winding L^4 is suitably chosen, the electromotive force impressed by it upon the input circuit L^2 will be of opposite polarity to that due to the primary winding of the input transformer L^1, which it will hence neutralize exactly for a proper capacity of the condenser C^2.

For neutralization or a condition of balance in this circuit, there must be the proper ratio between the capacities C_1 and C_2, this ratio being dependent upon the voltage induced in the winding N; as C_2 is a condenser type microphone with fixed capacity in its normal state, it becomes necessary to make the capacity C_1 variable for the purpose of adjusting the circuit to a balanced condition. Thus any variation of capacity of the condenser type microphone due to sound waves striking its diaphragm, destroys the balance of the circuit and causes the modulated carrier frequency to appear across the output, L_4.

With proper shielding and the ground connection G shown in both figures, the device is kept from being affected by body capacity.

A distinct advantage of the device is that a variable condenser may be connected across the windings L_2 in either Fig. 1 or Fig. 2, making it operable over a variable range of frequencies without changing the adjustment of the condenser C_1. This is because the neutralizing circuit, and the input circuit, the action of which it is intended to neutralize, are constituted in such a way as to have the same form. In this manner the coupling reactions vary in the same direction when the operating frequency is altered, and compensate each other over the entire frequency range of the device when tuned by a variable condenser.

What I claim is:—

1. A high frequency modulating system, comprising a source of high frequency current, an input circuit, an output circuit associated therewith, means for obtaining from said output circuit a potential of proper phase and amplitude, means to feed back said potential into said input circuit so as to cause neutralization of the currents normally present therein with consequent absence of output for this balanced condition, means to vary the amount of said portion of high frequency impressed back upon the input circuit in accordance with the modulating function to cause modulation of the high frequency current.

2. A high frequency modulating system comprising a source of high frequency current, an input transformer used as an input circuit, an output transformer with a tapped secondary, said tapped secondary simultaneously forming the output of the system and by connection of correct relative polarity, providing a means to secure an electromotive force opposite in phase to that normally present in said input circuit; a ca-

pacity formed by a condenser type microphone, through which said electromotive force of opposite phase is impressed back upon said input circuit, causing a neutralization of currents in said input circuit for a proper ratio between the capacities of the coupling condenser and the condenser type microphone and consequent absence of output across the double purpose secondary of the output transformer, and means provided in said condenser type microphone to vary the capacity ratio from that required for neutralization, causing modulation of the high frequency currents.

3. In a high frequency modulating system, a source of carrier frequency, an input circuit, an output circuit, means including a sound controlled device for variably feeding back a portion of the carrier frequency current from the output to the input circuit in correct phase and potential relation to cause neutralization of the carrier frequency current with no sound input to said sound controlled device and for modulating the carrier frequency in accordance with the sound input to said sound controlled device.

4. The method of high frequency modulation which consists of generating a high frequency current, impressing said high frequency current upon the input of a modulating system, obtaining a portion of said high frequency current from the output of said modulating system, changing the phase of said portion of high frequency current in respect to the high frequency current present in the input of said modulating system, neutralizing said high frequency current by impressing back the portion of high frequency current of changed phase, and modulating the high frequency by varying the phase of the changed phase portion in accordance with modulating signals, whereby the condition of neutralization is varied.

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