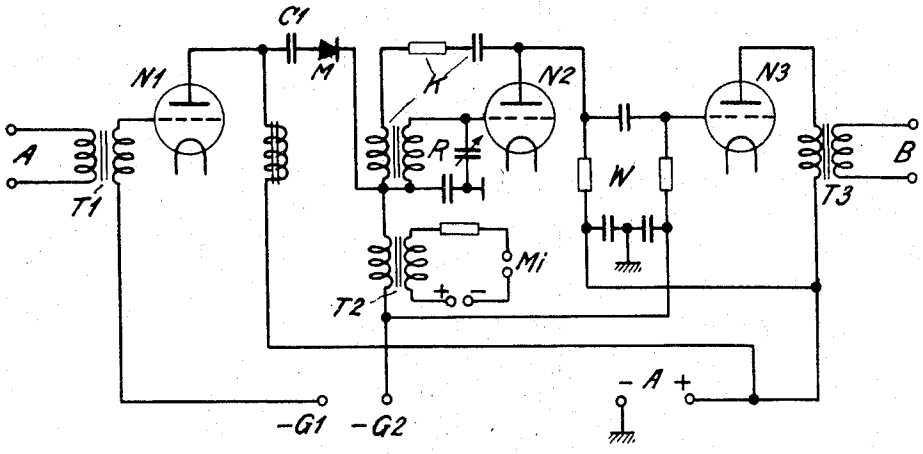
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ARRANGEMENT FOR CARRIER FREQUENCY MODULATION

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ARRANGEMENT FOR CARRIER FREQUENCY MODULATION

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Systems of communication are well-known in which low frequency is used for communicating from the subscriber's station to the exchange where the low frequency currents are employed for modulating a carrier frequency. In general the modulation is effected by means of circuit arrangents in which the carrier frequency is produced by an electron tube stage and modulated in an additional stage, for instance by grid modulation. Arrangements are also known wherein the grid voltage of the generator tube is influenced directly. They have the advantage of being very simple but are possessed also of the disadvantage that strong voice frequencies can suppress the oscillations by decreasing the anode current to such extent that the back coupling component thereof is not sufficient to maintain the oscillations.

By the present invention a modulating arrangement is provided which avoids this disadvantage. To such end a self-excited generator is modulated with only a half-wave so as to merely decrease the at-rest value thereof of the bias. This is advantageous especially if calling signals are transmitted by interrupting the carrier. In fact, if the carrier were suppressed by the modulating voltages being too strong, then this would be in the nature of a call transmission and thus would be deceptive.

The invention will be understood from the following description, reference being had to the accompanying drawing which is a circuit diagram illustrating one embodiment of the invention.

The low frequency arrives over wires A and is conveyed over a transformer T1 to a low frequency amplifying valve or tube N1 in which the voice frequency is amplified in a well known manner. Tube N1 through a condenser C1 is coupled to a generator stage which comprises an electron tube N2 provided with a grid, a resonance circuit R associated with this grid, and back coupling means K by which circuit R is connected to the anode of the tube N2. This arrangement serves to produce the carrier frequency in a well known manner. On the grid potential of the tube N2 a half-wave of the voice frequency arriving from tube N1 is superimposed while the other half-wave is by blocking means M, such as a dry rectifier, prevented from entering the generator stage. Included in the grid lead is a transformer T2 over which a microphone Mi acts to vary the grid potential, whereby speech may originate at the amplifying station. The modulated carrier frequency leaving the generator stage N2, R, K is, over a resistance coupling W, conveyed to an amplifying tube N3 and is thence conducted over an output transformer T3 to the output wires B. The provision of an additional amplifying stage, in this case represented tube N3, located behind the generator stage presents the advantage that changes in the electric properties of the wires B will not affect the generator and modulating stage.

Arrangements as provided by the invention enable a carrier frequency modulation to be attained in a very simple manner and with very few stages.

What is claimed is:

1. A carrier generation and modulation system for generating a carrier frequency and simultaneously modulating it in accordance with audio frequency waves, comprising a self-excited carrier frequency generator including a thermionic vacuum tube oscillator having a control grid, and rectifier means for freely transmitting to said grid those potential changes of said audio frequency which tend to render said grid more positive but for blocking from said grid those potential variations of said audio frequency which tend to render said grid more negative, whereby the extinction of oscillations by said audio frequency is prevented.

2. A combined carrier generation and modulation system comprising an electron discharge tube having an anode, a grid and a cathode, potential sources for said anode and grid, a resonant circuit connected to said grid, feedback means for coupling said anode to said resonant circuit to produce oscillations, a source of audio frequency waves, connections from said source to said grid, and a rectifier serially included in said connection for transmitting currents which tend to render said grid more positive but for blocking curents which tend to render said grid more negative, whereby the extinction of said oscillations by excessive amplitudes of said waves is prevented.

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