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RECEIVING CIRCUITS

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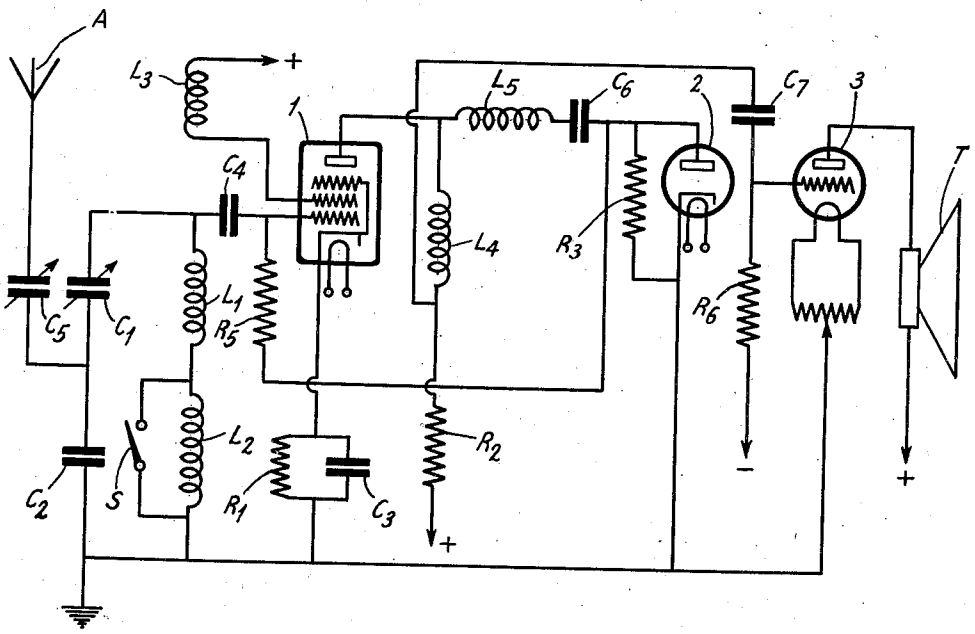

INVENTOR
W. D. VAN GOGH
BY H. S. Brower
ATTORNEY

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RECEIVING CIRCUITS

Willem Daniel van Gogh, Eindhoven, Netherlands, assignor to N. V. Philips' Gloeilampenfabrieken, Eindhoven, Netherlands

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1 Claim. (Cl. 250—20)

This invention has reference to a circuit arrangement for amplifying modulated high frequency electric oscillations and for amplifying the low-frequency oscillations obtained after detection of the said oscillations in which the reflex principle is employed and accordingly the same amplifying valve is used for amplifying high and low frequency oscillations.

In the usual circuit arrangements of this kind the control grid of the said amplifying valve has supplied to it the modulated high-frequency oscillations to be amplified and the low frequency alternating current component of the rectified current obtained by the detection of the high frequency oscillations.

In order to increase the sensitiveness of such a circuit arrangement it is desirable that the oscillatory circuit, tuned to the oscillations to be amplified, in the control grid circuit of the amplifying valve that serves both for high frequency and low frequency amplification should be negatively damped by means of a retroaction. If, however, this oscillatory circuit is coupled to an antenna, the risk occurs that in the case of excessive retroaction the amplifying valve may generate high frequency oscillations which are radiated by the antenna and thus bring about disturbances in neighbouring receiving sets.

According to the invention, in order to overcome this difficulty the control grid of the discharge tube which serves both for amplifying high frequency and low frequency oscillations has supplied to it not only the low frequency alternating voltage but also a direct voltage depending on the direct current component of the rectified current obtained by the detection of the modulated high frequency oscillations, the supply being effected in such direction that with increasing intensity of the retroaction the steepness of characteristic of the said tube decreases.

A secondary advantage of the circuit arrangement according to the invention is that as a result of the dependency of the steepness of characteristic of the said tube on the direct current component of the rectified oscillations an automatic fading compensation is obtained without the necessity for supplementary means.

In order that the invention may be clearly understood and readily carried into effect one embodiment of the invention will now be described more fully with reference to the accompanying drawing.

The single figure of the drawing shows the circuit arrangement of a receiving set comprising an amplifying valve 1 serving both for high frequency and for low frequency amplification, a rectifier 2 and a low frequency amplifying valve 3. A tuned oscillatory circuit constituted by coils L_1 and L_2, of which the latter is adapted to be short-circuited by means of a switch S for the receipt of short waves, and by condensers C_1 and C_2 is connected on the one hand to the end, remote from the cathode of the valve 1, of a resistance R_1 which is shunted by a condenser C_3 and on the other hand via a condenser C_4 to the control grid of the valve 1. The direct voltage loss which is brought about in the resistance R_1 by the anode direct current of the valve 1 serves for obtaining a negative control grid bias. An antenna A is coupled to the tuned oscillatory circuit via a condenser C_5 which if so required is adjustable. The valve 1 is a high frequency pentode the screening grid circuit of which includes a reaction coil L_3 and the anode circuit of which includes the series connection of a choke coil L_4 and a resistance R_2. The end of the choke L_4 which is connected to the anode of the valve 1 is connected via the series connection of a coil L_5 and a condenser C_6 to the anode of a diode rectifier 2. The coils L_4 and L_5 are inductively coupled to each other. A resistance R_3 is included between the anode and the cathode of the diode 2 and the anode of the diode is connected via a resistance R_5 to the control grid of the valve 1. The point of connection of the choke coil L_4 and the resistance R_2 is connected via a condenser C_7 to the control grid of a low frequency amplifying valve 3 the grid of which is given via a resistance R_6 a negative bias relatively to the cathode. Lastly, the output circuit of the valve 3 includes a reproducing device T.

When the circuit constituted by the condensers C_1 and C_2 and the coil L_1 or the coils L_1 and L_2, according as the switch S is closed or opened, is tuned to the modulated high frequency oscillations to be received, there is set up between the grid and the cathode of the valve 1 a high frequency alternating voltage bringing about between the anode and the cathode of the diode 2 an amplified alternating voltage the amplitude of which is regulated by adjustment of the reaction coil L_3. This high frequency alternating voltage brings about in the resistance R_3 a rectified current containing a low frequency alternating current component and a direct current component. The low frequency alternating voltage brought about by the first mentioned across the resistance R_3 controls the control grid of the valve 1 across the resistance R_5 so that an amplified low frequency alternating voltage occurs across the resistance

R_2 in the anode circuit and this voltage is supplied after amplification by the amplifier 3 to the reproducing device T.

Moreover, the direct voltage which occurs in the resistance R_3 and which is dependent on the amplitude of the high frequency alternating voltage impressed upon the diode is supplied to the control grid of the valve 1. Thus, it is ensured that with increasing intensity of the retroaction the negative grid bias of the valve 1 increases so that the increased amplification of the circuit arrangement brought about as a result of the intensified retroaction is partly offset. It is thus ensured that the adjustment of the reaction coil is less critical and the amplitude of the high frequency oscillations that are generated in the case of excessive retroaction is limited to such a small value that only oscillations of low amplitude which cannot bring about disturbances in neighbouring receiving sets can occur in the antenna.

As the grid bias of the amplifier valve 1 is regulated in accordance with the high frequency oscillations supplied to the diode automatic fading compensation is also obtained by means of the circuit arrangement hereinbefore described.

I claim:

In a circuit arrangement for receiving modulated high frequency electric oscillations in which use is made of a reactively coupled discharge tube serving both for amplifying the modulated high frequency energy and the low frequency oscillations obtained after detection, a pentode valve, an input circuit for the pentode valve connected between the signal grid and the cathode thereof, said input circuit being tunable to the frequency of the desired modulated high frequency oscillations, a source of signal energy coupled to said input circuit, said tunable circuit including an inductance coil, a screen grid circuit for said pentode valve, said last named circuit including an inductance coil, said two inductance coils being coupled for producing regeneration, a diode rectifier tube, a circuit, including an inductance and a coupling condenser in series, connected between the anode of the pentode valve and the anode of the diode rectifier tube, an anode circuit for the pentode valve including a choke coil and a resistor in series, coupling between the last named inductance coil and the choke coil, a resistor connected between the anode and the cathode of the diode rectifier tube, means including a resistor connecting the anode of the diode rectifier tube to the signal grid of the pentode valve whereby rectified energy derived from the output of the diode rectifier tube is impressed upon the input of the pentode valve, an audio frequency amplifier circuit, an input terminal therefor, a connection including a coupling condenser between the input terminal and the end of the choke coil remote from the anode of the pentode valve for feeding audio frequency energy amplified by the pentode valve to the input of the audio frequency amplifier tube, and a utilizing circuit connected to the output of the audio frequency amplifier.

WILLEM DANIEL VAN GOGH.