

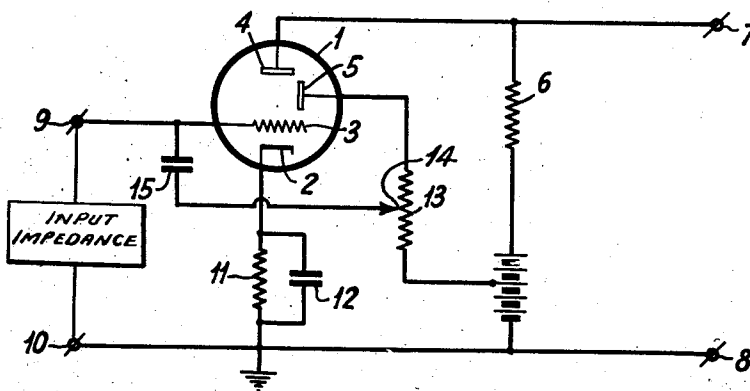
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AMPLIFIER CIRCUIT

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AMPLIFIER CIRCUIT

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3 Claims. (Cl. 179-171)

This invention relates to an amplifying circuit arrangement comprising a discharge tube which contains a cathode which is emitting when heated, at least one control grid, an anode and an auxiliary cathode which is emitting with electron bombardment.

To obtain an increase in amplification in such a circuit arrangement, an impedance is inserted according to the invention into the circuit which is connected to the auxiliary cathode, and part of the amplified alternating current voltage produced across the impedance in the circuit connected to the auxiliary cathode is supplied to the control-grid circuit.

The invention is based on recognition of the fact that, due to the negative slope of the characteristic curve of the auxiliary cathode, the amplified voltage produced through the impedance in the circuit which is connected to the auxiliary cathode exhibits a component which is in phase with the voltage to be amplified at the control grid so that an amplification-increasing feed-back coupling can be obtained in the feed-back coupling circuit without the use of a 180° phase-displacing transformer.

The invention will be more clearly understood by reference to the accompanying drawing showing, by way of example, one embodiment of the circuit arrangement according thereto. It comprises a discharge tube 1 which contains a cathode 2 which is emitting when heated, a control grid 3, an anode 4 and an auxiliary cathode 5 which is emitting with electron bombardment. The anode circuit comprises a resistance 6 from which is derived the amplified voltage taken from terminals 7 and 8. The voltage to be amplified is supplied to input terminals 9 and 10, of which the one is connected to the control grid 3 and the other is connected to the cathode via the parallel connection of a resistance 11, which serves for producing the automatic negative bias, and a condenser 12. The circuit connected to the auxiliary cathode 5 comprises a resistance 13. A point 14 of this resistance, which point is, for example, adjustable, is connected to the control grid 3 through a coupling condenser 15.

In the circuit arrangement described the voltages to be amplified, which are supplied to the terminals 9 and 10, will bring about across the resistance 13 a voltage which is in phase with the voltage to be amplified at the control grid 3. Due to part of this voltage being supplied to the control grid 3 through the coupling condenser 15, a feed-back coupling is obtained which increases the amplification.

It is not necessary that the impedance in the circuit connected to the auxiliary cathode 5 is an ohmic resistance. The feed-back coupling may also be obtained by using an arbitrary impedance. For obtaining a feed-back coupling which is independent of frequency, it is only necessary that the impedance in the circuit connected to the auxiliary cathode 5 and the impedance in the feed-back circuit, i. e. the impedance in the connection between the point 14 of the impedance in the auxiliary-cathode circuit and the grid 3 and the impedance located between the terminals 9 and 10 are so chosen that the voltage supplied to the control-grid circuit is in the frequency range to be amplified in an invariable relation to the voltage to be amplified.

What I claim is:

1. An amplifier circuit comprising an electron discharge tube provided with a heated cathode which emits primary electrons, a signal control grid, an anode and an unheated auxiliary cathode which is adapted upon bombardment by primary electrons to emit secondary electrons, input terminals connected respectively to the control grid and to the heated cathode, output terminals connected respectively to the anode and to the heated cathode, a load impedance and a source of positive potential connected between the output terminals, an impedance connected between the auxiliary cathode and said potential source and included only in the discharge path between the two cathodes, and a coupling reactance connected from an intermediate point on said auxiliary cathode impedance to the control grid for obtaining an amplification-increasing feed-back of a part of the amplified alternating voltage produced across said auxiliary cathode impedance.

2. An amplifier circuit as defined in claim 1, in which an input impedance is connected between the input terminals, and the auxiliary cathode impedance, the coupling reactance and the input impedance are so chosen that the voltage supplied to the control grid from the auxiliary cathode impedance is in the frequency range to be amplified in an invariable relation to the voltage to be amplified.

3. An amplifier circuit comprising an electron discharge tube provided with a heated cathode which emits primary electrons, a signal control grid, an anode and an unheated auxiliary cathode which is adapted upon bombardment by primary electrons to emit secondary electrons, input terminals connected respectively to the con-

trol grid and to the heated cathode, output terminals connected respectively to the anode and to the heated cathode, a load resistance and a source of positive potential connected between the output terminals, a resistance connected between the auxiliary cathode and said potential source, and a condenser connected on one side

5 by means of a variable tap to said auxiliary cathode resistance and on the other side to the control grid for obtaining an amplification-increasing feed-back of a part of the amplified alternating voltage produced across said auxiliary cathode resistance.

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