

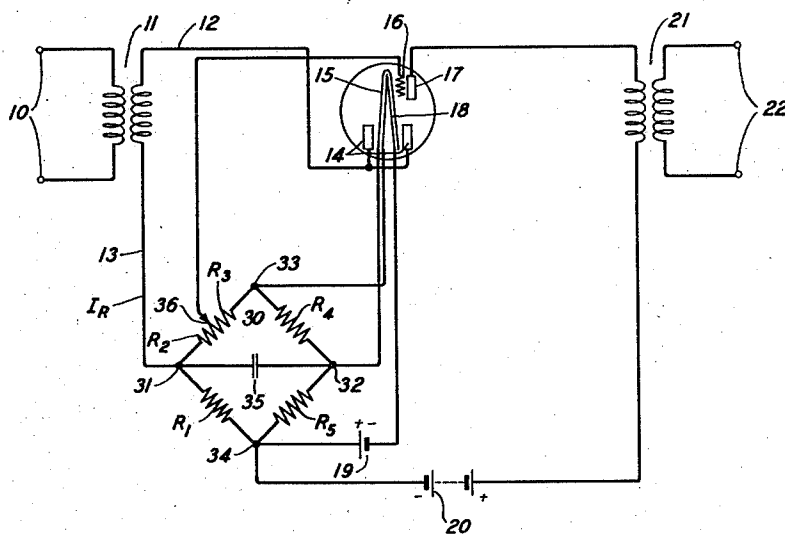
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DIODE-TRIODE APPARATUS

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DIODE-TRIODE APPARATUS

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3 Claims. (Cl. 250-27)

The invention relates to diode-triode apparatus, and more particularly to an arrangement for applying negative biasing voltage to the grid of a triode while at the same time maintaining the diode at zero bias.

When rectified diode voltage is applied to a triode amplifier included in diode-triode apparatus known heretofore, a resistance embodied in the filament circuit may serve to produce a biasing voltage for the control grid of the triode. One difficulty with such arrangement is that a biasing voltage of the same order of magnitude is also simultaneously applied to the diode. Consequently, no rectified current may flow until the peaks of the input signaling voltage overcome the negative bias on the diode. This tends to limit the sensitivity of the diode-triode apparatus and to change the rectified current-input characteristic thereof. Accordingly, this invention contemplates a diode-triode circuit organization which enables the application of a suitable biasing voltage to the control grid of the triode while at the same time maintaining zero bias on the diode.

The general object of the invention is to bias the control grid of a triode in a manner which is independent of the diode.

Another object is to increase the sensitivity of diode-cathode apparatus.

A common type of diode-triode apparatus embodies in a single envelope a diode and a triode, and utilizes a direct current source to energize the cathode heater thereof.

In a preferred embodiment, the invention comprises a bridge network having one diagonal connected in series in the diode circuit and an opposite diagonal connected in series in the circuit embodying the cathode heater source. A variable connection from the network to the control grid of the triode serves to supply thereto a negative biasing voltage of suitable magnitude.

A feature of this arrangement is that the diode circuit is maintained substantially at zero bias, that is, the shape of the rectified current-alternating current input characteristic is substantially unaffected by the bias applied to the triode amplifier. A further feature is that such biasing arrangement is achieved without the necessity of using a separate C battery.

The invention will be readily understood from the following description taken together with the accompanying drawing the single figure of which is a schematic circuit diagram of a preferred form of the invention.

Referring to this drawing, input circuit 10, 55

adapted to be connected to any suitable signaling wave source, is coupled through input transformer 11 and leads 12 and 13 to a diode rectifier comprising diodes 14, 14 and cathode 15. Associated with the diode is a triode amplifier comprising the cathode 15, a control grid 16 and an anode 17, and with the cathode a cathode heater 18 energized by a direct current source 19. The anode circuit of the triode amplifier includes a B battery 20 and is applied through a transformer 21 to output terminals 22, 22. For the purpose of this illustration the diode-triode is a 292-A Western Electric thermionic tube. As the operation of this tube is well understood, a general description thereof will be omitted here, and only such operation as is necessary to describe the invention will be included.

In accordance with this invention a bridge network 30 has one diagonal 31, 32 connected in series with the diode rectifier and an opposite diagonal 33, 34 connected in series with the direct current source 19 in the cathode heater circuit. Across the diagonal 31, 32 is a capacitor 35. A variable connection 36 from one arm of the network work extends to the control grid 16. The network comprises arms R_1 , R_2+R_3 , R_4 and R_5 .

In the operation of the above circuit organization, negative bias is normally provided for the control grid 16 without applying negative bias to the diodes 14, 14 with respect to the cathode 15. This is accomplished by maintaining $R_1=R_2+R_3$, and $R_4=R_5$. Thus, with no signal input the same voltage is developed across the arms R_1 and R_2+R_3 and also across the arms R_4 and R_5 . Such voltage is, of course, due to a flow of current from the cathode heater source 19. The negative biasing voltage for the control grid 16 is the voltage drop across R_4 minus that across R_3 , and may be made a suitable magnitude by adjustment of the variable connection 36.

The rectified signaling current I_R is independent of the ratio R_2/R_3 , provided $R_2+R_3=R_1$. The biasing voltage applied to the control grid 16 may be obtained by adjustment of the variable connection 36 without affecting the magnitude of the rectified current I_R flowing in the lead 13. Due to the aforementioned network arrangement the diodes 14, 14 do not receive any biasing voltage with respect to the cathode 15 as the diagonal 31, 32 comprises equipotential points. For the purpose of this illustration, $R_1=2$ megohms, $R_2=1.2$ megohms, $R_3=0.8$ megohms, $R_4=15$ ohms and $R_5=15$ ohms.

While the above description relates to a diode and triode contained in the same envelope, it is

to be understood that it is equally applicable to a diode and triode embodied in individual envelopes. The invention is not to be construed or limited to the specific details or values disclosed as these are rather for illustrative purposes, the scope being defined in the claims.

What is claimed is:

1. In a signaling wave receiver system, in combination, a source of signaling waves, a diode rectifier, circuit means to connect said diode 10 rectifier to said wave source, an amplifier including a control grid, a cathode and a cathode heater, and a source of direct current to energize said cathode heater; means to provide for said control grid a biasing voltage which does not produce a bias in the diode circuit, comprising a 15 bridge network having one diagonal connected in

series in said circuit means in the output of said diode and the opposite diagonal in series with said cathode heater source, a capacitor connected across the one diagonal in said circuit means, and a variable connection extending from said network to said control grid.

2. In the signaling wave receiver system according to claim 1 in which said bridge network comprises equal resistances in each of two adjacent arms and other equal resistances in each of the remaining two adjacent arms.

3. In the signaling wave receiver system according to claim 1 in which the terminals of the network diagonal connected in said circuit means 15 comprise equipotential points.

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