

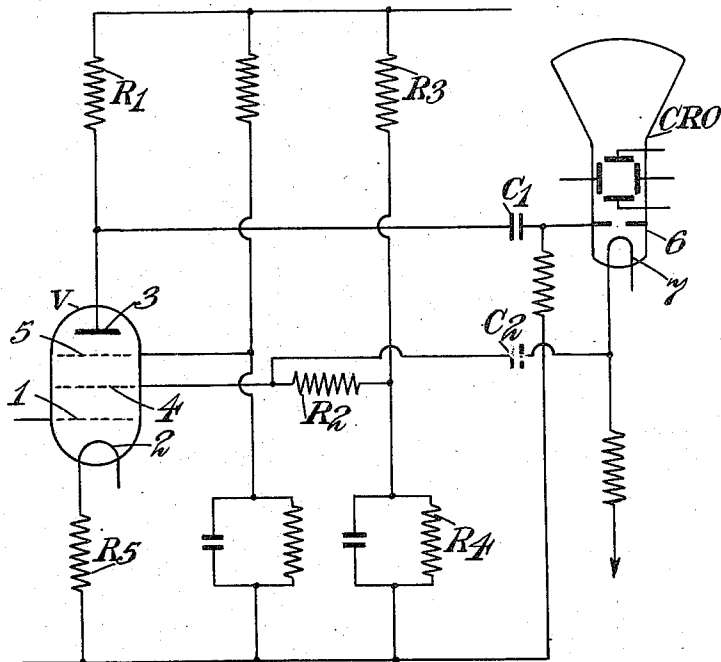
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THERMIONIC AMPLIFIER

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THERMIONIC AMPLIFIER

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This invention comprises a thermionic amplifier or valve-coupled stage in which two outputs opposed to one another in phase are obtained from a single electron stream, for example, for push-pull operation of an output apparatus.

According to the invention, this result is obtained by employing a secondary-emission valve having an anode connected to one output circuit and a secondary-emission cathode connected to another output circuit so that the application of a modulating voltage to an input electrode of the valve produces in the first circuit an output which is in phase opposition to the input voltage and produces in the second circuit an output which is in phase with the input voltage. There are thus obtained from a common input two outputs which are opposite to one another in phase and which can be used for example for operating a push-pull amplifier.

The invention has a particular application to a modulation stage for modulating a cathode-ray tube by applying modulation voltages of opposite sign to a modulator electrode and the cathode respectively of the cathode ray tube.

One embodiment of the invention will now be described, by way of example, with reference to the accompanying drawing, as applied to a modulation stage for modulating a cathode-ray tube.

In the arrangement illustrated diagrammatically in the drawing, V indicates a secondary-emission valve having a single input electrode or control grid 1 arranged to receive a video-frequency modulation voltage for controlling the beam modulation of a cathode-ray tube CRO which may form part of a television receiving system. The valve V has a thermionic cathode 2 connected through a suitable biasing resistance R5 to a source of negative potential, an anode 3 connected through a load resistance R1 to a positive HT source and a secondary-emission cathode 4 connected through an output resistance R2 to a junction between two resistances R3 and R4 which are connected in series with one another across the HT supply so as to form a potentiometer for applying a suitable positive DC potential to the electrode 4. The valve is also provided with a screen grid 5. The anode 3 is connected through a coupling condenser C1 to a modulator electrode 6 of the cathode-ray tube and the secondary-emission cathode 4 is connected through a condenser C2 to the cathode 7 of the cathode-ray tube.

In the operation of the system, modulation of the electron stream in the valve V by the input modulation voltage applied to the electrode 1 produces an output voltage across the resistance R1 which is opposite in phase to the input

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voltage and which is applied to the modulator electrode 6. It also produces a second output voltage across the resistance R2 connected to the secondary emission cathode 4, and this voltage is in phase with the input voltage and is thus opposite in phase to the voltage across the resistance R1. The second output voltage is applied to the cathode 7 of the cathode-ray tube so that it reinforces the effect of the output applied to the modulator electrode 6 in its beam-modulating effect.

The output resistances R1 and R2 may be of equal value so chosen as to obtain a sufficiently uniform response over the whole band of video-frequencies.

I claim:

1. Video-frequency receiving apparatus comprising a cathode-ray tube having a cathode and modulator electrode in combination with a secondary-emission valve having an anode and a secondary emission cathode, two output circuits connected respectively to said anode and secondary-emission cathode of the valve so as to obtain from a common input two outputs which are opposite to one another in phase, and means coupling said output circuits to the modulator electrode and the cathode of the cathode-ray tube respectively so that the two outputs reinforce one another in their beam modulating effect.

2. In a television receiver, video-frequency receiving apparatus comprising a cathode-ray tube having a cathode and a modulator electrode, a secondary-emission valve having an anode and a secondary-emission cathode, a modulation signal-input circuit to the valve, a first output circuit coupling the anode of the valve to the modulator electrode of the cathode-ray tube and a second output circuit coupling the secondary-emission cathode of the valve to the cathode of the cathode-ray tube.

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