

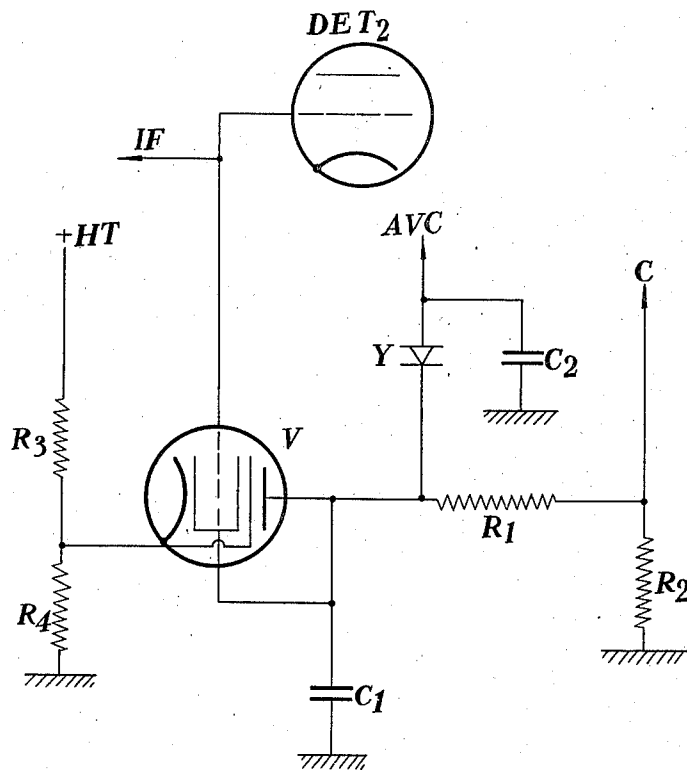
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GAIN CONTROL ARRANGEMENT

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GAIN CONTROL ARRANGEMENT

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1 Claim. (Cl. 179-171)

This invention relates to carrier wave receivers and more particularly to automatic volume control arrangements therefor.

In automatic volume control systems as usually employed in carrier wave receivers the speed at which the gain of the receiver falls for a given input signal is the same as the speed at which the gain increases when the signal is removed. This is unimportant, and in fact desirable when modulated carrier waves are being received, since in order to hold the output level constant when the signal fades either up or down the automatic volume control should operate rapidly and at the same rate either on an increasing or a decreasing carrier wave.

On commercial receivers which are required to receive interrupted continuous wave transmissions, however, such a high speed automatic volume control produces the undesirable effect of inserting "blocks" of noise between the elemental dots and dashes of the message, as between each signal element the sensitivity or gain is rapidly increased to "noise level".

To overcome this defect it is customary in commercial receivers to slow down the action of the automatic volume control by introducing a time lag or delay circuit which, while preventing the receiver gain from changing rapidly and introducing noise, has necessarily the defect of causing the receiver output to change only slowly, so that, for example, the volume of a "dash" is not constant throughout the length or period of its transmission. Similarly when tuning such a receiver to a strong carrier wave, overloading with consequent excessive output will momentarily occur until the automatic volume control comes into effective operation.

According to the invention in an automatic volume control system for a carrier wave receiver the time lag circuit which determines the response speed of the automatic volume control is arranged to be asymmetrical in speed of operation with respect to increasing and decreasing receiver gain.

According to a further feature an impedance in the time lag circuit comprises a device having an asymmetric resistance characteristic.

According to another feature of the invention in a radio receiver for interrupted continuous wave reception, an automatic volume control system in which the time lag circuit which determines the response speed of the automatic volume control is arranged to be asymmetrical with respect to increasing and decreasing receiver gain in such manner that the automatic

volume control operates slowly to increase gain and quickly to decrease gain.

It will be appreciated that the arrangement according to the invention is highly desirable in interrupted continuous wave reception as when, say, a dash commences, the gain of the receiver drops very rapidly and holds the output volume substantially constant for the duration of the dash. When however, the transmission of the dash is completed, the receiver gain during the space or no signal period increases only relatively slowly, thus preventing to a great extent "noise" from being received until the next dash, say, commences, when the gain of the receiver again falls rapidly. In this manner intelligibility is greatly increased.

The invention will be clearly understood from the following detailed description and the accompanying drawing which shows one embodiment as applied to a superheterodyne receiver, in the interest of simplicity only sufficient of the circuit being illustrated to assist in a clear appreciation of the invention.

Referring to the drawing DET2 is the second detector valve in the normal chain of signal reception whilst V is a pentode valve for effecting automatic volume control.

The intermediate frequency voltage applied over lead IF to the grid of the second detector valve DET2 is also applied to the grid of the automatic volume control valve V which is so biased by means of its cathode connection to the voltage divider R3, R4 that no anode current flows in valve V when no signals are being received (i. e., it operates as an anode bend detector).

When an intermediate frequency signal voltage is applied to the control grid of valve V over the lead IF anode current is drawn through the resistance R1. The anode potential of the valve V is supplied by the potential drop across a bias resistance R2 which is common to the cathode circuits of all the controlled valves and to the cathode circuit of the output valve. The conductor C on the drawing is assumed to extend to the cathode circuits of these valves which have not been shown in order not to complicate the diagram. The cathode circuit of the output valve is connected to the resistance R2 in order to maintain a sufficient potential drop along this resistance for proper operation of the automatic volume control circuit even when the cathode currents in resistance R2 of the controlled valves have been reduced almost to zero by the automatic volume controlling potential.

The arrangement so far described is a normal automatic volume control circuit.

The potential drop across the resistance R1 due to the anode current of the valve V is applied over the lead AVC through a dry plate metal rectifier Y or other device having an asymmetric resistance characteristic to bias the grids of the appropriate controlled valves.

The rectifier Y and a blocking condenser C2 connected between the AVC line and ground constitute a time lag circuit, the resistance of the rectifier Y determining the rate of charging of the condenser C2 which in turn determines the rate of change of grid potential of the controlled valves.

The rectifier Y is so connected that its resistance to the flow of condenser current is low when the grids of the controlled valves are becoming increasingly negative (that is the receiver gain is falling and condenser C2 charging) and high when the grids of the controlled valves are becoming decreasingly negative (that is the receiver gain is increasing and condenser C2 is discharging). In this manner the required asymmetric automatic volume control is achieved and the ratio of "forward" to "reverse" resistances of the rectifier determining the degree of asymmetry obtained.

It will be appreciated that the invention is not limited to the precise embodiment described in detail above, and modifications coming within the scope of the appended claim will readily suggest themselves to those versed in the art.

What is claimed is:

An automatic volume control system for a receiver having at least one amplifier valve, comprising a control valve having a first resistance and a second resistance serially connected in the plate circuit thereof, a connection from the cathode of said amplifier valve through said second resistance to ground, the value of said second resistance being such that a potential drop is secured sufficient for the operation of said control valve, an asymmetric resistance element connected between the plate of said control valve and the grid of said amplifier valve, and a condenser connected between the amplifier valve side of said asymmetric resistance and a point in the plate circuit of said control valve such that any potential drop across said first resistance is applied to said condenser, whereby the gain of said receiver decreases quickly and increases relatively slowly.

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