

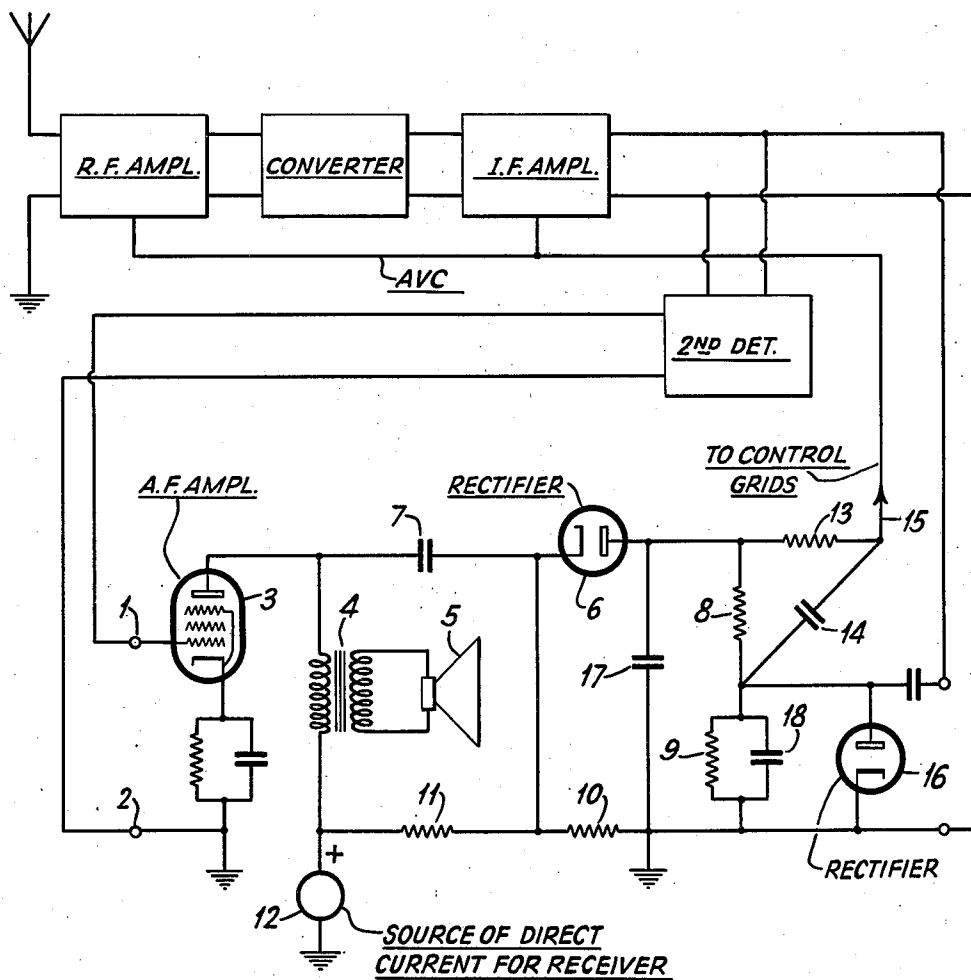
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RADIO RECEIVER OVERLOAD CONTROL CIRCUIT

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BY

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RADIO RECEIVER OVERLOAD CONTROL
CIRCUIT

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1 Claim. (Cl. 250—20)

This invention relates to a circuit arrangement for avoiding overloading of radio receiving sets.

According to the invention this is attained by including a rectifier in the output circuit of a low frequency amplifying tube, preferably the output tube, said rectifier having such a threshold value that only with overloading of the low frequency amplifier a rectified voltage is produced in the output circuit of the rectifier, and which voltage controls the amplification of one or more high, and/or intermediate, frequency amplification stages so as to reduce their amplification.

In a receiving set including automatic volume control in the high, and/or intermediate, frequency part the rectified voltage produced with overloading in the output circuit of the rectifier is, according to a further feature of the invention, preferably superimposed on the voltage that serves to insure automatic volume control.

The invention will be more clearly understood by reference to the accompanying drawing representing, by way of example, one embodiment thereof.

Low frequency oscillations are impressed on the grid circuit 1—2 of the output tube 3 of the low frequency amplifier of a radio receiving set, and, after having been amplified, supplied through an output transformer 4 to a loudspeaker 5. A rectifying diode 6 is connected on the one hand through a condenser 7, and on the other hand through resistance 8, 9, 10 and 11, to the primary winding of the output transformer. As appears from the drawing the resistances 10 and 11 are connected to the source of anode voltage 12 of the set. The resistances are so chosen that the voltage across the resistance 10, which determines the bias of the rectifying diode, has such a value that so long as overloading of the amplifier does not take place then the rectifier remains blocked. As soon, however, as overloading occurs, and consequently the alternating voltage set up at the terminals of the primary winding of the output transformer exceeds the threshold value of the rectifier 6 determined by the bias, there flows a rectified current. A voltage drop is produced across the resistance 8, the value of this voltage drop depending on the degree of overloading. This voltage drop is smoothed by means of a resistance 13 and condenser 14, and is supplied through a conductor 15 to the grid circuits of one or more high, and/or intermediate, frequency amplification stages, and controls their amplification in a manner known per se by grid voltage displacement, the amplification control

taking place in such a manner that the amplification is reduced in the event of overloading.

In the represented circuit the voltage drop across resistance 8 is superimposed on the usual control voltage for automatic volume control. This control voltage is set up across the resistance 9 and is obtained by rectification of the high, or intermediate, frequency oscillations in a rectifier 16. In this circuit the voltage drop across the resistance 8 will, in the event of overloading, decrease the amplification of the high, and/or intermediate, frequency amplifiers, so that the amplitude of the oscillations supplied to the rectifier 16, and consequently the control voltage across the resistance 9, will also decrease. With overloading the voltage drop across the resistance 8 will consequently increase at first, whereas the control voltage across resistance 9 decreases. Consequently the amplification of the high, and/or intermediate, frequency amplifier will at first vary to a slight extent only. Further decrease of the amplification does not occur before the control voltage across resistance 9 has been replaced by the voltage drop across resistance 8. In order that this takes place rapidly it is desirable to impress as high as possible a low frequency alternating voltage on the rectifier 6. However, this requires thorough smoothing of the voltage drop across the resistance 8, i. e., a large time constant of the resistance 13 and condenser 14.

This is favourable on the one hand in order that upon the overmodulation ceasing to act the amplification of the high, and/or intermediate, frequency amplifier does not return too rapidly to its initial value, but on the other hand this large time constant may not affect the operation of the automatic volume control. Since, however, as appears from the drawing, the steadying condenser 14 is connected to the junction of resistances 8 and 9 it is insured that the control is sufficiently slow with overloading, whereas the automatic volume control takes place in a sufficiently rapid manner.

The condenser 7 is preferably not too large in order that with overloading there is not abruptly taken excessive energy from the output circuit of the output tube 3 whereby the reproduction might be affected. Suitable values for the individual circuit elements are:

Capacity 7=10,000 micromicrofarads

Capacity 14=17=0.5 μ f

Capacity 18=0.2 μ f

Resistors 8=13=0.8 m-ohm

What is claimed is:

In a radio receiver of the type provided with a radio signal transmission network, a detector, a modulation voltage transmission network, means responsive to carrier amplitude variation for producing a control voltage proportional to carrier amplitude, a second means responsive to modulation voltage amplitude above a predetermined overloading value for producing a second control voltage proportional to modulation voltage amplitude, said second means comprising a rectifier coupled to said modulation voltage network, a load impedance in circuit with the rectifier to develop said second control voltage, com-

mon means applying both said control voltages in a transmission efficiency reducing sense to said radio transmission network, means connected to said load impedance for retarding the disappearance of the second control voltage with said modulation voltage decrease below said overloading value without affecting the development of said first control voltage, and said retarding means being a resistor-condenser network in shunt with said load impedance and having a relatively large time constant.

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