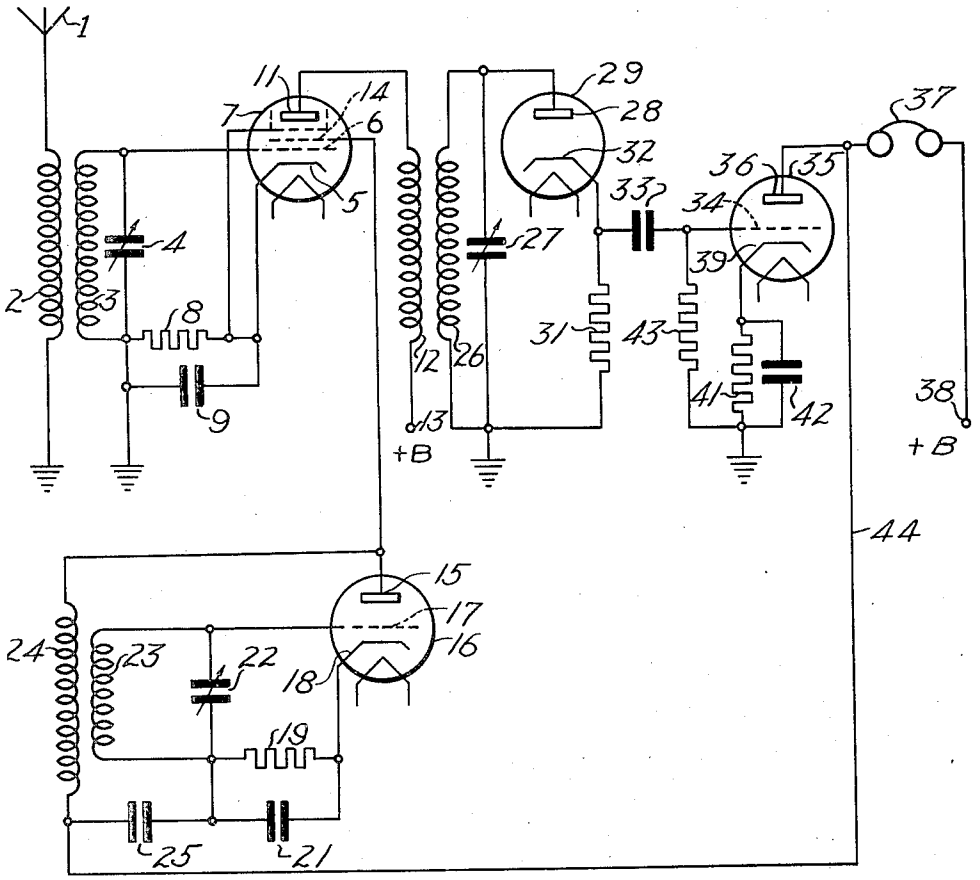
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RECEIVER FEEDBACK CIRCUIT

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RECEIVER FEED-BACK CIRCUITS

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2 Claims. (Cl. 250—20)

My invention relates to feedback circuits and, in particular, to inverse feedback from the audio frequency end of the receiver to points ahead of a detector.

One object of my invention is to reduce audio frequency harmonic distortion in radio receivers.

Another object of my invention is to reduce extraneous noises, such as hiss and hum.

Still another object of my invention is to improve the fidelity of response in radio receivers.

Other objects of my invention will become apparent upon reading the following description taken in connection with the drawing, in which the single figure is a schematic diagram of a heterodyne receiver embodying the principles of my invention.

Referring in detail to the drawing, an antenna 1 feeds receiver radio signals through the reaction of a primary winding 2 upon a secondary winding 3 which is shunted by a variable capacitor 4 and connected between the cathode 5 and control electrode 6 of a pentode amplifier 7 of conventional type. The cathode 5 is preferably of the uni-potential type and is connected to ground through a resistor 8 shunted by a capacitor 9. The anode 11 of the pentode 7 is connected through the primary 12 of an output transformer to the positive terminal 13 of a conventional direct-current plate supply. The grid electrode 14 of the pentode 7 is connected to the anode 15 of an oscillation generator 16 having a grid 17 and a cathode 18. To the cathode 18 is connected a resistor 19 shunted by a capacitor 21, the other end of the resistor 18 being connected to a variable capacitor 22 which is shunted by the primary winding 23 to the grid 17. The anode 15 is connected through a secondary winding 24 and a capacitor 25 to the end of the resistor 19 remote from the cathode 18.

Cooperating with the primary winding 12 above mentioned is a secondary winding 26 shunted by a variable capacitor 27 and connected to the anode 28 of a diode 29. The opposite end of the winding 26 is connected to ground and through a resistor 31 to the cathode 32 of the diode 29. The cathode 32 is connected through a capacitor 33 to the grid 34 of an amplifier 35. The anode 36 of the amplifier 35 is connected through a pair of earphones or other sound-reproducing device 37 to the positive terminal 38 of a conventional direct-current voltage supply. The cathode 39 of the amplifier 35 is connected through a resistor 41 shunted by a capacitor 42 to ground. A resistor 43 is connected between the grid 34 and ground.

The connections so far described will be recognized as a simple heterodyne receiver of a type known in the art. The inverse feedback connection which embodies my invention consists in the lead 44 which connects the anode 36 of the audio amplifier 35 with the circuit of the anode 15 of the oscillation generator 16, or, as it may alternatively be expressed, with the circuit of the grid electrode 14 of the radio frequency amplifier 7.

The energization of the audio frequency amplifier 35 decreases the potential of its anode 36 relative to ground. The effect of the feedback connection 44 is to decrease the output of the oscillator 16 and likewise to decrease the voltage of the grid 14 in the radio frequency amplifier 7. As a result of the latter action, the intermediate frequency voltage impressed by the anode 11 of the output transformer primary 12 is reduced, and this in turn decreases the output current from the diode detector 29 which flows through the resistor 31. As a result of the latter action, the voltage impressed upon the grid 34 of the audio frequency amplifier becomes less positive, thereby tending to decrease the output current flowing through the anode 36 of the latter.

In other words, the reaction of the feedback connection 44 is to decrease the strength of the output signal from the audio frequency amplifier 35; that is to say, the effect is one of inverse feedback.

It will be noted that the connection 44 introduces the feedback ahead of the first detector 29 which is present in the radio frequency chain; in other words, the feedback is impressed on the highest frequency portion of the system. In the case of a more highly elaborated receiver, such as those commonly employed which comprise a first detector, an intermediate frequency amplification stage, and a second detector for transforming the energy in the latter to audio frequency, this feedback connection 44 would introduce the feedback ahead of the first detector, the intermediate frequency amplifier and the second detector. However, as an alternative form of my invention, the connection 44 from the audio frequency output might, in the case of the more elaborate system involving two concatenated detector stages, be connected to an electrode, such as a grid of an intermediate frequency amplifier tube.

It will likewise be understood that, while my invention is here shown as applied to receivers of the superheterodyne type employing local os-

cillators, the principles are equally applicable to tuned radio frequency receivers, in which case the feedback connection 44 would extend from the anode of an audio frequency amplifier to a screen grid or other electrode in a radio frequency stage tube ahead of the detector.

It is likewise within the scope of my invention to introduce any desired phase by well known means such, for example, as an inductance-capacitance bridge in the feedback connection 44.

I claim as my invention:

1. In a radio receiver, a radio frequency mixer-tube comprising a cathode, a control electrode, an anode and a third electrode, an oscillation generator connected to impress voltages on said third electrode, a detector circuit coupled to the output of said mixer tube and acting to demodulate the output energy thereof, an audio frequency load circuit energized from said demodulator and a feedback connection from a point on said audio frequency load circuit to said third electrode.

2. In a radio receiver, a radio frequency mixer-tube comprising a cathode, a control electrode, an anode and a third electrode, an oscillation generator connected to impress voltages on said third electrode, a detector circuit coupled to the output of said mixer tube and acting to demodulate the output energy thereof, an audio frequency amplifier tube having the output voltage of said demodulator impressed on its control electrode, and a feedback connection between the anode of said audio frequency amplifier tube and said third electrode.

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