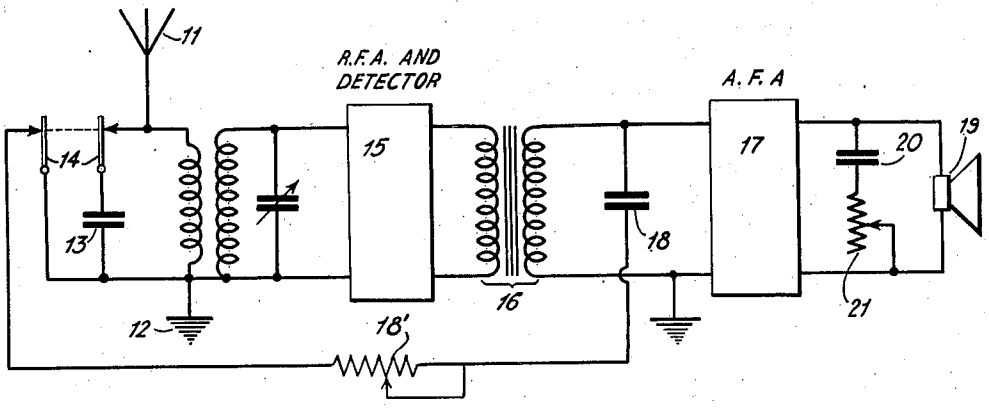
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TONE CONTROL

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TONE CONTROL

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4 Claims. (Cl. 250—20)

This invention relates to radio receivers, and more particularly to means for varying the tone of the reproduced signal.

In accordance with this invention, the tone of the reproduced signal is varied simultaneously with the sensitivity of the receiver so that the high frequencies are reduced as the sensitivity and overall amplification of the receiver are increased.

In a radio receiver, whenever the sensitivity is maximum, as, for instance, when operating a receiver equipped with a "local-distance" switch, with the switch in the distance position, annoying hissing sounds of the higher audio frequencies are reproduced. Furthermore, when operating a receiver at maximum sensitivity, static and other atmospheric noises of the higher audio frequencies are reproduced even when not tuned to a carrier frequency.

The primary object of this invention is to reduce the audio-frequency response to the high frequencies whenever the sensitivity of the receiver is such as to produce these high audio frequencies to an objectionable extent.

It is a particular object of this invention to provide a radio receiver including means for altering the sensitivity, such as a local-distance switch, and a tone control adapted to attenuate the high audio frequencies, which shall be operative whenever the receiver is operating at maximum sensitivity.

These and further objects of the invention will become apparent from the following description taken in connection with the accompanying drawing.

In accordance with this invention, means are provided to receive and reproduce audio-frequency currents representative of the signal being transmitted. In the receiving means, sensitivity control means are provided, such, for instance, as a local-distance switch, by means of which the sensitivity of the receiver may be altered. In some portion of the audio-frequency circuit a tone control arrangement is provided. Means are provided for simultaneously operating the sensitivity control and the tone control in such a manner that the high audio frequencies are attenuated in the output of the receiver whenever the receiver is operated at high sensitivity. The sensitivity control may be of any desired type, such, for instance, as an ordinary volume control, although that shown for the purpose of illustration is a local-distance switch in which the receiver may be adjusted to have either one of two degrees of sensitivity. The tone control may be of any desired arrangement, the specific details of which constitute no part of this invention, although that shown for the purpose of illustration is a filter composed of an audio-frequency by-pass condenser which is selectively connected in some portion of the audio-frequency circuit, the selecting means being operated conjointly with the sensitivity control means.

When receiving distant stations, which results in the production of an abnormally high proportion of disturbing high-frequency audio sounds, the loss of fidelity, due to a tone control, is not objectionable, and it is under these circumstances that the present invention provides such a tone control. When, on the other hand, the operator is listening to a local station, and his desire is to have the maximum tone fidelity obtainable, the high-frequency attenuator condenser is disconnected and the signals are reproduced with maximum fidelity.

Supplemental means may be provided to permit the operator to control the tone in accordance with his own particular desires.

The invention will be better understood by consideration of the drawing, which shows a single figure illustrating a preferred embodiment of this invention.

In this figure, the incoming signal is impressed upon the antenna circuit 11—12, the antenna inductance of which is coupled in the usual manner to the tuned input of the radio-frequency amplifier and detector 15. The detected output of this unit 15 is connected by means of audio transformer 16 to the input of the audio-frequency amplifier 17. The output of the audio-frequency amplifier is supplied to the loud speaker 19. The details of the amplifier and detector units 15 and 17 are well known and constitute no part of the present invention, so that they need not be further described.

A condenser 13 is arranged to be selectively connected in shunt with the antenna inductance by means of the double-pole, single-throw switch 14. When this condenser is in shunt with the antenna inductance, the sensitivity of the receiver is decreased, as the condenser 13 serves to by-pass a portion of the radio-frequency energy. The switch 14 also serves to connect the audio-frequency by-pass condenser 18 and the variable resistor 18' in shunt with the input of the audio-frequency amplifier 17. This condenser is so chosen as to by-pass the higher audio frequencies whenever it is connected in the circuit, and thus reduce or attenuate the audio response to the higher audio frequencies. By means of the

variable resistor 18', the operation of the tone control attenuation may be controlled by the operator so that even when receiving distant stations the attenuation at high frequencies may be reduced.

The tone control may be provided at any point in the audio circuit and any desired filter arrangement may be substituted for the condenser shown. The specific details of the tone control arrangement shown and described constitute no part of this invention and are for the purpose of illustration only.

Similarly, the specific details of the sensitivity control, which is in this instance represented as the usual local-distance switch, constitute no part of this invention, and it is to be understood that any appropriate sensitivity control may be substituted therefor.

The present invention resides in the combination of the sensitivity control, the tone control, and the means by which they are simultaneously operated, so that whenever the receiver is operated at maximum sensitivity, the high audio frequencies are attenuated.

Supplemental means may be provided for controlling the tone of the receiver even when the local-distance switch is in the local position and the condenser 18 is consequently disconnected from the circuit. Such means comprise the condenser 20 and the variable resistor 21, by means of which the effect of the condenser upon the audio-frequency circuit may be controlled by the operator. Thus, he may reduce the response of the receiver to high audio frequencies even when receiving local stations.

In operation, whenever the sensitivity of the receiver is increased, as, for instance, when receiving signals from distant stations, resulting in the reception of a large number of strays or atmospherics and in the generation of tube noises, etc., the tone control is simultaneously and automatically placed into operation and the resulting high audio frequencies are attenuated. When, on the other hand, the sensitivity of the receiver is reduced, as when receiving local stations, in which it is desired to have maximum tone fidelity, the tone control condenser is removed from the circuit, and the signals are reproduced with maximum fidelity.

What is claimed is:

1. In a radio receiver, the combination with means for receiving, detecting, amplifying and reproducing a signal-modulated carrier wave, means for altering the sensitivity of said receiver, means for altering the tone of the reproduced signal, a signal means for simultaneously operating said last two means, and manually operable means connected in series with the tone-altering means for varying the effect of said tone-altering means upon the reproduced signal.

2. In a radio receiver, the combination of means for receiving, detecting, and amplifying a signal-modulated carrier wave, means for altering the sensitivity of said receiver, comprising a local-distance switch included in said receiving means, means for altering the tone of the detected and reproduced signal, a single means for simultaneously operating said last two means, and a supplemental tone control means for controlling the tone of reproduction when the tone-altering means is inoperative.

3. In a radio receiver, the combination of means for receiving, detecting, and amplifying a signal-modulated carrier wave, means for amplifying the audio-frequency signal, means for altering the sensitivity of said receiver, means for altering the tone of the reproduced signal, said means comprising a condenser selectively connected in a portion of said audio-frequency amplifying circuit to by-pass high audio frequencies an adjustable resistor in series with said condenser for manually controlling the effect of said condenser in by-passing the high audio frequencies, unitary means for simultaneously operating the sensitivity-altering means and connecting said condenser in the audio-frequency circuit, and supplemental tone-control means for controlling the tone of the reproduced signal when the tone-altering means is disconnected.

4. In a radio receiver, the combination of means for receiving, detecting, and amplifying a signal-modulated carrier wave, audio-frequency amplifying means for amplifying the detected signal, means for altering the sensitivity of said receiver comprising a condenser selectively connected in the circuit of said receiving means to by-pass a portion of the radio-frequency energy when connected in said circuit, means for altering the tone of the detected signal comprising an audio-frequency by-pass condenser selectively connected in some portion of the audio-frequency amplifying circuit, and unitary means for simultaneously connecting said second-mentioned condenser and disconnecting said first-mentioned condenser, whereby as the sensitivity of said receiver is increased, the high-frequency response in the audio-frequency circuit is decreased, and vice versa.

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CERTIFICATE OF CORRECTION.

Patent No. 2,018,526. October 22, 1935.

JOHN KELLY JOHNSON.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, second column, line 1, claim 1, for "signal" second occurrence, read single; and line 25, claim 3, after "frequencies" insert a comma; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 26th day of November, A. D. 1935.

(Seal) Leslie Frazer
Acting Commissioner of Patents.