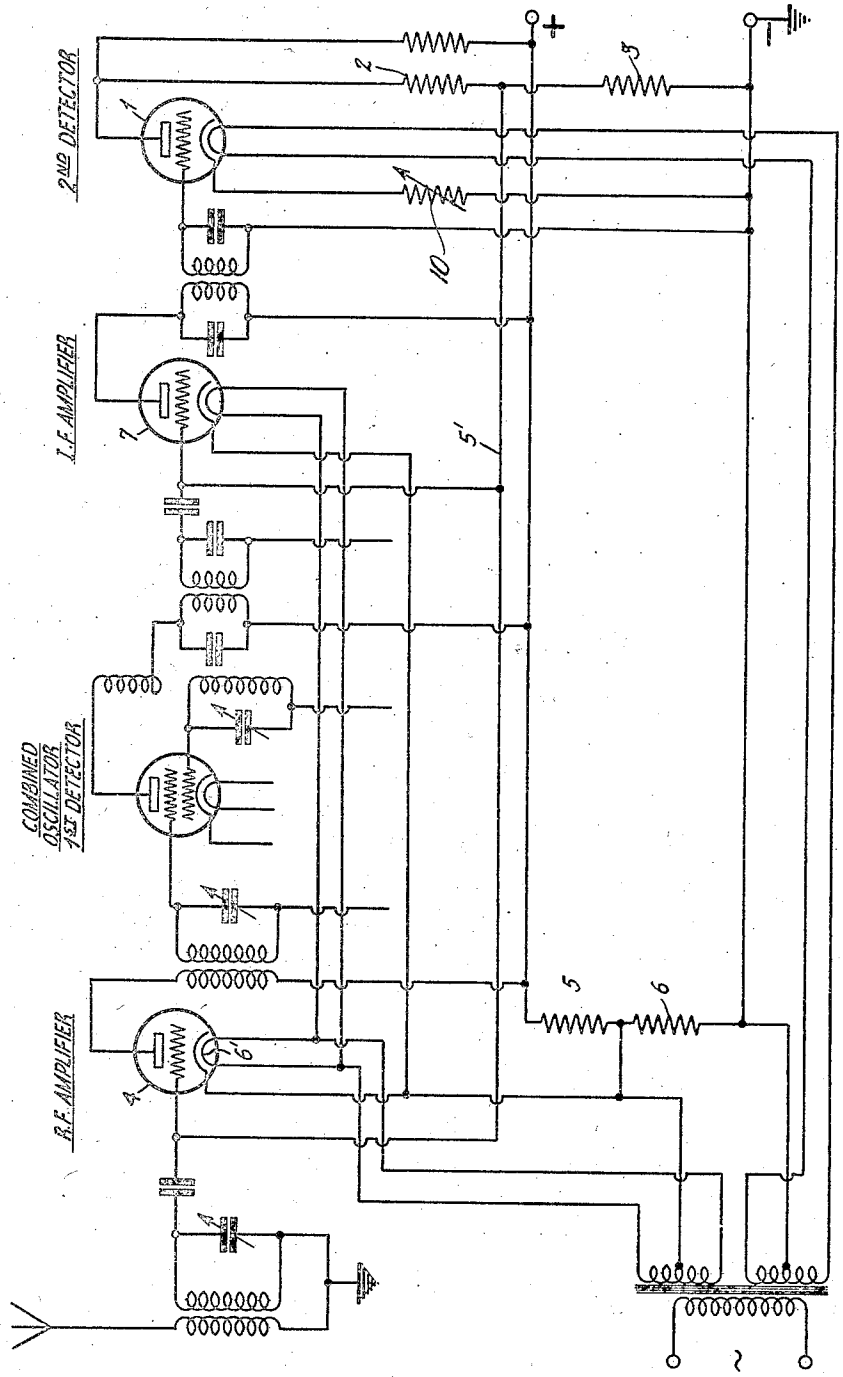
June 30, 1936. G. ANDERS 2,046,144

AUTOMATIC GAIN CONTROL RECEIVER

Filed Dec. 17, 1932



INVENTOR
GUIDO ANDERS
BY H. B. Grover
ATTORNEY

Patented June 30, 1936 2,046,144

UNITED STATES PATENT OFFICE

2,046,144

AUTOMATIC GAIN CONTROL RECEIVER

Guido Anders, Berlin, Germany, assignor to Telefunken Gesellschaft fur Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany

Application December 17, 1932, Serial No. 647,719
In Germany January 22, 1932

7 Claims. (Cl. 250—20)

My present invention relates to a novel gain control means for receiver arrangements using indirectly heated tubes.

In high-grade receiver sets for radio communication it is desirable to provide anti-fading (fading regulation or compensation) means so as to neutralize fluctuations in the volume. Arrangements of this kind are known in the art, and they are based upon the fact that, upon the rising of the signal voltage at the second detector grid, the plate current of the second detector is caused to increase while its plate potential decreases as a result of the growth in potential across the plate resistance. This amplitude dependence is usually utilized for the regulation of the grid biasing potential of the first radio frequency amplifier tube.

Customary circuit schemes of this type, however, involve the drawback that the plate voltage of the end, or power, tubes is reduced by an amount equal to the biasing voltage employed for fading compensation. The present invention discloses a circuit scheme which is free from the said drawback. One exemplified embodiment of the invention is shown in the drawing.

In parallel relation to the output of the second detector tube 1 is a high-ohm voltage divider consisting of the high-ohm resistances 2 and 3. Part of the voltage at the tube 1 is fed to the grid of the amplifier tube 4 through lead 5'. Inasmuch as the said grid would be biased as a consequence, it is necessary to introduce a negative compensating voltage. Contradistinct to schemes known in the earlier art, this is here insured by that the emissive layer, coat, or electrode of the amplifier 4, is fed with a positive biasing potential from a potentiometer consisting of the resistances 5 and 6, the said potentiometer being connected in parallel to the source of filtered direct current.

This arrangement first has the shortcoming that between the electron-emissive layer and the filament 6' there may prevail a relatively high potential difference which may be harmful for the tube. It is thus necessary to preclude this risk by the arrangement upon the line-supply transformer of a distinct heating winding. With unchanged dimensions of the network-supply unit compared with that used in former arrangements, it is feasible to obtain higher plate voltage for the power tube in a circuit scheme according to this invention, in spite of fading regulation.

In order to insure more intensive or efficient regulation it would be possible to act upon the grid biasing potential of the intermediate-frequency amplifier tube 7 conjointly with the use of a similar grid biasing voltage in the first radio tube. The influence of different tubes makes itself felt substantially only in the second detector tube. In order to secure optimum grid biasing voltages in the tubes to be regulated the said detector tube must show a certain value of plate current. This value is obtained by the adjustment of the second detector grid biasing voltage by the aid of a potentiometer 10 or the like, the variable resistor 10 being connected between the grid and cathode of tube 1.

What is claimed is:—

1. In combination, in a radio receiver, a radio frequency amplifier including a signal grid, cathode and anode, a rectifier including a tube provided with a grid, cathode and anode, means for coupling the rectifier grid to the amplifier anode circuit for signal energy transfer, a source of direct current, a connection including a resistor from the rectifier anode to a positive potential point of said source, the rectifier cathode being connected to a negative potential point of the source, a path including at least two resistive portions connected between the rectifier anode and the said negative point, a direct current connection between the amplifier grid and a point intermediate said portions, at least two resistors connected across said source between said positive and negative points, a connection from the amplifier cathode to a point intermediate said two resistors, the potential of the second intermediate point being substantially more positive than that of the first intermediate point and the said negative potential point to which the rectifier cathode is connected, and a connection from the amplifier anode to said positive potential point of said source.

2. In a receiver, as defined in claim 1, a heater element in said amplifier, a heater element in said rectifier tube, a supply transformer adapted to be connected to a heating alternating current source, the transformer including independent secondary windings for the amplifier and rectifier heater elements.

3. In a receiver, as defined in claim 1, a heater element in said amplifier, a heater element in said rectifier tube, a supply transformer adapted to be connected to a heating alternating current source, the transformer including independent secondary windings for the amplifier and rectifier heater elements, a connection between the amplifier cathode and its heater winding, and a connection between the rectifier cathode and its heater winding.

4. In a receiver as defined in claim 1, a variable

impedance in the cathode circuit of the rectifier tube for regulating the flow of current in the anode circuit thereof.

5. In a superheterodyne receiver including a radio frequency amplifier, first detector, intermediate frequency amplifier and second detector, a source of direct current for energizing the anode circuits of said amplifiers and second detector, a pair of resistors connected between the second detector anode and the negative side of said source, an impedance connected between the positive side of said source and the second detector anode, a direct current connection between the grids of said amplifiers and a point intermediate the said resistors, a second pair of resistors connected across said source, and a direct current connection between the cathodes of said amplifiers and a point intermediate the said second pair of resistors which is at a positive voltage with respect to the first point.

6. In a receiver as defined in claim 5, a connection between the cathode of the second detector and the negative side of said source, said last connection including a variable resistor for regulating the flow of current in the anode circuit of the second detector.

7. In a receiver as defined in claim 5, said amplifiers and second detector including heater elements for the cathodes thereof, and a heating current supply transformer having one secondary winding connected to the heater elements of said amplifiers and a second secondary winding connected to the second detector heater element.

GUIDO ANDERS.