Nov. 26, 1935. L. EGYED 2,022,412

DETECTOR CIRCUIT

Filed July 23, 1931

Fig. 1

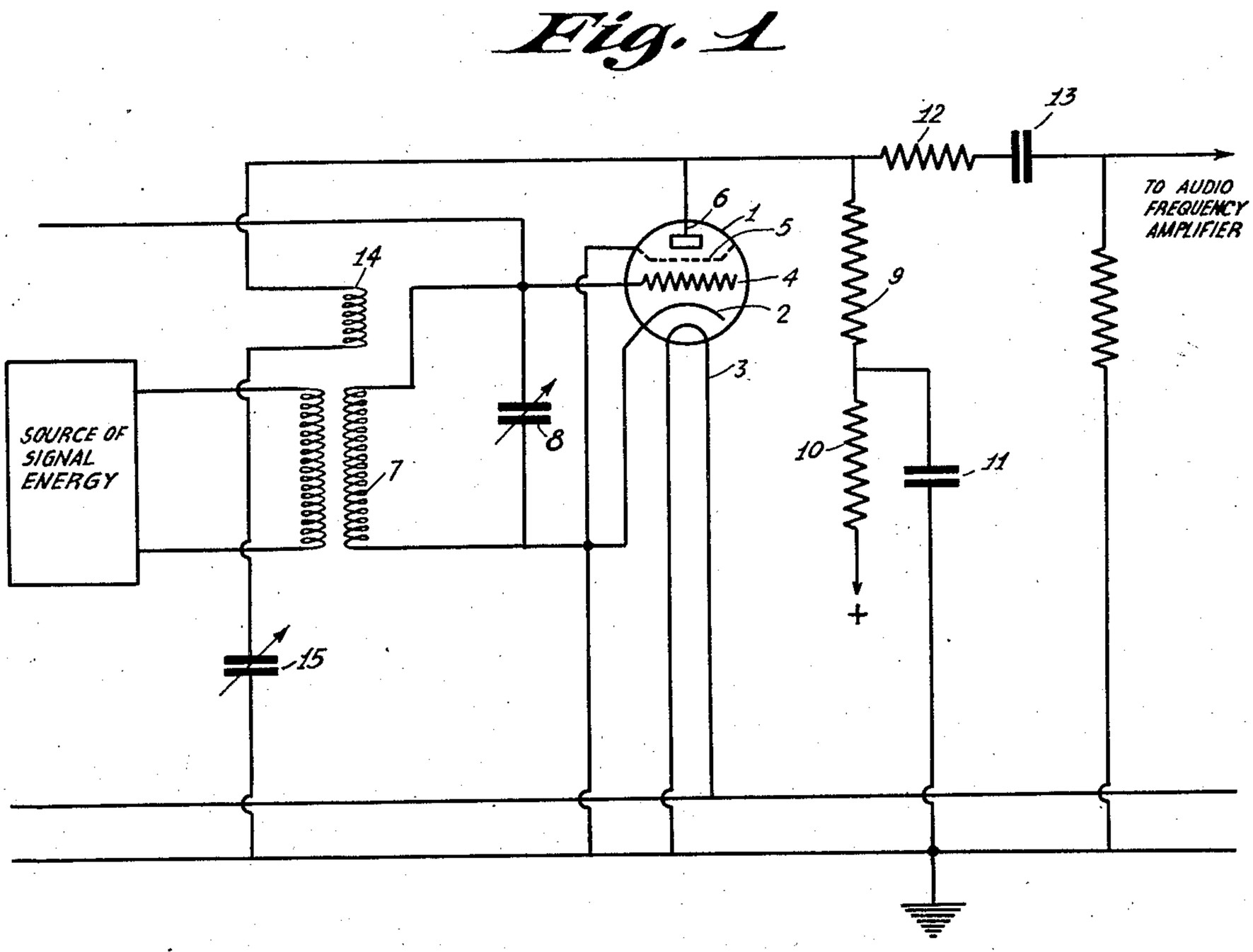
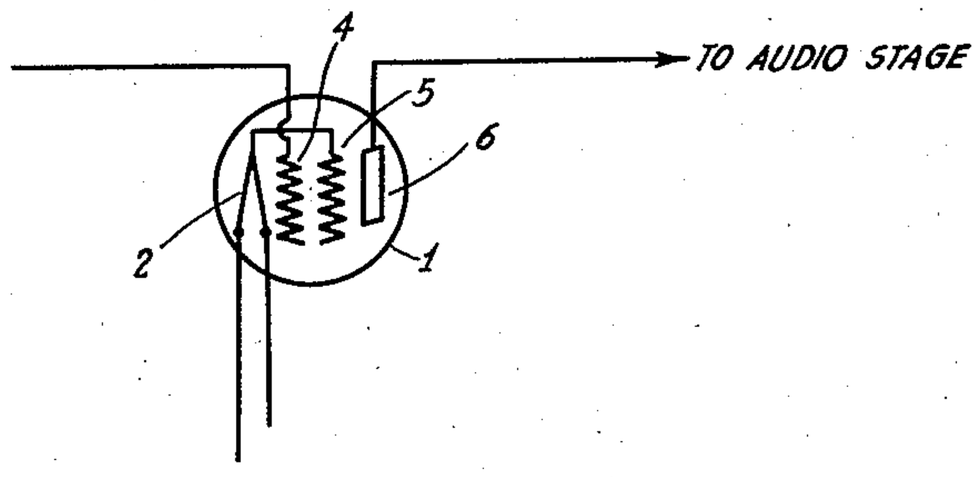


Fig. 2



INVENTOR
LADISLAUS EGYED
BY W. G. Glover
ATTORNEY

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DETECTOR CIRCUIT

Ladislaus Egyed, Berlin, Germany, assignor to Telefunken Gesellschaft für Drahtlose Telegraphie m. b. H., Berlin, Germany, a corporation of Germany

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2 Claims. (Cl. 250—27)

My present invention relates to frequency changers, and more particularly to a detector circuit utilizing plate rectification and comprising screen grid tubes.

In screen grid tube operation it has heretofore been customary to apply to the screen grid a positive potential in relation to the cathode, the potential being of the same order of magnitude as the positive potential of the plate in reference to the cathode or filament. Tests, upon which the present invention is based, on the subject of rectifier action in radio frequency screen grid tubes connected for plate rectification have shown that the curvature at the lower knee of the plate current control grid potential characteristic is so much more marked the lower the screen grid potential, and that the same attains a maximum when the screen grid potential is of zero value. In fact, the value of this curvature is critical for the efficiency of the tube in the rectification of low, and extremely low, amplitudes.

Contrary to the mode of operation of screen grid tubes heretofore customary, namely of imparting to the screen grid a comparatively high positive biasing potential, the screen-grid, according to the present invention is connected in a radio frequency screen grid type of tube, whenever the same is to be used as a plate rectifier, directly with the cathode, or filament; or else the screen grid is maintained only at a slightly positive biasing potential in reference to the filament.

The novel features which I believe to be characteristic of my invention are set forth in particularity in the appended claims, the invention itself however, as to both its organization and method of operation will best be understood by reference to the following description taken in connection with the drawing in which I have indicated diagrammatically several circuit organizations whereby my invention may be carried into effect.

In the drawing,

Fig. 1 shows diagrammatically a circuit embodying the invention,

Fig. 2 shows a modified form of the invention.

Referring to Fig. 1, 1 denotes an indirectly heated screen grid tube comprising the cathode 2, the heater filament 3, the control grid 4, the screen grid or shield 5, and the anode 6. Inductance coil 7 and variable condenser 8 constitute the tuned oscillation circuit interposed between the cathode 2 and the control grid 4, the cathode 2 being grounded.

A source of signal energy, as one or more stages of radio frequency amplification either tuned or untuned, is coupled to the coil 7. The anode circuit of the tube includes resistances 9 and 10, and at the end thereof, indicated by a plus sign (+), there is connected the positive pole of the plate potential supply (not shown). The other terminal of the resistance 10 is connected with the cathode, or ground, by way of a by pass condenser 11. By way of resistance 12 and the series condenser 13, the anode circuit of the tube is united with the tube of the first audio frequency stage of amplification.

For regeneration, there is provided the tickler coil 14, and connected in series therewith, for the purpose of varying regeneration, is the variable condenser 15. The screen grid 5, according to the invention, is united directly with the cathode 2.

The connection between the auxiliary electrode 5 and the cathode 2, in the embodiment here shown by way of example, is provided outside the tube, though it will be understood that the same could be disposed also inside the tube. In Fig. 2 the latter construction is shown.

While I have indicated and described several systems for carrying my invention into effect, it will be apparent to one skilled in the art that my invention is by no means limited to the particular organizations shown and described, but that many modifications may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim is:

1. In an anode rectifier an electronic device having as elements within an enclosure a cathode, an anode, a control electrode and a screening electrode, said latter electrode being arranged adjacent the anode but intermediate the anode on the one hand and the cathode and control electrode on the other hand so as to effectively screen the anode from the elements of said device, said device being adapted to operate along the lower knee of its anode current control grid potential characteristic curve, means for greatly increasing the steepness of the portion of said characteristic curve along which the device operates while maintaining normally a low plate current through the tube to thereby increase the efficiency of the device when utilized for the rectification of low amplitude signalling energy which comprises, means for maintaining the auxiliary electrode at a potential of the order of the cathode potential as regards the other electrodes whereby during operation of said device there

exists intermediately adjacent the anode a region through which the major portion of the electronic stream must pass having a potential of the order of the cathode potential, a utilizing circuit, a resistance coupling between said electronic device and the utilizing circuit, a source of direct current anode potential for the tube, means including a resistance for connecting the anode to the positive side of said source and means including a condenser for connecting the cathode of said tube to an intermediate point of said resistor.

2. In an anode rectifier an electronic device having an anode, a cathode, a control electrode and a screening electrode the latter electrode being arranged so as to be adjacent the anode but intermediate the anode on the one hand and the cathode and control electrode on the other hand so as to effectively screen the anode from the other elements of the device, circuit connections between the various elements of said electronic device arranged so as to cause the electronic device to operate along the low knee of its anode current control grid potential characteristic curve, means for greatly increasing the steepness of that portion of the characteristic curve along which the device operates while maintaining normally a low plate current through the tube to thereby increase the efficiency of the device when utilized for the rectification of low amplitude signalling energy, means for maintaining the auxiliary electrode at a potential of the order of the cathode potential whereby during operation of the device there exists adjacent the anode a region through which the major portion of the electronic stream must pass having a potential of the order of the cathode potential, a utilizing circuit, a resistance coupling between said electronic device output and the utilizing circuit, a tunable oscillation circuit between the control electrode and the cathode and means for regeneratively coupling the output of the electronic device to the input thereof.

LADISLAUS EGYED.