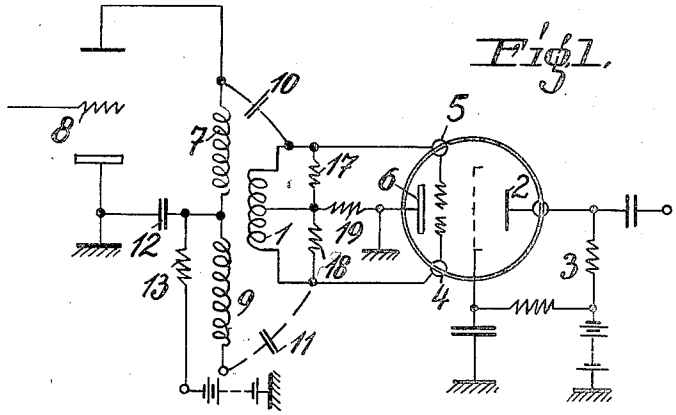
Jan. 26, 1937. K. SCHLESINGER 2,068,769

RECTIFIER FOR WIRELESS TELEVISION RECEPTION

Filed Oct. 17, 1934

Fig 1.



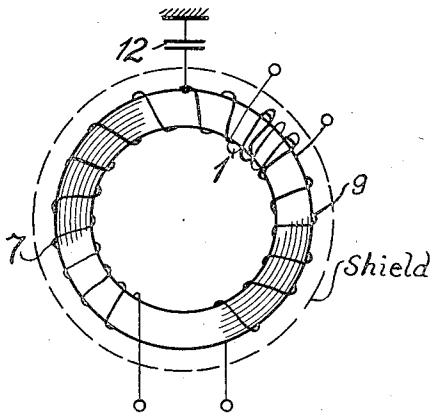


Fig 2.

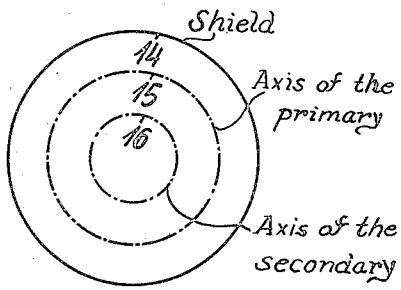


Fig 3.

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RECTIFIER FOR WIRELESS TELEVISION RECEPTION

Kurt Schlesinger, Berlin, Germany

Application October 17, 1934, Serial No. 748,644
In Germany October 21, 1933

6 Claims. (Cl. 250—27)

When employing the principle of push-pull audion connection for television reception purposes as set forth in the patent application Ser. No. 735,600, Patent No. 2,029,640, February 4, 1936, it is a characteristic feature that the grid circuit coil of the counter-cadence audion is raised to high-frequency potential against earth. The carrier wave disappears in the anode circuit of this audion only when the two grids receive as compared with the earthed cathode an equal but opposed carrier frequency potential.

The present invention is relative to an audion arrangement such as described above and constitutes an improvement of the connection device of the above mentioned patent application with respect to construction and arrangement of the primary and secondary circuits of the transformer connected to the input of said audion valve.

The invention will be best understood with reference to the accompanying drawing, in which

Fig. 1 shows an exemplary scheme of a counter-cadence audion arrangement,

Fig. 2 an exemplary embodiment of the transformer employed in the connection system, while in

Fig. 3 a scheme of the radii of the windings of said transformer is indicated.

With reference to Fig. 1 a grid circuit coil 1 constituting the secondary of a high frequency transformer is provided. The ends of said secondary are connected to the two grids 4 and 5 of a twin grid valve preferably possessing a screening grid and an anode 2, which is connected to the anode potential over the resistance 3. It is now the object of the invention to make the carrier wave disappear in the anode circuit of this audion valve.

This object may be accomplished without increase of the earth capacity of the total grid circuit, which according to the invention is reduced to a minimum. For this purpose, according to the invention, the primary coil 7 of the amplifier tube 8 is continued in the form of an additional winding 9 running in the same direction. There is then produced at the freely oscillating end of 9 a potential, which with the same number of windings is equal but opposed, in the case of no load, to the potential at the anode of 8. In this connection it is taken for granted according to the invention that the coils 7 and 9 are firmly coupled. This is accomplished by winding both coils 7 and 9 on the same cylinder. A toroid arrangement as shown in Fig. 2 is particularly favorable, in which arrangement the coils 7 and 9 are situated on a ring, over which there may be placed the coil 1. It may then be accomplished that through the medium of the stray capacities 10 and 11 between the primary and secondary windings potentials of opposite sign take effect on the grid lines of the coil 1, the ratio thereof being adjustable by displacement. There may accordingly be found a position of the coil 1 in relation to 7 and 9 in which the desired object is accomplished, viz., the centre of 1 earthed dynamically in respect of the carrier frequency. The middle of the coils 7 and 9 is short-circuited to earth over a condenser 12 of approximately 10,000 cm. or more, whilst the tube 8 is supplied with anode current through the medium of a resistance 13.

The capacities 10 and 11 represent in themselves an additional load for the circuit of the demodulated potentials. According to the invention, the same are made as small as possible by sufficient spacing between the primary and secondary windings. If, as usually necessary in the case of sensitive receiving apparatus, an earthed shield is placed over the transformer, there are preferably arranged within this shield 14, Fig. 3, which has the radius r_{14}, the primary winding 15 as outer and the secondary winding 16 as inner winding, provision being made for a sufficient spacing, for example, at least 5 mm., between 15 and 16. By using very thin wire for 16 the total surface with given self-induction may be made very small. If the reversed arrangement is employed, i. e., with the primary coil inside and the secondary coil outside, there is found in respect of the secondary winding a minimum of the resulting capacity against earth if, in accordance with the invention, the following equation is taken with regard to the radius:

$$r_{15}=\sqrt{r_{14}\cdot r_{16}}$$ (see Fig. 3)

In Fig. 1 there are included three resistances 17, 18 and 19. In this respect, in the connection of this resistance T-member as shown, merely the resistances 17 and 18 serve to damp the secondary coil 1, whilst the resistance 19 serves solely for leakage of the grid circuit charges. In a connection of the three resistances other than that shown this separation of the functions would not be ensured, for which reason the connection in the drawing is particularly advantageous for the independent adjustment of damping and leakage. The resistances 17 and 18 are equal to each other, and are selected in such fashion that they just attenuate the natural oscillation of the circuit formed by 1 and its parallel capacities sufficiently to avoid plasticity in the television image (order of magnitude approximately 10,000 ohms). According to the invention, the natural oscillation of the coil 1 is so selected that it approximately coincides with the lower side band of the modulated carrier wave. The resistance 19 is so chosen that the time constant of the total capacity to ground parallel to 19 is smaller than the duration of an image point (order of magnitude of 19 approximately 40,000

ohms in the case of tubes having the grids 4 and 5 passed out).

I claim:

1. A push pull detector arrangement, more particularly for television purposes comprising a twin grid tube connected to the output circuit of an amplifier stage, a high frequency input transformer consisting of a primary winding and a secondary winding, said primary winding being divided into two halves, one end of the one of said halves being connected to the anode of said preceding amplifier stage and the connection point of said two halves being connected to the cathode of the preceding amplifier stage, the ends of said secondary coil being connected each to one of said grids of said tube, an audion resistance, a middle tapping point at said secondary winding being connected to the cathode of said tube and to earth by means of said audion resistance, and two damping resistances connected across said ends of said secondary windings and said tapping point, the other one of said halves of said primary winding being wound in the same direction as the one half of said primary, said other one of said two halves forming a freely oscillating system, the end of said other half not connected to said one half being a free end.

2. A push pull detector arrangement, more particularly for television purposes comprising a twin grid tube connected to the output circuit of an amplifier stage, a high frequency input transformer consisting of a primary winding and a secondary winding, said primary winding being divided into two halves, one end of the one of said halves being connected to the anode of said preceding amplifier stage and the connection point of said two halves being connected to the cathode of the preceding amplifier stage, the ends of said secondary coil being connected each to one of said grids of said tube, an audion resistance, a middle tapping point at said secondary winding being connected to the cathode of said tube and to earth by means of said audion resistance, and two damping resistances connected across said ends of said secondary windings and said tapping point, the other one of said halves of said primary winding being wound in the same direction as the one half of said primary, said other one of said two halves forming a freely oscillating system, the end of said other half not connected to said one half being a free end, said two halves of said primary being firmly magnetically coupled to each other.

3. A push pull detector arrangement, more particularly for television purposes comprising a twin grid tube connected to the output circuit of an amplifier stage, a high frequency input transformer consisting of a primary winding and a secondary winding, said primary winding being divided into two halves, one end of the one of said halves being connected to the anode of said preceding amplifier stage and the connection point of said two halves being connected to the cathode of the preceding amplifier stage, the ends of said secondary coil being connected each to one of said grids of said tube, an audion resistance, a middle tapping point at said secondary winding being connected to the cathode of said tube and to earth by means of said audion resistance, and two damping resistances connected across said ends of said secondary windings and said tapping point, the other one of said halves of said primary winding being wound in the same direction as the one half of said primary, said other one of said two halves forming a freely oscillating system, the end of said other half not connected to said one half being a free end, said two halves of said primary being firmly magnetically coupled to each other, said transformer being constructed as a toroid.

4. A push pull detector arrangement, more particularly for television purposes comprising a twin grid tube connected to the output circuit of an amplifier stage, a high frequency input transformer consisting of a primary winding and a secondary winding, said primary winding being divided into two halves, one end of the one of said halves being connected to the anode of said preceding amplifier stage and the connection point of said two halves being connected to the cathode of the preceding amplifier stage, the ends of said secondary coil being connected each to one of said grids of said tube, an audion resistance, a middle tapping point at said secondary winding being connected to the cathode of said tube and to earth by means of said audion resistance, and two damping resistances connected across said ends of said secondary windings and said tapping point, the other one of said halves of said primary winding being wound in the same direction as the one half of said primary, said other one of said two halves forming a freely oscillating system, the end of said other half not connected to said one half being a free end, said two halves of said primary being firmly magnetically coupled to each other, said transformer being constructed as a toroid, said primary windings and said secondary possessing cylindrical shape, being shielded and arranged one in another, the radii of the windings and the shield being so dimensioned in relation to each other as to obtain a minimum of the resulting earth load of the secondary.

5. In a high-frequency transmission circuit a transformer for coupling an output-circuit of an amplifier stage to a push-pull connection circuit, comprising a primary and secondary winding, said primary winding being divided into two halves, one half being connected between the anode and the cathode of said amplifying stage, the other one being wound in the same direction as the one half and forming a freely oscillating system, the end of said other half not connected to said one half being a free end, said two halves of the primary being firmly magnetically coupled to each other, said secondary winding being arranged in a push-pull-circuit-connection and adjustable in its situation relative to said primary winding.

6. In a high-frequency transmission circuit a transformer for coupling an output-circuit of an amplifier stage to a push-pull connection circuit, comprising a primary and secondary winding, said primary winding being divided into two halves, one half being connected between the anode and the cathode of said amplifying stage, the other one being wound in the same direction as the one half and forming a freely oscillating system, the end of said other half not connected to said one half being a free end, said two halves of the primary being firmly magnetically coupled to each other, said secondary winding being arranged in a push-pull-circuit-connection and adjustable in its situation relative to said primary winding, said transformer being constructed as a toroid.

KURT SCHLESINGER.