

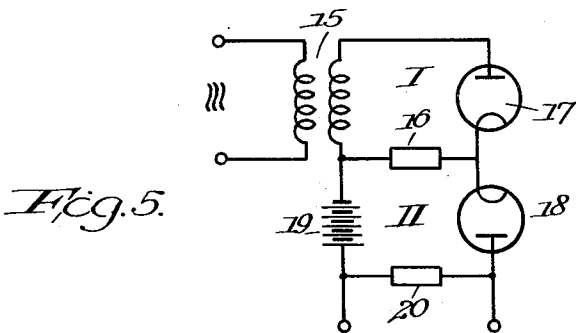
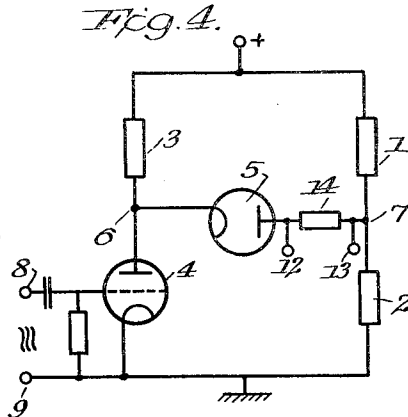
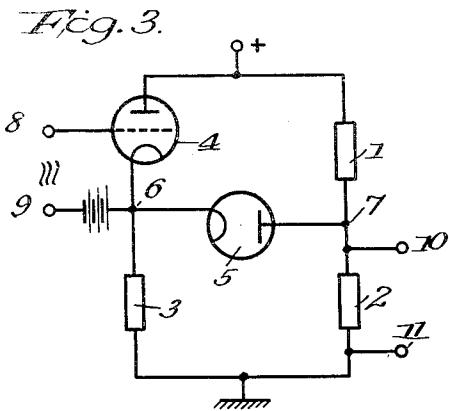
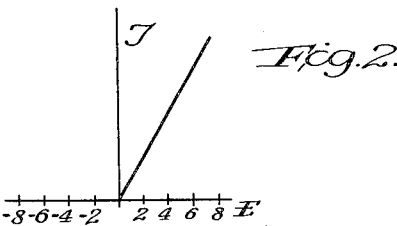
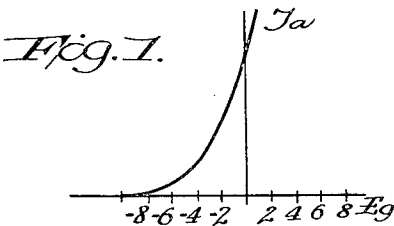
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AMPLITUDE FILTER

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AMPLITUDE FILTER

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This invention is related to circuits used in high frequency, particularly television or facsimile work, and is particularly related to devices for the separation of picture and synchronizing signals in systems in which a positive or negative synchronizing impulse is transmitted at the end of each line and each picture. It has been shown that perfect synchronization is highly dependent upon the constancy of the synchronizing impulses. Changes in their amplitude, for instance, because of difference in picture intensity or maximum picture signal amplitude cause the shifting or entire dropping of lines in the image. Therefore, synchronizing impulses of constant amplitude must be filtered out before they are applied to the synchronizing devices of the receiver.

In the known devices this problem is not solved to perfection. The reason therefor is the following:

The amplitude filtering occurred in one tube with three or more electrodes connected in a suitable circuit in such a manner that the picture and synchronizing signals were applied to the grid and by suitable choice of the point of operation of the tube only the synchronizing impulses were allowed to pass. Fig. 1 indicates the characteristic of the grid voltage versus anode current with a tube of three or more electrodes. The curve rises slowly and then gradually turns into the linear part. There is a gradual change from the condition of current flow to complete blocking of the tube. Therefore, the synchronizing impulses are not sharply filtered out of the high frequency applied to the grid. The residual component of the picture signal, which is also allowed to pass, causes a relation between the magnitude of the synchronizing impulse and the picture signal amplitude.

According to the invention, this defect of the amplitude filters so far known is eliminated by using a diode or rectifier with a similar characteristic showing a sharp bend, for instance, a dry-cell rectifier, in connection with a bridge or compensating device in such a manner that the bridge or compensating device is adjusted to a certain predetermined amplitude for which the device is in balance and is then alternately unbalanced by the applied high frequency over a rectifying device. A diode rectifier of similar characteristic is provided for the unidirectional separation of the synchronizing impulses.

Fig. 2, which is drawn in the same scale as Fig. 1, illustrates the obvious difference in the characteristics of a tube with three or more electrodes,

and of a diode or dry-cell rectifier, in regard to their rectifying effect.

Fig. 3 shows an embodiment of the invention. The resistors 1, 2 and 3 are placed in the three branches of a direct current bridge. The fourth branch contains a component 4, the direct current resistance of which changes with the applied high frequency amplitude. This component 4 may be a plate rectifier to the grid of which the high frequency modulated by picture and synchronizing signals is applied at 8 and 9. A diode 5 is disposed in the diagonal of the bridge. The bridge is balanced in such a manner that at a certain high frequency amplitude, which may be adjusted to any value desired and applied at 8 and 9, the voltage between the points 6 and 7 of the bridge is zero. The high frequency amplitude lies between the magnitude of the picture and synchronizing impulses. During the reception of the composite signal, the bridge is alternately unbalanced by the picture and synchronizing impulses. The diode in the diagonal of the bridge only allows impulses of one direction to pass and thereby sharply separates the picture impulses from the synchronizing impulses so that the latter may be taken from the ends 10 and 11 of the resistor 2, or from the ends of a resistor in series with a diode in the diagonal of the bridge.

The circuit shown in Fig. 3 is designed for the case of so-called positive transmission, i. e., where the synchronizing impulses are represented by zero carrier. According to the drawing the diode draws current only if the point 6 is negative in respect to point 7, i. e., if the resistance of the component 4 becomes larger than the value required for the balance of the bridge, thus with decreasing high-frequency amplitude. It may be understood that the arrangement of the individual components may be changed as desired and as may be required by the synchronizing method used.

A further embodiment of the invention is shown in Fig. 4, where the plate rectifier is substituted by an audion in the bridge. The components 3 and 4 are interchanged in this case because the plate resistance of the audion decreases with decreasing high-frequency amplitude contrary to the case of the plate rectifier. Otherwise, the same considerations as above are valid for the method of operation of this circuit. The synchronizing impulses may be taken, for instance, from the ends 12 and 13 of the resistance 14 in a series with the diode 5.

Fig. 5 shows a compensating device according to 55

to the invention. The high frequency applied at 15 is rectified in the circuit I consisting of the secondary of a high-frequency transformer 15, the resistance 16 and the diode 17, so that a D. C. voltage is generated at the ends of the resistance 16, the magnitude of which voltage depends on the high-frequency amplitude. In the second circuit, consisting of the resistance 18, the resistance 20 and the diode 18, the voltage drop through the resistor 16 is compensated by means of an auxiliary voltage source 19 in such a manner that the voltage at the diode 18 is zero at a certain adjustable value of the high-frequency amplitude which lies between the picture impulse amplitude and that of the synchronizing impulses. As in the bridge circuit, the diode 18 blocks the current impulses caused by the picture and synchronizing impulses in the circuit II in one direction, so that the filtered-out synchronizing impulses may be taken, for instance, from the ends of the resistance 20. The arrangement of the individual components may also be changed in this compensating device according to the requirements of the synchronizing method used.

In amplitude filters according to the invention it is preferable to limit the sensitivity of the element which rectifies the high frequency to such an extent by known means that atmospheric or similar interferences do not interfere with the synchronization.

I claim:

1. A circuit for filtering television signal and synchronizing impulses, comprising a direct current resistance bridge having a grid-controlled rectifier disposed in one arm thereof, having a diode diagonally disposed across said bridge, means for applying a television signal current to said triode, said circuit constants being so adjusted that signal potentials in excess of a desired value are required to permit passage of current across said diode, and means for withdrawing current from the one of said resistance arms disposed oppositely to said triode.

2. A circuit for separating television synchronizing impulses from a composite television signal, comprising a triode having a grid and cathode across which such a composite television signal may be applied, a resistance and a diode rectifier disposed between said cathode and the anode of said triode and potentials connected to said triode, so adjusted that current flow through said diode is permitted only when the composite television signal potentials exceed a certain desired value, and a pair of resistors disposed across said diode across one of which a synchronizing impulse may be obtained.

3. A circuit for filtering television synchronizing impulses from a composite television signal, comprising a balanced bridge including three resistors and a grid-controlled triode, a diode rectifier diagonally disposed within said bridge circuit, output leads connected to one of said resistors disposed diagonally opposite said triode, means for energizing said triode and said diode, and means for biasing said triode whereby only signal potentials in excess of a certain value thereof will permit current flow through said diode.

4. A filtering circuit for separating television synchronizing impulses from a composite television signal substantially as described in claim 3, and having output signal leads applied to a resistor connected in the anode circuit of said diode.

5. A circuit for separating television synchronizing impulses from a composite television signal, which comprises an input transformer having a diode rectifier and an output resistor connected in series across the secondary thereof, a second circuit comprising a diode rectifier and a second output resistor, together with a potential source connected across said first output resistor, and output leads connected to said second output resistor.

6. A circuit for filtering television synchronizing impulses from a composite television signal, comprising a balanced bridge including three resistors and a grid-controlled electron discharge device, a rectifier diagonally disposed within said bridge circuit, output leads connected across a resistor in said bridge circuit, means for energizing said electron discharge device and means for biasing said electron discharge device wherein only signal potentials beyond a predetermined range of values will cause current flow through said rectifier.

7. A circuit adapted for filtering out synchronizing impulses from a program modulated wave wherein the synchronizing impulses are of a magnitude outside the amplitude range of the program signals, comprising a circuit including a rectifier and an impedance, means for establishing a potential across said rectifier in the non-conductive direction in accordance with program modulations and in the conductive direction in accordance with synchronizing impulses whereby resulting current flow through said impedance will develop potentials thereacross representative of the synchronizing impulses to the exclusion of the program modulations, and means for applying such potentials for synchronizing purposes.

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