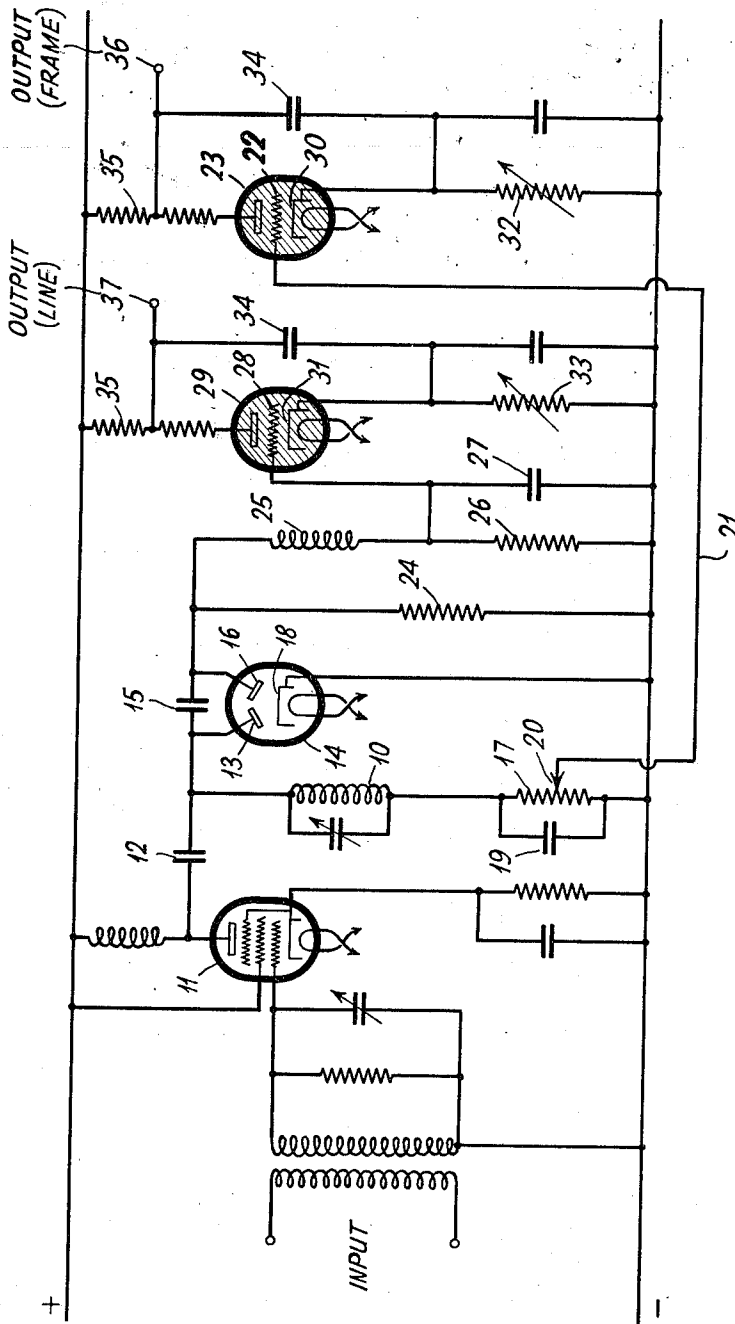


June 11, 1940.

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TELEVISION RECEIVER CIRCUIT

2,203,722

Filed Dec. 16, 1937



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UNITED STATES PATENT OFFICE

2,203,722

TELEVISION RECEIVER CIRCUIT

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Application December 16, 1937, Serial No. 180,076
In Great Britain December 21, 1936

4 Claims. (Cl. 178—7.3)

The present invention relates to synchronizing circuits for use in television receiving apparatus.

The synchronizing of television receivers is now effected by means of synchronizing signals which are combined with the modulated picture signal and are produced by an increase or decrease in carrier amplitude at the end (or beginning) of every line scan and at the end (or beginning) of each complete picture or frame scan. While the present invention is more particularly concerned with arrangements in which the synchronizing signal is produced by reducing the carrier to zero it is not restricted thereto and may be adapted for use with other types of synchronizing arrangements.

The objects of the present invention are, first to prevent interaction of the picture or frame time base and the line time base in a simple but effective manner; second, to render the synchronizing operation of both of the time bases independent of the degree of picture modulation immediately preceding the synchronizing signal, and third, to minimize the effect of interference upon the synchronizing operations.

According to the present invention the complete picture signal is applied to a rectifier circuit comprising two load circuits having different characteristics whereby one responds only to the frame synchronizing signals and the other to line synchronizing signals and the resulting change in voltage across each of the said load circuits is fed directly to the corresponding time base to trigger it. The expression "fed directly" is to be understood to mean either that a direct connection is employed or that, when an amplifier is used, the D. C. connection to the time base is preserved.

In order that the invention may be more readily understood it will now be described with reference to the accompanying drawing which illustrates by way of example a circuit arrangement according to the present invention employing separate rectifiers for each of the load circuits associated respectively with the line and frame time bases.

In the arrangement shown a tuned circuit 10 (either R. F. or I. F.) is fed with the complete picture signal, for instance by the preceding amplifier valve 11 through the blocking condenser 12. One end of the tuned circuit 10 is directly connected to one anode 13 of a double-diode valve 14 and by way of a blocking condenser 15 to the other anode 16 thereof. The other end of the tuned circuit 10 is connected to one end of a load resistance 17 for the first diode anode 13, the said load resistance being connected at its opposite

or low-potential end to the cathode 18 of the double-diode valve 14. The said load resistance is shunted by a condenser 19 of such capacity as to offer a low impedance to pulses of line frequency.

The load resistance 17 has its high potential end (or a movable contact 20) connected directly by lead 21 to the grid 22 of a discharge tube 23 associated with the frame or picture-scan time base.

The second diode anode 16 is connected to the cathode 18 by a further resistance 24 and by way of a high frequency choke coil 25 to one terminal of a second load resistance 26 which is also connected at its other end to the cathode 18. The resistance 26 is preferably shunted by a condenser as shown at 27 for assisting in removal of any radio frequencies and preventing interaction between the time bases. The anode or high-potential end of the load resistance 26 is connected directly to the grid 28 of a discharge tube 29 associated with the line-scan time base. The cathodes 30 and 31 of the respective discharge tubes 23 and 29 are connected to the cathode 18 of the double diode 14 by way of bias controlling resistances 32 and 33 respectively.

The discharge tube 23 and 29 of the respective time bases are preferably tubes of the gas-discharge type and are provided with charging condensers 34 and resistances 35 for operation in the usual manner, the required scanning potentials being fed off from terminals 36 and 37. The time bases may however be of the blocking oscillator type, the hard valve type or any other type requiring a positive pulse to trigger them.

In the arrangement described, during the whole of the modulated picture portion of the signal the anode end of each of the load resistances 17 and 26 is at a negative potential with respect to the cathode 18 due to rectification of the modulated carrier wave. The grids 22 and 28 of the discharge tubes 23 and 29 are likewise held at a similar negative potential supplemented by any additional steady bias provided therefor and in consequence these discharge tubes will not be triggered off. The arrival of a line synchronizing signal in which the carrier amplitude drops to zero causes the potential at the anode 16 to fall to zero, and in consequence the potential of the anode end of the resistance 26 is also reduced to zero and with it the interconnected grid 28 of the discharge tube 29. The reduction or negative bias upon the grid 28 causes the tube 29 to trigger-off in the desired manner to control the line scan. The condenser 19 shunting the

load resistance 17 is of a value offering a low impedance to the line scanning frequency and therefore prevents the line pulses from appearing across this resistance.

5 A frame synchronizing signal which is of greater duration is sufficient to cause the condenser 19 shunting the load resistance 17 to acquire a decreased negative potential and this is then transmitted to the grid 22 of the gas discharge tube
10 23 which is triggered off in the desired manner.

The load resistance 17 has been shown in the form of a potentiometer whereby the proportion of the potential developed across the resistance which is transmitted to the discharge tube grid
15 may be varied but it will be clear that if desired the resistance 26 may be in the form of a potentiometer of both of the resistances 17 and 26 so constructed. Similarly two separate diodes may be employed instead of the double diode tube as
20 shown. If desired a D. C. amplifier valve may be inserted in one or both of the connections between the load resistances 17 and 26 and the respective discharge tubes 23 and 29.

By the arrangement above described the
25 "depth" of the synchronizing signal is rendered immaterial since the action depends only upon the reduction of the voltage drop in a load resistance due to absence of a signal carrier; for similar reasons interference which can be likened to
30 a further superimposed signal cannot cause triggering of the time base circuits, while the separation of the grid circuits of the two discharge tubes prevents interaction therebetween, the shunting condensers 19 and 27 across the respective load
35 resistances being of values which offer low impedance to the respective grid current impulses consequent upon triggering of the tubes.

Other forms of rectifiers, such as dry rectifiers and other thermionic valves, may be employed instead of diode rectifiers as shown provided due
40 consideration is paid to any potentials that may be required in the circuit.

Having now described my invention, what I desire to secure by Letters Patent is:

45 1. In a television receiving system for separating line and frame synchronizing signals wherein the signals are of different time duration comprising, an input circuit, a pair of rectifiers connected across said circuit, a first resistance,
50 a first condenser, means for connecting said first resistance and condenser in parallel with one of said rectifiers, the time constant of the resistance and condenser being substantially equal to the frame synchronizing signal frequency, a second
55 resistance and condenser, means for connecting said second resistance and condenser parallel with the other of said rectifiers, the time constant of the second resistance and condenser being substantially equal to the line synchronizing signal frequency, whereby the potentials appearing
60 across said first and second resistances vary in accordance with the received frame and line synchronizing impulses respectively, a pair of condensers, means including a source of current for charging said condensers at a predetermined rate,
65 and separate means for substantially instantaneously discharging said condensers, said last-named means being adapted to be controlled by the potentials across said first and second resistances.

70 2. In a television receiving system for separating line and frame synchronizing impulses wherein the impulses are of different duration and wherein the synchronizing impulses are

transmitted at substantially zero carrier frequency amplitude comprising, an input circuit, a pair of rectifiers coupled across said circuit, a first resistance and condenser, means for connecting said first resistance and condenser in
5 parallel with one of said rectifiers, the time constant of the resistance and condenser being substantially equal to the line synchronizing signal frequency, a second resistance and condenser, means for connecting said second resistance and
10 condenser in parallel with the other of said rectifiers, the time constant of the second resistance and condenser being substantially equal to the frame synchronizing signal frequency, whereby the potential across the resistors may vary in
15 accordance with the presence or absence of carrier frequency, a pair of condensers, means including a source of current for charging said condensers at a predetermined rate, and separate means for substantially instantaneously discharging said condensers, said last-named means being adapted to be controlled by the potentials across the said first and second resistances.

3. In a television receiving system with separate line and frame synchronizing impulses
25 wherein the impulses are of different time duration and wherein the synchronizing impulses are transmitted at substantially zero percentage carrier frequency modulation comprising, an input circuit, a pair of rectifiers coupled across said circuit, a first resistance and condenser having a time constant substantially equal to the line synchronizing signal frequency connected across one of said rectifiers, a second resistance and condenser having a time constant substantially equal to the frame synchronizing signal frequency connected across the other of said rectifiers, a pair of condensers, means including a source of current for charging said condensers at a predetermined rate, separate electron discharge means for substantially instantaneously discharging said condensers, each of said discharge means including a control electrode and a cathode, and means to control the potentials of the control electrodes with respect to their cathodes in accordance with the potentials across said first and second resistances respectively, whereby said discharge tubes will respond to a predetermined percentage of modulation of carrier frequency and to the duration of such modulation.

4. In a television receiving system for separating line and frame synchronizing signals wherein the signals are of different time duration comprising, an input circuit, a pair of rectifiers connected across said circuit, a first resistance and a condenser, means for connecting said first resistance and condenser in parallel with one of said rectifiers, the time constant of the resistance and condenser being substantially equal to the frame synchronizing signal frequency, a second resistance and condenser, means for connecting said second resistance and condenser in parallel with the other of said rectifiers, the time constant of the second resistance and condenser being substantially equal to the line synchronizing signal frequency, whereby the potentials appearing across said first and second resistances vary in accordance with the received frame and line synchronizing impulses respectively, a pair of thermionic oscillators, and means for controlling the frequency of operation of said oscillators in accordance with the potentials appearing across said first and second resistances.

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