May 12, 1942. P. DESERNO 2,282,992

TELEVISION RECEIVER

Filed May 11, 1940

FIG. 1.

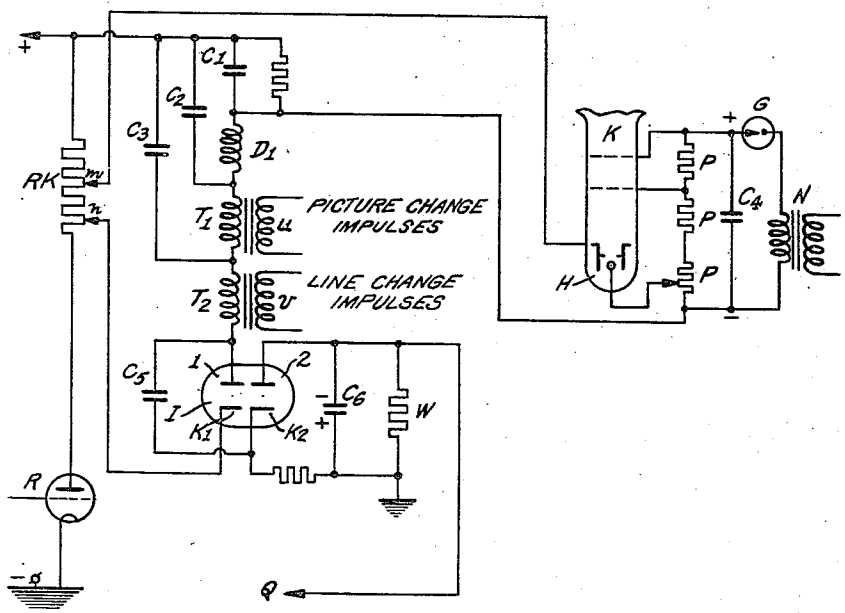
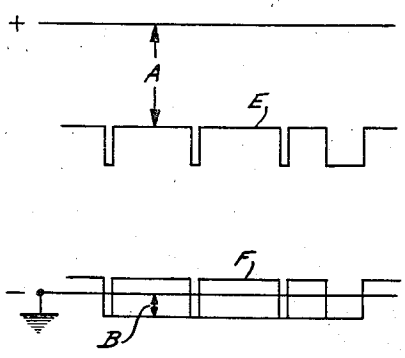


FIG. 2.



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TELEVISION RECEIVER

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5 Claims. (Cl. 178—7.3)

This invention relates to a method for the automatic adjustment of the contrasts in pictures reproduced by television receivers of the kind operating in accordance with the so-called gap synchronization method.

Television pictures should be adjusted not only as regards their brightness but should be adjusted also with a view to obtaining the greatest possible sharpness of contrasts. The adjustment is proper if the black value of the mixture of picture and synchronizing signals acts to control the cathode ray tube to just dark. With the working point of the cathode ray tube positioned too far in the negative region the intensity of the dark details of the picture is impaired thereby, whereas if the working point is too far in the positive region a dim picture is obtained. Proper adjustment is hence difficult especially to those not skilled in the art. It is therefore desirable to provide for means whereby the contrast effects of a picture are automatically given the best intensity.

In this regard it has been proposed to employ regulating means which are mechanically coupled together and by which the received picture is given both the best contrast effects and the desired brightness. Such arrangements, however, have considerable disadvantages. In fact, these two adjustments are effected by means of intercoupled potentiometers. This requires the operative means to be balanced with respect to each other. Such balancing, however, is extremely difficult to perform and, moreover, has to be accomplished every time the tube is replaced by another. It is disadvantageous also that the contrast effects are adjusted only in company with the brightness. The disadvantage resides in the fact that the adjustment of the brightness is correct only for a certain ratio of modulation to gap and that this ratio is liable to variations caused by the transmitter. These variations cannot be compensated on the receiving side.

In order to overcome these drawbacks the invention described hereafter proposes to obtain an automatic adjustment of contrasts by means of a control voltage that corresponds to the black value of the received and rectified frequency mixture.

An arrangement particularly adapted for this purpose comprises means whereby the control voltage is caused to change the potentials of the Braun tube and also those of its voltage source. The control voltage may be taken from a condenser which is charged over a rectifier and a filter chain, this filter chain segregating the synchronizing signals. The filter chain, which comprises a number of choke coils connected in series, may be arranged to segregate the synchronizing impulses while at the same time separating them into the well known picture change and line change impulses.

With the aid of simple additional means it is possible also to effect an automatic regulation of amplitudes. To such end a means is used which has a time constant and is connected to the filter chain through a rectifier path.

In the drawing, Fig. 1 is a circuit diagram showing one embodiment of the invention, while Fig. 2 is a graphical representation referred to in explaining the function of this embodiment.

An electron tube R, Fig. 1, serves to rectify the received amplified frequency mixture. Through a tap m of a coupling resistance RK the Wehnelt cylinder H of the Braun tube K is coupled to the tube R. The control voltage that corresponds to the black value arises at condenser C_1. This condenser is charged over a filter chain which comprises choke coils D_1, T_1 and T_2 and condensers C_2, C_3, and over a dual diode I. This diode here acts by means of that discharge path which in the drawing is shown to constitute the lefthand half thereof. The cathode of this discharge path is connected to a tap n of the resistance RK.

The respective voltage conditions will appear from Fig. 2. The upper line represents the anode potential. The voltage arising at condenser C_1 corresponds to the distance A. This voltage is conveyed to the negative pole of a voltage source N, G for the Braun tube. Any change in the control voltage therefore causes the potentials of the Braun tube and of its voltage source to be changed as a whole with respect to the amplifier.

N denotes a transformer by which the Braun tube is connected to a public supply. G indicates a rectifier while C_4 denotes a smoothing condenser. Connected in parallel with G and C_4 are potentiometer resistances P which serve to adjust the potentials applied to the beam producing system of the Braun tube.

The inductances T_1, T_2 are constituted by transformers. They are so dimensioned and by means of the condensers C_2, C_3 are so tuned that from T_1 the picture change impulses and from T_2 the line change impulses are derived by secondary coils u and v, respectively.

Curve E, Fig. 2, illustrates the current conditions peculiar to the lefthand discharge path or

system of the diode I. The voltage between the anode thereof and earth only contains the synchronizing impulses, the picture impulses not being contained therein. This voltage acts through coupling condenser C_5 on the cathode of that discharge path or system which in the drawing forms the righthand half of diode I. The cathode of this system is also joined through a high ohmic resistance to the negative grounded pole of the anode voltage source.

The voltage conditions of this cathode are illustrated by curve F, Fig. 2. Over the righthand half of the diode a condenser C_6 is charged to acquire a negative potential with respect to earth. Condenser C_6 and resistance W constitute a means which has a certain time constant. This potential, characterized by distance B, corresponds to the black value.

As the voltage is negative with respect to earth it may serve directly for controlling the input voltage, thus enabling an automatic amplitude regulation thereof over line Q.

The novel arrangement, in which the potentials of the Braun tube and of the voltage source therefor are changed as a whole by the control voltage that corresponds to the black value, has the advantage that the mean brightness of the pictures need not be transmitted. The tube stages associated with the intermediate frequency rectifier tube R hence need not be connected by galvanic coupling means.

What is claimed is:

1. In a television system wherein signals are transmitted by a stabilized carrier system in which a direct current component of the picture signals is transmitted, the peaks of the synchronizing signals being represented by zero or approximately zero carrier amplitude, the black level in the transmitted picture represented by a predetermined percentage of the carrier amplitude, a circuit arrangement comprising a rectifier tube operatively connected to a source of amplified signals, a load comprising a resistance connecting the anode of said tube with a source of positive potential, a Braun tube, a tap on said resistance connected to the Wehnelt electrode of said tube to cause variation in the acceleration of electrons in said tube in accordance with signals across said resistance, a double diode tube, a circuit connected between a point on said resistance more negative than said tap and a cathode of said diode tube, a chain of tuned inductances comprising two transformers and a condenser shunted by a resistance connected between the anode associated with said cathode of the double diode and the positive terminal of said load resistance and a circuit connecting the cathode of said Braun tube to the more negative side of said condenser, the arrangement being such that the operating characteristics of the Braun tube are varied in accordance with the amplitude of the signals across said load resistance.

2. A television receiver according to claim 1 in which the second cathode of the double diode is connected through a condenser to the anode of the first diode, and the second anode and the second cathode are shunted by a resistance and also a condenser comprising a time constant device, the arrangement being such that the anode being negative in respect to ground provides a volume control voltage.

3. A television receiver according to claim 1 in which the chain of tuned inductances serve as filters from which the synchronizing signal is derived.

4. A television receiver according to claim 1 in which the chain of tuned inductances include the primaries of two transformers.

5. A television receiver according to claim 1, in which the chain of tuned inductances include the primaries of two transformers, said transformers being so tuned that picture frame impulses are derived from the secondary of one and line impulses from the secondary of the other.

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