Jan. 17, 1939. R. BARTHELEMY 2,143,933

TELEVISION RECEIVER

Filed Jan. 16, 1935

Fig. 1

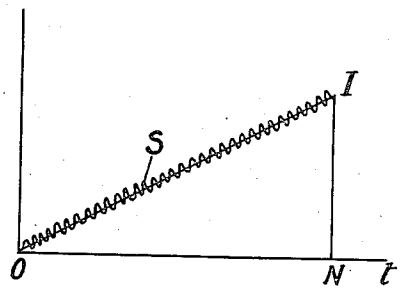
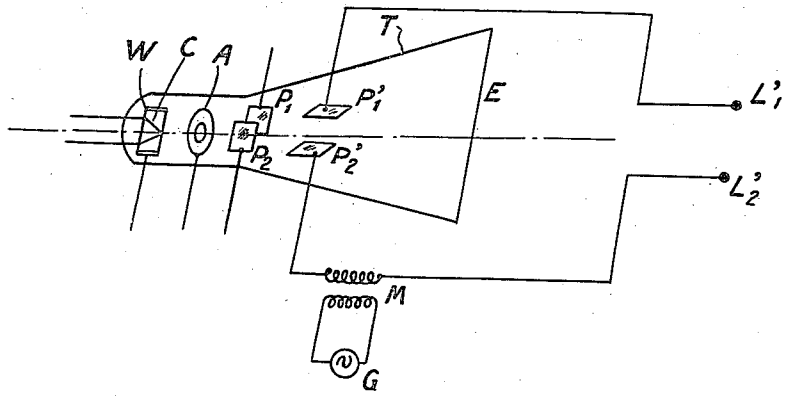


Fig. 2



René Barthelemy
INVENTOR
By Otto Schmidt
his ATTY.

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TELEVISION RECEIVER

René Barthelemy, Fontenay-aux-Roses, France, assignor to Compagnie pour la Fabrication des Compteurs et Materiel d'Usines a Gaz, Montrouge, France

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7 Claims. (Cl. 178—7.5)

The present invention relates to television receivers employing cathode ray tubes such as Braun tubes and cathode ray oscillographs.

In such receivers one of the principal defects encountered in the use of these cathode ray tubes, rests in the variation of the luminous "spot" as a function of the modulation; this modulation is, in general, applied to an electrode known as the "Wehnelt cylinder" and placed near the cathode. There is thus established a notable concentration of the luminous point at the same time as there results an increase of the luminous intensity under the effect of an important modulation which sets up an undesirable striation at the brilliant parts of the image.

One object of the present invention is to provide a method which overcomes these defects, that is to say which avoids the narrowing of the lines of analysis whilst maintaining at least in the direction of the continuous analysis, the increase of fineness due to the narrowing of the point.

This method consists in introducing into the voltage which produces the slow deviation of the cathode beam, which deviation is perpendicular to the direction of the lines, a component of small amplitude but of high frequency which causes the luminous spot to oscillate over space between two consecutive lines and perpendicularly to these lines. If this vibration be sufficiently rapid, the eye will only see, during a horizontal scanning, a line of constant thickness, this thickness being determined principally by the high frequency elongation but, the brilliancy of the line is variable as a function of the modulation. The narrowing generally observed on the white parts will no longer be present. Moreover, the fineness of analysis is increased for these brilliant parts since the "spot" has diminished in diameter and it is not spread out in the horizontal direction, the high frequency oscillations only displacing this "spot" vertically.

Another object of the present invention is to provide a television receiver employing cathode ray tubes in which there are incorporated appropriate means to carry out the above defined method.

The invention is described more fully in the following with reference to the attached drawing, in which:

Figure 1 is a diagram illustrating the method according to the present invention.

Figure 2 is a diagrammatic example of a television receiving apparatus employing cathode ray tubes in which there is provided an example of the means for carrying out the method.

In a television receiver employing cathode ray tubes, the scanning of the screen by the concentrated cathode pencil is obtained by a rapid deviation of the pencil in a horizontal direction simultaneously with a slow vertical deviation. This slow deviation as a function of time can be shown over the period of scanning of an image by the straight line O I of Figure 1 which is obtained by marking off, as abscissae the values of time and as ordinates the values of the slow deviation. The substantially vertical part I N corresponds to the return of the luminous spot from the end of one image to the beginning of the next. In these usual conditions of scanning the screen there is set up, under the effect of an important modulation, a notable concentration of the luminous spot on the screen at the same time as an increase in the luminous intensity of the same, which results, in the reproduced image, in very troublesome striations at the brilliant parts of the image.

In order to overcome this disadvantage, the method according to the present invention consists in causing the luminous spot to oscillate additionally in the space between two consecutive lines and perpendicularly to these lines at a high frequency and of feeble amplitude. To this effect there is superimposed on the voltage causing the slow deviation of the concentrated cathode pencil, an oscillating voltage having a feeble amplitude and a high frequency.

The object of the method according to the present invention can be shown graphically as in Figure 1, in which a very rapid oscillation S, of feeble amplitude, is superimposed on the slow deviation O I during the course of the sweeping of the image. By reason of the high frequency of the oscillation S the eye, during each horizontal scanning, sees only a line of which the constant thickness is determined by the elongation of the additional high frequency oscillation but of which the brilliancy varies as a function of the modulation.

In order to carry this superimposition into effect in a receiver using cathode ray tubes, the additional high frequency oscillation can be applied to the electrodes of the tubes which control the slow deviation, as shown diagrammatically in the example of Figure 2. The cathode ray tube comprises a cathode C, an electrode known as the Wehnelt cylinder W, an anode A and two pairs of perpendicular deflecting plates P_1 P_2 and P'_1 P'_2. The vertical plates P_1 P_2 by means of

the voltage which is applied to the same control the rapid horizontal deviation along lines. The horizontal plates P'_1 P'_2 by reason of the voltage which is applied to them control the slow vertical deviation. The slow deviation voltage is applied to the terminals L_1 L_2. In accordance with the method according to the present invention there is introduced into the circuit of the slow deviation plates P'_1 P'_2, through the intermediary of an inductive coupling M, for example, an oscillating voltage of high frequency and of small amplitude, furnished by an auxiliary generator G. This oscillating voltage, the form of which is shown at S in Figure 1, causes the concentrated cathode pencil to oscillate and consequently the luminous spot formed on the screen E oscillates perpendicularly to the direction of the lines. By this means a television receiver is obtained in which the troublesome striations are no longer present in the brilliant parts of the image and moreover the fineness of analysis is increased for these brilliant parts.

In practice the value of the additional high frequency voltage need only be of the order of one volt and it is possible to obtain this voltage without using an auxiliary generator. For example, where the receiver is of the superheterodyne type which already possesses a high frequency oscillator, the additional high frequency voltage can be furnished by this oscillator (Fig. 3); it is sufficient to provide a slight coupling between the oscillator and the circuit of the slow deviation electrodes P'_1 P'_2.

Another method, which proportions the correction to the amplitude of the modulation is to use, for the additional high frequency voltage, a fraction of the modulated high frequency voltage which is available in the receiver before detection (Fig. 4). This fraction will act on the circuit of the slow deviation electrodes in place of the generator G. In this case there is obtained a greater definition in the half-tones than in the case where an additional high frequency voltage of constant amplitude is employed.

What I claim is:

1. A television receiver employing a cathode ray tube having two pairs of perpendicularly arranged electrodes, a circuit associated with one of the pairs of electrodes to apply to the same a voltage to cause the cathode pencil to deviate rapidly along parallel lines, and another circuit associated with the other pair of electrodes in order to apply to the same a voltage to cause the cathode pencil to deviate slowly in a direction perpendicular to the lines, and means for introducing into the circuit associated with the slow deviation pair of electrodes an additional high frequency oscillating voltage of small amplitude.

2. In a television receiver employing a cathode ray tube having two pairs of perpendicularly arranged electrodes, a circuit associated with one of the pairs of electrodes to apply to the same a voltage to cause the cathode pencil to deviate rapidly along parallel lines, and another circuit associated with the other pair of electrodes in order to apply to the same a voltage to cause the cathode pencil to deviate slowly in a direction perpendicular to the lines, means for introducing into the circuit associated with the slow deviation pair of electrodes an additional high frequency oscillating voltage which amplitude is varying with the modulation of the modulated wave received.

3. In a television receiver employing a cathode ray tube having two pairs of perpendicularly arranged electrodes, a circuit associated with one of the pairs of electrodes to apply to the same a voltage to cause the cathode pencil to deviate rapidly along parallel lines and another circuit associated with the other pair of electrodes in order to apply to the same a voltage to cause the cathode pencil to deviate slowly in a direction perpendicular to the lines, means comprising an auxiliary generator to apply, to the circuit associated with the slow deviation pair of electrodes, an additional oscillating voltage of high frequency and of small amplitude.

4. In a television receiver of the superheterodyne type employing a cathode ray tube having two pairs of perpendicularly arranged electrodes, a circuit associated with one of the pairs of electrodes to apply to the same a voltage to cause the cathode pencil to deviate rapidly along parallel lines, and another circuit associated with the other pair of electrodes in order to apply to the same a voltage to cause the cathode pencil to deviate slowly in a direction perpendicular to the lines, coupling means between the local generator of the receiver and the circuit associated with the slow deviation pair of electrodes in order to apply to the said circuit an additional high frequency voltage of small amplitude.

5. In a television receiver employing a cathode ray tube having two pairs of perpendicularly arranged electrodes, a circuit associated with one of the pairs of electrodes to apply to the same a voltage to cause the cathode pencil to deviate rapidly along parallel lines, and another circuit associated with the other pair of electrodes in order to apply to the same a voltage to cause the cathode pencil to deviate slowly in a direction perpendicular to the lines, means for taking a fraction of the modulated high frequency voltage present before detection and for adding this fraction of the voltage into the circuit associated with the slow deviation pair of electrodes to the voltage causing the cathode pencil to deviate slowly.

6. A method for reconstituting images by means of a cathodic oscillograph, which method consists in modulating the intensity of a cathode beam, said modulation corresponding to the modulation of the modulated image current making the impact point of said cathode beam on the screen of the oscillograph describe parallel juxtaposed lines and giving to said impact point an additional oscillation perpendicular to the direction of the lines, of feeble amplitude and of high frequency corresponding to the frequency of the lines.

7. A method for reconstituting images by means of a cathodic oscillograph, said method comprising modulating the intensity of a cathode beam, said modulation corresponding to the modulation of the modulated image current, making the impact point of said cathode beam on the screen of the oscillograph describe parallel juxtaposed lines and giving to said impact point an additional oscillation perpendicular to the direction of the lines, of feeble amplitude, and varying with the modulation of the modulated image current and of high frequency corresponding to the frequency of the lines.

RENÉ BARTHELEMY.