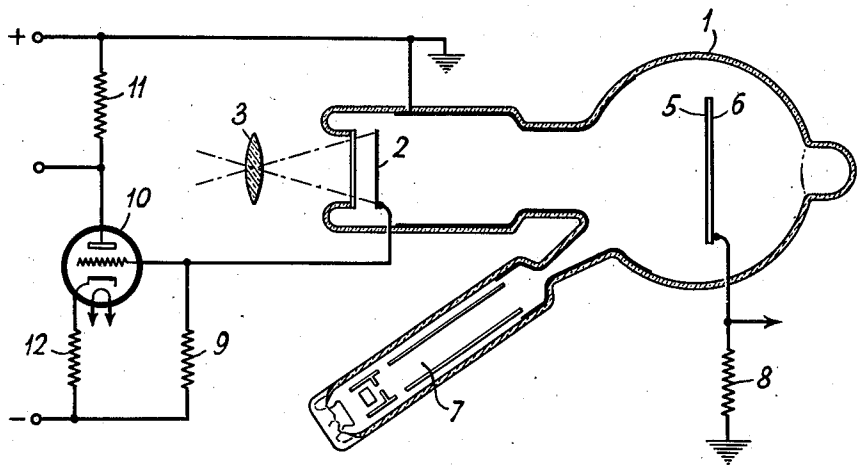
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TELEVISION TRANSMITTING SYSTEM

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TELEVISION TRANSMITTING SYSTEM

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2 Claims. (Cl. 178—7.2)

This invention relates to television transmitting apparatus of the kind in which a picture resolving device is employed having a substantially continuous photo-sensitive surface upon which an optical image is projected and in which an electron image derived from said surface is employed for obtaining positive signals, and is mainly concerned with the re-insertion of lost D. C., or low frequency components hereinafter referred to as "D. C. component."

In such television transmission apparatus various proposals have heretofore been made for the re-insertion of the D. C. component and in one of these proposals it has been suggested to obtain the D. C. component by measuring the average brightness of the picture projected onto the transmitting tube by providing a photo-electric cell upon which the image is also projected, the current derived from the photo-cell being employed for D. C. re-inserting purposes.

In some forms of picture resolving devices the image of the object is projected onto a substantially continuous photo-sensitive surface or cathode and the photo-electron image emanating from the cathode is projected and focussed onto a mosaic screen which acquires electrostatic charges according to the intensity of the electron image projected thereon, the elements of the mosaic screen being periodically restored to a datum value by scanning with a cathode ray beam. In another form of picture resolving device the image is projected onto a similar photo-sensitive cathode and the electron image emanating from the cathode as a whole is scanned over an apertured electrode, this type of transmitting tube being called an "image dissector." The D. C. component is usually lost at the resolving device and various methods are employed or have been proposed for re-inserting the component at various points in the amplifier chain. The D. C. component may require to be inserted at several points prior to transmission owing to the difficulty of constructing amplifiers capable of handling very high as well as D. C. and low frequency signals. The present invention is mainly concerned with the re-insertion of the D. C. component in transmitting apparatus employing resolving devices of the types described or other kinds in which the optical image is projected on a photo-sensitive surface and has for its main object to provide an improved apparatus in which the photo-sensitive surface of the resolving device is employed for D. C. re-insertion purposes.

According to one feature of the invention a television transmitting apparatus is provided employing a picture resolving device of the kind in which an image of the object for transmission is projected onto a substantially continuous photo-sensitive surface, the electron image obtained therefrom being utilised so as to derive picture signals therefrom, and wherein means are provided for obtaining from said photo-sensitive surface a current or voltage representative of the average brightness of the optical images projected onto said photo-sensitive surface and for indicating the value of said current or voltage, thus enabling said surface to be employed for D. C. reinsertion purposes or for indicating the optimum aperture for the optical lens of the resolving device.

According to a further feature of the invention a television transmitting apparatus is provided employing a picture resolving device of the kind in which an image of the object for transmission is projected onto a substantially continuous photo-sensitive surface, the electron image obtained therefrom being utilised so as to derive picture signals therefrom, the D. C. component of said signals being lost, and wherein said photo-sensitive surface is connected in circuit in such a way that a current or voltage representative of the average brightness of the optical image projected onto said surface can be obtained, and means for feeding said current or voltage after amplification, if required, to said signals so as to re-insert the lost D. C. components.

In order that the said invention may be clearly understood and readily carried into effect the same will now be more fully described with reference to the accompanying drawing which illustrates a circuit arrangement for obtaining a signal suitable for D. C. re-insertion purposes.

As shown, there is employed a picture resolving device in the form of a cathode ray tube of known type comprising an evacuated envelope 1 having a substantially continuous photo-electrode cathode 2 onto which an image for transmission is projected by an optical lens 3. The electron image emanating from the cathode 2 is focussed by means, not shown, and accelerated by an anode 4 onto a mosaic screen 5 associated with the signal plate 6. On the projection of the electron image onto the mosaic screen 5 the latter acquires electrostatic charges which are periodically restored to a datum potential by scanning with a cathode ray beam generated by a cathode ray gun 7. The signal plate 6 is connected to a resistance 8 and on scanning the mosaic screen

picture signals are developed across the resistance 8 and are fed to a suitable amplifier prior to transmission. It will be found that the signals developed across the resistance 8 do not contain their D. C. component and according to the invention a signal suitable for re-inserting the lost D. C. component is derived from the photo-sensitive cathode 2. The cathode 2, as shown, is connected through a resistance 9, in turn connected to the negative pole of a source of E. M. F. the positive pole of which is earthed and connected to the accelerating electrode 4. The passage of the photo-electric current through the resistance 9 generates a voltage which is applied to the control electrode of a valve 10, which is preferably a triode, having a high amplification factor, the anode of the valve being connected through a resistance 11 to the positive terminal which is earthed, as stated above. The cathode of the valve 10 is connected through a biassing resistance 12 to the negative pole of the above-mentioned source, the resistance 12 also serving to provide negative feedback for straightening the characteristic of the valve. The photo-electric current is thus amplified by the valve 10 and appears as a negative potential across the resistance 11 and can be applied in any suitable way to the amplified picture signals derived from the resistance 8. For example, the potential developed across the resistance 11 may serve directly as a bias potential for the amplifier of the picture signals.

The present invention may be conveniently employed in conjunction with the invention described in the specification of co-pending patent application No. 35,791/37 in which the average brightness of the object is employed in conjunction with the average voltage at the output of a D. C. amplifier for D. C. re-insertion purposes the electrical difference of the two voltages being applied as a bias control to the input of the amplifier for the purpose of maintaining the D. C. level of the output signals at the required value.

In some cases the photo-electric current of the cathode 2 may be employed as an indication as to the amount of bias necessary to re-introduce the lost D. C. component. For this purpose a simple current meter may be connected in series with the cathode 2 or, alternatively, where a voltage indication is required a suitable voltmeter may be connected across the resistance 9. The bias control of the amplifier may thus be manually adjusted according to the current or voltage indication on the meter associated with the cathode 2.

In some cases it may be desired to obtain in a suitable manner a measure of the largest picture amplitude occurring and to employ this measure in conjunction with the average brightness of the object, so that the resultant indication is a combined contrast and D. C. indication.

The current or voltage indication obtained from the photo-sensitive cathode ray may also be employed to indicate the optimum aperture required to be used with the optical lens 3 through which the image is projected onto the photo-sensitive cathode.

We claim:

1. Television transmitting apparatus comprising a transmitting tube having a conducting light-responsive electrode positioned at one end thereof, means for focusing an optical image upon said light-responsive electrode, a mosaic electrode and a signal plate positioned parallel to the light responsive electrode at the other end of the tube, potential means for accelerating and focusing the photo-electrons liberated from the light-responsive electrode onto the mosaic electrode when an optical image is projected on the light-responsive electrode, means in said tube adapted to produce a beam of electrons for scanning said mosaic electrode to produce picture signals at the signal plate, a discharge tube including a cathode, a control electrode and an anode, means for connecting the light-responsive electrode to the control electrode of said discharge tube, and means for maintaining said anode positive with respect to said cathode whereby the low frequency and direct current potential variations of the picture signals may be derived from said discharge tube.

2. Television transmitting apparatus comprising a transmitting tube having a conducting light-responsive electrode positioned therein upon which an optical image is adapted to be projected, a mosaic electrode and a signal plate also positioned in the tube in a plane parallel to said light-responsive electrode, means for accelerating and focusing the liberated photo-electrons from the light-responsive electrode onto the mosaic electrode, means adapted to scan said mosaic by an electron beam to produce picture signals at the signal plate, an output circuit connected to the signal plate, a discharge tube including a cathode, a control electrode and an anode, means for connecting said light-responsive electrode to the control electrode of said discharge tube, and means for maintaining said anode positive with respect to said cathode whereby low frequency and direct current potential variations may be derived from said discharge tube.

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