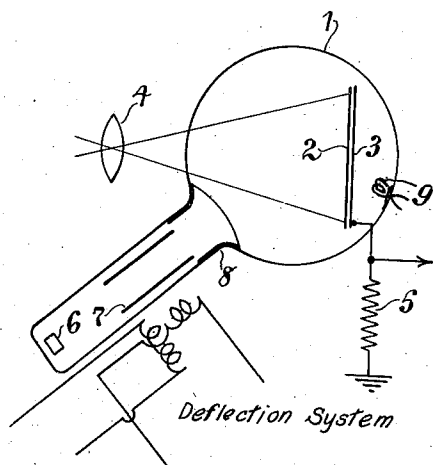


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TELEVISION TRANSMITTING SYSTEM

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TELEVISION TRANSMITTING SYSTEM

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This invention relates to television transmitting systems and is directed to the reduction or elimination of spurious or undesired signals of irregular wave form, and of relatively low frequency.

The invention is particularly concerned with transmitting systems embodying a cathode ray tube picture scanner in which a screen structure is provided composed of a plurality of photo-sensitive mutually insulated elements capacitatively associated with a signal plate, the elements acquiring an electrostatic charge according to the intensity of the corresponding elementary areas of the picture to be transmitted. The elements are restored to an equilibrium potential under the action of a scanning beam of cathode rays, restoration of the elements to the equilibrium potential generating picture signals which are fed to a suitable amplifier for transmission.

In such transmission apparatus the spurious or undesired signals give rise to what has become known as "tilt," and the tilting effect is manifested in the picture signals by the signals having superimposed upon them a saw-tooth like wave or on a curved wave so that the picture signals generated when scanning a line of constant brightness are such to correspond to a line having a progressively changing brightness along its length. In a picture, reconstituted by means of a cathode ray tube, the image on the fluorescent screen appears to have a progressively increasing brightness towards one corner of the reconstituted image. In addition "tilt" is also manifested in that dark areas of the picture become partially filled with a white "mist."

In order to reduce the effect of "tilt," it has been suggested to apply an equal and opposite saw-tooth or other wave form to counteract the saw-tooth wave upon which the picture signals are imposed. It is found that the "tilt" component varies according to the particular scene or picture being transmitted, and if the scene or picture or the light contrasts in the scene or picture change rapidly, then it is necessary to vary the shape of the correcting signals which, as will be appreciated, give rise to complications in the adjustment of the signals and result in a very complicated wave form for the correcting signals.

"Tilt" is also found to arise in other types of television transmitting tubes such as a tube in which the image of the picture or object is projected on to a photo-sensitive cathode and the photo-electron image from the cathode is projected on to a substantially non-photosensitive

mosaic screen. In this case the mosaic screen may be composed of a sheet of material having a high transverse resistance such as a sheet of mica.

5 It is the chief object of the present invention to provide an improved television transmission system in which the effect of "tilt" can be more readily overcome.

10 It is found by projecting or generating in the vicinity of the mosaic screen relatively slow speed electrons, that it is possible to stabilise the "tilt" component, thus permitting a correcting signal to be employed which may be kept more constant despite rapid changes in contrast of the picture being transmitted.

15 According to the invention a method of generating picture signals for the transmission of pictures to a distance is provided wherein use is made of a television transmission tube having a mosaic screen upon which an image of the picture is projected, and in which picture signals generated by such a tube suffer from the effect of "tilt" wherein, in order that a correcting signal may be used which may be maintained more constant despite rapid changes in contrast of the images projected on to the mosaic screen, slow speed electrons are generated within the tube in such a manner as to stabilise the "tilt" component.

20 Where a photo-sensitive mosaic screen is used it is known that during the admission of photo-sensitive material to the tube during the manufacture thereof for photo-sensitising the mosaic screen, some of the photo-sensitive material becomes deposited on other parts of the tube such as for example, the envelope, or on to what is known as the second anode and other parts. With a tube of this kind the slow speed electrons for stabilising purposes may be generated by projecting diffused light either directly on to the mosaic screen (which thereby generates slow speed electrons) or on to other parts of the tube which are photo-sensitive, particularly on to the second anode. The light which is projected thereon generates the slow speed electrons necessary for stabilizing purposes. In the other type of tube hereinbefore referred to, that is to say the tube in which an optical image is projected on to a photo-sensitive cathode and the photo-electron image emanating from the cathode is projected on to a substantially non-photo-sensitive mosaic screen, the photo-sensitive material also becomes deposited on such parts of the tube as the envelope and the second anode, and in this case therefore slow speed electrons

may be generated by projecting diffused light on to photo-sensitive parts of the tube preferably in the vicinity of the mosaic screen. Alternatively the slow speed electrons may be generated by employing one or more thermionic emitters, such emitter or emitters producing streams of slow speed electrons which are directed towards or are present in the vicinity of the mosaic screen with a substantially uniform intensity. The speed of the electrons should be such as to be comparable with the speed of photo-electrons.

In order that the said invention may be clearly understood and readily carried into effect, it will now be more fully described with reference to the accompanying drawing which illustrates diagrammatically a cathode ray, television transmitting tube suitable for use in the invention.

As shown, the tube comprises an evacuated envelope 1 in which is mounted the mosaic screen 2 composed of a plurality of photo-sensitive mutually-insulated elements capacitatively associated with a signal plate 3. The picture to be transmitted is projected on to the screen 2 through a suitable optical system indicated diagrammatically at 4. On projecting an image on to the screen 2 the elements of the screen acquire electrostatic charges according to the intensity of the corresponding elementary areas of the picture to be transmitted. The elements of the screen are restored to an equilibrium potential under the action of a scanning beam of cathode rays restoration of the elements to the equilibrium potential generating picture signals which are fed to a suitable amplifier for transmission. The signal plate 3 is connected to earth through a resistance 5 across which the picture signals are developed, the picture signals being fed to the amplifier, not shown, from the arrow in the drawing. The scanning beam is generated from a cathode 6 the electrons emanating from the cathode being focussed by an electron lens constituted by a first anode 7 and a second anode 8 to which suitable potentials are applied in known manner. The cathode ray beam is deflected over the screen 2 by deflecting coils or plates, not shown. In a transmitting system embodying a transmitting tube as shown in the drawing, the picture signals fed to the amplifier will, in effect, be superimposed upon a saw-tooth-like or similar wave which gives rise to what is known as "tilt."

During the photo-sensitising operation of the mosaic screen 2, other parts of the tube such as the envelope 1 and the second anode 8, become slightly coated with the photo-sensitive material. In accordance with one feature of the invention light is projected on the screen 2 or on to the second anode 8, or on to any other part or electrode of the tube in the vicinity of the screen 2, or on to one or more of these elements which are photo-sensitive for the purpose of generating slow speed electrons which it is found serve to stabilise the "tilt" component.

The light is preferably derived from a direct current source although in some cases light from an alternating current source, preferably of low frequency, may be employed for the same purpose. As shown in the drawing, a light source 9 in the form of filament is provided internally of the envelope 1, although in some cases the light source may be arranged externally of the tube. The intensity of the light projected on to the mosaic screen 3 or other part will be determined

empirically. The light source 9 may, if desired, be disposed in other positions in the envelope 1. It is however preferable to arrange the light source to the rear of the signal plate 3 or otherwise in such a manner that although the mosaic screen 2 receives substantially no light directly from the light source, light is permitted to reach the second anode 8 for the purpose above mentioned. In this construction the sensitivity of the mosaic screen is increased and in addition the arrangement permits of a more intense light to be employed. For example a 12 volt lamp consuming 130 milliamperes may be used. Since in accordance with the invention the "tilt" component is stabilised, the correcting signal which it is necessary to superimpose on the signals derived from the transmitting tube, can be maintained substantially constant in form despite changes in the light contrasts of the object to be transmitted.

As stated above, it is possible that the light source 9 may be replaced by a source or sources generating slow speed electrons. In some cases an additional electrode may be provided suitably disposed within the tube and made photo-sensitive, the light source being disposed so that the light rays are projected only on to the additional electrode.

The cathode ray tube shown in the drawing is of one particular kind in which an image of the object for transmission is projected directly on to the mosaic screen 2. The invention can also be employed in conjunction with transmitting tubes in which a scene or view from a film or other transparency is projected on to the mosaic screen. In the latter case it may be arranged that the transparency is moved intermittently so that the picture is projected on to the mosaic screen also intermittently or it may be arranged that the transparency is moved continuously and a mirror system or other arrangement interposed between the transparency and the mosaic screen so that the picture is in effect projected on to the mosaic screen intermittently.

The invention may also be applied in connection with other types of transmitting tubes in which "tilt" occurs.

In these cases, and where the invention is employed for the transmission of pictures in other manners, the light or the emission of the slow speed electrons may occur continuously or intermittently during the intervals between successive frames of the picture or transparency.

We claim:

1. The method of operating a light sensitive tube wherein is provided a photosensitive mosaic electrode and a further photoelectric surface, which includes the steps of continuously photoelectrically releasing electrons of substantially constant number and velocity from said surface, and flooding the photosensitive mosaic electrode with the released electrons.
2. The method of operating a light sensitive tube wherein is provided a photosensitive mosaic electrode and a further photoelectric surface, which includes the steps of producing incandescent light, continuously photoelectrically releasing electrons of substantially constant number and velocity by the produced light from said surface, and flooding the photosensitive mosaic electrode with the released electrons.
3. The method of operating a light sensitive tube wherein is provided a photosensitive mosaic electrode and a further photoelectric surface,

which includes the steps of projecting a light image upon the mosaic electrode, continuously photoelectrically releasing electrons of substantially constant number and velocity within the tube from said surface, and flooding the mosaic electrode with the released electrons.

4. In a cathode ray tube wherein is positioned a photosensitive mosaic electrode and an electron gun having an anode having a photo-sensitized surface, the method of operation which comprises the steps of projecting a light image on the mosaic electrode, continuously photoelectrically releasing electrons of substantially constant number and velocity from the said surface of said anode, flooding the mosaic electrode with the released electrons, and scanning the mosaic electrode by electrons from the electron gun.

5. An electron system comprising an evacuated envelope, a photosensitive mosaic electrode positioned within the envelope, a photosensitized surface and an electron gun having an anode for developing a beam of electrons to scan the mosaic positioned within the envelope, means to continuously photoelectrically release electrons of substantially constant number and velocity within the envelope from said surface, and means to flood the mosaic electrode with the released electrons.

6. A light translating system comprising a photosensitive mosaic electrode, a photoelectric surface adjacent said electrode means to project an optical image upon the mosaic electrode, light means to continuously photoelectrically release electrons of substantially constant number and velocity from said surface, and means to flood the mosaic electrode with the released electrons.

7. A cathode ray tube comprising a photosensitive mosaic electrode, a photosensitive surface adjacent said electrode, an electron gun, means including an anode for directing a beam of electrons from the electron gun toward the mosaic electrode, a source of radiant energy positioned within the tube for continuously photoelectrically releasing electrons of substantially constant number and velocity from said surface, and a signal plate mounted integral with the mosaic electrode.

8. In a television system wherein is provided a cathode ray tube having a photosensitive mosaic electrode and an electron gun having an anode having a photosensitized surface, the method of producing signals representative of a light image to be transmitted which includes the steps of projecting a light image on the mosaic electrode, continuously photoelectrically releasing electrons of substantially constant number and velocity from the photosensitized surface of said anode, flooding the mosaic electrode with the released

electrons, scanning the mosaic electrode by electrons from the electron gun, and converting the variation in electric charges resulting from the scanning operation into electrical potentials representative of the change of electric charge.

9. A method of operating a light sensitive tube wherein is provided a photoelectric surface and a mosaic electrode having a photosensitive area facing the photoelectric surface which includes the steps of continuously projecting light from behind the photoelectric area of the mosaic upon the photoelectric surface to release electrons therefrom and impacting the released electrons on the photosensitive area.

10. The method of operating a cathode ray tube wherein is provided a photosensitive mosaic electrode and a further photoelectric surface in close proximity to said mosaic which includes the steps of illuminating the photosensitive mosaic with an optical image and photoelectrically maintaining the photoelectric surface at a substantially predetermined constant equilibrium potential relative to the mosaic electrode by projecting light upon the photoelectric surface.

11. The method of operating a cathode ray tube wherein is provided a photosensitive mosaic electrode and a further photoelectric surface in close proximity to said mosaic which includes the steps of projecting light continuously on the photoelectric surface to release photoelectrons therefrom and maintaining the photoelectric surface at a substantially predetermined constant equilibrium potential with respect to the mosaic electrode by collecting the released photoelectrons.

12. A system for producing electrical image signal energy which comprises a cathode ray tube having included therein a photosensitive mosaic electrode, means for producing a cathode ray beam for scanning the photosensitive mosaic electrode, and a photoelectric surface coating, means to project an optical image upon the mosaic electrode to develop thereupon electrostatic charges of magnitudes normally proportional to image brightness, means to scan the mosaic electrode by the produced scanning beam to translate the charges into signal energy and means to project continuously radiant energy upon the photoelectric surface to release photoelectrons for compensating for the spurious charges developed upon the mosaic electrode during the translation of the said electrostatic charges into signal energy.

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