Nov. 23, 1937. H. A. IAMS 2,099,980

METHOD AND APPARATUS FOR TELEVISION TRANSMISSION

Filed March 30, 1933

Fig. 1.

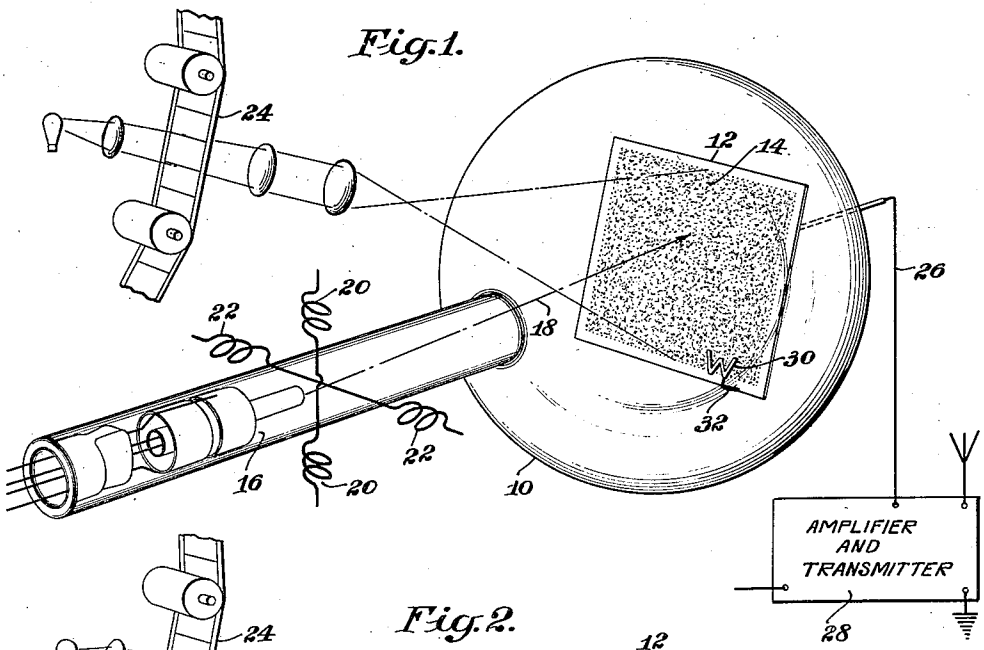


Fig. 2.

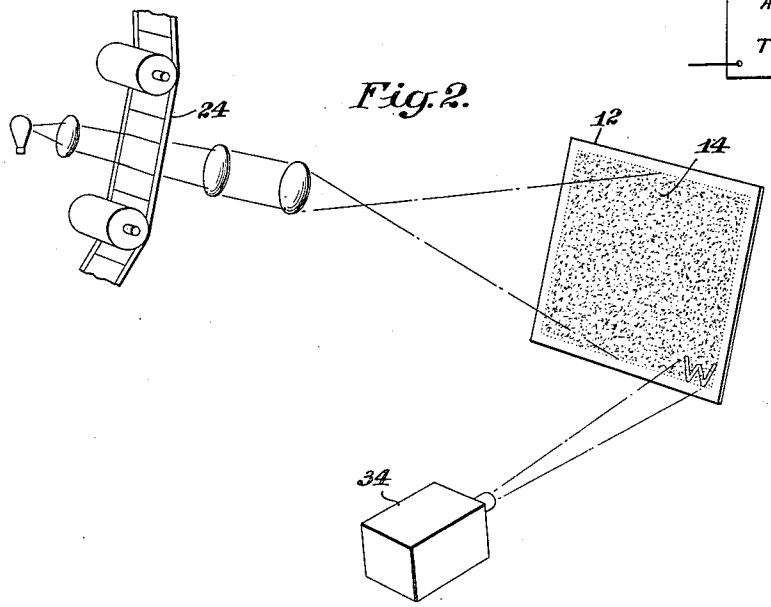


Fig. 3.

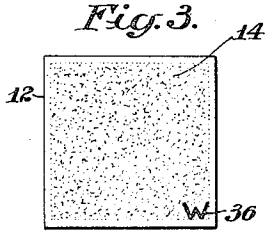
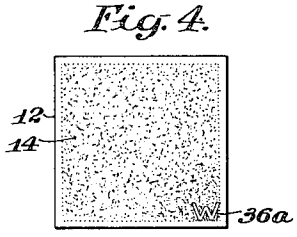


Fig. 4.



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METHOD AND APPARATUS FOR TELEVISION TRANSMISSION

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Application March 30, 1933, Serial No. 663,450

7 Claims. (Cl. 178—6)

My invention relates to improvements in methods and apparatus for television transmission.

During the presentation of television programs, the transmitting station has, heretofore, been identified either by placing in the transmitting apparatus a suitable slide or plate containing the station call letters, or by making an announcement by voice such as in the usual broadcast programs. It is seen however, that it would be advantageous to have the transmitting station constantly identified at the receiving points, and it is one of the objects of my invention to provide an improved method of operation and apparatus for such purpose.

Another object of my invention is to provide an improved method and apparatus for television transmission whereby any desired representation may be transmitted independently of the transmitted object, the representation being station letters, advertising slogans or any other desired information.

Other objects and advantages will hereinafter appear.

In accordance with my invention, a cathode ray tube, provided with photosensitive mosaic screen structure onto which an image of the view for transmission is projected, is utilized for developing the picture signals, and a portion of the photosensitive area of the screen structure is utilized for developing signals independently of development of the picture signals. The independently developed signals, when received, cause reproduction of the representation referred to.

More particularly, in accordance with my invention, the call letters of the transmitting station are transmitted continuously and independently of occurring changes in the transmitted view by placing in front of the photosensitive surface of a cathode ray transmitting tube a mask shaped to make the station call letters. This mask is placed at a corner of the photosensitive screen structure, and prevents the cathode ray from scanning the masked part of the photosensitive area.

In another form of my invention, wherein picture signals are developed by projecting an image of the view onto a photosensitive, mosaic screen in a cathode ray tube, an image of the call letters of the transmitting station is projected independently onto a corner of this structure.

In still another form of my invention, the call letters of the transmitting station are painted, scratched or otherwise applied directly upon the photosensitive screen structure of a cathode ray transmitter tube when apparatus of this type is used for developing the picture signals.

My invention resides in the improved method of operation and apparatus of the character hereinafter described and claimed.

For the purpose of illustrating my invention, an embodiment thereof is shown in the drawing, wherein

Figure 1 is a perspective diagrammatic view of television transmitting apparatus embodying and operating in accordance with my invention;

Fig. 2 is a simplified perspective view, showing another way of practicing my invention; and

Figs. 3 and 4 are front elevational views of photosensitive screen structure for use in a cathode ray transmitter tube, illustrating further modifications.

In Fig. 1, the reference numeral 10 designates a cathode ray transmitter tube comprising screen structure 12 having a photosensitive, mosaic area 14. Suitable means, in the form of a gun 16, operates to develop a ray 18 of electrons and to direct the same at the screen structure 12. For the purpose of causing the ray to scan the screen structure, it is deflected horizontally at a relatively high rate and is deflected vertically at a relatively low rate, depending upon the number of frames required per second.

Horizontal deflection of the ray is effected by causing a saw-tooth current wave at the required frequency to pass through deflecting coils 20. Vertical deflection of the ray is effected by causing a saw-tooth current wave at the required frequency to pass through deflecting coils 22.

Since the method and mechanism for projecting an image of the view or object onto the photosensitive area forms no part of my present invention, no detailed explanation thereof is believed to be necessary.

As the ray 18 scans the photosensitive area 14, picture signals are developed in the output connection 26 which supplies the usual amplifier and transmitter 28, as disclosed in the co-pending application of Ray D. Kell, Serial No. 649,766, filed January 3, 1933 and assigned to Radio Corporation of America.

It has been found that when the ray is interrupted by some means, such as a piece of metal, a signal is produced in the amplifier similar to that which would be produced for a bright spot on the transmitted object. In the embodiment of my invention shown in Fig. 1, this action is made use of by interposing a metallic mask 30 between the lower right hand corner of the photosensitive area 14 and the electron gun 16. The mask may

be carried at the end of a wire 32 extending outwardly from and affixed to the screen structure 12 whereby the mask is supported in close proximity to the photosensitive area. The mask may be in the form of a single letter, as shown, or may comprise a number of letters, numerals, or other configurations which, when reproduced at the receiving points, identify the particular transmitting station.

In operation, the mask 30 prevents the electrons in the ray from bombarding that portion of the photosensitive area directly back of the mask. The signals thereby developed operate to reproduce at the receiving points a bright representation having the same configuration and extent as the mask 30. When the receiving apparatus is in the form of a cathode ray tube having a fluorescent screen which is scanned by a cathode ray in the same manner in which the ray 18 scans the screen structure 12, a bright letter or other representation of the same shape as the mask 30 will appear in the lower right hand corner of the fluorescent screen.

With reference to Fig. 2, the same effect and result is obtained as in Fig. 1 by projecting an image of the required representation onto the photosensitive area 14. This is done by a suitable form of projecting apparatus 34 into which a slide is placed containing the station call letters, advertising matter or other information or representation desired. It is to be noted that projection of the image of the required representation is entirely independent of projection of the image of the view or object 24 onto the photosensitive area 14. As in Fig. 1, the required representation is continuously transmitted and reproduced at the receiving points independently of occurring variations of conditions of light and shade over the object or view.

If the photosensitivity of the screen structure 12 is reduced, a signal is produced the same as if there were at that instant a dark spot on the object. This action is utilized in the modification shown in Figs. 3 and 4. In Fig. 3, the station call letter or letters, or any representation 36 desired, is painted on the photosensitive surface 14. When the ray scans the painted portion, therefore, the effect is to cause reproduction at the receiving point of a dark figure having the same configuration as the figure 36. In Fig. 4 the action and result is the same as in Fig. 3, except that the representation 36a is made by scratching away the photosensitive material.

It will be understood that other modifications of my invention within the conception of those skilled in the art are possible without departing from the spirit of my invention or the scope of the claims.

I claim as my invention:

1. In a television transmission system of the cathode ray type, a cathode ray optical image translating tube, means for projecting an optical image thereupon for transmission, said tube being provided with a source of cathode rays and a photosensitive light translating target of which predetermined areas within the picture signal developing section of said target have different electrical characteristics for producing substantially fixed electrical output effects irrespective of conditions of illumination of the entire screen, means for causing the cathode ray to scan the target, and means for producing from the scanning a series of image signals representing both the optical image and a modification thereof as determined by the scanning of the areas of different electrical properties from the projected optical image upon the light translating target area.

2. In a television transmission system of the cathode ray type, a cathode ray optical image translating tube, means for projecting an optical image thereupon for transmission, said tube being provided with a source of rays and a target surface embodying photosensitive light translating portions and predetermined areas within the picture signal developing section of said target having different electrical characteristics from the light translating portions so as to produce substantially fixed electrical output effects irrespective of conditions of illumination of the entire screen, means for causing the cathode ray to scan the target, and means for producing from the scanning a series of image signals representing both the optical image and a modification thereof as determined by the scanning of the areas of different electrical properties from the projected optical image light translating target area.

3. The method of multiple signal translation which comprises the steps of projecting a light image upon a light sensitive plane to produce electronic emission proportional to the brilliance of the light image scanning the plane of projection to produce electrical signals representative of the projected light image, controlling independently of the projected light image the electronic emission within a selected portion of the projected optical image area to vary by predetermined variations the series of produced electrical signals, and producing a train of image signals representing the optical image projected upon the plane and modified by the controlled emission.

4. The method of multiple signal transmission which comprises projecting a light image upon a photosensitive surface to produce from the surface electronic emission proportional to the brilliance of the light image to produce thereby an electrical image of the light image, scanning the produced electrical image to produce electrical signals representative of the projected light image, controlling independent of the projected light image the electron emission from predetermined areas of the photosensitive surface within the areas over which the light image is projected during scanning of the electrical image formed by the optical image upon the photosensitive area to vary thereby, by predetermined amounts, the produced electrical signals.

5. The method of multiple signal translation which comprises the steps of projecting an optical image for transmission upon a light sensitive plane to produce normally over the entire area electronic emission proportional to the brilliance of the light image scanning the plane of projection to produce electrical signals representative of the projected light image, controlling independently of the projected light image the electronic emission over selected portions within the area over which the optical image is projected to vary by predetermined variations the series of normally produced electrical signals and transmitting the resultant signals to cause at points of reception the conversion of the signals into an electro-optical image.

6. In the art of a television system, the method of operation which comprises projecting onto a given area a photosensitive screen structure an optical image of a subject for transmission so as to produce electron emission from the screen, scanning the area of said screen structure to develop picture signals representative of condi-

tions of light and shade at the respective elemental areas of the optical image and effective at a receiver to produce an image of said subject, developing over a portion of the photosensitive area within that portion of the said screen structure subjected to the optical image and independent of any conditions of illumination thereof a second series of signals intermingled with the first series and effective at the receiver tube to modify in a visible manner the optical representation resulting from the translation of the series of signals due to the image of said subject into electro-optical representations.

7. In a television transmitting system, a cathode ray tube, a photosensitive light translating screen provided within the tube, means for projecting an optical image upon the photosensitive screen, said screen also having predetermined areas thereof within the boundaries over which the light image is projected of different electrical characteristics from the photosensitive light translating portion, means within the tube for developing a cathode ray beam, means for causing the developed cathode ray beam to scan the screen within the tube, an external circuit wherein picture signals are developed for transmission in accordance with the scanning of the screen structure by the cathode ray beam, and means for causing during the scanning operation signals to be developed in the external circuit which are representative of the optical image and modified during predetermined time periods by a series of signals of predetermined amplitude developed upon scanning the screen and completely independent of the signals due to any projected optical image upon the photosensitive screen.

HARLEY A. IAMS.