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CATHODE RAY TELEVISION RECEIVER TUBE AND METHOD OF USING THE SAME

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Fig. 1.

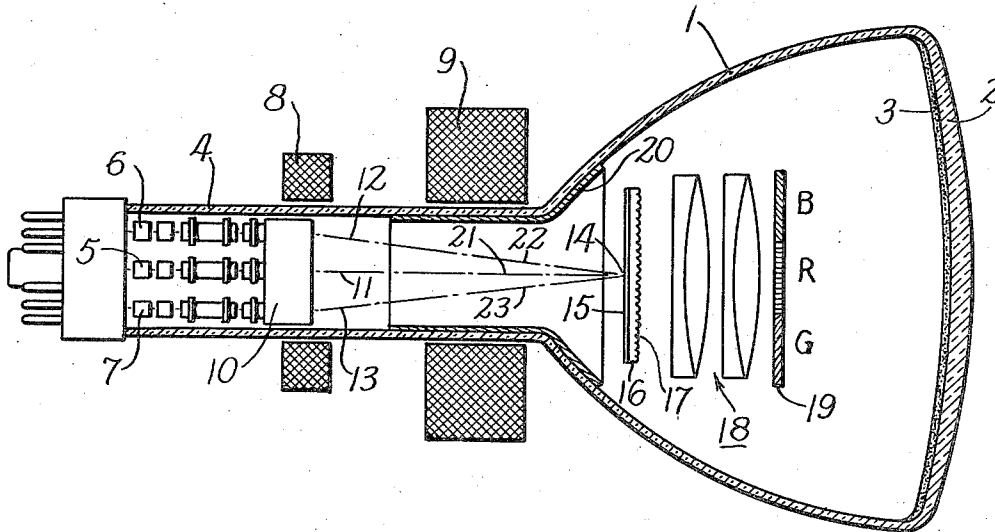
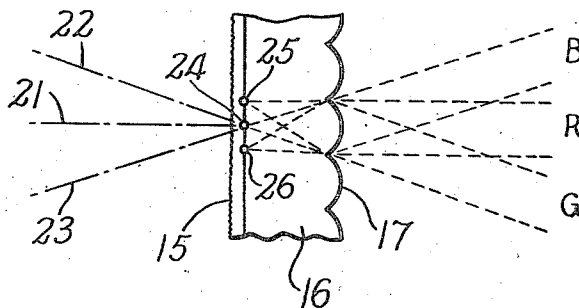


Fig. 2.



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CATHODE RAY TELEVISION RECEIVER TUBE
AND METHOD OF USING THE SAMEArthur Wright, Forest Hills, N. Y.; Annie Wright, admin-
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6 Claims. (Cl. 313—70)

My invention relates particularly to a television apparatus and receiver tube of an improved type and method, whereby many disadvantages previously encountered may be avoided in the present day color television.

An object of my invention is to provide an apparatus and method, or color-kinescope, for producing graphic figures and pictures in which many disadvantages of present day methods are avoided by the receiving apparatus or cathode ray tubes herein provided. A further object is to obtain brighter images, without resorting to higher beam power to attain increased brilliancy. Another object is to avoid shadow masks which intercept the electron beam and prevent the use of a large percentage of the power of the beam and which also detract from the image sharpness. Still another object is to avoid the difficulties encountered in the buckling of the very thin shadow masks hitherto found necessary. Still another object is to avoid the difficulty of applying a succession of microscopic phosphor dots to the target area in several different colors. Still further objects will appear from the detailed description of my invention hereinafter.

My invention may be carried out with any desired number of electron guns, for instance by utilizing three electron guns and the other structural elements as set forth in the patent to Epstein No. 2,659,026, granted November 10, 1953, or, instead, one electron gun as in the patent to Jenny No. 2,611,099, granted September 16, 1952, but by omitting the shields and perforated screens as well as the dotted phosphor construction in said patents, while, however, utilizing the angularity of the electron beams.

While my invention is capable of being carried out in many different ways, I have described and shown only one example by way of illustration thereof, in the accompanying drawings, in which—

Fig. 1 is a horizontal section of a color-kinescope tube made in accordance with my invention; and

Fig. 2 is a diagrammatic horizontal detail section enlarged thereof.

By way of example, as shown in the drawings, I may provide an envelope 1, provided with an appropriate amount of vacuum, made of glass or any other suitable material, having a front thickened wall 2 through which the television image may be observed from an inner ground glass surface 3. The tube 1 is provided with a neck 4 which contains three electron guns 5, 6 and 7, arranged for example 120° away from one another as related to the axis of a neck portion 4 of the tube 1. A set of magnetic yokes or coils 8 and 9 is provided around the neck portion 4 of the tube. The yoke or coil 8 is located near the common anode 10 of the electron guns 5, 6, and 7, so as to converge parallel beams 11, 12 and 13 therefrom which relate to the red, blue and green respectively, onto any given point 14 of a target surface 15 of any suitable phosphor, but preferably such as to provide white light. The luminescent coating 15 is carried on the rear face of a thin glass plate 16 having formed on the front face thereof lenticulations 17, which

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are preferably cylindrical, but may be in the form of spherical pivots, which have a focal point at the rear of the plate 16, and have a radius, approximately, of $\frac{1}{3}$ of the plate thickness. The width of the lenticles 17 may be of any desired size, as for example from 4 to 30 per mm. larger or smaller, but preferably about 4, and which are located and have their dimensions such as to accord and register with the sequence of the respective three different-color impulses received by the electron beam in the tube 1. These, of course, will be synchronized in time, distance and direction with the colors registered by the camera tube scanning beams. However, the composite beam of the tube 1, as usual, is preferably directed substantially horizontally across the target surface 15, or at the conventional slight angle to the horizontal, whereas the lenticles 17, if cylindrical, are located at any desired angle to the track of the scanning beam but preferably in a vertical direction, although the cylindrical lenticles may be located at any other desired angle to the track of the scanning beam. The synchronized light image thus emitted by the phosphor 15 is transmitted to and through the lenticulations 17, each of the said images being divided into two, three or more portions corresponding to the two, three or more transmitted color components of the color filter of the camera tube. The respective light components thus formed thereupon pass at their respective angles, caused by the curvature of each lenticle, to an objective system 18, of any desired type, thence through a multizone color filter 19, as set forth for instance in my Patent No. 2,621,247, granted December 9, 1952, or in my copending application Ser. No. 440,671, filed July 1, 1954. The objective system 18, such as referred to therein, then focuses the images in their multicolor components onto the ground glass viewing surface 3. A conductive coating 20 is provided on the inside of the tube neck 4 having the same potential as the anode 10 which acts as an accelerating electrode. The yoke 8 acts as a converging coil upon the electrons from the three electron guns 5, 6 and 7, which form three converging beams 21, 22 and 23, relating respectively to the colors red, blue and green, that converge at the luminescent surface 15, but have three different angularities according to the three color impulses, red, blue and green respectively. The yoke 9 is comprised of a pair of deflecting coils for producing the usual horizontal and vertical scanning action of the beams on the target area 15. The angularities of the three respective beams aid in the sharp separation between them and the transmission to the conformations of either smooth or rough phosphor coating 15 in the most effective directions, as they have separate relative inclinations, in the general directions of the three different inclinations of the courses of light within each of the lenticles transmitted to the three respective parallel color zones of the color filter 19, through the objective 18. In other words, preferably, one of the repetitive time-division multiplexed beams, for example beam 21, would be angularly inclined from the axis of the tube neck 4 substantially vertically along the axis of each particular lenticle 17, when the lenticles 17 are at right angles to the beam track, which is customarily slightly inclined to the horizontal, and the beams 22 and 23 would be inclined angularly to the right and left, respectively, of the axis of each said lenticle, preceding a similar angular separation of the courses of the respective bundles of light rays transmitted from the rear focal points 24, 25 and 26 of each lenticle, by reason of the curvature thereof, thence through the objective 18 and through the central red, left blue, and right green zones of the color filter 19, inasmuch as, as shown in Fig. 2, said three bundles of light rays, which are produced by the plate 17, cross one another within each of said lenticles.

It will be understood, of course, that any alternative forms of beam courses and scanning systems may be utilized herein as referred to, for instance, in the patent to Epstein aforesaid.

While I have described my invention above in detail I wish it to be understood that many changes may be made therein without departing from the spirit of the same.

I claim:

1. A cathode ray tube comprising an envelope, an electron gun device therein, means to produce scanning beam impulses therefrom of varying angularity according to a succession of different-color signals, a luminescent target surface therefor, arranged to receive the entire impulses from said device, a succession of lenticles located in said envelope to receive the light from said surface, an objective and multizone color filter in said envelope to receive the light therefrom, and a viewing screen in the focal point of said objective.

2. A cathode ray tube comprising an envelope, an electron gun device therein, means to produce scanning beam impulses therefrom of varying angularity according to a succession of different-color signals, a luminescent target surface therefor, arranged to receive the entire impulses from said device, a succession of lenticles located in said envelope to receive the light from said surface, an objective and multizone color filter in said envelope to receive the light therefrom, and a viewing screen at said envelope in the focal point of said objective.

3. A cathode ray tube comprising an envelope, a plurality of electron guns therein, means to produce a plurality of converging scanning beams therefrom of varying angularity according to a succession of different-color signals, a luminescent target surface therefor, arranged to receive the entire beam from said gun, a succession of lenticles located in said envelope to receive the light from said surface, an objective and multizone color filter in said envelope to receive the light therefrom, and a viewing screen in the focal point of said objective.

4. A cathode ray tube comprising an envelope, a plurality of electron guns therein, means to produce a plurality of converging scanning beams therefrom of varying

angularity according to a succession of different-color signals, a luminescent target surface therefor, arranged to receive the entire beam from said gun, a succession of lenticles located in said envelope to receive the light from said surface, an objective and multizone color filter in said envelope to receive the light therefrom, and a viewing screen at said envelope in the focal point of said objective.

5. A cathode ray tube comprising an envelope, a plurality of electron guns therein laterally displaced respectively 120° , means to produce a plurality of converging scanning beams therefrom of varying angularity according to a succession of different-color signals, a luminescent target surface therefor, a succession of cylindrical lenticles located in said envelope to receive the light from said surface each of which is located so as to receive all said beams in different positions, respectively, behind the lenticle, an objective and multizone color filter in said envelope to receive the light therefrom, and a viewing screen in the focal point of said objective.

6. A cathode ray tube comprising an envelope, a plurality of electron guns therein laterally displaced respectively 120° , means to produce a plurality of converging scanning beams therefrom of varying angularity according to a succession of different-color signals, a luminescent target surface therefor, a succession of cylindrical lenticles located in said envelope to receive the light from said surface each of which is located so as to receive all said beams in different positions, respectively, behind the lenticle, an objective and multizone color filter in said envelope to receive the light therefrom, and a viewing screen at said envelope in the focal point of said objective.

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