May 25, 1943. J. N. DYER 2,319,804

TELEVISION

Original Filed Feb. 24, 1941

Fig. 1

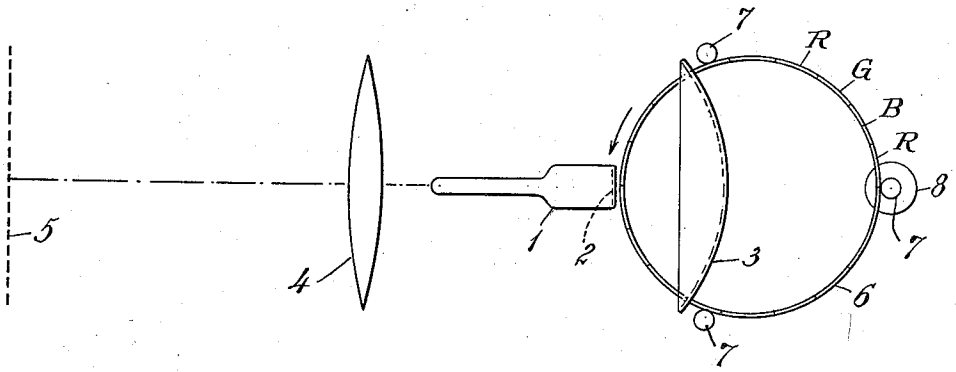


Fig. 2,

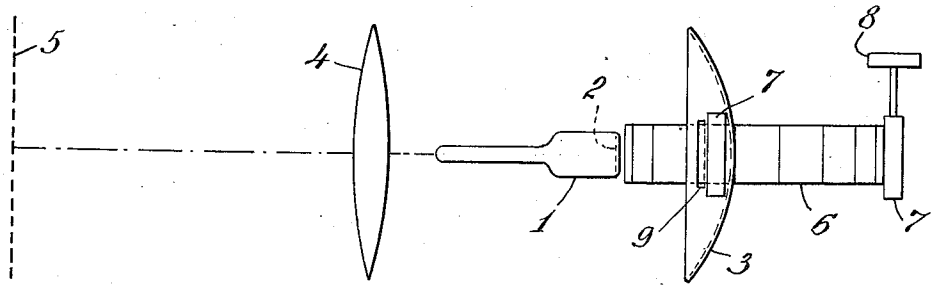
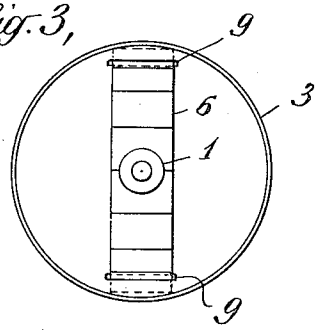


Fig. 3,



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UNITED STATES PATENT OFFICE

2,319,804

TELEVISION

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Original application February 24, 1941, Serial No. 380,097. Divided and this application June 9, 1942, Serial No. 446,385

5 Claims. (Cl. 178—5.4)

This invention relates to television, especially to television in natural colors. The invention particularly relates to apparatus of the type employing rotating filter elements, and contemplates the provision of a form of rotating element and arrangement of the rotating element with respect to a cooperating scanning device which will yield a compact assembly adapted to be conveniently housed in a cabinet, etc.

In color television systems in which the object field is scanned successively in a plurality of colors and the signals transmitted to the receiver for reproduction, the use of rotating disks have heretofore been suggested. Suitable disks having segments of novel design are described in an application of Peter C. Goldmark, Serial No. 355,839, filed September 7, 1940, for "Color television." Such disks have been found to be quite satisfactory from the standpoint of operation.

The use of rotating filter drums instead of disks has been suggested in an application of Peter C. Goldmark, Serial No. 370,008, filed December 13, 1940, and entitled "Television."

The present invention especially contemplates the combination of a filter drum, a mirror and a projection cathode-ray tube for the projection of television images in color. The combination is arranged in a novel manner so that the filter drum cuts off a minimum amount of light.

This application is a division of my application Serial No. 380,097, filed February 24, 1941.

The invention will be more fully understood by reference to the specific embodiment illustrated in the drawing and the following description thereof. In the drawing:

Fig. 1 is an elevation of a specific embodiment in which a rotating filter drum is combined with a cathode-ray tube, mirror and correcting lens for the projection of color images; and

Figs. 2 and 3 are plan and front views, respectively, of the apparatus of Fig. 1.

Referring now to Figs. 1–3, a specific embodiment is illustrated which is especially applicable to the projection of images formed by a cathode-ray tube. A cathode-ray receiver tube 1, forming an image on the luminescent surface 2 thereof, is employed. This tube may be of a type which produces a small but very brilliant image. Light from the projector tube 1 is received by the concave mirror 3 and reflected through the lens 4 to a suitably positioned screen 5. Lens 4 is designed to correct for the aberrations of the mirror 3. The mirror 3 and lens 4 thus function in a manner similar to that of the so-called "Schmidt camera," familiar in connection with astronomical instruments.

A filter drum 6 is positioned with its peripheral surface closely adjacent the scanning area 2 of the projector tube, and with at least a portion of its peripheral surface between the scanning area and the mirror 3. Although the drum could be positioned to encircle the projector tube 1, in order to avoid impeding the light rays as much as possible, the invention contemplates positioning the mirror and drum so that the surface of the mirror extends within the drum.

As shown in Figs. 2 and 3, the filter drum impedes the rays of light through only a relatively narrow vertical band. The drum is preferably positioned so that the filters pass as closely as possible to the image so that all rays of light which reach the mirror will pass through the proper filter. It will be apparent that if the central portion of the mirror is reflecting, light rays therefrom will be reflected through various parts of the periphery of the drum lying within the mirror at any given instant. If the filter in front of the projector tube 1, is, say, red, such reflected rays which impinge on green or blue filter segments will be absorbed and hence will not impair the color reproduction. If the reflected rays impinge on a red filter, they will be partially attenuated and then allowed to pass. With a large number of filter segments this attenuation may not be objectionable. However, if desired, suitable stationary masks may be placed inside those portions of the drum lying between the mirror and the projector tube 1, so as to cut off rays which would otherwise pass through the periphery of the drum.

The number of filter segments may be selected as desired, six groups of three red, green and blue filters being specifically illustrated.

The drum may be supported and driven by suitable bearings 7 as shown. Driving power may be supplied to pulley 8, or in any other desired manner. Or, a vertical central slice may be cut out of the mirror to allow the periphery of the drum to be attached to a central axle, and supported and driven thereby. When such a slice is cut out, it will be understood that the surface of the mirror may still be considered to pass within the drum.

The mirror and drum may be proportioned so that the mirror lies entirely within the drum in the vertical plane, or the mirror may extend somewhat beyond the surface of the drum as shown in Fig. 1. In such case suitable slots 9 may be provided in the surface of the mirror.

In either case, those portions of the mirror which extend laterally from the drum (see Fig. 2) will receive light rays from the projector tube and reflect them to the screen 5. If desired, the mirror may be wider than it is high so as to provide more light gathering power.

It will be understood that the present invention is not limited to the mere details of construction and arrangement of the parts disclosed, since many modifications may be made by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. In color television, in combination an electronic scanning device comprising an envelope having a two-dimensional scanning area associated therewith, a concave mirror positioned in the path of light of said scanning area with its concave side toward the scanning area, and a rotatable color filter drum having a plurality of different color filter segments on the pheripheral surface thereof, said drum being positioned so that its pheripheral surface moves adjacent said scanning area in the path of light between said scanning area and said mirror.

2. In color television, in combination, an electronic scanning device comprising an envelope having a two-dimensional scanning area associated therewith, a concave mirror positioned in the path of light of said scanning area with its concave side toward the scanning area, and a rotatable color filter drum having a plurality of different color filter segments on the pheripheral surface thereof, said drum being positioned with its peripheral surface adjacent said scanning area in the path of light between said scanning area and said mirror and the surface of said mirror extending within said drum.

3. In color television, apparatus for projecting images in natural color which comprises a cathode-ray tube having a luminescent surface at the end thereof on which two-dimensional images are successively reproduced in a plurality of side-by-side lines, means for projecting said images to a selected viewing screen comprising a concave mirror positioned in the path of light from said images with the concave surface thereof toward the luminescent surface, said luminescent surface being substantially on the axis of said mirror, a rotatable substantially cylindrical color filter drum having a plurality of different color filter segments arranged around the peripheral surface thereof, said drum being positioned so that its peripheral surface passes closely adjacent said image surface in the path of light from the images to the mirror and the mirror being positioned so that the surface thereof extends within the drum, and means for rotating said drum to exhibit said images successively in different colors.

4. In color television, apparatus for projecting images in natural color which comprises a cathode-ray tube having a luminescent surface at the end thereof on which two-dimensional images are successively reproduced in a plurality of side-by-side lines, a concave mirror positioned in the path of light from said images with the concave surface thereof toward the luminescent surface, said luminescent surface being substantially on the axis of said mirror, a correcting lens positioned in the path of light of said mirror and adapted to correct aberrations thereof, said mirror and correcting lens being adapted to project said images to a selected viewing screen, a rotatable substantially cylindrical color filter drum having a plurality of different color filter segments arranged around the peripheral surface thereof, said drum being positioned so that its peripheral surface passes closely adjacent said image surface in the path of light from the images to the mirror and the mirror being positioned so that the surface thereof extends within the drum, and means for rotating said drum to exhibit said images successively in different colors.

5. Color television apparatus which comprises, in combination, an electronic scanning device comprising an envelope having a two-dimensional scanning area associated therewith, a concave mirror positioned in the path of light of said scanning area with its concave side toward the scanning area, and a movable endless band having a plurality of different color filter segments arranged therealong, said endless band being positioned so that the color filter segments traverse the scanning area in the path of light between the scanning area and said mirror.

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