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RECEIVER ARRANGEMENT FOR ELECTRIC TELEVISION APPARATUS

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Fig.1

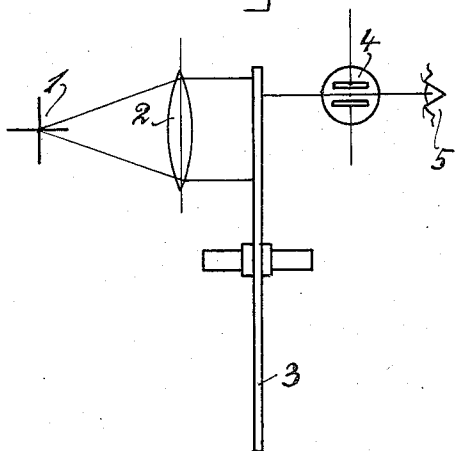


Fig.2

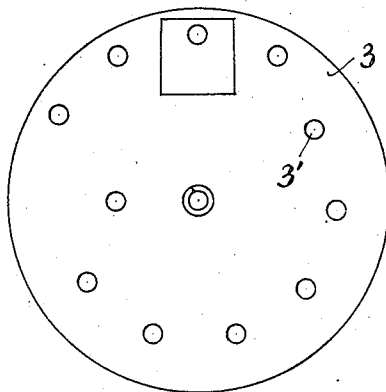
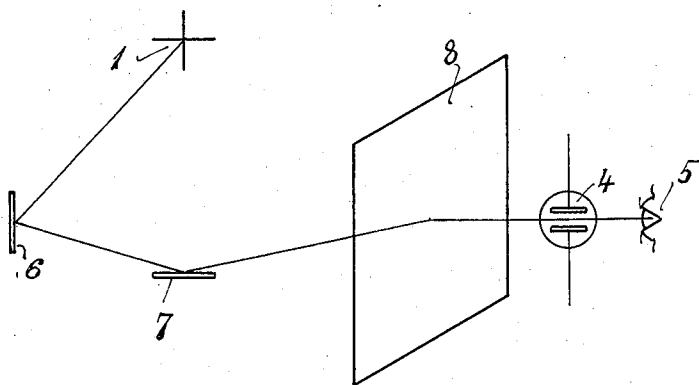


Fig.3



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UNITED STATES PATENT OFFICE

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RECEIVER ARRANGEMENT FOR ELECTRIC TELEVISION APPARATUS

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REISSUE

My invention relates to a receiver arrangement for electric television apparatus and has for its objects simplification of the optical arrangement and greater brightness of the television image.

A television apparatus usually comprises a source of light, a light relay by which the light radiated from the source is regulated in accordance with the relative brightness of the several areas of the image transmitted by the sender, means for coordinating the areas so transmitted and which constitute the image, said means operating in synchronism with the means at the sender for breaking up the image, and optical auxiliaries.

Heretofore the general arrangement of the principal parts constituting a receiver was such that the light from the light source was first regulated as to its brightness by the light relay and then directed to the coordinating means which projected the image into a single plane or on a suitable screen for observation.

In contradistinction to this known arrangement, in my invention the light is directed onto the screen or the image plane as radiated from the light source, that is without previous regulation as to brightness and the image is then viewed through the medium of the lighting relay which is arranged intermediate the eye and the image. The light from the source may be radiated freely onto the entire plane of the image in which case the means for coordinating the areas into the complete image serves for directing the light rays issuing from the several dots in the illuminated plane into the light relay and into the observer's eye, or the entire radiation of light from the source is concentrated and directed on the image plane by the area coordinator.

In this novel arrangement of parts in the receiver only that portion of the light radiation which is projected into the eye at a given time is varied as to its brightness, in contradistinction to the existing arrangement in which the entire radiation from the source of light had to pass the light relay.

The advantages of the novel arrangement are particularly important where electrically controlled relays are provided the operation of which is based on the known electro-optical or magneto-optical effect on polarized light.

Effects which may be applied in the present instance are principally: The Faraday effect in which the rotation of the polarization plane of the light is utilized by a magnetic field; the Kerr phenomenon, rotation of the polarization plane of the light during the reflection at a magnetized mirror; and the Kerr effect, electrical double refraction in a condenser filled with a suitable transparent medium. A very suitable light relay for television apparatus is the Kerr cell on account of its lack of inertia and its quantitative effect due to which it may be used for the highest frequencies. However, its load is limited to a predetermined maximum quantity of light and therefore this maximum was a limit for the intensity of the source of light with the above-mentioned arrangement of parts since the total quantity of light radiated from the source had to pass the Kerr cell and only a fraction of this quantity got into the eye of the observer.

In my novel arrangement, on the other hand, it is possible to increase the intensity of the source of light to such an extent that the fraction of its light which is projected into the observer's eye, is at the limit of load for the Kerr cell. Therefore, the brightness of the image will be much higher than in the known arrangements.

The arrangement according to my invention involves the further advantage of a considerable simplification of the optical auxiliaries. For instance if a Kerr cell is used in connection with the known arrangements it is necessary to provide systems of lenses for parallelizing the rays of the bundle of light which system is dispensed with in my novel arrangement according to my invention as the eye is enabled to survey the entire plane of the image through the Kerr cell directly.

In the drawings affixed to this specification and forming part thereof television apparatus embodying my invention are illustrated diagrammatically by way of example.

In the drawings—

Figs. 1 and 2 illustrate diagrammatically an apparatus in which the image plane is illuminated entirely and by direct radiation;

Fig. 3 illustrates an apparatus where the light rays are concentrated and directed across the field of the image.

Referring now to Figs. 1 and 2, 1 is a source of light, 2 is a lens through which the light of the source is concentrated, and 3 is a plate on which the concentrated light is projected. The plate 3 may be of any suitable construction, for instance, it may be the known Nipkow perforated plate which serves for breaking up the image at the sender and is here utilized at the receiver for coordinating the transmitted areas into a complete image. A light relay, for instance a Kerr cell 4, may be arranged on the side of the plate 3 which is opposite the source of light 1, and 5 is the eye of the observer who surveys through the light relay 4 that part of the plate 3 which constitutes the image field. A ray of light which passes through one of the perforations 3' of the plate 3 is projected into the eye 5 through the Kerr cell 4 in which its intensity is regulated. Only this fraction of the radiation and not the total quantity of light radiated from the source 1, passes through the Kerr cell 4.

Referring now to Fig. 3, the source of light, the light relay, which may be a Kerr cell, and the eye of the observer are indicated by the same reference numerals as in Figs. 1 and 2 but in this case the light from the source 1 which may be either an arc lamp or a glow lamp is directed onto two mirrors 6 and 7, which may, for instance, be arranged to pivot or oscillate in two planes at right angles to each other, for instance by arranging the mirror 6 to oscillate about the vertical axis and to reflect a light beam therefrom to the mirror 7 arranged to pivot or oscillate about a horizontal axis so as to direct the rays of light onto the screen 8 along two coordinates at right angles to each other. The focus point 11 upon the picture screen 8, due to the motion of the mirrors 6 and 7, travels over the entire surface in the shape of a relatively narrow zig-zag line. The travelling or migration of this luminous spot of concentrated brightness is viewed through the light control cell 4 through the eye 5, and it is only by reason of the fact that the permeability of the cell 4 is controlled by the incoming current that a picture is produced in the eye. The advantage of this arrangement contrasted with that illustrated in the Figs. 1 and 2 resides in that the light falling from source 1 is concentrated at a single point on the screen 8, contradistinct from what is true of the scheme shown in Figs. 1 and 2 where only a small fraction of the light rendered parallel by the lens 2 and corresponding to the diaphragm aperture 3' is utilized. Hence, in the arrangement, as disclosed and illustrated by Fig. 3, the efficiency of the illuminous source 1 is many times higher and, in fact, it is particularly high on the ground that intensity

control means inserted in the path of the rays between 1 and 11 may even be dispensed with according to this invention. It will be understood that this intensity controlling device would produce an impairing action on account of the loss of light incidentally produced thereby.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art, and I, therefore, believe myself to be entitled to make and use any and all of these modifications as fall fairly within the spirit and scope of the hereinafter appended claims.

I claim:—

1. A receiver for electric television apparatus including a light relay of the Kerr type, comprising, a light screen, a source of illuminous rays, means for projecting said luminous rays as a position controlled point source of light upon said screen, and a light relay interposed between an observer and said screen whereby said observer when looking through said light relay toward said screen may view a series of position controlled light spots and visually construct a moving image upon said screen.

2. A receiver arrangement for electric television apparatus comprising, a source of light, a picture point distributor, an optical system including a plurality of oscillating mirrors for illuminating said distributor and moving concentrated light beams from said light source back and forth across said distributor surface in synchronism with a corresponding motion at a transmitting station, and a light relay positioned between an observer and said distributor, said relay being controlled by variations in received signal potentials for producing variations in the amount of light passing therethrough in accordance with said signals whereby an observer looking through said relay experiences changes in light intensities proportional to light intensities of an object viewed at a transmitting point.

3. An apparatus for electric television including a light source, a distributor screen, means positioned between said light source and said distributor screen for directing light as a point source to said screen and moving the light point with respect thereto, and a light relay positioned between an observer and said distributor screen, said light relay being subjected to variations in potential in accordance with signal pulses, whereby an observer viewing said screen through said relay receives an optical impression of light images produced by said variations in potential applied to said relay and corresponding to a like image at a point of transmission.

In testimony whereof, I affix my signature.

AUGUST KAROLUS.