

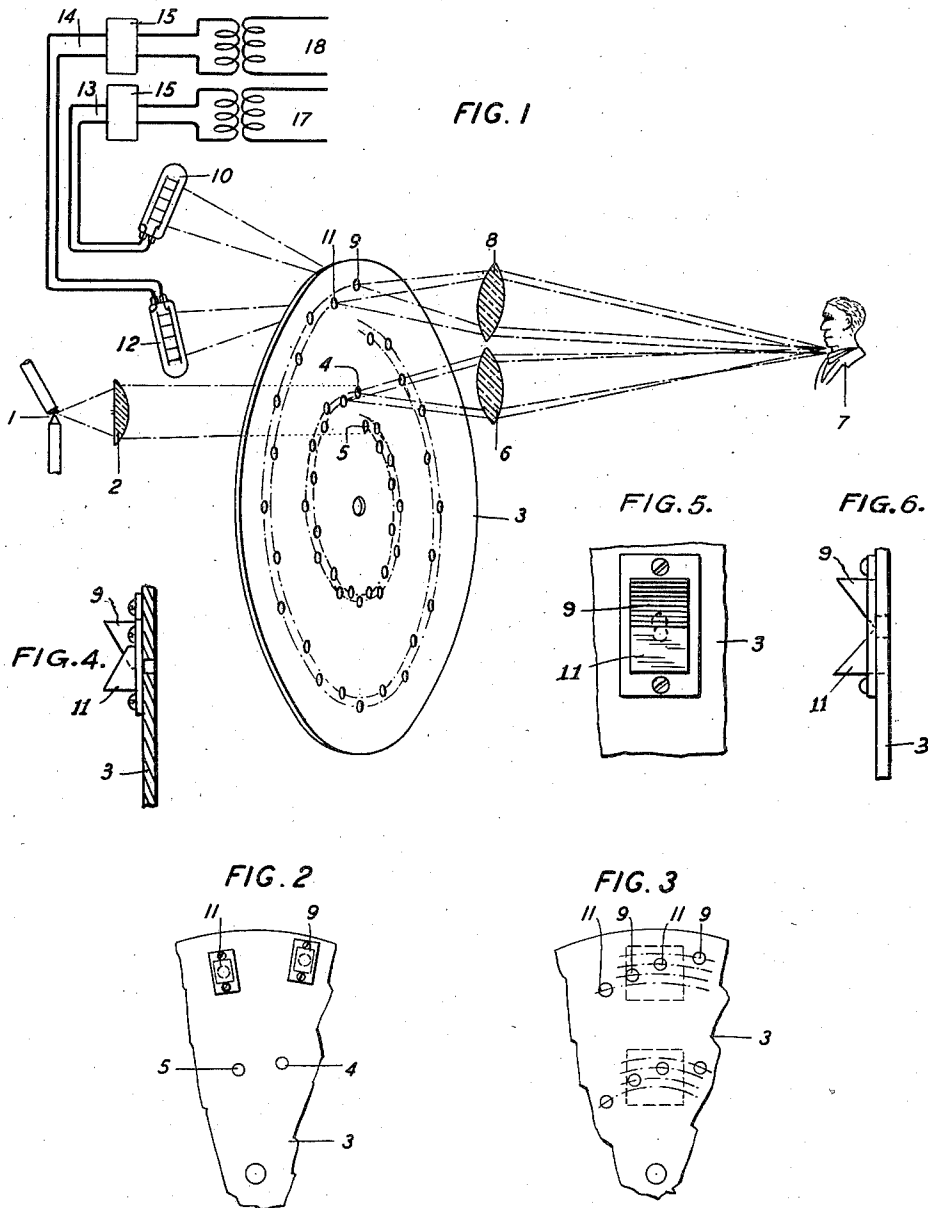
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ELECTROOPTICAL SYSTEM

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2,072,478

ELECTROOPTICAL SYSTEM

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6 Claims. (Cl. 178—6)

This invention relates to electro-optical systems and more particularly to multi-channel television systems.

The prior art discloses electro-optical systems in which a field or object to be transmitted is completely illuminated, and mechanism is provided to scan the field so that light radiations reflected from separate strips of the field are caused to traverse two or more light sensitive devices, each included in a different communication channel.

It has also been proposed to simultaneously illuminate different strips or paths of a scene or object by a plurality of moving beams of light, each of which comprises a different spectral band, and to use the light simultaneously reflected from the areas illuminated by the different light beams to respectively actuate light sensitive devices, each included in a different communicating channel.

The present invention provides a system in which the advantageous features of the above described disclosures are simultaneously utilized to effect multi-channel operation.

An object of the present invention is to effect simultaneous beam illumination and scanning of a field or subject, together with transmission over a plurality of channels.

One embodiment of the invention may include a light source and a scanning disc, provided with two or more sets of spirally arranged apertures for producing a plurality of moving beams of light for illuminating distinct strips or paths of the scene or object to be transmitted, lenses for controlling the supply of light to the field or object and for gathering the light reflected from simultaneously illuminated areas to constitute separate beams which are applied to a portion of the scanning disc provided with prisms, which operate to direct the respective beams of reflected light to different light sensitive devices included in separate communication channels.

A more detailed description of the invention follows and is illustrated in the attached drawing.

Fig. 1 illustrates a television transmitting apparatus, involving the invention;

Fig. 2 is a front view and Fig. 3 is a rear view of a portion of the scanning disc of Fig. 1,

Fig. 4 is a section through the disc 3, and

Figs. 5 and 6 are front and side views, respectively, of a portion of a scanning disc with prisms contiguously mounted thereon.

The transmitter of Fig. 1 comprises a source of

light 1, a lens 2 for imaging the source 1 upon an intermediate portion of a rotating disc 3. The intermediate portion of the disc is provided with two rows of spirally arranged apertures 4 and 5.

Two beams of light, projected through the apertures 4 and 5, are focused by the lens 6 upon the surface of the subject or field to be transmitted 7. The light beam projected through the apertures 4 illuminates a series of unit bands or strips of the field, for example the first, third, fifth, etc. Alternate adjacent unit bands or lines of the field, i. e. the second, fourth, sixth, etc., are illuminated by the beam projected through the apertures 5. The two series of apertures are of such number and so arranged that, when the disc has completed a single revolution, the subject 7 has been completely illuminated.

As herein described, the mode of scanning the field of view or subject is the same as that disclosed in application Serial No. 227,649 filed October 21, 1927, by applicant.

Light reflected from the elemental areas, comprising the unit bands illuminated by the light beams supplied through the rows of apertures 4 and 5, respectively, are concentrated by the lens 8 upon a portion of the rotating disc 3 adjacent its periphery.

The beam, constituting the light rays reflected from the elemental areas of the band illuminated by the light supplied through the apertures 4, is focused upon a row of prisms 9, which directs it to a photoelectric cell 10.

The beam comprising the light rays reflected from elemental areas included in the band illuminated by the light passing through the aperture 5, is focused upon a row of prisms 11, by which it is directed to photoelectric cell 12.

The photoelectric cells 10 and 12 are thereby actuated to cause the production of two distinct image currents which respectively vary as the tone values of the elemental areas of the alternate unit bands of the subject 7. Cells 10 and 12 are included in separate circuits 13 and 14, which may each include an amplifier 15 to raise the image current wave to the desired power level.

The respective amplified image currents may be supplied to distinct transmission paths 17 and 18, extending to a receiving station, or to modulators in which they are combined with carrier waves of different frequencies. The distinct image-current carrier modulated waves may be transmitted over separate channels of a carrier line or a radio system.

The sector of the scanning disc 3, shown in Fig. 2, clearly illustrates the relative positions of the rows of apertures 4 and 5 and the rows of prisms 9 and 11.

5 Figs. 3 and 4 illustrate a segment of the disc 3 having the prisms 9 and 11 mounted thereon to effect selective application of the light, reflected from the elemental areas of the respective unit bands of the object, upon the photoelectric cells 10 and 12.

The mode of controlling the application of the beams of reflected light to the respective light sensitive devices is similar to that disclosed in Patent 1,989,618, of H. E. Ives issued Jan. 29, 1935.

15 Preferably the apertures 4 and 5 and prisms 9 and 11, which occupy corresponding positions on the spirals, should be staggered with respect to each other as herein shown. However, they may be contiguous to each other or they may 20 even be merged to constitute a single entity.

The present invention contemplates the use of two or more simultaneously operated channels.

At the receiver, the image currents, incoming over the respective channels, may be applied to 25 separate light sources, and a scanning disc, carrying prisms associated with each aperture similar to that at the transmitting station may be used to direct the scanning light beams to the eye of the observer, so as to scan the produced 30 image in synchronism with the scanning operation at the transmitter. A receiver of this type, which is suitable for the purpose of this invention, is disclosed in the above mentioned Ives patent.

The receiving light sources may be of any well 35 known type adapted to produce a small sized intense spot of light which varies in accordance with the exciting current. A glow lamp, suitable for this purpose, is disclosed in patent of H. W. Weinhardt, issued July 18, 1933.

40 The present invention therefore provides a system in which distinct areas of the subject or field may be illuminated by moving beams of light of high intensity and may be scanned to produce separate image currents which are respectively 45 transmitted over distinct communication channels. Hence it embodies the attendant advantages of beam scanning, as disclosed in the above mentioned application of Gray, and reduction in the frequency range used to transmit the sub- 50 ject or field of view.

What is claimed is:

1. A television system comprising a source of light, a plurality of photoelectric means, apertured means for simultaneously producing a plu-

5 rality of beams of light which traverse different regions of the object, means for simultaneously focusing at different points light reflected from different illuminated regions on said object at any instant, a plurality of optical prisms, and means 10 for successively moving groups of said prisms through said focal points respectively to direct said beams of light to different ones of said photoelectric means.

2. A television system comprising a source of 10 light, a plurality of photoelectric means, apertured means for simultaneously producing a plurality of beams of light which traverse different regions of the object, means for simultaneously 15 focusing at different points light reflected from different illuminated regions on said object at any instant, a plurality of prisms carried by said apertured means which successively moves groups of said prisms through said focal points respec- 20 tively to direct said beams of light to different ones of said photoelectric means.

3. Television transmitting apparatus comprising a scanning disc having a series of light openings, prismatic means at said openings for de- 25 flecting the light passing through one portion of each opening relative to that passing through another portion thereof, means for imaging adjacent unit areas of the transmitted view respectively on said portions and a plurality of photoelectric means arranged to receive the light 30 respectively from said portions.

4. Television transmitting apparatus comprising a scanning disc having a series of elongated light openings, prisms at said openings for re- 35 fracting the light passing through one portion of each opening relative to that passing through another portion thereof, means for imaging respectively on said portions adjacent unit areas of the view being transmitted, and a separate photoelectric device for receiving the light from 40 each of said portions.

5. In television apparatus, a scanning disc having a series of light openings each comprising portions arranged radially with respect to each other, and a pair of prisms at each opening 45 arranged to deflect the light passing one portion with respect to the light passing the other portion.

6. In television apparatus, a scanning disc having a series of light openings and a pair of prisms at each of said openings arranged radially with 50 respect to each other, whereby all of the light passing said openings is refracted by one prism or the other.

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