May 16, 1944. J. L. BAIRD 2,349,071

METHOD OF AND APPARATUS FOR PRODUCING IMAGES BY TELEVISION IN STEREOSCOPIC RELIEF

Filed Sept. 16, 1942 2 Sheets-Sheet 1

FIG. 1.

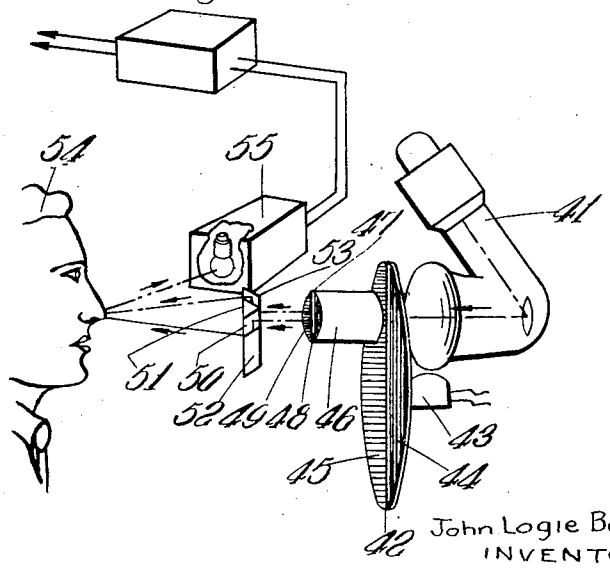
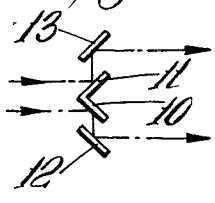


FIG. 3.



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Fig. 4.

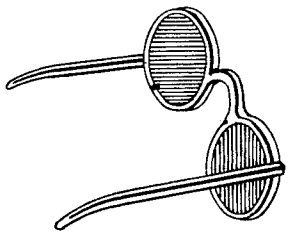
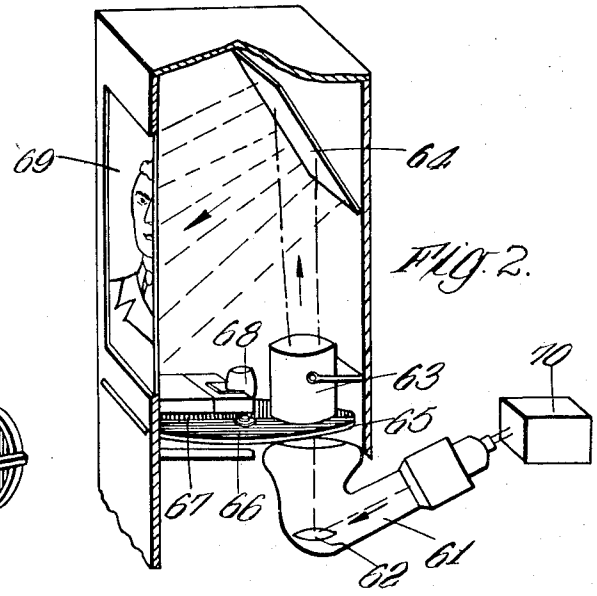


Fig. 2.



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Patented May 16, 1944 2,349,071

UNITED STATES PATENT OFFICE

2,349,071

METHOD OF AND APPARATUS FOR PRODUCING IMAGES BY TELEVISION IN STEREOSCOPIC RELIEF

John Logie Baird, London, England

Application September 16, 1942, Serial No. 458,486
In Great Britain July 11, 1941

1 Claim. (Cl. 178—6.5)

This invention relates to television and has for its object to provide an improved method of and apparatus for producing images in stereoscopic relief.

In order to obtain the required stereoscopic effect the two positions from which the object is scanned are chosen to correspond to the natural effect due to viewing an object by the right and left eye respectively of an observer and the reproduced images are presented in rapid sequence in such a manner that they are viewed respectively by the corresponding eyes of an observer.

The method according to the present invention consists in producing images by television in stereoscopic relief which comprises scanning the object from two positions spaced apart to correspond to left and right eye views to give the required stereoscopic effect, reproducing the images thus obtained in superposed sequence on substantially the same field area and obscuring the images corresponding to the left eye views from the right eye of the observer and those corresponding to the right eye views from the left eye of the observer.

A further feature of the invention consists in the provision of suitable apparatus for carrying out the above described method.

In order that my invention may be readily understood and carried into effect it is hereinafter described with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic view of a preferred form of television transmitting apparatus according to my invention,

Figure 2 is a diagrammatic view of receiving apparatus particularly suitable for use with the transmitting apparatus shown in Fig. 1.

Figure 3 is a detail view of means for providing two separate positions from which to effect scanning.

Figure 4 is a detail view of means for viewing the images at the receiver so that they will appear in stereoscopic relief from any position.

The transmitting apparatus shown in Figure 1 comprises the cathode ray tube 41 a colour filter disc 42 arranged to be rotated by means such as an electric motor 43 and having two differently coloured sections 44 and 45 for example orange-red and blue-green, a lens 46 having at one end a fixed colour filter 47 having an orange-red section 48, and a blue-green section 49 corresponding to the sections 44 and 45 of the disc 42 and each covering one half of the lens 46. Mirrors 50, 51, 52 and 53 are arranged between the lens 46 and the object 54. The mirrors 50 and 51 are each arranged at an angle of 45° to the axis of the lens 4, the two meeting along a vertical line at right angles to the axis of the lens in proximity to the lens.

The mirrors 52 and 53 are arranged facing the mirrors 50 and 51 and parallel to them so that after the scanning beam of light has traversed the lens 46 it will be divided, the beam of light from one half of the lens being reflected on to the object from the mirrors 50 and 52 facing that half of the lens and the beam of light from the other half will be reflected on to the object from the mirrors 51 and 53. Thus two images of the object will be transmitted to the means of converting the light reflected from the object into electrical impulses. The mirrors 52 and 53 are spaced the required distance apart so that these two images will correspond to the respective view of the object as seen by the right and left eyes of an observer.

With this apparatus the filter disc 42 and the colour filter 47 co-operate to act as a shutter to cause the object to be scanned in sequence by beams of light reflected by the mirrors 50—52 and 51—53 respectively.

The orange-red segment 48 only passes the orange-red beam from one half of the lens 46 while the blue-green segment 49 only passes the blue-green beam from the other half of the lens. The orange-red beam is reflectd by the mirrors 50 and 52 on to the object while the blue-green beam is reflected by the mirrors 51 and 53 on to the object. These beams from the respective halves of the lens 46 are diffusely reflected by the object in succession on to the light sensitive cells, which are connected to an electric circuit which responds to the electrical variations of the photo-electric cells and transmits the corresponding electrical impulses to the receiver. As this forms in itself no part of the present invention it is diagrammatically indicated by a single photo-electric cell at 55 and a transmitter apparatus at 56.

The receiving apparatus shown in Figure 2 comprises a cathode ray tube 61 having a fluorescent screen 62 and arranged to operate in the same manner as the cathode ray tube 21 of Figure 2. A lens 63 is arranged to project the image from the fluorescent screen 62 onto a mirror 64. A colour disc 65 having an orange-red section 66 and a blue-green section 67 corresponding to the sections 44 and 45 of the disc 42 at the transmitter, is arranged between the fluorescent screen 62 and the lens 63. The disc 65 is arranged to be rotated by an electric motor

68 in synchronism with the disc 42. The mirror 64 reflects the images onto a screen 69. The circuit for applying the electrical impulses received from the transmitter to the cathode ray tube 61 is similar to that circuit 22 of Figure 2 and is therefore merely indicated at 70 as it forms no part in itself of the present invention.

The arrangement described enables this stereoscopic effect to be obtained by a number of observers in different positions by providing each observer with spectacles having different coloured glasses, for example a right glass 71 coloured orange-red and a left glass 72 coloured blue-green as indicated in Figure 4, to correspond with the filter disc 65 at the receiver and the fixed filter 47 at the transmitter. Thus the orange-red eye piece passes the orange-red images and cuts out the blue-green images while the blue-green eyepiece passes the blue-green images and cuts out the orange-red images so that a coloured picture in stereoscopic effect will be seen. The orange-red and the blue-green images, corresponding to respective scans by the respective eyes are projected in such rapid sequence on the same field area that, although each is only seen by the corresponding eye of the observer, they appear as a complete colour picture in stereoscopic relief.

In the examples described above the moving spot type of transmitter has been described but the apparatus is not limited to any particular form of transmitter and it is equally applicable to any form of flood light transmission, suitable light sources then replacing the photoelectric cells and a flood light transmitter (for example a photoelectric mosaic type transmitter or an electron camera) replacing the cathode ray tube.

I claim:

In television apparatus means at the transmitter for scanning the object from two different positions spaced apart to correspond to left eye and right eye views respectively, a rotatable transparent disc having substantially one half of its area of one colour and the other half of a different colour, said disc being arranged so that the respective halves intercept the scanning light in sequence as the disc is rotated, a lens for focussing the light passing through the coloured disc on to the object, a second transparent disc having its respective halves coloured to correspond to the respective halves of the said rotatable disc, said disc being fixed in close proximity to the said lens between the same and the object with its respective halves covering the respective halves of the lens, a pair of mirrors arranged in close proximity to the fixed coloured disc between said disc and the object with their adjacent edges meeting on the line coinciding with the diametrical line dividing the colours in the fixed disc at right angles to the axis of the scanning beam of light projected by said lens, said mirrors facing outward at an angle to deflect the light to opposite sides, a second pair of mirrors arranged to receive the light from the respective mirrors of the first pair and direct it on to the object whereby the object will be exposed in sequence to light of one colour from one half of the aforesaid lens corresponding to a left eye view and to light of the other colour from the other half of the said lens corresponding to a right eye view.

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