Nov. 18, 1930. J. L. BAIRD 1,781,800

TELEVISION APPARATUS AND THE LIKE

Filed April 8, 1929

Fig. 1.

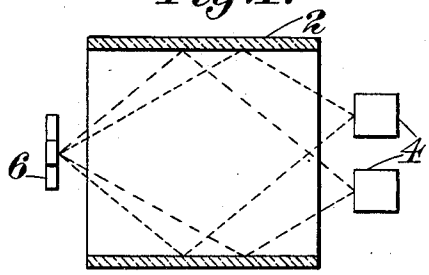


Fig. 2.

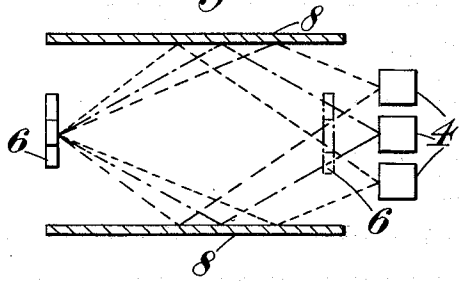
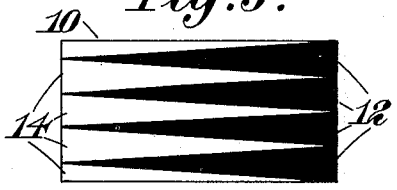


Fig. 3.



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UNITED STATES PATENT OFFICE

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TELEVISION APPARATUS AND THE LIKE

Application filed April 8, 1929, Serial No. 353,633, and in Great Britain April 16, 1928.

This invention is for improvements in or relating to television apparatus and the like of the kind in which the object, whereof an image is to be transmitted, is explored by illuminating it by means of a spot of intense light which is traversed over it, the light being reflected back from the object on to light-sensitive cells.

According to the present invention, there is provided in television and like apparatus of the kind above set forth, the combination with the object and the light-sensitive cells of reflecting surfaces disposed to the side of or around the direct path of light from the object to the cells, for the purpose of concentrating on to the cell's light which is scattered laterally from the object.

Preferably, the reflecting surfaces aforesaid are so arranged as to permit movement of the object towards or away from the light-sensitive cells whilst maintaining substantially the same total transmission of light from the object to the cells.

According to another feature of this invention, the reflecting surfaces aforesaid are so arranged or constructed that the parts more remote from the light-sensitive cells reflect a greater portion of the light incident on them, than the parts nearer to the cells. This effect may be obtained by vignetting the reflecting surfaces with non-reflecting portions as hereinafter described.

The accompanying drawings represent diagrammatically in Figures 1, 2 and 3, various embodiments of the present invention.

Referring first to Figure 1, a series of reflectors 2 may be arranged as a box-like structure with the reflecting surfaces directed inwards, and the two ends of the box open. A light-sensitive cell or a group of such cells are placed at or near one of the open ends of the parts as indicated at 4, and the object whereof an image is to be transmitted is placed at or near the other end of the box, as shown at 6. A certain proportion of the light incident on the object 6 is reflected directly to the light-sensitive cells 4, but it will be seen that the provision of the reflecting surfaces 2 surrounding the direct path of light just mentioned ensures that light which is scattered in a lateral direction from the object 6 is reflected towards the cells 4, so that a very much larger portion of the light reflected from the object reaches the cells 4 and thereby a stronger signal is obtained for transmission to the receiving station.

In the arrangement shown in Figure 2, provision is made for movement of the object 6 relatively to the light-sensitive cells 4. When the object is in the position shown in dotted lines near the cells, practically all the light reflected from it will reach the cells. Reflecting surfaces, indicated at 8, extend away from the cells in the direction in which it is desired to move the object, and it will be seen that when it is moved in this direction, for example to the position shown on the left-hand side, the amount of light reflected from the object 6 and directly incident on the cells 4 will be greatly reduced. The light, however, which is scattered laterally from the object will be received on the reflectors 8 and, by a single or repeated reflection, will ultimately fall on the cells 4. In this way, it is ensured that the total amount of light reflected from the object and falling on the cells remains substantially uniform and is not subject to the diminution in accordance with the ordinary square law which applies to the light reflected from the object directly on to the cells. It is thereby rendered possible for the object to move towards and away from the cells during the transmission of the image without producing any serious variation in the brilliance of the image. The reflectors in Figure 1 and in Figure 2 may be mirrors or any other surfaces, such, for example, as a whitened surface which reflects a large proportion of the light incident upon it. The number and exact position of these reflectors may be varied at will; thus, for example, they may constitute a closed tubular or box-like structure, as in Figure 1, or one or two screens may be used at the sides or above and below the direct line joining the object to the cells. Furthermore, the reflecting surfaces may be used in such a manner as to give an increased effect on the cells from any one particular part of the object, or

at certain distances of the object away from the cells, by arranging the reflecting surfaces so that the object approaches nearer to them or subtends a more effective reflecting angle with them at the particular position.

Figure 3 illustrates a modified form of screen in which its controlling effect is increased. This result is obtained by vignetting the reflecting surface with a non-reflecting surface outwardly away from those parts which are nearer the cell. The screen 10 may be a mirror or have a surface which is highly reflecting, but portions of it, indicated as a series of triangles 12, are made of a non-reflecting character. When the object is situated near the right-hand end of this reflector, only a small proportion of light incident on the screen 10 will be reflected, since a greater part of the area is non-reflecting. When, however, the object is moved towards the left, the reflecting surfaces 14 adjacent the object become a greater proportion of the total and thereby a larger amount of the light reflected from the object is reflected towards the light-sensitive cells, compensating to any desired degree for the change in the distance of the object from the cells.

It will be understood that whilst plain reflecting surfaces have been illustrated, they may be of any desired shape, either curved or polygonal, and any desired number of them may be used.

I claim:—

1. In a television system, the combination, with light-sensitive means responsive to light reflected from an object, of reflecting surfaces disposed adjacent the path of light from the object to the light-sensitive means, said reflecting surfaces being adapted to concentrate onto said light-sensitive means light scattered laterally from said object.

2. In a television system, the combination, with light-sensitive means responsive to light reflected from an object, of reflecting surfaces disposed around the path of light from the object to the light-sensitive means, said reflecting surfaces being adapted to concentrate onto said light-sensitive means light scattered laterally from said object.

3. In a television system, the combination, with light-sensitive means responsive to light reflected from an object, of reflecting surfaces defining a region wherein said object is free to move, said surfaces being adapted to concentrate substantially all of the light reflected from said object onto the light-sensitive means.

4. In a television system, the combination, with light-sensitive means responsive to light reflected from an object, of reflecting surfaces disposed adjacent the path of light from the object to the light-sensitive means, said reflecting surfaces having reflecting efficiencies diminishing with diminishing distance to the light-sensitive means.

5. In a television system, the combination, with light-sensitive means responsive to light reflected from an object, of reflecting surfaces vignetted with non-reflecting portions which diminish in area from the ends near the light-sensitive cells towards the other ends.

In testimony whereof I affix my signature.

JOHN LOGIE BAIRD.