

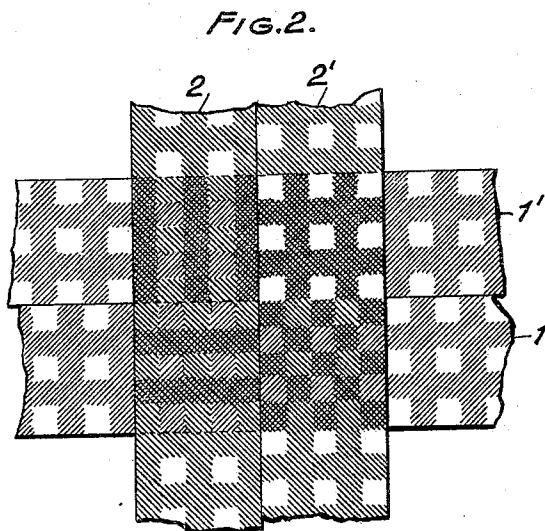
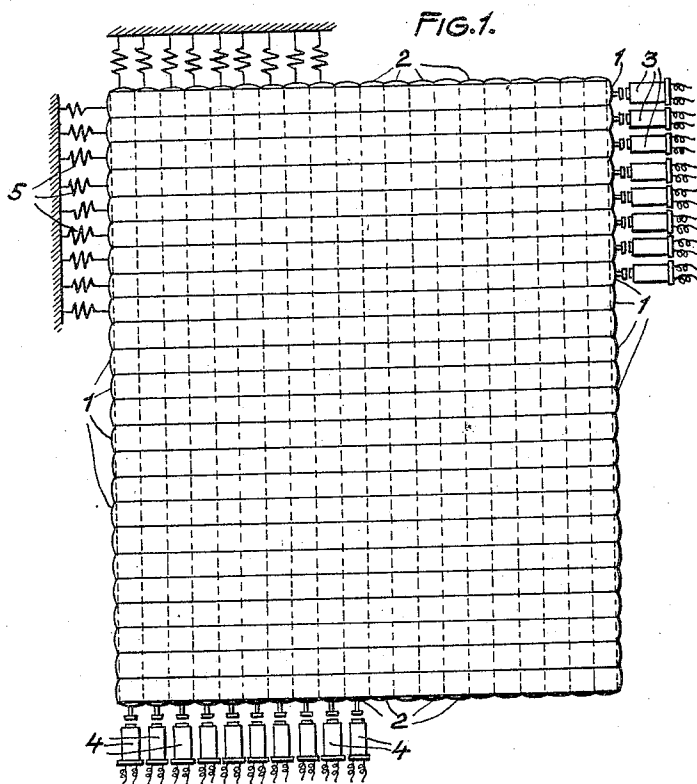
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PICTURE REPRODUCING DEVICE FOR TELEVISION

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PICTURE REPRODUCING DEVICE FOR TELEVISION

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The invention relates to a picture reproducing device for television, and consists in providing in a screen of the dot, line, checkerboard or similar type two superimposed screen strips acting as light relay and being made of celluloid, cello, glass or the like, the said strips or sheets permitting the light of an independent constant illuminant to pass through when the dark screen units cover one another and stopping the passage of the light when a displacement takes place to the extent of the width of a screen unit.

The invention makes it possible to impart to the reproduced picture a degree of brightness limited only by the intensity of the illuminant available, since there is no restriction as to the choice of an illuminant. Furthermore, the control of the screen requires little mechanical power and is extraordinarily reliable.

When an ordinary screen of the dot, line or checkerboard type is employed, the necessity arises to render each unit or element displaceable independently of all others. As the number of units amounts to several thousands, the apparatus becomes too complex for the reason that each element requires a special electromagnet or another system of motion, the number of which renders the area of image expensive and complicated. Moreover, the driving systems cover the path of the light and produce troublesome dark spots on the reproduced picture.

According to the invention, these drawbacks are eliminated by the employment of two superimposed line or cross screens. The area of image is divided into two groups of screen rows disposed vertically to one another, and the excitations are guided stripwise over the adjacent strips, while one of the two screen strips is displaced once during the passage of the strip and the strips arranged vertically thereto are moved separately during the impulse for each unit. The displacement of a single strip will not brighten the picture, but brightening will be effected if a counterstrip disposed vertically to the first strip is displaced. At the crossing of the two screen strips the picture will therefore be brightened to the extent of a

unit only during the displacement of the second strip. The advantage connected with this arrangement is that each single strip may be moved by a mechanism located outside the image area and that the number of these driving mechanisms may be reduced to a fraction of that normally required. Instead of a cross screen, line screens may be used having lines that are inclined 45° relative to the direction of motion of the screen, or jagged screens may be employed. In either case, however, the lines of one of the screen strips must be twice as broad as those of the other to prevent brightening at the displacement of only one strip.

By way of example, one form of the invention is illustrated in the accompanying drawing, in which Figure 1 is a top view of the image reproducing area with two screen strip systems having the form of a ruler; and Fig. 2, a view of the strips on an enlarged scale.

The area of image is divided in two coordinate directions into strips. The strips 1 are, for example, displaceable in horizontal direction and the strips 2, vertically disposed to the strips 1, in vertical direction. The strips are displaced by means of the electromagnets 3 and 4 which draw the strips against the action of the springs 5 which return the strips into their initial position after magnetic induction ceases. The image point excitation takes place, for instance, from top to bottom along a strip 2 and always passes over the adjacent strips 2 also. During the passage of the strip 2, the latter remain continually in its drawn down position while, according to the speed of the optical excitation passing over the strip 2, the strips 1 are moved successively transversely over the strips 2.

In their initial position the screens of the strips 1 and 2 are arranged relative to one another in such a way that no transparent places are produced and the lines of one screen cover the transparent lines of the counterscreen. The sole displacement of the strip 2 does not result in the brightening of the image by means of the constant powerful illuminant, such as an arc lamp, since the

displacement of the longitudinal screen strips constitutes merely a displacement within themselves. On the other hand, the motion of each strip will produce a brightening of the area common to both screens, i. e., the area of crossing which may be represented by a single screen unit or a group formed thereof; the latter case is preferable, since the brightening of the entire area may be effected by a smaller motion of the strips. In Fig. 2, the upper right-hand field where the strips $1' \times 2'$ cross is brightened while the fields $1' \times 2$, 1×2 and $1 \times 2'$ are dark. The construction of strips affords the added advantage that current of any intensity may be used for moving the screen row covering a row of units lying in one line and being displaced first, as the proper modulation of the picture is effected by the strips disposed transversely thereto. Image current is therefore required merely for actuating these latter strips, while current of any origin may be used for actuating the first one. It is probably the most practical arrangement to construct the screen rows like rulers and to arrange them vertically to one another, though the rulers may be inclined relative to one another also. The image reproducing area may possess the size of the original or act as diapositive through which an illuminant of suitable intensity throws the picture on to the area of projection. In this case a small image area will do, and an area of projection of any size may be obtained by enlarging during projection in the manner applied by the known projectors so that transmission or projection becomes possible as in films, with the difference, however, that the image area remains stationary but changes its contents.

The screen device may be employed also as light relay in connection with a picture reducing device, such as a Wipkov disc, a mirror wheel or the like. For this purpose two superimposed screen strips of low weight and made, for example, of celluloid are moved relative to one another. For example, one of the two strips is moved by an electromagnet, the excitation of which is controlled at to intensity by the subsequently arriving intensified image currents. By providing a large number of screen lines it becomes possible to obtain a large free passage section for the pencil of rays of the constant illuminant by means of a slight displacement of the screen strips. In the order of the picture units worked by the transmitter, the screen in the receiver is shifted more or less, proportionally to the luminous intensity of the analogous image points in the sender, so as to let through more or less light and to control in this manner the current of light sent through the screen by a powerful constant illuminant in the proper order and intensity. In order to reduce still more the

working stroke of the strips, each of the two strips may be controlled by a special magnet so as to produce the same cross section of light passage at a slighter motion of the screen strips.

I claim:—

1. Picture reproducing device for television, comprising two superimposed strips of screen composed of a plurality of units and adapted to be displaced in different directions, means for displacing the said screen strips, means for returning the said strips to their initial position, and an illuminant, the light of the said illuminant passing through the said strips when the dark screen units are covered and being stopped when the said screen strips are displaced for the width of a unit.

2. In a device according to claim 1, a picture reproducing area subdivided into elements arranged analogous to the worked points of the transmitted image, each of the said elements consisting of a pair of screen strips.

3. In a device according to claim 1, a picture reproducing area consisting of two rows of screen strips in the form of rulers and arranged vertically to one another, a cross screen carried by the said screen rulers, and means for producing and guiding optical excitations successively by rows or strips, one of the said screen rulers being permanently displaced during the excitation of a row and the motion of all rulers arranged transversely to the permanently displaced one taking place successively according to the excitation of each individual unit.

4. In a device according to claim 1, a picture reproducing area consisting of rows of screen strips in the form of rulers and adapted to be displaced by rows in accordance with optical motion impulses, the ruler through which the impulse has passed being moved according to the unit excitations and the motion of each crosswise ruler taking place successively according to the excitation of each unit.

5. In a device according to claim 1, a picture reproducing area consisting of rows of movable screen strips in the form of rulers, means for exciting the said rows, one of the said rows remaining displaced for the length of the excitation of a row, lines in the said screens inclined relative to the direction of displacement of the rulers, the lines of one group of rulers exceeding in width those of the other to the extent of their mutual displacement in order to prevent the production of screen portions adapted to let light pass through during the displacement of the said ruler remaining displaced for the length of the excitation of a row.

6. In a device according to claim 1, screen elements having a zigzag form.

7. In a device according to claim 1, a pic-

ture reproducing area adapted to act as a diapositive, a projection area, means for throwing the image through the said picture reproducing area on to the said projection area, the said picture reproducing area being smaller than the said projection area, and means for enlarging the image area.

8. Picture reproducing device for television, comprising two superposed screen strips adapted to be displaced in different directions and each composed of transparent strips covered with a plurality of parallel dark lines, so that light conducting slits are produced, and so that the device is transparent when the strips are so displaced as to cause their lines to register, and is opaque when the strips are so displaced as to cause the dark lines of one screen strip to register with the light gaps of the other screen strip.

20 In testimony whereof I affix my signature.

LUDWIG TSCHÖRNER.

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