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H. KNOBLAUCH ET AL
TELEVISION TRANSMITTER TUBE

2,220,964

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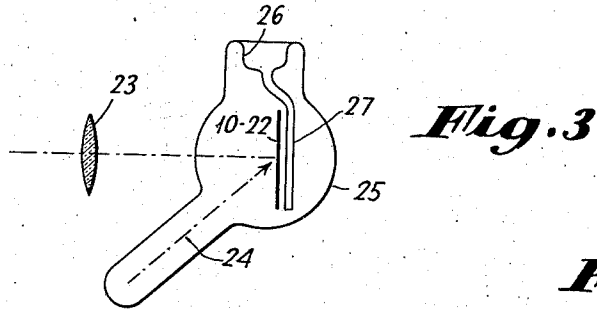


Fig. 3

Fig. 1

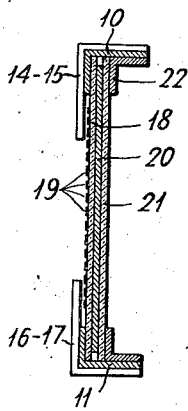


Fig. 2

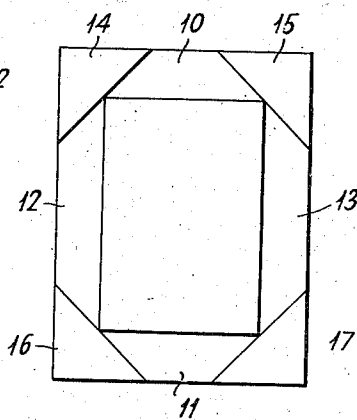


Fig. 5

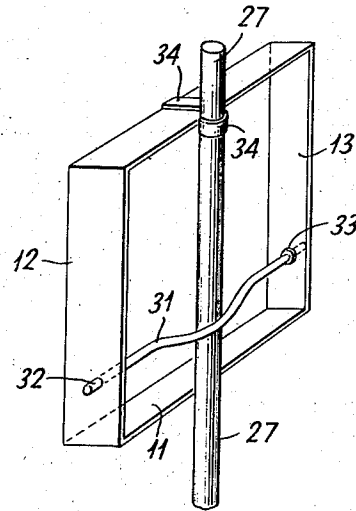


Fig. 4

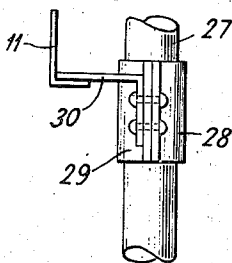


Fig. 6

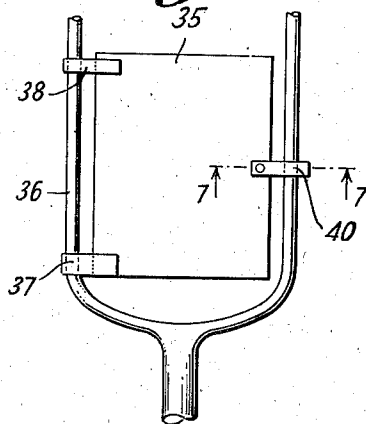
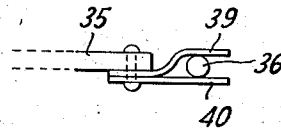


Fig. 7



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TELEVISION TRANSMITTER TUBE

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2 Claims. (Cl. 250—153)

This invention relates to improvements in the construction of television picture transmitter tubes of the "Iconoscope" type wherein a photo-sensitive mosaic is used and wherein the mosaic is systematically scanned by a cathode ray beam.

When such tubes are used, difficulties are occasionally encountered in the production of undistorted signals from the signal plate of the tube because of the fact that the mosaic screen may have become warped or distorted in the course of the thermal treatments to which the tube is subjected during its manufacture. The mosaic screen should be even and flat in order that clear reproductions of the image may be possible. When the mosaic screen is warped and not flat, it is difficult to properly and sharply focus the image to be televised upon the mosaic, with the result that proper details and definition of the image to be transmitted to a distant point is prevented or reduced.

Now, according to this invention, with a view to obviating the said difficulty, the mosaic screen of the television transmitter tube is so constructed as to be inherently free from twist and warp, that is, it is made in such a way that even when subject to an intense heat treatment it will stay planar and even; inside the vacuum vessel it is rigidly secured only at one point.

A number of exemplified embodiments of the invention shall be explained more fully in what follows by reference to the schematic representations of the drawing, wherein:

Figures 1 and 2 show respectively a sectional and plan view of one improved form of construction of the mosaic.

Figure 3 shows, somewhat schematically, the location of the mosaic in the transmitter of tube.

Figure 4 shows in detail one manner in which the mosaic may be attached to the supporting rod.

Figures 5 and 6 show modifications in the manner of attaching the mosaic to the support member.

Figure 7 shows a detail of Figure 6 along lines 7—7.

Unwarped construction of the mosaic screen, for example, may consist as shown in Figures 1 and 2 being two views at right angles to each other. In building up the frame of the screen of angular sheet strips 10 to 13 are used, to which are attached triangular pieces of sheeting 14 to 17 which are joined to strips 10 to 13 by spot welding, for example. Into the resulting frame is inserted a mica lamination 18 which

supports particles or spherules of silver representing the elements of the mosaic screen, and which are shown at 19 on the left-hand side of the mica sheet 18, while on the right side is an unbroken metallic coat 20 which constitutes what is known as the signal plate. Superposed upon the latter is another sheet of mica, 21, and this is connected with the frame comprising parts 10 to 17. This, for instance, may be effected by pressure-connecting small sheet-metal angle pieces 22 in the four corners of the frame and, if desired, they may also be placed in the middles of the sides of the frame against the mica lamination 21, connection with the parts 10 to 13 being established by spot welding, for instance. The metal layer 20 which serves as the signal plate must, of course, be provided with a lead or conductor; this has not been indicated in detail in the drawing.

Before going into the details of how to secure the screen illustrated in Figures 1 and 2 inside the vacuum vessel, it shall be explained by reference to Figure 3 that the screen 10 to 22, upon which the image to be televised may be projected by the photo-optic objective or lens system 23, and which may be scanned or explored by the aid of the cathode-ray pencil or beam 24, is mounted inside the vacuum vessel. The cathode ray beam 24 is generated by a conventional electron gun structure which produces a narrow beam of electrons. Furthermore, the cathode ray beam is deflected by means of electrostatic or electromagnetic means in order that the screen 10 to 22 may be scanned. Since the structure of cathode ray guns and beam deflecting elements is old in the art, these elements are not specifically shown in the drawing. The glass vessel or bulb 25 has on its top what is called a cup-shaped lead-in depression or bay as indicated at 26 to which a glass rod 27 is welded or fused.

Now, to this glass rod may be attached the warp-proof screen in a manner, for example, as shown in Figure 4, by using a clip or two strips of sheet metal laid around the rod as indicated at 28 and 29. To these strips is attached an angle piece 30, which, in turn, is attached as by spot welding to the side of the screen 11. A rigid connection is established between the screen and the glass rod by securing the angle piece 30 to the strips 28 and 29 by rivets or by spot welding. Now, if the dimensions of the screen should undergo an expansion during the thermal treatment, the screen itself will stay perfectly even.

Another mode of securing the screen to the

support is illustrated in Figure 5. Attached to the glass rod 27, which, for the sake of clarity of representation, is shown only in part, there is rigidly connected a piece of wire 31 which is welded to the frame member 12 at one end thereof as shown in front in Figure 5. The other end of the wire is permitted to slide in a bore or opening 33 in the frame member 13. The frame member 10 is attached by means of a strip of sheet metal 34 to the glass rod 27 in such a manner that sliding and also a certain amount of rotation are feasible. Now, in the course of the thermal treatment any expansion of the screen in the direction of the piece of wire 31 will result only in a small amount of sliding of the frame member 13 upon the wire 31, and rotational stresses are relieved by a slight turn about the axis A—B. An extension of the screen in the direction of the rod 27 causes sliding of the sheet-metal strip 34 or the wire 31 on the rod 27, and also in this case the smooth and even form of the screen will be preserved.

Figures 6 and 7 illustrate an arrangement which is particularly suited for the so-called bi-lateral or double sided image scanners, that is to say, for image scanners in which the charge or electrical pattern is produced by the means disposed upon one face of the mosaic screen, while the neutralizing or releasing pencil, which may be a pencil or beam of cathode-rays or of light-rays, is caused to impinge upon the opposite face of the same screen. The screen 35 which comprises mosaic elements which extend all the way through the screen (being here shown only schematically) is rigidly attached on a U-shaped glass rod 36 only at one corner 37 by the aid of a clip. At the left-hand top corner is provided a clip 38 which is capable of a sliding movement in vertical direction, and upon the right-hand side of the screen a single fork-shaped guide device is provided; the latter being capable of a sliding motion in the direction of the right-hand side of the screen 35 as well as in a direction at right angles thereto. In Figure

7 is shown a fork-shaped supporting member which comprises two strips of sheet metal 39, 40, which are welded or riveted fast to the screen 35 and which span the glass rod 36.

It is claimed:

1. In a television transmitter tube, a planar light-sensitive rectangular electrode, an electron beam source, means for scanning said electrode with said beam, means for supporting the electrode in the tube which includes a pair of support arms for the electrode, means for rigidly securing a point along one edge of the electrode to one of the support arms, means for slidably securing another point along said one edge of the electrode to the said one supporting arm to permit movement of the electrode relative to and along the said arm at the last mentioned point, and means for slidably securing the opposite edge of the electrode to the other arm to permit bi-lateral movement thereof with respect to the said other arm whereby unequal changes in the dimensions of the electrode and the support arms may be alleviated, said opposite edge being supported solely by said slidably securing means.

2. A television transmitter tube, a rectangular light-sensitive mosaic surface, an electron beam source, means for scanning said electrode with said beam, means for supporting the surface of the tube which includes a U-shaped support member, means for securing one edge of the surface to one of the arms of the support member at a plurality of points, at least one of said securing means being rigid, whereas the remaining securing means are slidable, and means for slidably securing the opposite edge of the surface to the other arm of the support member for bi-lateral movement with respect to the last mentioned arm, whereby expansional and contractional stresses in the mosaic surface may be alleviated, said opposite edge being supported solely by said slidably securing means.

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