

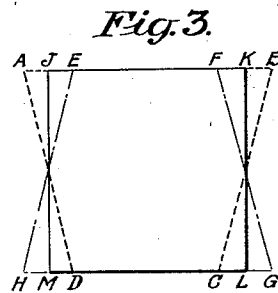
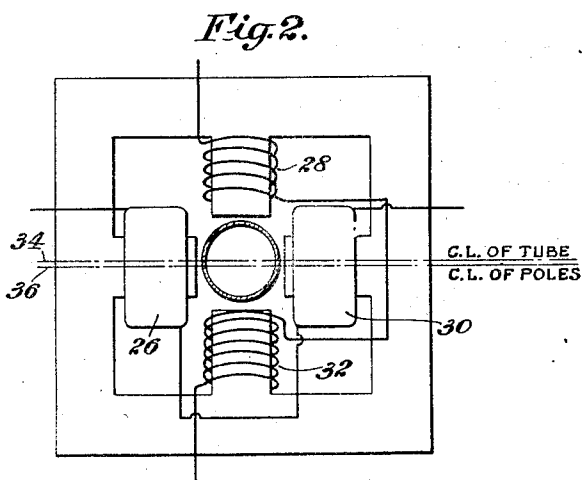
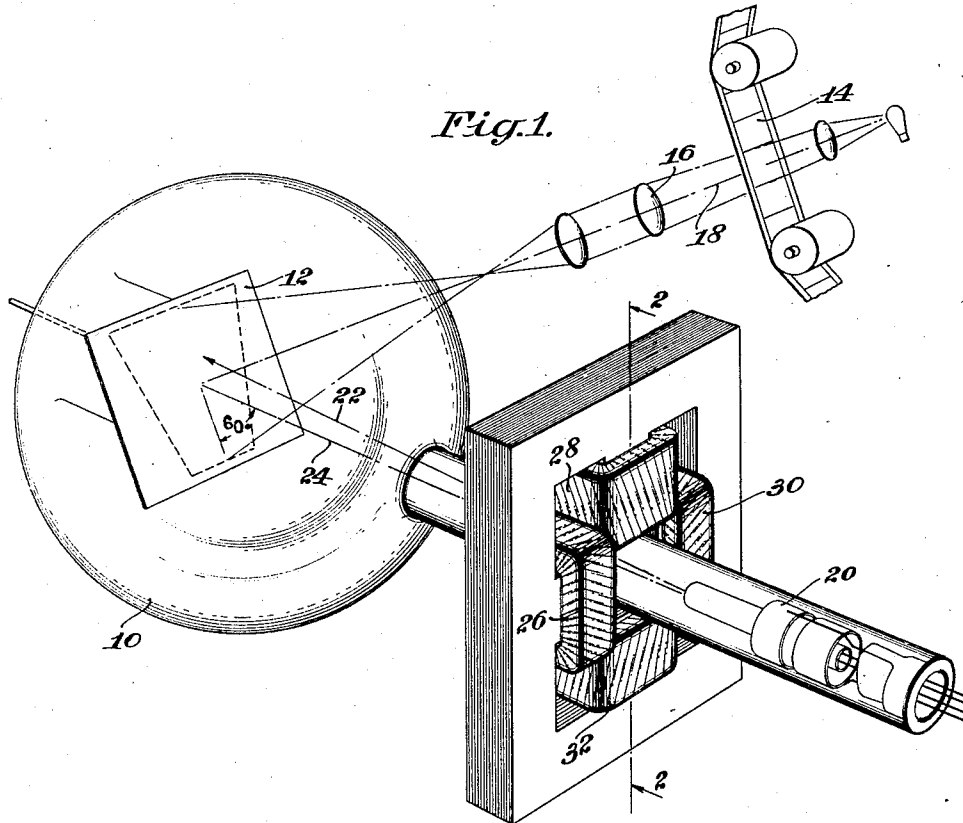
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CATHODE RAY APPARATUS

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CATHODE RAY APPARATUS

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3 Claims. (Cl. 250—27.5)

My invention relates to improvements in television systems.

In television systems embodying a cathode ray tube at the transmitting station, and in which the tube comprises a photosensitive mosaic screen on which an image of an object is projected, and which is scanned by a cathode ray, it has been found to be advantageous to project the image on the same side of the screen which is scanned by the ray. When this is done, the axis of the optical system for projecting the image is preferably perpendicular to the screen, but the axis of the so-called gun for developing and directing the ray of electrons is, of necessity, disposed at an acute angle to the screen. On account of this arrangement, the outline of the area scanned by the ray has a keystone shape rather than the desired rectangular shape. This distortion of the scanned pattern is manifested by a substantial and corresponding distortion of the reproduced image at the receiving station, the reproduced image being also the shape of a keystone, with the vertical lines inclined to each other.

With the foregoing in mind, it is one of the objects of my invention to provide an improved television system of the character referred to wherein the keystone distortion is corrected.

Other objects and advantages will hereinafter appear.

In accordance with my invention, in a cathode ray tube of the character referred to, the ray is deflected in part by an electromagnetic field wherein the flux is disposed in planes substantially perpendicular to the axis of the electron gun, and wherein the distribution of the flux density on one side of the axis of the gun is different than such distribution on the other side of the axis. In this manner, the ray is caused to scan a keystone area in an intermediate plane perpendicular to the axis of the electron gun, whereby the ray is caused to scan the surface of the inclined screen structure over a substantially rectangular area.

More particularly, in accordance with my invention, the ray is deflected horizontally by electromagnetic coils disposed respectively on opposite sides of the axis of the electron gun, the turns of one coil being substantially greater in number than the turns of the other coil.

My invention resides in the improved apparatus of the character hereinafter described and claimed.

For the purpose of illustrating my invention, an embodiment thereof is shown in the drawing, wherein

Figure 1 is a perspective view, partly diagrammatic, of a television transmitting apparatus embodying my invention;

Fig. 2 is a simplified, sectional view, the section being taken on the line 2—2 in Fig. 1; and

Fig. 3 is a diagrammatic view illustrative of the principle of operation.

With reference to Fig. 1, the reference numeral 10 designates a cathode ray tube provided with some suitable form of mosaic, photosensitive screen structure 12 upon which an image of the object is projected. The screen structure 12 comprises, generally, a supporting plate provided on the front surface thereof with a great number of minute metallic elements insulated from each other and from the plate, and each provided with a coating of photosensitive material.

An image of the object, shown as being in the form of a moving picture film 14, is projected upon the photosensitive surface by a suitable optical system 16, the axis 18 of which is perpendicular to the screen structure 12.

An electron gun 20, of any suitable construction, operates to develop a ray 22 of electrons, and to direct the ray at the photosensitive surface of the screen 12, the axis 24 of the tube being inclined at an acute angle of about 60° to the plane of the screen 12.

For the purpose of causing the ray 22 to scan the photosensitive surface of the screen 12, sawtooth current waves at different frequencies are caused to flow through the coils 26, 28, 30 and 32. The coils 26 and 30 operate to deflect the ray vertically, while the coils 28 and 32 operate to deflect the ray horizontally.

In the constructions proposed heretofore, the ray 22 scanned the screen 12 over a keystone area ABCD as shown in Fig. 3, and as further illustrated in Fig. 1. This is accounted for by the fact that the screen 12, in these constructions, was disposed at an acute angle to the axis 24 of the electron gun.

For the purpose of correcting for this action, I propose to make the coil 32 of a substantially greater number of turns than the coil 28, so that the deflecting field below the center line 34 of the tube will be substantially stronger than the field above this line. By this arrangement, the tendency is for the ray 22 to scan a keystone area EFGH in a plane perpendicular to the axis 24 of the gun. Therefore, when the ray strikes the screen 12, it will scan the surface thereof over a substantially rectangular area JKLM.

In cathode ray tubes of this type constructed

heretofore, there is also a distortion of the vertical deflection which causes the pattern on the inclined screen 12 to be spread out over the upper half thereof and crowded at the bottom half. That is, there is uneven spacing between the horizontal lines, the spaces between adjacent lines increasing from the lower edge of the scanned area to the top edge thereof. In my improved apparatus, I correct for this distortion by causing the vertical deflecting field to increase as the beam is deflected vertically, toward the portion of the screen where the lines are crowded and this is done by supporting the vertical deflecting coils 26 and 30 with the center line 26 of the poles thereof offset or spaced downwardly from the center line 30 of the tube 10.

It will be understood that various modifications within the conception of those skilled in the art are possible without departing from the spirit of my invention or the scope of the claims.

I claim as my invention:

1. Cathode ray apparatus comprising screen structure, means for developing a ray of electrons and directing the ray at one side of said structure, and means for deflecting said ray to cause the same to scan said structure, said deflecting means comprising coils disposed respectively on opposite sides of the axis of said ray-developing means, the turns of one coil being substantially greater in number than the turns of the other coil.

2. Cathode ray apparatus comprising screen structure, means for developing a ray of electrons and directing the ray at one side of said

structure, the axis of said ray-developing means being inclined at an acute angle to said structure, and means for deflecting the ray to cause the same to scan a keystone area in a plane perpendicular to said axis whereby the ray is caused to scan the surface of said structure over a substantially rectangular area, said ray-deflecting means comprising coils disposed respectively on opposite sides of the axis of said ray-developing means, the turns of one coil being substantially greater in number than the turns of the other coil.

3. Cathode ray apparatus comprising screen structure, means for developing a ray of electrons and directing the ray at one side of said structure, the axis of said ray-developing means being inclined at an acute angle to said structure, and means for deflecting the ray to cause the same to scan the surface of said structure; said deflecting means comprising a first set of complementary deflecting devices disposed respectively on opposite sides of said axis, the center line of said devices being substantially perpendicular to and spaced from said axis, and a second set of complementary deflecting devices in the form of electromagnetic coils disposed respectively on opposite sides of said axis with their center line substantially perpendicular to said first-named center line, the turns of one coil of the second set being substantially greater in number than the turns of the other coil of the second set.

ARTHUR W. VANCE.