

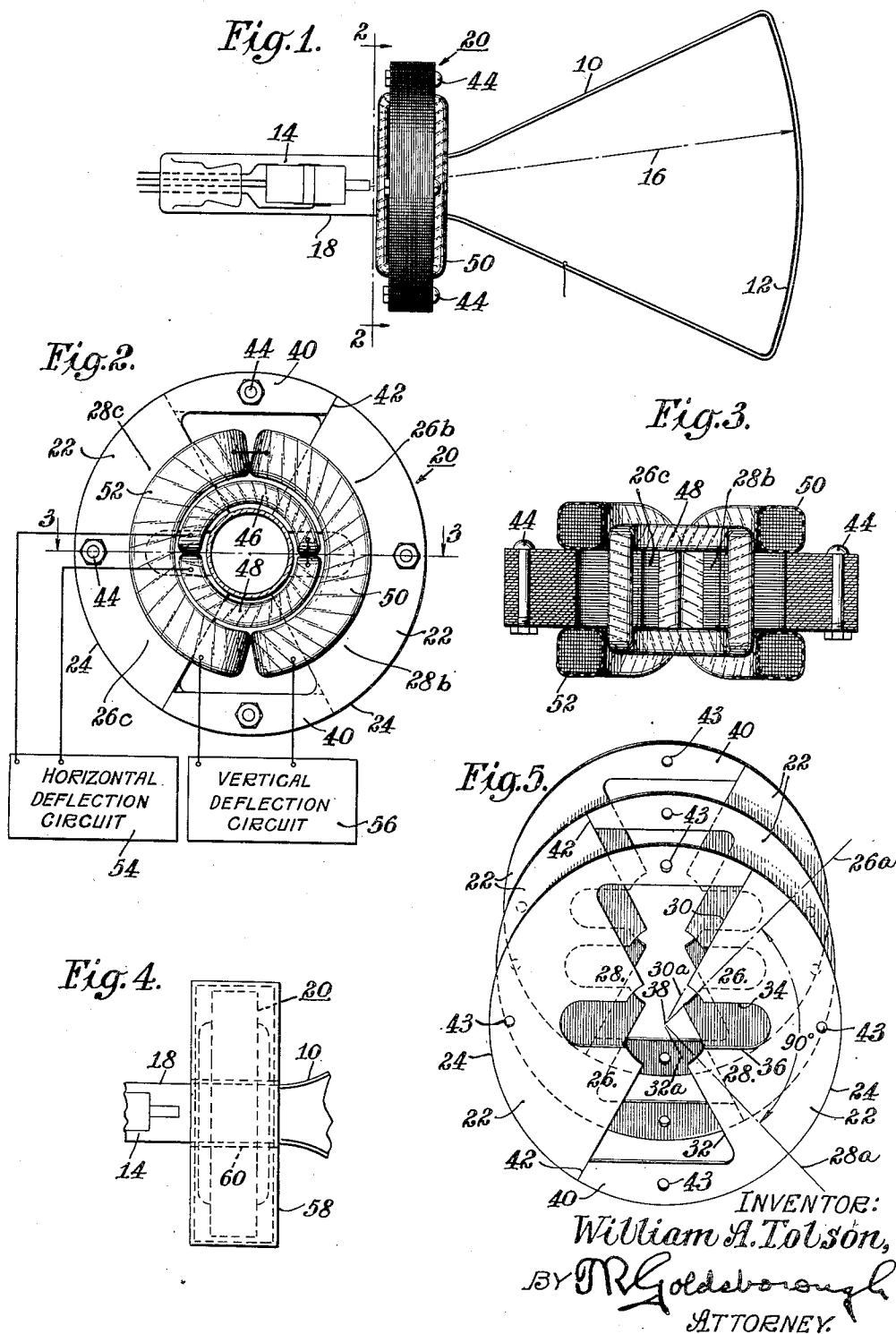
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DEFLECTION DEVICE FOR CATHODE RAY TUBES

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DEFLECTION DEVICE FOR CATHODE-RAY TUBES

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2 Claims. (Cl. 250—27.5)

My invention relates to improvements in deflection devices for cathode-ray tubes.

Cathode ray tubes of the type used for television reception comprise a fluorescent screen at one end of the tube and means at its other end for deflecting a ray of electrons and directing the ray at the screen. The electron ray is deflected simultaneously in both vertical and horizontal directions. For this purpose, it has been found to be advantageous to use two pairs of deflecting coils mounted on a common yoke of permeable material and provided with pole pieces on which the coils are disposed.

Deflection devices of the general character referred to have been found to be effective, but the deflecting efficiency thereof has been found to be relatively low. This has been attributed to the fact that the coupling between corresponding deflecting coils is only of the order of three percent, by the fact that the vertical pole pieces unavoidably act as a leakage path for the horizontal deflecting flux, and by the fact that the horizontal pole pieces, in like manner, act as a leakage path for the vertical deflecting flux.

With the foregoing in mind, it is one of the objects of my invention to provide an improved deflection device for cathode ray tubes in which electromagnetic coils are employed for both vertical and horizontal deflection of the ray, and which has a deflecting efficiency substantially higher than that of the various constructions proposed heretofore.

Other objects and advantages will hereinafter appear.

In accordance with my invention, the deflecting coils are disposed on a common yoke provided with two pairs of pole pieces. The coils for horizontal deflection of the ray are disposed between the center of the yoke and the coils for vertical deflection of the ray, and each of the coils is disposed about two of the pole pieces which are adjacent to each other in the direction circumferentially about the center of the yoke.

My invention resides in the improved construction 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 side elevational view of a cathode ray tube for television reception, embodying my improved deflecting device;

Fig. 2 is an enlarged sectional view, the section being taken on the line 2—2 in Fig. 1;

Fig. 3 is a sectional view, the section being taken on the line 3—3 in Fig. 2;

Fig. 4 is a simplified, elevational, fragmentary view, showing the manner in which my improved deflection device can be completely encased; and

Fig. 5 is an elevational view illustrative of the manner in which the core laminations of my improved deflection device are assembled.

In Fig. 1, the reference numeral 10 designates a cathode ray receiver tube of conventional construction provided at its large end with a fluorescent screen 12 and with means in the form of a "gun" 14 for developing a ray 16 of electrons and directing the same at the screen. The electron gun is disposed in the neck 18 of the cathode ray tube upon which my improved deflection device, designated generally by the reference numeral 20, is mounted.

The yoke of my improved deflection device is comprised of a plurality of similar laminations 22 of permeable material. The outer edge 24 of each lamination is disposed on a half circle, and is provided with two pole portions 26 and 28. The respective side edges 30 and 32 of the pole pieces 26 and 28 lie respectively on the radii 30a and 32a from the center 38 of the circle. The respective adjacent edges 34 and 36 of the pole pieces are parallel to each other and are substantially shorter than the outer edges 30 and 32.

The respective center lines 26a and 28a of the pole portions are spaced angularly from each other 90°, as represented.

Each lamination is provided with a circumferential extension 40 from the base of the pole portion 28. The end or outer edge 42 of the extension 40 lies substantially on the diameter of the half circle, as shown.

Each lamination is provided with holes 43 which receive bolts or rivets for holding the parts together.

In making up the yoke, the laminations are stacked as shown in Figs. 1, 2, 3 and 5, to form a laminated yoke provided with pole pieces 26b, 28b, 26c and 28c. Each of the laminations of the yoke is comprised of two of the laminations 22, as more clearly shown in Fig. 5, these being reversed with respect to each other and placed together in complementary relation as shown to complete the circle. In making the succeeding laminations of the yoke, the complementary pairs of laminations 22 are placed in position so that the extensions 40 at either the bottom or top, as viewed in Fig. 5, extend to the right and left alternately. When the stack is complete, therefore, the extensions 40 are interleaved, and the

holes 43 are aligned to receive rivets or bolts 44 which hold the parts together.

The electron ray 16 is deflected horizontally by a pair of coils 46 and 48. The coils 46 and 48 are disposed between the center of the yoke and a pair of coils 50 and 52 for deflecting the ray vertically.

The coil 46 is disposed about the adjacent pole pieces 26b and 28c, and the complementary coil 48 is disposed about the adjacent pole pieces 26c and 28b.

The coil 50 is disposed about the adjacent pole pieces 26b and 28b, and the complementary coil 52 is disposed about the adjacent pole pieces 26c and 28c.

In the operation of my improved deflection device, a circuit 54 generates a saw-tooth current wave at a relatively high frequency and causes this wave to pass through the coils 46 and 48 which may be connected in series, as indicated. A circuit 56 generates a saw-tooth current wave at a relatively low frequency and causes this wave to pass through the coils 50 and 52 which may be connected in series, as indicated. In this way, the ray 16 is caused to scan the screen 12 over a rectangular area.

In Fig. 4 my improved deflection unit 20 is shown enclosed in a casing 58 having a central cylindrical wall 60 for receiving the neck 18 of the tube 10. The casing 58 may be made of cardboard, and the spaces between the walls thereof and the deflection unit are filled with a suitable insulating and waterproof material. In this way, the deflection device is completely encased and protected.

Deflection devices made in accordance with my invention have been found to be approximately 2.25 times as effective for deflection of the electron ray, under similar operating conditions, as the various devices constructed heretofore and employing coils for both vertical and horizontal deflection.

While my improved deflection device has been described more in association with cathode ray tubes for television reception, it will be understood that it is adaptable for use with any cathode ray tube for deflecting the ray in two directions with coils.

While but one embodiment of my invention has been disclosed, 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. A cathode ray deflection device comprising a yoke of magnetic material provided with two pairs of pole pieces, said pole pieces being disposed about and extending inwardly toward the center of said yoke, the pole pieces of each pair being disposed respectively on diametrically opposite sides of said center, and two pairs of ray-deflecting coils, the coils of one pair being disposed between said center and the coils of the other pair, each of said coils being disposed about two of the pole pieces which are adjacent to each other in the direction circumferentially about said center, each of said coils in one pair also being disposed about two adjacent pole pieces each of which has disposed thereabout a different coil of the other pair.

2. A cathode ray deflection device comprising a substantially ring-shaped yoke of magnetic material having a plurality of slot-like openings disposed about the center of said yoke and extending at substantially right angles to the plane of said ring, a pair of deflecting coils, one of said deflecting coils disposed in at least two of said slots, the other of said deflecting coils disposed in at least two of said slots and positioned diametrically opposite said first coil, a second pair of deflecting coils so positioned inside said first pair that at the center of the yoke the magnetic field produced by one pair of coils is substantially at right angles to the magnetic field produced by the other pair of coils, one coil of said second pair being disposed in at least two other of said slots in overlapping relation with said first pair of coils, and the other coil of said second pair being disposed in at least two of said slots and positioned diametrically opposite said last mentioned coil in overlapping relation with said first pair of coils.

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