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CATHODE RAY TUBE

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Fig. 1

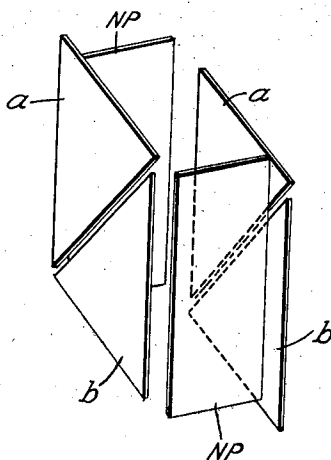
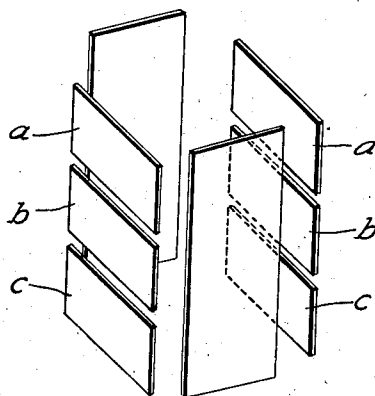


Fig. 2



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CATHODE RAY TUBE

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6 Claims. (Cl. 250—27.5)

This invention relates to cathode ray tubes for use for oscillograph and like purposes and has for its object to provide a cathode ray tube wherein it is possible to control the electron beam in accordance with a plurality of separate wave forms in a simple and satisfactory manner.

When a cathode ray tube of ordinary and usual construction, wherein two mutually perpendicular ray deflecting means (generally constituted by pairs of electrostatic deflecting plates) are provided, is employed for oscillograph purposes, it is usually necessary to utilize one of the deflecting means, e. g., one pair of plates to provide the time base. It may, however, be desired to control the deflection of the ray or beam by means of two or more waves which may be of different frequencies and amplitudes and which may occur in different circuits which for practical reasons cannot be interconnected and the present invention provides a cathode ray tube for use for oscillograph purposes whereby such control may be accomplished.

According to this invention a cathode ray tube is provided with means for deflecting the ray in one direction and a plurality of means, each capable of deflecting the ray in a direction different from said first mentioned direction.

The invention is illustrated in the accompanying schematic drawing.

In a simple form of construction wherein the invention is applied to a cathode ray tube of the type in which electrostatic deflection is resorted to, the tube is provided with a pair of deflecting plates arranged about the mean path of the ray as in the usual way and, in place of the usual second pair of plates at right angles to the first pair there is provided a plurality of pairs of additional deflecting plates at right angles to the first mentioned pair each pair of the additional plates being capable of deflecting the ray in a direction at right angles to the direction of deflection producible by the first mentioned pair of plates. The additional plurality of pairs of plates may together occupy approximately the same area as the second pair of plates, in the usual well known cathode ray tube construction, and may be arranged in a generally similar way; in other words the said additional plurality of plates may be in effect constituted by sub-dividing each plate of the second pair of plates in the usual arrangement into a plurality of separate smaller plates. For example, as illustrated in Figure 1 the first pair of deflecting plates (which are not sub-divided) may consist of plates NP of the ordinary rectangular form and the other plates

may be triangular and together occupy substantially the areas and positions that would be occupied by a second pair of similar rectangular plates in the ordinary usual tube construction; in other words each plate in the said second pair of rectangular plates in the usual construction, may be divided, for example, as shown in Figure 1, diagonally, into two plates, *a*, *b*. Instead of dividing a rectangular area diagonally as shown in Figure 1 it may be divided, for example, into two, or, as shown in Figure 2, three (or more) plates *a*, *b*, *c*, by parallel divisions running at right angles to the mean direction of the ray, i. e., each small plate in the plurality of pairs of plates replacing the second pair of plates in the usual construction, may be of rectangular form.

When a cathode ray tube as above described is intended for use in the ordinary way, the plates in the additional plurality of pairs of plates may be connected together in such manner as electrically to constitute the usual second pair of plates, but, if it be desired to examine a plurality of waves these connections are broken and the wave from each separate circuit is applied to a different pair of the aforementioned plurality of pairs of plates, the circuits for these pairs of plates being thus kept separate. The first pair of plates, i. e., that pair which is not subdivided, serves to provide the time base for all the waves to be examined, and for this reason the frequencies of the waves to be examined should stand in multiple relationship to one another, since otherwise the time base will not be correct for all of them.

The invention is, of course, not limited to the use of electrostatic deflection since electrostatic or electromagnetic or both methods of deflection, may be employed.

In order that each pair of plates in the additional plurality of pairs will exert, for a given applied potential, a similar deflecting action on the ray, the deflecting potentials should be applied to the individual deflecting plates in such manner that the mean line of electrostatic force passing between each pair intersects the mean path of the ray at a common point; for example, if the additional plurality of plates comprises, as shown in Figure 2, three pairs of plates arranged side by side in a direction parallel to the mean path of the ray, one deflecting potential wave would be applied across the middle pair of plates, a second wave across the plate nearest the cathode on one side of the ray and the plate most remote from the cathode on the opposite side of the ray while the third potential wave would be applied

across the remaining pair of plates. Alternatively, the additional plurality of pairs of plates may consist of a pair of rectangular plates each of which is surrounded by a hollow rectangular plate in turn surrounded by a further rectangular plate, and so on, all these plates lying in one or the other of a pair of planes and all being of the same area. This form of construction is not illustrated since it is thought that it will be clearly understood from the preceding description.

Having thus described the invention, what is claimed is:

1. A cathode ray tube comprising a first set of beam deflecting electrodes for deflecting a beam generated within the tube along a predetermined path and a second set of beam deflecting electrodes arranged within the area bounded by said first named set of deflecting electrodes and supported perpendicularly thereto, at least one of said second set of beam deflecting electrodes including a plurality of independent sections.

2. The electrode structure for a cathode ray tube claimed in claim 1 wherein said sectional electrode includes a plurality of rectangular shaped electrode elements.

3. The electrode arrangement for cathode ray tubes claimed in claim 1 wherein said sectional electrode includes a pair of triangular shaped electrodes.

4. A cathode ray tube wherein an electron beam is developed and adapted to impinge upon a

fluorescent screen which comprises a pair of beam deflecting electrodes supported within the tube to deflect the beam in one plane and a set of beam deflecting electrodes supported within the boundary area provided by said pair of beam deflecting electrodes, said set of beam deflecting electrodes being positioned perpendicularly with respect to said pair of electrodes and said set of beam deflecting electrodes comprising a multiplicity of independent sections to which deflecting voltages may be independently applied.

5. A cathode ray tube comprising a first means for deflecting the ray developed within the tube in one direction, and a second plurality of means each capable of deflecting the ray in a direction different from the first mentioned direction of deflection, said last named means being supported within an area bounded by the first named means and comprising a plurality of electrodes each including a plurality of separate sections.

6. A cathode ray tube comprising a pair of electrostatic deflecting plates, and a further plurality of pairs of electrostatic deflecting plates positioned substantially perpendicularly with respect to the first named pair of plates, said second plurality of pairs of electrostatic deflecting plates each comprising a plurality of separate sections and each arranged to occupy substantially an area within the boundary provided by said first named pair of electrostatic deflecting plates.

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