July 4, 1950 A. PINCIROLI 2,513,742

OSCILLOGRAPHIC CATHODE-RAY TUBE WITH CYLINDRICAL FLUORESCENT SCREEN

Filed Aug. 5, 1948

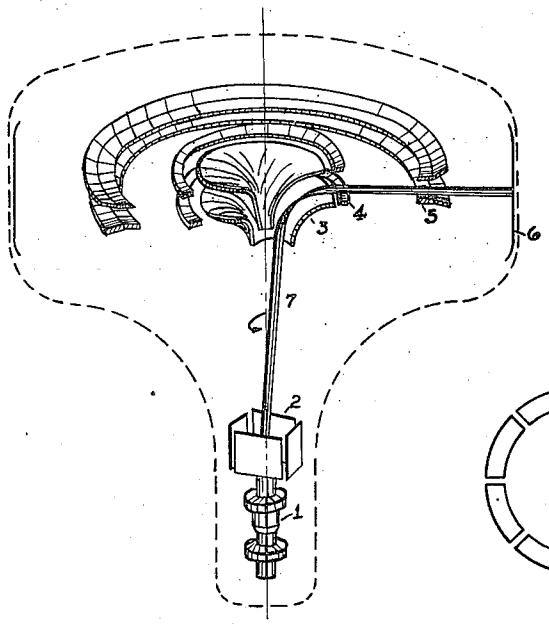


Fig 1

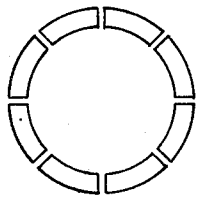


Fig 2

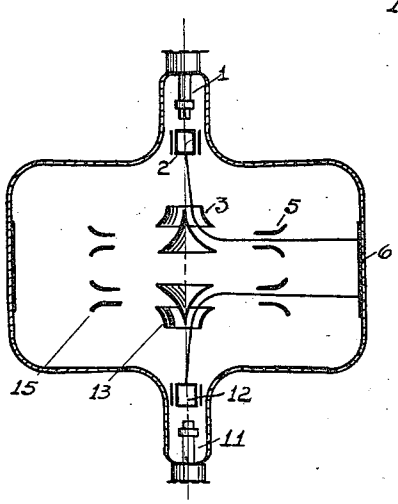


Fig 3

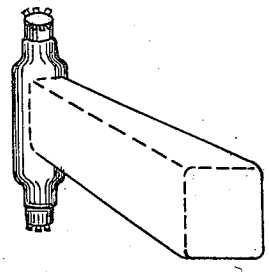


Fig 4

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OSCILLOGRAPHIC CATHODE-RAY TUBE WITH CYLINDRICAL FLUORESCENT SCREEN

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15 Claims. (Cl. 315—24)

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The present invention relates to an oscillographic cathode ray tube with fluorescent screen.

According to this invention, the fluorescent screen has the shape of a cylindrical surface. This surface may be extended as to cover completely the cylinder or may be extended along only a segment of it. The time base is originated by a rotating field acting upon an electron beam created as usual by an electron gun. The electron beam is further bent to a direction approximately perpendicular to the surface of the screen by an adequate electric field.

The time base is produced without saw toothed voltages; it requires sinusoidal electric quantities, voltages or currents having a lower frequency than that of the voltage to be examined. The apparatus, object of the invention, also allows the simultaneous recording of more than one oscillographic curve, of quantities having the same frequency or having frequencies multiple from one another. The obtained time base is particularly extended. The apparatus allows also for the simultaneous examination of a large number of electric quantities, voltages or currents with their oscillographic figure projected along separate segments of the cylindrical screen. It is also possible to arrange in the same vacuum tube two separate electron beam systems in order to obtain two different time bases. Finally there is no interaction between time base system and electron beam deflecting system.

The new invention will be better understood with the aid of the accompanying figures.

Figure 1 shows the tube completely in partial section; Figure 2 shows a modification of the deflecting system; Figure 3 shows a tube with two simultaneous time bases; Figure 4 shows a tube having its fluorescent screen extended only along a small segment of the cylinder.

Considering Figure 1, the electron gun is indicated by 1. The rotating field is created by the electrodes 2 fed two by two by two voltages lagging 90 electric degrees from one another in the usual way. This rotating field is then an electric field. A magnetic field can also be adopted or even the superposition of a magnetic field upon an electric field. The electron beam 7 is bent by means of two corolla shaped electrodes and finally it is deflected by means of two deflecting ring shaped electrodes 5. The rotating and deflected electron beam hits the fluorescent screen 6 extending along the cylindrical part of the tube. On the same figure two ring shaped electrodes 4 located near the corolla shaped electrodes 3

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are represented forming an electric cylindrical lens; this feature is non-essential.

The deflecting electrodes 5 may be subdivided, according to this invention, in many sections, each section being isolated from one another and corresponding to a separate electric quantity to be examined, as Fig. 2 shows.

According to the invention, one may have two separate electron beam systems operating simultaneously in the same tube as Figure 3 shows. The numerals 1 and 11 indicate the electron guns. The numerals 2 and 12 indicate the system creating the rotating field; in this case the rotating field is a magnetic one created by magnetic coils, as indicated in the figure, in the usual way. The numerals 3 and 13 indicate the corolla shaped bending electrodes. The numerals 5 and 15 indicate the deflecting electrodes and finally the numeral 6 indicates the fluorescent cylindrical screen.

So far a cylindrical screen covering 360 angular degrees has been indicated but one may limit the extension of the fluorescent screen along a small angular segment and the tube has the external aspect indicated by Figure 4.

I claim:

1. An oscillographic cathode ray tube having a cylindrical fluorescent screen, the control of the electron beam being operated by an electrostatic deflecting system of two concentrical electrodes and having its time base extended along the fluorescent cylindrical screen by means of a rotating electric field created by a system of electrodes connected to a source of polyphase voltages and being symmetrically placed with respect to the axis of the tube along which an electron gun is projecting an electron beam; the said electron beam being bent normally to the axis of the tube by means of corolla shaped electrodes symmetrically located with respect to the axis of the tube; the said electron beam being deflected by two deflecting ring shaped electrodes, concentric and essentially parallel to one another symmetrically located with respect to the axis of the tube; the vacuum tube being itself cylindrically shaped and bearing the fluorescent screen along its cylindrical wall.

2. An oscillographic cathode ray tube having a cylindrical fluorescent screen, the control of the electron beam being operated by an electrostatic deflecting system of two concentrical electrodes and having its time base extended along the fluorescent cylindrical screen by means of a rotating magnetic field created by a system of coils traversed by polyphase currents symmetri-

cally placed with respect to the axis of the tube along which an electron gun is projecting an electron beam; the said electron beam being bent normally to the axis of the tube by means of corolla shaped electrodes symmetrically located with respect to the axis of the tube; the said electron beam being deflected by two deflecting ring shaped electrodes, concentric and essentially parallel to one another symmetrically located with respect to the axis of the tube; the vacuum tube being itself cylindrically shaped and bearing the fluorescent screen along its cylindrical wall.

3. An oscillographic cathode ray tube having a cylindrical fluorescent screen, the control of the electron beam being operated by an electrostatic deflecting system of two concentrical electrodes and having its time base extended along the cylindrical fluorescent screen by means of a rotating electric field superimposed upon a rotating magnetic field, the electric field being created by electrodes symmetrically placed with respect to the axis of the tube and energized by polyphase voltages and the magnetic rotating field being created by coils symmetrically placed with respect to the axis of the tube and traversed by polyphase currents symmetrically placed with respect to the axis of the tube along which an electron gun is projecting an electron beam; the said electron beam being bent normally to the axis of the tube by means of corolla shaped electrodes symmetrically located with respect to the axis of the tube; the said electron beam being deflected by two deflecting ring shaped electrodes, concentric and essentially parallel to one another symmetrically located with respect to the axis of the tube; the vacuum tube being itself cylindrically shaped and bearing the fluorescent screen along its cylindrical wall.

4. An oscillograph cathode ray tube as described in claim 1 and where at the corolla outlet a cylindrical electric lens is placed formed by two parallel concentric rings.

5. An oscillograph cathode ray tube as described in claim 2 and where at the corolla outlet a cylindrical electric lens is placed formed by two parallel concentric rings.

6. An oscillograph cathode ray tube as described in claim 3 and where at the corolla outlet a cylindrical electric lens is placed formed by two parallel concentric rings.

7. An oscillograph cathode ray tube according to claim 1 the deflecting electrodes being subdivided in many circular sectors electrically insulated and energized by different sources.

8. An oscillograph cathode ray tube according to claim 2 the deflecting electrodes being subdivided in many circular sectors electrically insulated and energized by different sources.

9. An oscillograph cathode ray tube according to claim 3 the deflecting electrodes being subdivided in many circular sectors electrically insulated and energized by different sources.

10. An oscillograph cathode ray tube having two co-axial electrobeam systems as indicated in claim 1, the corresponding two electron guns being located at the top and at the bottom respectively of the tube and the time axes being two parallel circles on the cylindrical screen.

11. An oscillograph cathode ray tube having two co-axial electron beam systems as indicated in claim 2, the corresponding two electron guns being located at the top and at the bottom respectively of the tube and the time axes being two parallel circles on the cylindrical screen.

12. An oscillograph cathode ray tube having two co-axial electron beam systems as indicated in claim 3, the corresponding two electron guns being located at the top and at the bottom respectively of the tube and the time axes being two parallel circles on the cylindrical screen.

13. An oscillograph cathode ray tube having an electron beam system as described in claim 1 and having its fluorescent cylindrical screen extending only along a segment of the cylinder.

14. An oscillograph cathode ray tube having an electron beam system as described in claim 2 and having its cylindrical fluorescent screen extending only along a segment of the cylinder.

15. An oscillograph cathode ray tube having an electron beam system as described in claim 3 and having its cylindrical fluorescent screen extending only along a segment of the cylinder.

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