

June 12, 1934.

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1,962,873

CATHODE RAY OSCILLOGRAPH

Filed Aug. 11, 1933

FIG-1

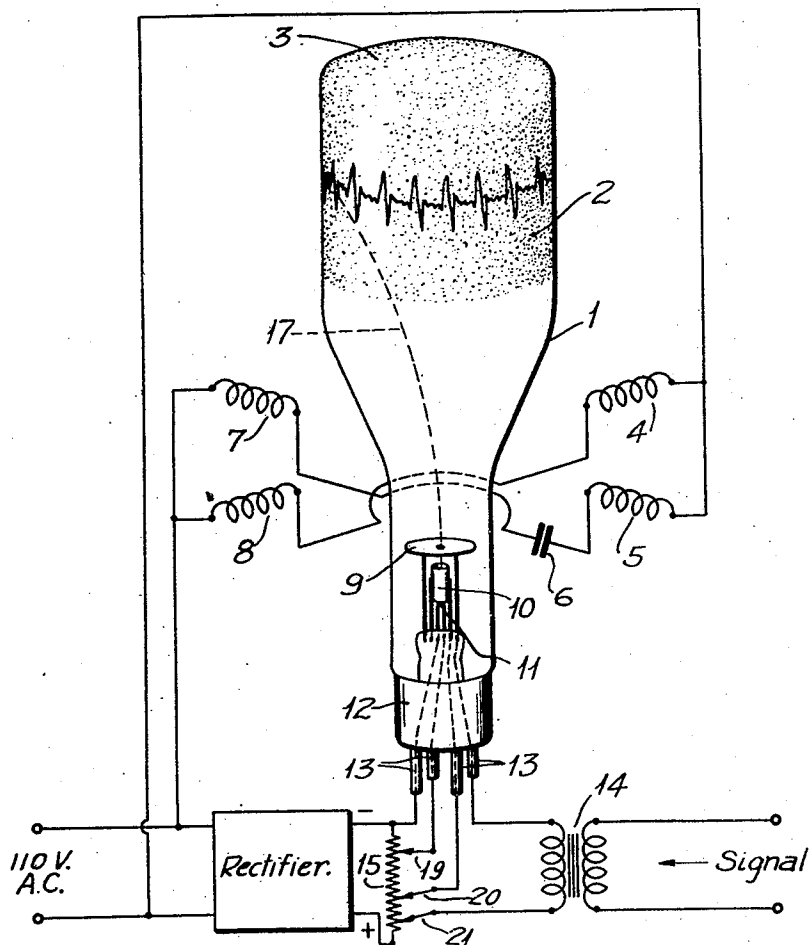
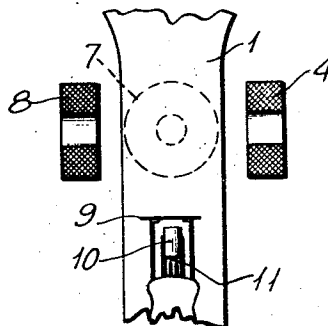


FIG-2



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1,962,873

CATHODE RAY OSCILLOGRAPH

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Application August 11, 1933, Serial No. 684,657

3 Claims. (Cl. 171-95)

My invention pertains to oscillographs and relates in particular to that type of such devices as are known as Braun tube or cathode ray oscillographs.

5 An object of my invention comprises producing a simplified and effective cathode ray oscillograph.

Another object comprises producing a cathode ray oscillograph in which distortion of the portrayed wave is eliminated.

10 A further object comprises producing an oscillograph in which the necessity for complicated linear time mechanisms is eliminated.

A still further object comprises producing an oscillograph in which a voltage wave may be portrayed in cylindrical coordinates in a closed continuous manner on a surface adapted to be viewed simultaneously by a number of observers.

20 A still further object comprises producing an oscillograph in which the time axis extends linearly and continuously around a cylinder or on a spherical surface to eliminate the distortion present in oscillographs as now used.

I accomplish the above and other novel and desirable features which will hereinafter be pointed out and described by providing a novel form of cathode ray oscillograph in which an electron stream is caused to trace a voltage wave in cylindrical or spherical coordinates continuously and in closed configuration upon a fluorescent coating applied to the walls of a cathode ray tube.

30 In the drawing accompanying and forming a part of this specification, Fig. 1 illustrates diagrammatically one embodiment of my cathode ray oscillograph showing the circuit diagram for operating the same.

Fig. 2 is a partly sectioned, broken view of the same showing the preferred disposition of the coils for rotating the electron stream.

Referring now to the drawing, there is provided a partially exhausted vitreous envelope which is preferably constructed of glass, formed as shown in Fig. 1 with a portion thereof in the form of a cylinder of uniform diameter, the end 3 of which is closed and is in the form of a spherical section. The cylindrical portion and the end portion are coated with a coating 2 of zinc sulphide or other well known material which fluoresces upon bombardment by electrons. The envelope preferably contains mercury vapor.

55 There is provided within the envelope 1 a cathode 11 which may be any well known source of electrons either direct or indirectly heated, a focussing cylinder 10 and the usual perforated an-

ode 9 with connections therefor respectively to the usual contact prongs 13 maintained in an insulating base 12 attached to the envelope 1.

The radius of the spherical section 3 of the envelope is approximately equal to the distance 60 from the end of the tube to the anode 9 and in commercial embodiments which have been constructed and successfully operated, this distance is approximately 12".

There is provided a series of inductance coils 65 or electromagnets 4, 5, 7, and 8 which are positioned at right angles to each other about the neck of the envelope 1 as shown in Fig. 2 and connected in the form of a bridge. Inductances 4 and 8 are connected in series and to a source of 70 alternating current, while inductances 5 and 7 are connected in series through a condenser 6 and across the source of alternating current supply. This arrangement provides a well known method of splitting a single phase alternating current 75 into two phase, thereby obtaining a two phase rotating magnetic field which is utilized electromagnetically through the inductance coils or electromagnets 4, 5, 7 and 8 to rotate the electron stream within the envelope 1.

80 Direct current operating potentials are supplied to the filament 11, focussing cylinder 10 and anode 9 from a rectifier connected to the alternating current source as shown in Fig. 1 and provided with a potentiometer 15 from which 85 taps 19, 20 and 21 are taken to supply respectively the operating potentials and currents to the cathode, focussing cylinder, and anode. The signal to be portrayed is impressed upon the anode 9 through transformer 14 as shown. The 90 direct current potential applied to the anode is adjusted by potentiometer tap 21 to a value sufficient to cause the electron stream 17 to impinge upon a desired portion of the coating 2 on the envelope 1. By varying the anode voltage 95 the fluorescent spot may be placed upon any desired portion of the coating and as the beam is rotated by the inductances 4, 5, 7, and 8, a luminous line or linear time axis is drawn continuously around the cylindrical portion of envelope 100 1 in closed configuration or in closed configuration on the spherical portion 3. The radius of curvature of the beam 17 is a function of the velocity of the electron stream, if the field supplied by inductances 4, 5, 7, and 8 is steady, hence 105 a low velocity stream will be directed to the lower portion of the fluorescent cylinder and a high velocity stream to the upper portion of the cylinder or to the spherical portion. Varying potentials of the voltage wave of the signal to be 110

The inductances 4, 5, 7, and 8 are preferably located at right angles to each other and as shown in Fig. 2. These inductances may be as shown air cored, or they may be provided if desired with laminated cores. The split phase beam rotating mechanism being external of the envelope 1, may be easily adjusted with respect to the beam and also with respect to the inner-relation of the inductances to provide the optimum rotation of the beam. Obviously, if the velocity of the electron stream is increased, the voltage wave may be portrayed in closed circular configuration and wholly in spherical coordinates upon the spherical portion 3 of the envelope 1, or, if desired, the voltage wave may be portrayed partially on the cylindrical walls of the envelope 1 and on the spherical portion 3 in combined cylindrical and spherical coordinates, respectively.

While I have thus completely described one embodiment of my device, it will be readily apparent that numerous changes may be made therein without departing from the spirit or narrowing the scope of my invention.

1. A cathode ray oscillograph comprising, a vitreous envelope, a portion of the walls of which are in the form of a cylinder of substantially uniform diameter, a coating of material rendered luminous on bombardment by electrons on the inner walls of said cylindrical portion, means for producing a stream of electrons within said envelope, means for causing said stream of electrons to rotate to trace a continuous coordinate line on said coating and means for varying the velocity of said stream to trace a second coordinate line on said coating whereby a voltage wave may be portrayed in cylindrical coordinates on the cylindrical portion of said envelope.

2. A cathode ray oscillograph comprising, a vitreous envelope, a considerable portion of the walls of which are in the form of a cylinder of substantially uniform diameter, a coating of fluorescent material on the inner walls of said cylindrical portion, means for producing a stream of electrons within said envelope, means for causing said stream of electrons to rotate to trace a continuous coordinate line on the coating of said envelope and means for varying the instantaneous position of said line in accordance with instantaneous values of the voltage of an applied varying voltage to display in closed configuration on said coating a voltage wave in cylindrical coordinates.

ordinates.

3. A cathode ray oscillograph comprising, a vitreous envelope, a portion of the walls of which are in the form of a cylinder of uniform diameter, a coating of fluorescent material on the inner walls of said cylindrical portion, means for producing a stream of electrons within said envelope, means including a source of alternating current of substantially constant voltage and frequency for rotating said stream of electrons to trace a continuous closed line on said coating and means including a source of varying potential for varying the velocity of said stream to vary the instantaneous position of said line in accordance with the instantaneous values of the voltage of said varying source to continuously portray a voltage wave in cylindrical coordinates and in closed configuration on said coating.

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