Nov. 20, 1934. K. ENGEL 1,981,350

OSCILLOGRAPH

Filed Sept. 21, 1932

Fig. 1

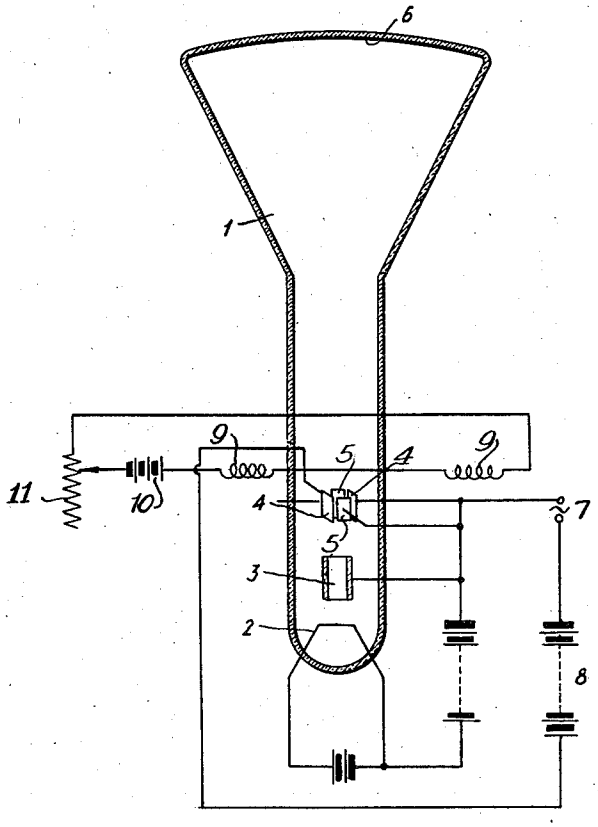
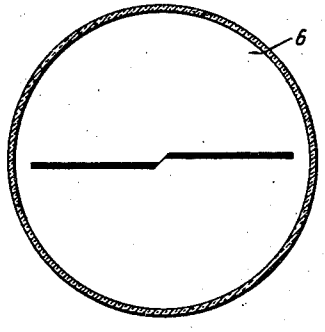


Fig. 2



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OSCILLOGRAPH

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2 Claims. (Cl. 171—95)

The present invention relates to cathode ray tubes and principally to a method of operating cathode ray oscillograph tubes, especially tubes of the low-voltage ray or radiation type.

In connection with the recording of oscillograms by means of electron-radiation tubes, especially when using rays of low electron velocity, it has been discovered that the oscillograms in the zero point exhibit a more or less marked knee which herein shall be designated as the "zero-point anomaly".

This phenomenon, in all likelihood, is ascribable to the fact that at the very instant when the alternating current potential to be investigated and which is applied across the pair of deflector plates of the oscillograph tube passes through the zero point, the electron radiation or ray pencil fails to follow faithfully the field set up across the deflector plates as a result of space-charge actions.

According to the present invention the "zero point" effect which often is found to be very troublesome, is eliminable by superimposing upon the alternating potential wave to be investigated such a high direct current potential bias that the voltage wave to be recorded will never pass through the zero point or value. By the aid of a suitable supplementary magnetic deflection it will be an easy matter to cause the oscillogram to be positioned in the middle of the fluorescent screen.

The invention shall be explained in more detail by reference to the accompanying drawing wherein Fig. 1 represents in purely schematic form an oscillograph tube arranged according to the present invention and Fig. 2 illustrates the "zero-point" effect.

Referring now to the drawing, the cathode ray tube 1 includes a cathode member 2, an anode 3, the plate pair 4 for time deflection, the plate pair 5 for deflection by the alternating voltage wave to be investigated, and finally the fluorescent screen 6. For the purpose of concentrating the electron-ray pencil as a sharply defined spot upon the fluorescent screen 6 the tube has a gas filling of low pressure, preferably a low-pressure mercury vapor atmosphere. However, electrostatic focusing in a high vacuum type tube may be substituted for the gas focusing. In order to control the position at which the developed cathode ray beam normally impinges upon the viewing screen 6, a suitable magnetic field which is energized from a voltage source conventionally shown at 10 and regulated in intensity by a variable resistor 11, for example, may be supplied.

If the alternating voltage supplied across terminals 7, as customary in the prior art, is applied across plate pair 5, then, with the use of rays of low electron velocity, say, of an order of magnitude of 100 v., the "zero-point anomaly" or discontinuity will arise. In other words, the voltage to be investigated fails to appear upon the fluorescent screen in the form of a straight line, but rather in the shape of a broken line presenting a knee or irregularity at the zero point, as is shown more particularly in Fig. 2.

According to the invention the said anomalous behavior at the zero point may be obviated by providing a supplementary direct current potential 8 in series with the alternating voltage wave to be recorded or investigated. The direct current potential preferably has a crest value higher than that of the alternating current voltage wave to be measured. In fact, the direct current most suitably is made from 3 to 4 volts higher than the crest value of the voltage to be investigated.

The invention is, of course, capable of many modifications and should therefore be understood to include all modifications such as would suggest themselves to those skilled in the art to which it is directed.

Having now described the invention, what is claimed is the following:

1. In a cathode ray oscillograph tube, the method of obtaining a visual representation of an alternating voltage wave to be investigated which comprises generating a cathode ray within the tube, applying an alternating voltage wave to one set of the deflecting electrodes of the tube to cause the ray to be deflected to a degree to correspond to the amplitude of the supplied voltage, and superimposing upon the supplied alternating current voltage applied to the deflecting electrodes a direct current voltage of a value at least equal to the crest value of the applied alternating current voltage.

2. In the method claimed in claim 1, the step which comprises supplying a magnetic biasing deflection to cause the cathode ray to be observable upon the center portion of the viewing screen.

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