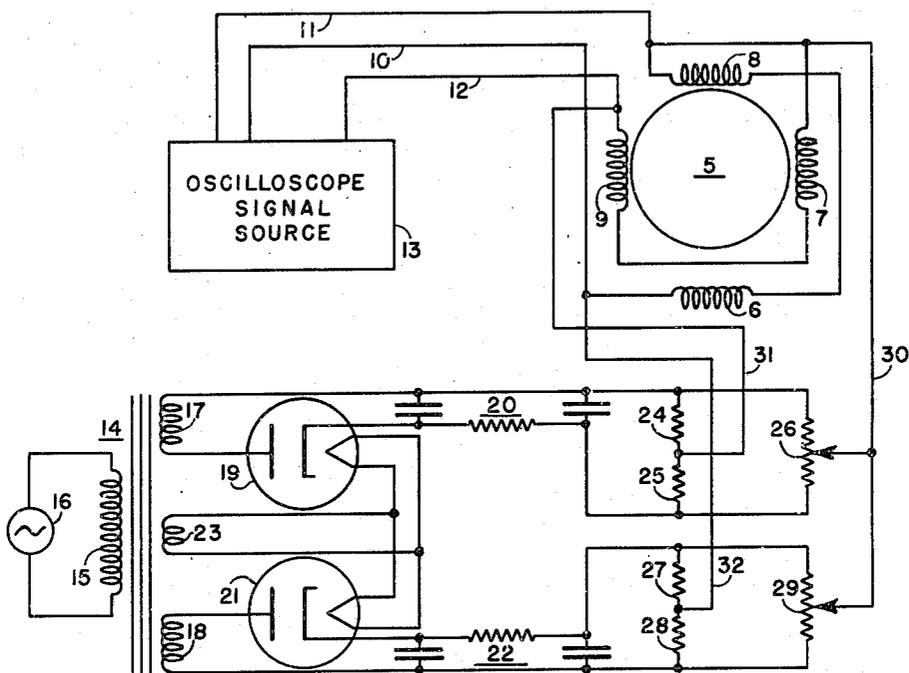


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METHOD OF AND APPARATUS FOR COMPENSATING FOR RESIDUAL
MAGNETIZATION IN CATHODE-RAY APPARATUS
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METHOD OF AND APPARATUS FOR COMPENSATING FOR RESIDUAL MAGNETIZATION IN CATHODE-RAY APPARATUS

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This invention relates to a method of and apparatus for compensating for residual magnetization in cathode ray apparatus wherein the beam deflecting force is provided by an electromagnetic field.

After an electro-magnetically deflected cathode ray apparatus has been in operation for some time, the iron cores of the cathode ray tube's deflection coils may pick up a certain amount of residual magnetization. The presence of such residual magnetization in an apparatus wherein the cathode ray beam deflecting force is provided by a rotating electromagnetic field may be indicated on the tube as a circle instead of a point. This has the effect of distorting the pattern and forming non-opposing bilateral indications. In order to remove the residual magnetization, one practice has been to insert a small iron core demagnetizing coil energized from a 60 cycle 110 volt source in the area of the deflecting coils and then to slowly withdraw the demagnetizing coil, repeating the process until the pattern on the cathode ray tube shows no indication of residual magnetization. Such a procedure is very time-consuming and uncertain.

An object of the present invention is to provide an effective and efficient method of and apparatus for compensating for residual magnetization in cathode ray apparatus wherein the beam deflecting force is provided by an electromagnetic field.

In accordance with one embodiment of the present invention, in order to overcome the distortion caused by residual magnetization in an electromagnetically deflected cathode ray apparatus, a steady current of proper amplitude and direction may be caused to flow in each set of deflecting coils setting up thereby a magnetomotive force which will oppose and cancel the residual magnetic field.

Other objects and advantages of the present invention will be apparent from the following detailed description taken in conjunction with the single figure wherein is schematically illustrated an electromagnetically deflected cathode ray apparatus having associated therewith a residual magnetization compensating circuit constructed in accordance with this invention.

Referring to the drawing, an electromagnetically deflected cathode ray tube 5 is there illustrated having four deflecting coils 6, 7, 8, and 9, respectively, disposed about its periphery. The coils 6 and 8 and the coils 7 and 9 form pairs and are respectively connected through leads 10 and 11 and 11 and 12 to an oscilloscope signal source

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13. Differential energization of the coils will cause deflection of the cathode ray beam, as is well known in the art. However, when the coils are no longer energized from the signal source 13, it has been found that the previous energization of the coils, in some cases, may result in the presence of some residual magnetization and this magnetization may be sufficient to cause undesirable deflection of the electron beam. Thereafter when a signal is applied to the coils from the signal source, the resulting deflecting force will be affected by the deflecting force produced by the residual magnetization and thereby distort the pattern on the cathode ray tube.

15 In order to overcome the effects of residual magnetization, in accordance with this invention, a steady current of proper amplitude and direction is caused to flow in the deflecting coils to set up a magneto-motive force which will oppose and cancel the residual magnetization. While such a current could be provided by a pair of batteries, a more convenient source is that illustrated in the drawing wherein an isolating transformer 14 has its input winding 15 connected to a suitable alternating current source 16 and is provided on its output side with two identical windings 17 and 18, whereby a voltage on the order of 125 to 135 volts is obtained from each winding. The winding 17 is connected through a rectifier tube 19, to a low pass filter circuit 20, while the winding 18 is connected through a rectifier tube 21 to a low pass filter circuit 22. Filament voltage for the tubes 19 and 21 may be provided from a small winding 23 associated with the power transformer 14.

The rectified and filtered current from the winding 17 is applied to a resistance bridge network, two arms of which are formed by a pair of resistors 24 and 25 and the other two arms of which are formed by a potentiometer resistance 26. Similarly the rectified and filtered current from the winding 18 is applied to a second resistance bridge network comprising a pair of resistors 27 and 28 and a potentiometer resistance 29. The resistors 24, 25, 27 and 28 are of the same value.

The first resistance bridge network is connected to the deflecting coils 7 and 9 through a lead 30 which is connected to the potentiometer 26 and a lead 31 which is connected between the resistors 24 and 25. The second resistance bridge network is connected to the deflecting coils 6 and 8 through the lead 30 which is also connected to the potentiometer 29 and a lead 33 which is connected between the resistors 27 and 28. By ad-

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justing the potentiometers 26 and 29 it will be readily apparent that the bridge networks may be so balanced that no current will flow in the coils or that current will flow in one or both pairs of coils, the direction or sense of the current as well as the amount depending on the adjustment of the two potentiometers.

In the operation of this apparatus, when it is apparent that with no signal being applied to the deflecting coils from the signal source the beam is being deflected, it is necessary merely to adjust one or both of the potentiometers to cause the beam to return to its correct position.

While but one embodiment of this invention has been shown and described, it will be understood that many changes and modifications may be made therein without departing from the present invention.

The invention described herein may be manufactured and used by or for the Government of the United States of America for government purposes without payment of any royalty thereon or therefor.

What is claimed is:

In combination, a magnetic deflection yoke comprising orthogonal pairs of iron cored deflection coils, a signal source for separately activating each pair for effecting deflecting operation

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by core magnetization adjustable direct current supply means connected only across each pair and operative to supply constant currents of independently adjustable magnitude and direction to each pair to cancel residual magnetism resulting from signal source operation independently of coil potential.

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