

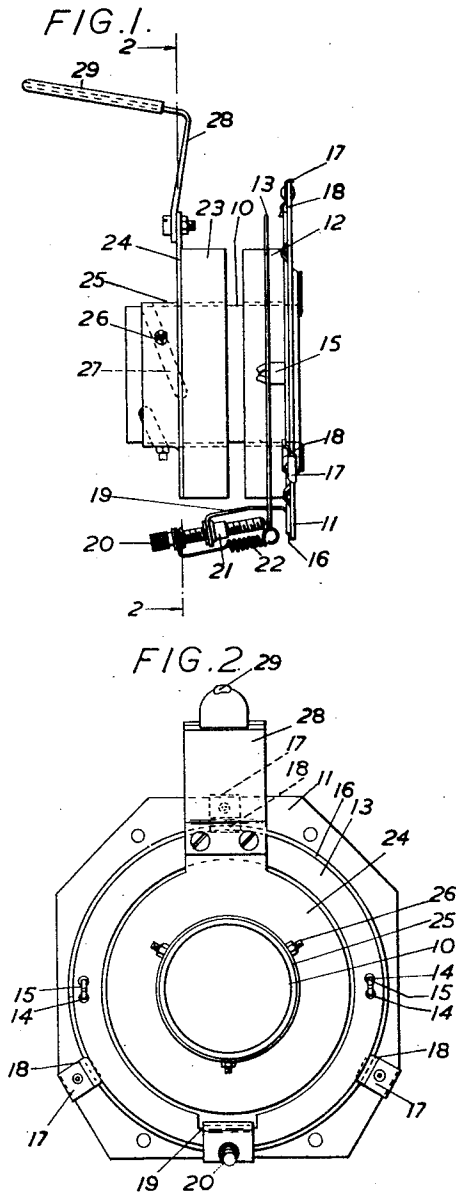
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MAGNETIC FOCUSING FIELD ARRANGEMENTS FOR CATHODE RAY TUBES

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MAGNETIC FOCUSING FIELD ARRANGEMENTS FOR CATHODE RAY TUBES

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The present invention relates to improvements in magnetic focussing field arrangements for cathode ray tubes.

In operation of a cathode ray tube the beam requires to be focussed in a spot on the tube screen and it is known to employ an annulus or annuli of a permanent magnetic material consisting of oxidic ceramics not containing any nickel or cobalt, one example of this kind of material being that referred to under the registered trademark "Ferroxdure," for providing the magnetic focussing field in a television cathode ray tube.

In addition to means for focussing the beam spot on the tube screen a television cathode ray tube generally requires an arrangement for centering the beam spot on the tube screen in the absence of applied deflecting voltages.

There has previously been used in conjunction with "Ferroxdure" annuli mounted on the neck of a cathode ray tube a centering arrangement for the beam spot formed on the tube screen which arrangement comprised two thin apertured discs positioned on the tube neck to the side of the annuli nearer the screen, the discs being permanently magnetised such that when mounted on the tube neck the direction of magnetisation was perpendicular to the axis of the tube neck, the discs being angularly rotatable on the tube neck for centering the beam spot.

It is an object of the present invention to economise in the length of cathode ray tube neck taken up by a centering arrangement used in conjunction with an annulus or annuli of a material such as that known as "Ferroxdure."

According to the present invention there is provided for use in centering the beam spot formed on the screen of a cathode ray tube an arrangement which comprises a first annulus of a material such as that known as "Ferroxdure," a second annulus of magnetic material mounted in a concentric manner with respect to said first annulus so as to lie within the tube neck length taken up by the said first annulus or the tube neck length taken up by a plurality of said first annuli, and a locating device whereby there can be produced relative angular rotation between the first annulus and the second annulus about a common axis and also tilting of the second annulus with respect to the first annulus.

Preferably the first annulus is stationary with respect to the cathode ray tube neck while the second annulus is movable with respect to the neck.

It is preferably arranged that the axis about which the second annulus tilts is, for all positions of rotation of said second annulus, a diameter of said first annulus. The locating device may be made dependent on a frame member which is used for supporting the first annulus with respect to the tube neck. The locating device may comprise a further annular member concentric with and rotatable with respect to the first annulus, said further annular member having two extending lugs located substantially diametrically with respect to the first annulus from which lugs said second annulus is supported.

Tilt of the second annulus with respect to the first annulus may be obtained through an adjustable screw the

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end of which bears on one of the said annuli and a bias spring device may be provided to urge one of said annuli up against the screw end. The adjustable screw may be mounted on the said further annular member to be rotatable therewith. The mounting member for the adjustable screw may provide means by which the second annulus can be rotated with respect to the first annulus.

The said first annulus may be axially displaceable for focussing the beam spot on the tube screen on a further annulus of a material such as "Ferroxdure," or further such annuli, may be provided and arranged to be axially displaceable for effecting focussing of the beam spot on the tube screen.

Reference is now made to the accompanying drawings which illustrate an embodiment of the present invention here given by way of example,

Fig. 1 being a side elevation and

Fig. 2 is an end view as seen from the left of Fig. 1.

A cylindrical member of non-magnetic material indicated at 10 is of an internal diameter such that it is a loose fit on the neck of a television cathode ray tube. It has an octagonal end plate 11 of non-magnetic material riveted to it, this end plate 11 serving as a frame member for positioning the arrangement on to the cathode ray tube neck. There is secured to the end plate 11 by a hardening glue material a first annulus of "Ferroxdure" indicated at 12, the inside dimension of this first annulus making it a close fit to the outer surface of the cylindrical member 10.

A second annulus of magnetic material indicated at 13 is mounted in a concentric manner with respect to the first annulus 12, this second annulus 13 taking up but a part of the axial distance occupied by the first annulus 12. This second annulus 13 has two pairs of diametrically opposed circular apertures indicated at 14 through which project gripping fingers of lugs indicated at 15 extending laterally from a further annular member 16. This further annular member 16, which is of non-magnetic material, is supported from the end plate 11 by a number of spring retaining members indicated at 17 into the open end portions 18 of which the further annular member 16 fits; by this means the further annular member 16, while held close to the end plate 11, can be rotated around the first annulus 12. Angular rotation of the further annular member 16 with respect to the first annulus 12 causes corresponding rotation of the lugs 15 which rotate with the second annulus 13.

Fixed to one part of the circumference of the further annular member 16 is a laterally extending shifting member indicated at 19; angular rotation of further annular member 16 can be obtained by finger pressure suitably applied to shifting member 19. An adjustable screw indicated at 20 is threaded through a tapped insert 21 fitted to a radially extending portion of shifting member 19 and is arranged to have a substantial component of movement parallel with the axis of the sleeve 10. The end of adjustable screw 20 bears on the second annulus 13 and a bias spring indicated at 22 is held between a collar on adjustable screw 20 and an aperture in the second annulus 13 through which the bent-over end of bias spring 22 is hooked.

Rotation of the adjustable screw 20 in its tapped insert 21 varies the pressure exerted on the second annulus and causes a tilt of the second annulus about the axis provided by the extending lugs 15; as these lugs are substantially diametrically opposed the tilt of the second annulus 13 resulting from such rotation of the adjustable screw 20 is always substantially symmetrically about a diameter of the first annulus 12 in all positions of angular rotation of the second annulus 13 with respect to the first annulus 12.

It will be seen that further annular member 16 locates the second annulus 13 with respect to the first annulus 12,

Also it will be seen there is provided a locating device having adjustable means whereby by manual adjustment, as by suitable finger pressure applied to 19 and adjustment of screw 20, there is obtained angular rotation and tilting of the second annulus 13 with respect to the first annulus 12.

There is also provided on the cylindrical member 10 another "Ferroxidure" annulus indicated at 23, like magnetic poles of annuli 12 and 23 being adjacent one another. This "Ferroxidure" annulus 23 is held by hardening glue to a non-magnetic end plate 24 which extends radially from a sleeve member 25 which is a rotatable fit on cylindrical member 10. The sleeve member 25 has three locating screws indicated at 26 each riding in one of three portions of a locating spiral groove indicated at 27 provided in cylindrical member 10. A radially extending arm 28 screwed on to end plate 24 enables the "Ferroxidure" annulus 23 to be radially rotated and thus axially displaced in its spiral groove 27 along cylindrical member 10. The portion of the extending arm 28 by which it is turned by hand is provided with an insulating cover indicated at 29.

When extending arm 28 is rotated axial displacement of the "Ferroxidure" annulus 23 occurs with respect to the first "Ferroxidure" annulus 12 and such axial displacement can be utilised for focussing the beam spot on the screen of the television cathode ray tube.

I claim:

1. An arrangement for use in centering the beam spot formed on the screen of a cathode ray tube which arrangement comprises the combination of a first annulus of a permanent magnetic material, a second annulus of magnetic material mounted in a concentric manner with respect to said first annulus and located within the tube neck length taken up by the said first annulus, means mounting said annuli for relative angular rotation between the two annuli about the axis of the tube neck, and means pivotally mounting the second annulus for tilting about a diameter of the second annulus with respect to the first annulus.

2. An arrangement for use in centering the beam spot formed on the screen of a cathode ray tube which arrangement comprises the combination of a plurality of first annuli of a permanent magnetic material, a second annulus of magnetic material mounted in a concentric manner with respect to one of said first annuli and located within the tube neck length taken up by said plurality of first annuli, a locating device for said second annulus by which there can be produced relative angular rotation between the said one annulus and the second annulus about the axis of the tube neck, and means pivotally mounting said second annulus for tilting about a diameter of said one annulus.

3. An arrangement according to claim 1 wherein the first annulus is mounted stationary with respect to the cathode ray tube neck, and the second annulus is mounted for movement with respect to the cathode ray tube neck.

4. An arrangement according to claim 2 wherein the plurality of first annuli are mounted stationary with respect to the cathode ray tube neck, and the second annulus is mounted for movement with respect to the cathode ray tube neck.

5. An arrangement for use in centering the beam spot formed on the screen of a cathode ray tube which arrangement comprises the combination of a first annulus of a permanent magnetic material, a second annulus of magnetic material mounted in a concentric manner with respect to said first annulus so as to lie within the tube neck length taken up by the said first annulus, an annular frame surrounding the neck portion of said tube and supporting said first annulus in concentric relation with said neck portion, first means carried by said annular frame and mounting said second annulus upon said frame for rotation with respect to said frame and about the axis of said neck portion, and second means carried by said frame and pivotally mounting said second annulus for tilting about a diameter of said first annulus.

6. An arrangement according to claim 5 wherein said first means comprises a further annular member mounted concentric with and rotatable with respect to the first annulus, and said second means comprises two extending lugs carried by said further annular member and located substantially diametrically with respect to the first annulus, and pivotally supporting said second annulus for tilting with respect to said first annulus.

7. An arrangement according to claim 1 and including means for tilting the second annulus with respect to the first annulus comprising an adjustable screw mounted with the end thereof bearing on one of the said annuli, and a bias spring device urging said annulus up against the screw end.

8. An arrangement according to claim 1 wherein a further annulus of a permanent magnetic material is provided and arranged to be axially displaceable for effecting focussing of the beam spot on the tube screen.

9. An arrangement according to claim 2 wherein a further annulus of a permanent magnetic material is provided and arranged to be axially displaceable for effecting focussing of the beam spot on the tube screen.

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