

Description

The invention relates to a method of transforming a deflection unit for a colour-picture tube, especially having guns in the same plane, and such that the tube-deflection unit set is autoconvergent, in order that it should be suitable - with the same property of auto-convergence - for a tube which is similar but of different dimensions, especially smaller dimensions, or, in a more general way, in order that it should be suitable for a family of tubes of the same angle of deflection.

A device corresponding to the preamble of Claim 1 is described in GB-A-2,029,089.

It is known that a tube for colour television comprises three electron guns, each one of which is intended to excite on the screen a luminophore substance of a determined colour, red, green or blue. At each instant, these three beams strike a triplet of luminescent substances on the screen. The displacement of these three electron beams is obtained by means of a deflection unit mounted on the neck of the tube and which comprises two coils, through each one of which flows an alternating electric current generating a variable magnetic field to deflect the electron beams. One of these coils permits the horizontal scanning, that is to say in lines, of the screen, and the other coil is intended for the vertical scanning, or field scanning.

It is easily understood that the design and the development of the coils of a deflection unit are difficult operations, since the three electron beams must converge on the screen at all its points and each beam must be focused at the centre of the screen, this being the case with a tube which does not exhibit any symmetry of revolution, a substantially flat screen and guns producing beams in a same plane. Thus, in order to develop an autoconvergent tube-deflection unit set, it is necessary to establish a compromise between a certain number of contradictory requirements. The result of this is that a deflection unit devised for a tube of determined type and dimensions is not suitable for a tube of

another type and/or of other dimensions.

5 It has, however; already been observed that a same deflection unit can be suitable for two autoconvergent tubes which differ only by the dimension of the screen (and thus likewise by the length of the conical portion) subject to the condition of modifying - in order to reduce the anisotropic astigmatism (cause of defects of convergence between horizontal lines) - the distance separating the line deflection centre from the field deflection centre (see, for example, GB-A-2,029,089). For 10 this modification up to the present time, one coil is axially displaced with respect to the other, or the length of each coil is caused to vary.

15 The invention permits the further simplification of the modification of a deflection unit for an autoconvergent tube in order to match it to a tube of smaller dimensions.

20 It is characterized in that a magnetic element such as a screen is arranged across the lines of the magnetic fields produced by the coils in order to cause variation of the distance separating the vertical and horizontal deflection centres.

It is thus not necessary to modify or to displace the coils.

25 When the deflection unit is of the saddle-torus type with a horizontal deflection coil in the shape of a saddle terminating at the front and at the rear by top-knots extending in planes perpendicular to the axis of the tube between which planes there is arranged the vertical deflection coil in the shape of a torus, it is 30 possible to arrange the magnetic screen between the rear top-knot of the horizontal deflection coil and the rear face of the vertical deflection coil.

35 Likewise, when the deflection unit is of the saddle-saddle type, the vertical deflection coil being in the shape of a saddle, like the horizontal deflection coil, with front and rear top-knots, the magnetic screen is, for example, arranged between the rear top-knots of the two coils.

28

5 In both cases mentioned hereinabove, the magnetic screen modifies the field lines in such a manner that the vertical deflection centre is displaced towards the front (towards the screen of the tube) and the horizontal deflection centre is displaced towards the rear (towards the guns).

10 Other features and advantages of the invention will appear with the description of some of its embodiments, this description being made with reference to the accompanying drawings, in which:

- Figure 1 is a diagrammatic overall view of a television tube with the deflection unit and the electron guns,

15 - Figure 2 is a half view, in axial cross-section, of a deflection unit according to the invention and of the guns,

- Figures 3 to 6 are charts and diagrams of magnetic fields and field lines corresponding to the deflection unit of Figure 2,

20 - Figure 7 is a view through the rear face of the deflection unit of Figure 2,

- Figure 8 is a view similar to that of Figure 7 for a variant,

25 - Figure 9 is a view similar to that of Figure 2 for another variant, and

- Figure 10 is likewise a view similar to that of Figure 2, again for another variant.

30 In the example, the set formed by the colour-picture tube and the deflection unit is autoconvergent; the tube comprises guns producing coplanar beams and a mask incorporating oblong holes. The deflection unit 20 is mounted around the neck 21 and around the conical portion 22 of the tube 23, which is connected to the neck. It comprises a horizontal deflection coil 24 in the shape of a saddle with a central portion 25 espousing the contour of the portion of the tube which it surrounds and end top-knots, 26 and 27 respectively, extending in a plane perpendicular to the axis 15 of the tube.

35 The function of the coil 24 is to produce the



magnetic field displacing horizontally the electron beams produced by the three guns 28 within the tube.

5 Another coil 29 in the shape of a torus of substantially rectangular cross-section is wound on a core of ferromagnetic material, such as ferrite, and surrounds the coil 24 between the front 26 and rear 27 top-knots. It ensures the vertical displacement of the beams produced by the guns 28.

10 For a tube of large dimension, the diagonal of the screen 30 of which has a length of 67 cm, the horizontal deflection coil 24 exhibits a deflection centre 31 on the axis 15, which is separated from the vertical, or field, deflection centre 32 of the coil 29 by a distance of the order of a few millimetres (see Figs. 3 and 4). It is the horizontal deflection centre 31 which is closer to the screen 30.

20 For a colour-picture tube, the screen 30' of which, represented in broken lines in Figure 1, is of smaller dimension than the screen 30, its diagonal having a length of 56 cm, but exhibiting, on the other hand, the same features: the same guns 28, the same diameter and the same length of the neck 21, the same aperture angle of the conical portion 22, it is necessary that the respectively horizontal and vertical deflection centres of the deflection unit should be virtually coincident or at a short distance from one another. The common horizontal and vertical deflection centre 33 for a deflection unit matched to a tube, the screen 30' of which has a diagonal of 56 cm, must be between the horizontal 31 and vertical 32 deflection centres. In other words, in relation to a screen tube of diagonal 67 cm, the tube the screen of which has a diagonal of 56 cm has a horizontal deflection centre of its deflection unit closer to the guns and a vertical deflection centre of its deflection unit further away from the guns.

35 In order to permit this displacement of the horizontal and vertical deflection centres without modifying either the relative position or the configuration of the coils of the deflection unit 20, according

20

to the invention a magnetic screen 35 (Figure 2) is arranged, which, in the example, is between the rear top-knot 27 of the horizontal deflection coil 24 in the shape of a saddle and the rear portion 36 of the vertical deflection coil 29 in the shape of a torus.

This magnetic screen is made of a material, for example mumetal, having high magnetic permeability, exceeding 1.

Figure 3 is a diagram showing the variations along the axis 15 of the magnetic field H_0 produced by the vertical deflection coil 29.

The curve 37 in solid line corresponds to the magnetic field in the absence of the screen 35. The vertical deflection centre 32 is the projection onto the axis 15 of the centre of gravity of the surface delimited by this curve 37 and the axis 15.

When the screen 35 is arranged as represented in Figure 2, the rear portion 38 of the curve 37 is displaced towards the front (that is to say towards the screen) and becomes the curve 39 in broken lines. Under these conditions, the vertical deflection centre is displaced towards the front.

Figure 4 is a diagram similar to that of Figure 3 but showing the variations along the axis 15 of the magnetic field H_0 produced by the horizontal deflection coil 24. The curve 40 in solid line corresponds to the absence of magnetic screen 35. In this case, the horizontal deflection centre of the deflection unit 20 is at the point 31. When the magnetic screen 35 is fitted, the rear portion 41 of the curve 40 is displaced towards the rear, thus becoming the curve 42 in broken lines. Under these conditions, the horizontal deflection centre is displaced at 33 towards the rear.

Figure 5 is a diagram showing the vertical deflection coil 29 with the field lines which the latter produces in the horizontal plane (plane ZX). It is seen that the field lines in the vicinity of the magnetic screen 35 and of the rear portion 36 of the coil 29 in the shape of a torus are deviated from their initial path

31

43 and displaced towards the front (at 43') by reason of the mirror effect which is produced by this magnetic screen 35; this explains the displacement of the vertical deflection centre (Figure 3).

5 Figure 6 is a diagram similar to that of Figure 5, but for the horizontal deflection coil 24. In this case, the field lines 44 at the rear of the magnetic screen 35 are pushed back even further towards the rear; this explains the transition from the curve 41 to the
10 curve 42 in Figure 4 and the displacement of the horizontal deflection centre when the said screen 35 is introduced between the top-knot 27 and the rear portion 36 of the coil 29.

 It is important to note that the quality of the
15 image obtained on the screen of the tube is dependent upon the shape, the dimensions and the position of the magnetic screen 35. In other words, with the screen 35 there is available a means for the supplementary adjustment of the tube. This adjustment is obtained by modification of the position and/or of the dimensions and/or of
20 the shape of the screen 35. It will also be noted that the screen 35 increases the horizontal deflection and diminishes the vertical deflection. The result of this is that the power supply energy of the horizontal deflection
25 coil is smaller, while the power supply energy of the vertical deflection coil is greater.

 In the example of Figure 7, the magnetic screen
35 35 is in two portions forming the two halves of a crown extending in a plane perpendicular to the axis 15, virtually right around this axis.

 In this example, as is known per se, the deflection unit exhibits a carcass made of plastic material 50 with a central cylindrical hole for the passage of the neck 21 and within which there is situated the principal
35 portion 25 of the horizontal deflection coil 24. The vertical deflection coil is arranged around this carcass. The rear top-knot 27 is applied against the rear phase 51 of a crown, or end flange 52 of the carcass 50. The coil 29 (which cannot be seen in Figure 7) is on the other

32

side, in relation to the top-knot 27, of this crown 52. The magnetic screen 35 is arranged between the top-knot 27 and the rear phase 51 of the crown 52. Its separation into two portions is intended to permit its mounting.

5 In the example of Figure 8, the magnetic screen 35 is formed from four segments 35₁, 35₂, 35₃ and 35₄ of a crown, which are distributed regularly about the axis 15, each segment being ... (lacuna) ... and arranged in such a manner that the bisector of the quadrant which it occupies constitutes an axis of symmetry for this segment.

10 In the example of Figure 9, the horizontal deflection coil 24_a is identical with the coil 24 of Figure 2. On the other hand, the vertical deflection coil 15 54 is, just like the coil 24_a, in the shape of a saddle. This coil 54 is shorter than the coil 24_a; it surrounds the latter and it exhibits front 55 and rear 56 top-knots extending perpendicularly to the axis of the tube. The magnetic screen 35_a is arranged between the rear top-knot 20 27_a of the coil 24_a and the rear top-knot 56 of the coil 54. A ferrite core 57 is arranged between the top-knots 55 and 56 around the central portion of the coil 54.

25 In the example of Figure 10, the magnetic screen 35_b exhibits a portion 60 perpendicular to the axis 15 and an extension 61 towards the rear, that is to say towards the guns, and of oblique direction. This extension increases, to a greater extent than the simple crown 35 or 35_a, the horizontal deflection field to the rear of the deflection unit.

30 The invention encompasses not only in (sic) deflection unit with magnetic screen but also the set formed by the tube and the deflection unit with magnetic screen.



33

Claims

1. Method of transforming a deflection unit (20) for a colour-picture tube (23) of autoconvergent type to permit its use with a tube the screen (30') of which has smaller dimensions, but which, in other respects is identical to that wherefor said deflection unit is initially provided, being a method in which the distance separating the horizontal deflection centre (31) from the vertical deflection centre (32) is modified, characterized in that a magnetic screen (35, 35_a, 35_b) is arranged across the magnetic field lines produced by the vertical (29) and horizontal (24) deflection coils in such a manner as to obtain said variation of distance separating the deviation centres without modification of the coils.

2. Method according to Claim 1, characterized in that the magnetic screen is arranged in such a manner that it increases the horizontal deflection and reduces the vertical deflection.

3. Method according to Claim 2, characterized in that the horizontal deflection coil (24) being of saddle shape with top-knots perpendicular to the axis of the tube, the magnetic screen (35, 35_a, 35_b) is arranged between the rear top-knot (27, 27_a) and the rear (36, 56) of the vertical deflection coil (29, 54).

4. Method according to Claim 3, characterized in that, in a manner known per se, the vertical deflection coil (29) is of toroidal shape.

5. Method according to Claim 3, characterized in that, in a manner known per se, the vertical deflection coil (54) is of saddle shape with top-knots perpendicular to the axis of the tube, the screen (35_a) being thus arranged between the rear top-knots (56, 27_a) of the vertical (54) and horizontal (24_a) deflection coils.

6. Method according to any one of the preceding claims, characterized in that the magnetic screen (35) is arranged in such a manner that the vertical deflection centre (32) is shifted towards the front and the horizontal deflection centre (31) towards the rear of the tube.

34

7. Method according to any one of the preceding claims, characterized in that the magnetic screen (35) comprises two portions forming the two halves of a circular crown.

8. Method according to any one of Claims 1 to 6, characterized in that the magnetic screen comprises a plurality of sectors (35₁, 35₂, 35₃, 35₄) of a crown.

9. Method according to Claim 7 or 8, characterized in that the crown extends along a plane perpendicular to the axis (15) of the tube.

10. Method according to Claim 7 or 8, characterized in that the crown has a portion (60) perpendicular to the axis of the tube and a portion (61) inclined with respect to said portion perpendicular to the axis.

11. Method of adjusting the autoconvergent set formed by a colour-picture tube and a deflection unit obtained according to the method of Claim 3, characterized in that for the adjustment, the shape and/or the dimensions and/or the position of the magnetic screen is adjusted.



* C L N S *

35

Patentansprüche

1. Verfahren zur Umformung einer Ablenkeinheit (20) für eine Farbbildröhre (23) vom selbstkonvergierenden Typ, um ihre Verwendung bei einer Röhre zu ermöglichen, deren Bildschirm (30') kleinere Abmessungen aufweist, die aber ansonsten völlig mit derjenigen übereinstimmt, für welche die genannte Ablenkeinheit anfangs vorgesehen war, wobei gemäss dem Verfahren der Abstand verändert wird, der zwischen dem Horizontalablenkzentrum (31) und dem Vertikalablenkzentrum (32) liegt, dadurch gekennzeichnet, dass ein magnetischer Schirm (35, 35_a, 35_b) durch die Magnetfeldlinien gelegt wird, die von der Vertikalablenkwicklung (29) und der Horizontalablenkwicklung (24) erzeugt werden, dergestalt, dass die genannte Veränderung des Abstandes zwischen den Ablenkzentren ohne Veränderung der Wicklungen erhalten wird.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass der magnetische Schirm derart angeordnet wird, dass er die Horizontalablenkung verstärkt und die Vertikalablenkung schwächt.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, dass bei sattelförmiger Horizontalablenkwicklung (24) mit senkrecht zur Röhrenachse ausgerichteten Wicklungssträngen der magnetische Schirm (35, 35_a, 35_b) zwischen dem hinteren Wicklungsstrang (27, 27_a) und der Rückseite (36, 56) der Vertikalablenkwicklung (29, 54) angeordnet wird.

4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, dass in an sich bekannter Weise die Vertikalablenkspule (29) ringförmig ist.



36

5. Verfahren nach Anspruch 3, dadurch gekennzeichnet, dass in an sich bekannter Weise die Vertikalablenkwicklung (54) sattelförmig mit senkrecht zur Röhrenachse verlaufenden Wicklungssträngen ausgebildet ist und der Schirm (35_a) zwischen den hinteren Wicklungssträngen (56, 27_a) der Vertikal- (54) und Horizontal-Ablenkwicklung (24_a) angeordnet ist.

6. Verfahren nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, dass der magnetische Schirm (35) derart angeordnet wird, dass das Vertikalablenkzentrum (32) nach vorne und das Horizontalablenkzentrum zur Rückseite der Röhre verlagert wird.

7. Verfahren nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, dass der magnetische Schirm (35) zwei Teile umfasst, welche die beiden Hälften eines kreisrunden Kranzes bilden.

8. Verfahren nach einem der Ansprüche 1 bis 6, dadurch gekennzeichnet, dass der magnetische Schirm mehrere Sektoren (35₁, 35₂, 35₃, 35₄) eines Kranzes umfasst.

9. Verfahren nach Anspruch 7 oder 8, dadurch gekennzeichnet, dass der Kranz sich in einer zur Röhrenachse (15) senkrechten Ebene erstreckt.

10. Verfahren nach Anspruch 7 oder 8, dadurch gekennzeichnet, dass der Kranz einen senkrecht zur Röhrenachse ausgerichteten Teil (60) und einen Teil (61) aufweist, der gegenüber diesem zur Achse senkrechten Teil geneigt ist.

11. Verfahren zum Abgleichen der selbstkonvergierenden Baugruppe, welche durch eine Farbbildröhre und eine Ablenkeinheit gebildet ist, die durch das Verfahren nach Anspruch 3 erhalten wird, dadurch gekennzeichnet, dass für den Abgleich die Form und/oder die Abmessungen und/oder die Lage des magnetischen Schirmes verändert wird.

Claims

1. Method of transforming a deflection unit (20) for a colour-picture tube (23) of autoconvergent type to permit its use with a tube the screen (30') of which has smaller dimensions, but which, in other respect, is identical to that wherefor said deflection unit is initially provided, method wherein the distance separating the horizontal deflection center (31) from the vertical deflection center (32) is modified, characterized in that a magnetic screen (35, 35_a, 35_b) is arranged across the magnetic field lines produced by the vertical (29) and horizontal (24) deflection coils

in a manner to obtain said variation of the distance separating the deviation centers without modification of the coils.

2. Method according to claim 1, characterized in that the magnetic screen is arranged in such a manner that it increases the horizontal deflection and reduces the vertical deflection.

3. Method according to claim 2, characterized in that the horizontal deflection coil (24) being of saddle type with top-knots perpendicularly to the tube axis, the magnetic screen (35, 35_a, 35_b) being arranged between the rear top-knot (27, 27_a) and the rear side (36, 56) of the vertical deflection coil (29, 54).

4. Method according to claim 3, characterized in that, in a manner known per se, the vertical deflection coil (29) is of toroidal shape.

5. Method according to claim 3, characterized in that, in a manner known per se, the vertical deflection coil (54) is of saddle shape with top-knots perpendicularly to the tube axis, the screen (35_a) being thus arranged between the rear top-knots (56, 27_a) of the vertical (54) and horizontal (24_a) deflection coils.

6. Method according to any of the preceding claims, characterized in that the magnetic screen (35) is arranged in such a manner that the vertical deflection center (32) is shifted towards the front side and the horizontal deflection center (31) towards the rear side of the tube.

7. Method according to any of the preceding claims, characterized in that the magnetic screen (35) comprises two portions forming the two halves of a circular crown.

8. Method according to any of claims 1 to 6, characterized in that the magnetic screen comprises a plurality of sectors (35₁, 35₂, 35₃, 35₄) of a crown.

9. Method according to claim 7 or 8, characterized in that the crown extends along a plane perpendicular to the tube axis (15).

10. Method according to claim 7 or 8, characterized in that the crown has a portion (60) perpendicular to the tube axis and a portion (61) inclined with respect to said portion perpendicular to the axis.

11. Adjustment method for an autoconvergent set formed by a colour-picture tube and a deflection unit obtained by the method of claim 3, characterized in that, in view of the adjustment, the shape and/or the dimensions and/or the position of the magnetic screen is adjusted.

