

Description

The present invention relates to a colour cathode ray tube (CCRT) comprising an in-line electron gun structure centred along a gun axis for producing three electron beams whose propagation paths lie in a plane, the propagation path of the central electron beam substantially coinciding with said gun axis, said electron structure having final focusing and accelerating electrodes constructed to provide a co-operative lensing arrangement, wherein the lensing arrangement comprises a first lensing structure in the focusing electrode and a second lensing structure in the accelerating electrode, the first lensing structure comprises three apertures in a forward, considered in the direction of propagation, planar surface of the focusing electrode normal to said gun axis, their axes of symmetry lying in said in-line plane, each of said apertures comprising a first opening in the forward plane, a sidewall extending rearward from the periphery of said first opening to define a terminal, second planar opening normal to said gun axis, said second openings non-intersecting, the second lensing structure comprises three apertures in a rearward, considered in the direction of propagation, planar surface of the accelerating electrode normal to said gun axis, their axes of symmetry lying in said in-line plane, each of said apertures comprising a first opening in the rearward planar surface and a sidewall extending forward from the periphery of the first opening to define a terminal, second planar opening normal to said gun axis, said second openings non-intersecting, and the sidewalls of the apertures of the first and second lensing structures are truncated surfaces of revolution.

Such a CCRT is known from United States Patent 4374341. Herein a CCRT comprising a unitized tri-potential (TPF) gun embodying four sequential electrodes, comprising a final focusing and accelerating electrode is disclosed. The individually unitized electrodes are formed as box-shaped structures and have definitive rear and forward substantially circular apertures individually defined by peripherally intumed projections.

Reducing the diameter of the neck of CCRTs can lead to cost savings for the television set maker and user in enabling smaller beam deflection yokes and consequent smaller power requirements. However, reducing the neck diameter while maintaining or even increasing beam deflection angle and display screen area severely taxes the performance limits of the electron gun.

In the conventional in-line electron gun design, an electron optical system is formed by applying critically determined voltages to each of a series of spatially positioned apertured electrodes. Each electrode has at least one planar apertured surface oriented normal to the tube's long or Z-axis, and contains three side by side or "in-line" circular straight through apertures. The apertures of adjacent electrodes are aligned to allow

passage of the three (red, blue and green) electron beams through the gun.

As the gun is made smaller to fit in the so-called "mini-neck" tube, the apertures are also made smaller and the focusing or lensing aberrations of the apertures are increased, thus degrading the quality of the resultant picture on the screen.

Various design approaches have been taken to attempt to increase the effective apertures of the gun electrodes. For example, U.S. Patent 4,275,332, describes an overlapping lens structure. This design is intended to increase effective apertures in the main lensing electrodes and thus to maintain or even improve gun performance in the new "mini-neck" tubes.

In the so called "Conical Field Focus" or CFF arrangement, the electrode apertures have the shape of truncated cones or hemispheres, and thus each aperture has a small opening and a related larger opening. In a preferred embodiment, the apertures are positioned so that the larger openings overlap. This overlapping eliminates portions of the sidewalls between adjacent apertures, leaving an arcuate "saddle" between these apertures.

Regardless of their complex shapes, CFF electrodes may be produced by deep drawing techniques, offering a marked cost advantage over other complex designs. However, in forming the CFF electrodes by deep drawing for mass production quantities, it has been discovered that the edge of the saddle between adjacent apertures becomes rounded, resulting in a slight decrease in the wall area between the apertures. Unfortunately, such a slight modification to the electrode is sufficient to distort the lensing field, and result in a out-of-round spot for the central electron beam on the display screen.

It is an object of the present invention to compensate distortions of the lensing field between the final focusing and accelerating electrode to provide a circular spot for the central electron beam on the display screen of a colour cathode ray tube.

According to the invention there is provided a colour cathode ray tube of the type mentioned in the preamble characterized in that one pair of similarly sized and shaped electron beam correctors extend from, and are integral with, the periphery of the second opening of at least the central aperture of at least one of said first and second lensing structures, the beam correctors being symmetrically disposed on diametrically opposite sides of the axis of symmetry and each point of the inwardly-directed surface thereof being substantially equidistant from the said axis of symmetry.

An embodiment of the present invention is characterized in that the surfaces of said sidewalls converge so that said second openings are smaller than the first openings.

A further embodiment of the invention is characterized in that a portion of the sidewall of each aperture intersects a portion of the sidewall of an adjacent aperture to form an arcuate saddle

which slopes inwardly from the respective planar surface.

In a preferred embodiment, the beam correctors are formed in the forward portion of the focusing electrode and the rear portion of the accelerating electrode, which are in adjacent, facing relationship, each defining three tapered in-line apertures, a central aperture and two side apertures. The apertures are of 3-dimensional surface of revolution (herein "volumetric configuration") which is substantially truncated, for example, a truncated cone or hemisphere, the axes of symmetry of which are parallel to one another and to the associated path of the electron beam. Each aperture has a large opening in an outer aperture plane of the electrode and a smaller opening in the interior of the electrode, the openings being separated by sloping sidewalls. The apertures are preferably partially overlapping, resulting in a portion of the sidewall of each aperture intersecting a portion of the sidewall of an adjacent aperture to form an inwardly-sloping arcuate rounded saddle along the region of intersection. The resulting structure is derived from the partial overlapping of geometric constructions of the volumetric configurations.

In order to compensate for the lensing field distortion caused by the rounded saddles, the structure also includes at least one pair of integral electron beam correctors located in mirrored, facing relationship in the region of the smaller-dimensioned opening of the central aperture of at least one of the lensing electrodes, the correctors being extensions of the sidewalls of the aperture.

In the presently most preferred embodiment, a pair of correctors is located in the focusing electrode in the central aperture, as rounded tabular extensions of the aperture sidewall, intersecting and symmetrical with the in-line plane of the electron gun. The correctors preferably have the same curvature as the rear opening.

In accordance with the invention, there may also be a pair of correctors as extensions of each of the side apertures, located above and below the in-line plane and symmetrical with it.

Another method of correcting distortions of a central electron beam of an in-line electron gun structure is disclosed in European Patent Application 84200504.3, which constitutes prior art according to Article 54(3) EPC. A pair of electron beam correctors is provided and constitute separate members from the sidewall of the central aperture. The electron beam correctors each comprise a central arcuate wall portion interconnecting two flat wall portions. The central arcuate portion is located outside the sidewall of the central aperture and is orientated such that a plane containing the flat wall portions intersects the in-line plane substantially perpendicularly. The distance between the facing surfaces of the flat wall portions is less than the diameter of the terminal opening of the central aperture. If corrections are necessary to the outer electron beams, Application 84200504.3 discloses providing

straight beam correctors, parallel to the in-line plane, on opposite sides of the outer apertures at the level of the terminal openings therein. The height of these straight beam correctors in the axial direction is less than that of the beam correctors for the central aperture.

The present invention will now be described, by way of example, with reference to the accompanying drawings, wherein:

Figure 1 is a sectioned elevation view of a colour cathode ray tube according to the invention;

Figure 2 is a sectioned elevation view of the forward portion of the in-line plural beam electron gun assembly shown in Figure 1, such view being taken along the in-line plane thereof;

Figure 3 is a perspective view from above of one embodiment of an integrated low potential lensing electrode, affording a partial view of the small openings of the apertures and one of the integral beam correctors;

Figure 4 is a sectioned elevation view of the low potential electrode of Figure 3, taken along a plane normal to the in-line plane and bisecting the central aperture;

Figure 5 is a representation of beam spot shapes related to the electron gun of Figure 2 without beam correctors;

Figure 6 is a representation of beam spot shapes related to the electron gun of Figure 2 with beam correctors; and

Figure 7 is a top view of an electrode workpiece ready for forming into an electrode structure having integral beam correctors.

With reference to Figure 1 of the drawings, there is shown a colour cathode ray tube (CCRT) 11 of the type employing a plural beam in-line electron gun assembly. The envelope enclosure is comprised of an integration of neck 13, funnel 15 and face panel 17 portions. Disposed on the interior surface of the face panel is a patterned cathodoluminescent screen 19 formed as a repetitive array of colour-emitting phosphor components in keeping with the state of the art. A multi-opening structure 21, such as a shadow-mask is positioned within the face-panel, spaced from the patterned screen.

Encompassed within the envelope neck portion 13 is an integrated plural beam in-line electron gun assembly 23, comprised of an integration of three side-by-side gun structures. Emanating therefrom are three separate electron beams 25, 27 and 29 which are directed to pass through mask 21 and land upon screen 19. It is within this electron-gun assembly 23 that the structure of the invention resides.

Referring now to Figure 2, the forward portion of the electron gun 23 of Figure 1 is shown, including a low potential electrode 31, a high potential electrode 33, and a convergence cup 35. Electrode 31 is the final focusing electrode of the gun structure, and electrode 33 is the final accelerating electrode.

In a "Uni-Bi" gun typically used in mini-neck CCRTs, the main focusing electrode potential is

typically 25 to 35 percent of the final accelerating electrode potential, the inter-electrode spacing is typically about 1.02 mm (0.040 inches), the angle of taper of the apertures is about 60° with respect to the tube axis, and the aperture diameters (smaller and larger dimensioned openings) are 3.556 mm (0.140 inches) and 5.588 mm (0.220 inches) for the focusing electrode and 3.81 mm (0.150 inches) and 6.35 mm (0.250 inches) for the accelerating electrode. The spacing between aperture centers is 4.496 mm (0.177 inches) (S¹) for the focusing electrode and 4.623 mm (0.182 inches) (S²) for the accelerating electrode.

Together, these two electrodes form the final lens fields for the electron beams. This is accomplished by co-operation between their adjacent, facing apertured portions to form lens regions which extend across the inter-electrode space. The tapered sidewalls of the apertures enable optimum utilization of the available space inside the tube neck 13.

Referring now to Figure 3, there is shown a focusing electrode 100 of the type shown in Figure 2, having three in-line apertures with large front beam-exiting openings 110, 120 and 130 substantially in the forward planar surface of the electrode, and smaller rear beam-entering openings 140, 150 and 160 in the interior of the electrode, such openings connected by substantially tapered sidewalls terminating with relatively short cylindrical portions 170, 180 and 190. Geometric constructions of the apertures are truncated cones (ignoring cylindrical portions 170, 180 and 190) which partially overlap one another. This overlap is indicated in phantom in the forward planar surface, and results in the partial removal of sidewall portions of adjacent apertures and the formation of inwardly sloping arcuate edges 230 and 240. In fabrication of such electrode structures by drawing, the edge tends to have a rounded contour forming what is termed herein a "saddle", resulting in reduced sidewall area between apertures and distortion of the lensing field. This field distortion results (for a typical Uni-Bi mini-neck gun as described above) in electron beam spots at the screen as shown in Figure 5. That is, the central beam spot 81 tends to become compressed vertically and elongated in the direction of the in-line plane of the three beams. Compensation for such distortion is provided herein by integral beam correctors. One of a pair of such beam correctors 210 is seen in Figure 3. A more detailed view is provided in Figure 4 which is a section view of the central portion of focusing electrode 100. Corrector 45a is an integral extension of cylindrical sidewall 45 and has a curvature conforming to that of rear opening 150. The corrector has a rounded, tabular shape. A similarly shaped corrector extends from the opposite side in facing relationship to corrector 45a. Depending upon the degree of field distortion present, and the amount of compensation desired, there may also be provided a similar pair of beam correctors for each of the side apertures 140 and 160. The corrector pair for the central

aperture lie within the in-line plane and are symmetrical with respect to it. The corrector pairs for the side apertures face the in-line plane, but are also symmetrical with respect to it. A lesser amount of compensation is generally needed for the side aperture-related fields than for the central aperture-related field, which may be achieved simply by smaller disc beam correctors.

Figure 6 shows the beam spots after compensation by use of the correctors as described herein.

Referring now to Figure 7, there is shown a central portion of a flat workpiece 70 of electrode material, having three in-line holes 71, 72 and 73 formed therein. Central hole 72 has a constricted central portion (hour-glass shape), in which the neck portion 72a is oriented normal to the in-line plane. When the workpiece 70 is formed, such as by deep drawing, dies having the desired shape force the electrode material surrounding the holes to deform into the sidewall portions defining the apertures. Tabular portions 70a and 70b of the workpiece become extensions of the central sidewall in this process, forming the desired integral beam correctors.

Claims

1. A colour cathode ray tube (CCRT) comprising an in-line electron gun structure (23) centred along a gun axis for producing three electron beams whose propagation paths lie in a plane, the propagation path of the central electron beam substantially coinciding with said gun axis, said electron structure having final focusing (31) and accelerating electrodes (33) constructed to provide a co-operative lensing arrangement, wherein the lensing arrangement comprises a first lensing structure in the focusing electrode (31) and a second lensing structure in the accelerating electrode (33), the first lensing structure comprises three apertures in a forward, considered in the direction of propagation, planar surface of the focusing electrode normal to said gun axis, their axes of symmetry lying in said in-line plane, each of said apertures comprising a first opening (110, 120, 130) in the forward plane, a sidewall extending rearward from the periphery of said first opening to define a terminal, second planar opening (140, 150, 160) normal to said gun axis, said second openings (140, 150, 160) non-intersecting, the second lensing structure comprises three apertures in a rearward, considered in the direction of propagation, planar surface of the accelerating electrode normal to said gun axis, their axes of symmetry lying in said in-line plane, each of said apertures comprising a first opening in the rearward planar surface and a sidewall extending forward from the periphery of the first opening to define a terminal, second planar opening normal to said gun axis, said second openings non-intersecting, and the sidewalls of the apertures of the first and second lensing structures are truncated surfaces of revolution, characterized in that one pair of similarly sized and shaped electron beam correctors (210) extend from, and are

typically 25 to 35 percent of the final accelerating electrode potential, the inter-electrode spacing is typically about 1.02 mm (0.040 inches), the angle of taper of the apertures is about 60° with respect to the tube axis, and the aperture diameters (smaller and larger dimensioned openings) are 3.556 mm (0.140 inches) and 5.588 mm (0.220 inches) for the focusing electrode and 3.81 mm (0.150 inches) and 6.35 mm (0.250 inches) for the accelerating electrode. The spacing between aperture centers is 4.496 mm (0.177 inches) (S¹) for the focusing electrode and 4.623 mm (0.182 inches) (S²) for the accelerating electrode.

Together, these two electrodes form the final lens fields for the electron beams. This is accomplished by co-operation between their adjacent, facing apertured portions to form lens regions which extend across the inter-electrode space. The tapered sidewalls of the apertures enable optimum utilization of the available space inside the tube neck 13.

Referring now to Figure 3, there is shown a focusing electrode 100 of the type shown in Figure 2, having three in-line apertures with large front beam-exiting openings 110, 120 and 130 substantially in the forward planar surface of the electrode, and smaller rear beam-entering openings 140, 150 and 160 in the interior of the electrode, such openings connected by substantially tapered sidewalls terminating with relatively short cylindrical portions 170, 180 and 190. Geometric constructions of the apertures are truncated cones (ignoring cylindrical portions 170, 180 and 190) which partially overlap one another. This overlap is indicated in phantom in the forward planar surface, and results in the partial removal of sidewall portions of adjacent apertures and the formation of inwardly sloping arcuate edges 230 and 240. In fabrication of such electrode structures by drawing, the edge tends to have a rounded contour forming what is termed herein a "saddle", resulting in reduced sidewall area between apertures and distortion of the lensing field. This field distortion results (for a typical Uni-Bi mini-neck gun as described above) in electron beam spots at the screen as shown in Figure 5. That is, the central beam spot 81 tends to become compressed vertically and elongated in the direction of the in-line plane of the three beams. Compensation for such distortion is provided herein by integral beam correctors. One of a pair of such beam correctors 210 is seen in Figure 3. A more detailed view is provided in Figure 4 which is a section view of the central portion of focusing electrode 100. Corrector 45a is an integral extension of cylindrical sidewall 45 and has a curvature conforming to that of rear opening 150. The corrector has a rounded, tabular shape. A similarly shaped corrector extends from the opposite side in facing relationship to corrector 45a. Depending upon the degree of field distortion present, and the amount of compensation desired, there may also be provided a similar pair of beam correctors for each of the side apertures 140 and 160. The corrector pair for the central

aperture lie within the in-line plane and are symmetrical with respect to it. The corrector pairs for the side apertures face the in-line plane, but are also symmetrical with respect to it. A lesser amount of compensation is generally needed for the side aperture-related fields than for the central aperture-related field, which may be achieved simply by smaller disc beam correctors.

Figure 6 shows the beam spots after compensation by use of the correctors as described herein.

Referring now to Figure 7, there is shown a central portion of a flat workpiece 70 of electrode material, having three in-line holes 71, 72 and 73 formed therein. Central hole 72 has a constricted central portion (hour-glass shape), in which the neck portion 72a is oriented normal to the in-line plane. When the workpiece 70 is formed, such as by deep drawing, dies having the desired shape force the electrode material surrounding the holes to deform into the sidewall portions defining the apertures. Tabular portions 70a and 70b of the workpiece become extensions of the central sidewall in this process, forming the desired integral beam correctors.

Claims

1. A colour cathode ray tube (CCRT) comprising an in-line electron gun structure (23) centred along a gun axis for producing three electron beams whose propagation paths lie in a plane, the propagation path of the central electron beam substantially coinciding with said gun axis, said electron structure having final focusing (31) and accelerating electrodes (33) constructed to provide a co-operative lensing arrangement, wherein the lensing arrangement comprises a first lensing structure in the focusing electrode (31) and a second lensing structure in the accelerating electrode (33), the first lensing structure comprises three apertures in a forward, considered in the direction of propagation, planar surface of the focusing electrode normal to said gun axis, their axes of symmetry lying in said in-line plane, each of said apertures comprising a first opening (110, 120, 130) in the forward plane, a sidewall extending rearward from the periphery of said first opening to define a terminal, second planar opening (140, 150, 160) normal to said gun axis, said second openings (140, 150, 160) non-intersecting, the second lensing structure comprises three apertures in a rearward, considered in the direction of propagation, planar surface of the accelerating electrode normal to said gun axis, their axes of symmetry lying in said in-line plane, each of said apertures comprising a first opening in the rearward planar surface and a sidewall extending forward from the periphery of the first opening to define a terminal, second planar opening normal to said gun axis, said second openings non-intersecting, and the sidewalls of the apertures of the first and second lensing structures are truncated surfaces of revolution, characterized in that one pair of similarly sized and shaped electron beam correctors (210) extend from, and are



integral with, the periphery of the second opening (150) of at least the central aperture of at least one of said first and second lensing structures, the beam correctors (210) being symmetrically disposed on diametrically opposite sides of the axis of symmetry and each point of the inwardly-directed surface thereof being substantially equidistant from the said axis of symmetry.

2. A CCRT as claimed in claim 1, characterized in that the surfaces of said sidewalls converge so that said second openings are smaller than the first openings.

3. A CCRT as claimed in claim 2, characterized in that a portion of the sidewall of each aperture intersects a portion of the sidewall of an adjacent aperture to form an arcuate saddle which slopes inwardly from the respective planar surface.

4. A CCRT as claimed in claim 1, 2 or 3, characterized in that the beam correctors (210) are located in the first lensing structure, adjacent the side apertures thereof, and are bisected by the in-line plane.

5. A CCRT as claimed in claim 4, characterized in that a pair of similarly shaped and sized beam correctors extend from and are integral with the periphery of the second openings (140, 160) of each of the side apertures of the said first lensing structure, the members of each of said pairs of beam correctors being located in facing relationship at opposite sides of a diameter of the respective side aperture normal to the said in-line plane.

6. A CCRT as claimed in any of the claims 1 to 5, characterized in that the beam correctors (210) are rounded tabular formations.

Patentansprüche

1. Farbkathodenstrahlröhre mit einem "in line"-Elektronenstrahlerzeugungssystem (23) zentriert um eine Erzeugerachse zum Erzeugen von drei Elektronenstrahlen, deren Fortpflanzungswege in einer Ebene liegen, der Fortpflanzungsweg des mittleren Elektronenstrahls im wesentlichen mit der Erzeugerachse zusammenfällt und das Erzeugungssystem Endfokussierungs- (31) und Beschleunigungselektroden (33) enthält zur Bildung eines zusammenarbeitenden Linsensystems, das eine erste Linienstruktur in der Fokussierelektrode (31) und eine zweite Linienstruktur in der Beschleunigungselektrode (33) enthält, die erste Linienstruktur drei Löcher in einer vorderen, in der Fortpflanzungsrichtung gesehenen, ebenen Fläche der Fokussierelektrode senkrecht zur Erzeugerachse enthält, wobei ihre Symmetrieachsen in einer "in line"-Ebene liegen, jedes Loch eine erste Öffnung (110, 120, 130) in der vorderen Ebene enthält, eine Seitenwand sich rückwärts vom Umfang der ersten Öffnung zur Bestimmung einer zweiten, ebenen Endöffnung (140, 150, 160) senkrecht zur Erzeugerachse erstreckt, die zweiten Öffnungen (140, 150, 160) sich nicht schneiden, die zweite Linienstruktur in einer rückwärtigen, in der Fortpflanzungsrichtung gesehenen, ebenen Fläche der Beschleunigungselektrode

senkrecht zur Erzeugerachse drei Löcher enthalten, deren Symmetrieachsen in der "in line"-Ebene liegen, wobei jedes Loch eine erste Öffnung in der rückwärtigen, ebenen Fläche und eine sich Vorwärtsrichtung vom Umfang der ersten Öffnung erstreckende Seitenwand um Bestimmung einer zweiten, ebenen Endöffnung senkrecht zur Erzeugerachse enthält, diese zweiten Öffnungen sich nicht schneiden, und die Seitenwände der Löcher der ersten und zweiten Linienstrukturen stumpfe Umdrehungsflächen sind, dadurch gekennzeichnet, daß ein Paar gleich bemessener und gleich geformter Elektronenstrahlkorrektoren (210) sich vom Umfang der zweiten Öffnung (140) wenigstens des zentralen Lochs wenigstens ein Teil der ersten und zweiten Linienstrukturen und integral damit erstrecken, wobei die Strahlkorrektoren (210) in diametral einander gegenüberliegenden Seiten der Symmetrieachse angeordnet sind und jeder Punkt ihrer inwärts gerichteten Fläche im wesentlichen äquidistant zur Symmetrieachse liegen.

2. Farbkathodenstrahlröhre nach Anspruch 1, dadurch gekennzeichnet, daß die Flächen der Seitenwände derart konvergieren, daß die zweiten Öffnungen kleiner als die ersten Öffnungen sind.

3. Farbkathodenstrahlröhre nach Anspruch 1, dadurch gekennzeichnet, daß ein Teil der Seitenwand jedes Lochs einen Teil der Seitenwand eines benachbarten Lochs zur Bildung eines gebogenen Sattels schneidet, der von der betreffenden ebenen Fläche nach innen abfällt.

4. Farbkathodenstrahlröhre nach Anspruch 1 oder 3, dadurch gekennzeichnet, daß die Strahlkorrektoren (210) sich in der ersten Linienstruktur und neben ihren Seitenlöchern befinden und durch die "in line"-Ebene halbiert werden.

5. Farbkathodenstrahlröhre nach Anspruch 1, dadurch gekennzeichnet, daß ein Paar gleich geformter und bemessener Strahlkorrektoren sich vom Umfang der zweiten Öffnungen (140, 160) jedes der Seitenlöcher der ersten Linienstruktur erstrecken und integral mit diesen Umfang sind, wobei die Elemente jedes der Paare von Strahlkorrektoren an einander gegenüberliegenden Seiten eines Durchmessers der betreffenden Seitenlochs senkrecht zu dieser "in line"-Ebene einander zugewandt angeordnet sind.

6. Farbkathodenstrahlröhre nach einem oder mehreren der Ansprüche 1 bis 5, dadurch gekennzeichnet, daß die Strahlkorrektoren (210) gerade tafelförmige Ausbildungen sind.

Revendications

1. Tube à rayons cathodiques couleurs (TRC) comportant une structure de canon électronique en ligne (23) centrée le long d'un axe de canal pour la réalisation de trois faisceaux d'électrons dont les trajets de propagation se situent dans un plan, le plan de propagation du faisceau d'électrons central coïncidant pratiquement avec le



axe de canon, ladite structure électronique présentant des électrodes de focalisation (31) et d'accélération (33) finales réalisées pour fournir un ensemble de lentille coopératif, dans lequel l'ensemble de lentille comporte une première structure de lentille dans l'électrode de focalisation (31) et une deuxième structure de lentille dans l'électrode d'accélération (33), la première structure de lentille comportant trois ouvertures dans une surface plane avant, vue dans la direction de propagation, de l'électrode de focalisation perpendiculaire audit axe de canon, leurs axes de symétrie étant situés dans ledit plan en ligne, chacune desdites ouvertures comportant un premier orifice (110, 120, 130) dans le plan avant, une paroi latérale s'étendant vers l'arrière à partir de la périphérie dudit premier orifice pour définir un deuxième orifice plane terminal (140, 150, 160) perpendiculaire audit axe de canon, lesdites deuxième orifices (140, 150, 160) ne se coupant pas, la deuxième structure de lentille comportant trois ouvertures dans un plan plane arrière, vu dans la direction de propagation, de l'électrode d'accélération perpendiculaire audit axe de canon, leurs axes de symétrie étant situés dans ledit plan en ligne, chacune desdites ouvertures comportant un premier orifice dans la surface plane arrière et une paroi latérale s'étendant à partir de la périphérie du premier orifice pour définir un deuxième orifice plane terminal perpendiculaire audit axe de canon, lesdits deuxième orifices ne se coupant pas et les parois latérales des ouvertures des première et deuxième structures de lentille sont des surfaces de révolution tronquées, caractérisé en ce qu'une paire de correcteurs de faisceau d'électrons (210) de mêmes dimensions et formes s'étend à partir de et de façon intégrée à la périphérie du deuxième orifice (150) d'au moins l'ouverture centrale d'au moins l'une desdites première et

deuxième structures de lentille, les correcteurs de faisceau (210) étant disposés symétriquement d'une façon diamétralement opposée des deux côtés de l'axe de symétrie et chaque point de la surface dirigée vers l'intérieur en est pratiquement équidistant par rapport à l'axe de symétrie.

2. Tube à rayons cathodiques couleurs selon la revendication 1, caractérisé en ce que les surfaces desdites parois latérales convergent de façon que lesdites deuxième orifices soient plus petits que les premiers orifices.

3. Tube à rayons cathodiques couleurs selon la revendication 2, caractérisé en ce qu'une partie de la paroi latérale de chaque ouverture coupe une partie de la paroi latérale d'une ouverture adjacente pour former une selle courbée inclinée vers l'intérieur à partir de la surface plane respective.

4. Tube à rayons cathodiques couleurs selon la revendication 1, 2 ou 3, caractérisé en ce que les correcteurs de faisceau (210) sont situés dans la première structure de lentille, voisine des ouvertures latérales de cette dernière et sont coupés par le plan en ligne.

5. Tube à rayons cathodiques couleurs selon la revendication 4, caractérisée en ce qu'une paire de correcteurs de faisceau de formes et de dimensions analogues s'étendant à partir de et sont intégrés à la périphérie des seconds orifices (140, 160) de chacune des ouvertures latérales de ladite structure de lentille, les éléments de chacune desdites paires de correcteurs de faisceau étant situés face à face du côté opposé d'un diamètre de l'ouverture latérale respective perpendiculaire audit plan en ligne.

6. Tube à rayons cathodiques couleurs selon l'une des revendications 1 à 5, caractérisé en ce que les correcteurs de faisceau (210) sont des ensembles arrondis tabulaires.



* C L M S *