

[54] **DEGAUSSING DEVICE FOR COLOUR CATHODE RAY TUBES**

3,614,519 10/1971 Figlewicz et al. 315/8

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[52] **U.S. Cl.** **315/8, 317/157.5 TV**

[51] **Int. Cl.** **H01f 13/00**

[58] **Field of Search** **315/8; 317/157.5 TV**

[56] **References Cited**

UNITED STATES PATENTS

3,317,781 5/1967 Barbin et al. 315/8

[57] **ABSTRACT**

A degaussing device which is adapted for use with a colour cathode ray tube comprised of a funnel-shaped envelope having neck and conical sections, faceplate, shadow mask and deflection coil, the degaussing device comprising a frustum-shaped magnetic shield received in the conical section of said envelope and a pair of annular degaussing coils stretched along the outer periphery of the conical section so as to partly surround the neck section, part of each degaussing coil being disposed in the rear end opening of the magnetic shield between the rear end portion of said magnetic shield and the front end portion of the deflection device. Part of each degaussing coil also extends along the outer side periphery of the face plate.

6 Claims, 15 Drawing Figures

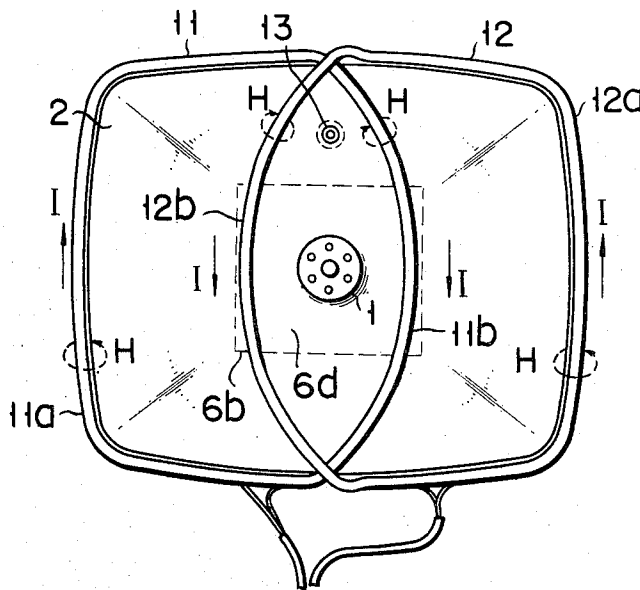


FIG. 1

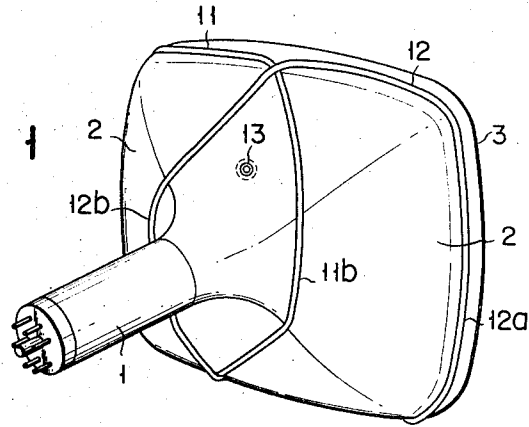


FIG. 2

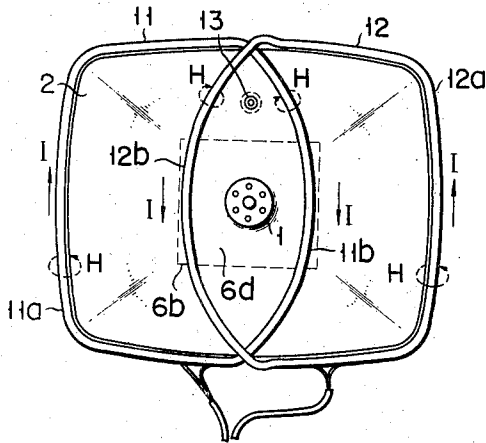


FIG. 3

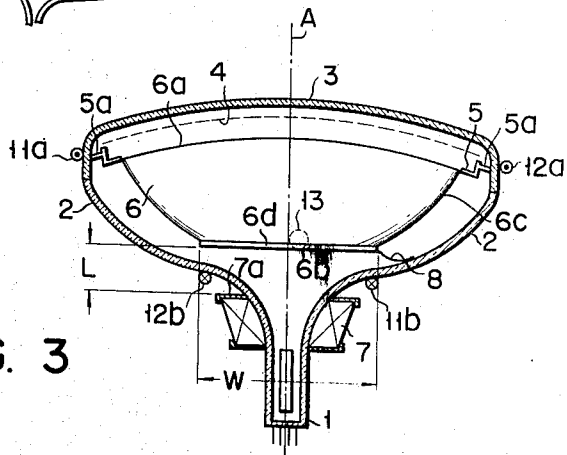


FIG. 4

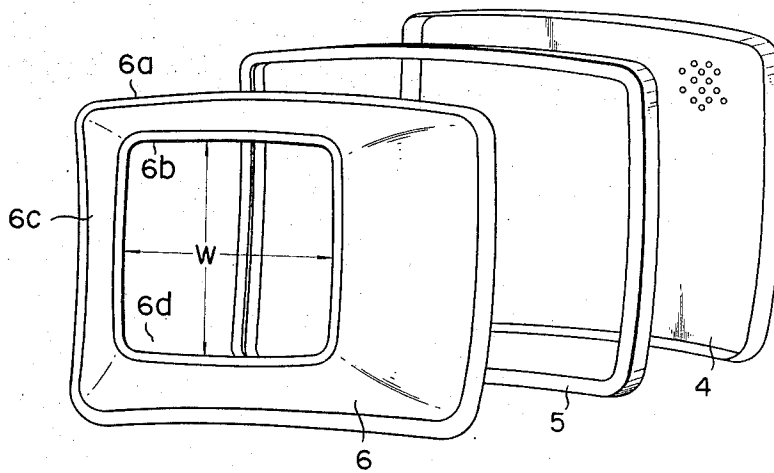


FIG. 5

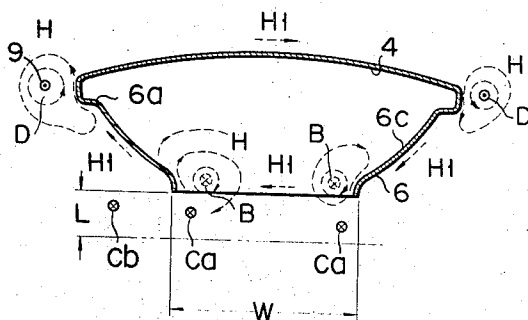


FIG. 6

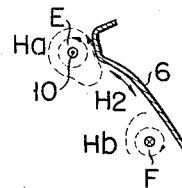


FIG. 7

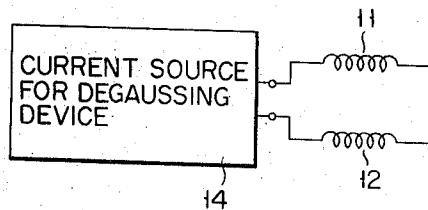


FIG. 8

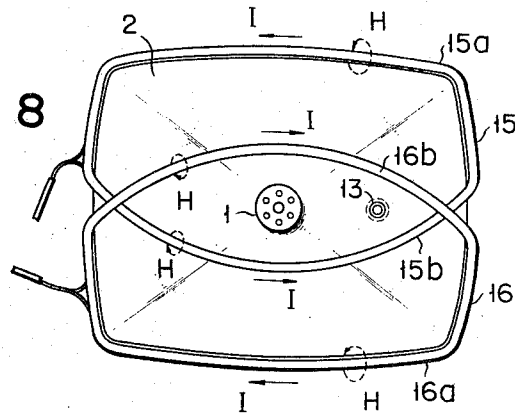


FIG. 9

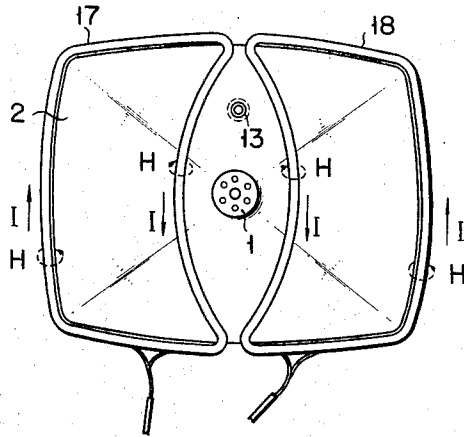


FIG. 10

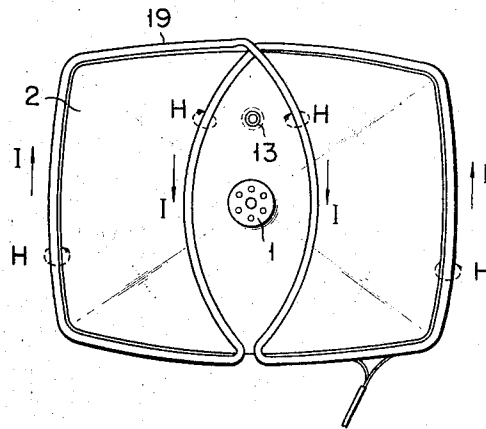


FIG. 11

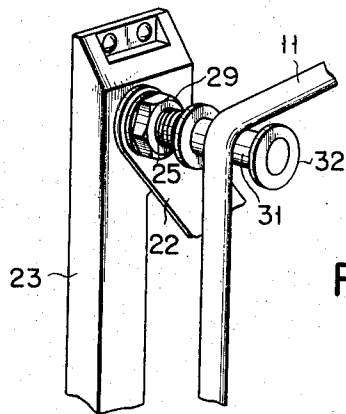
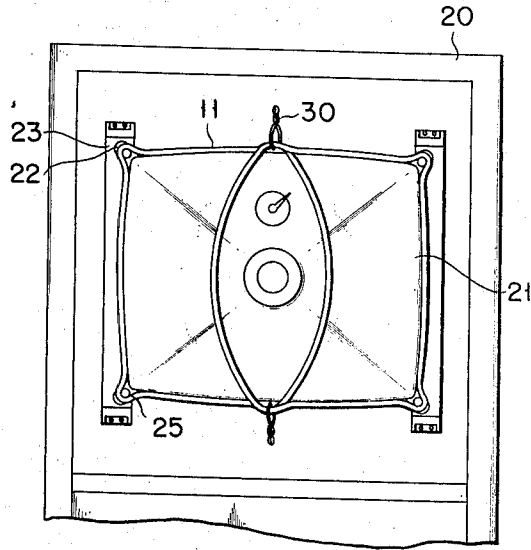


FIG. 12

FIG. 13

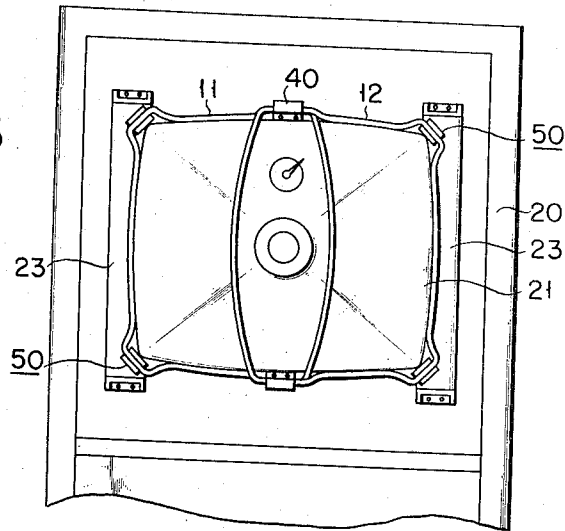
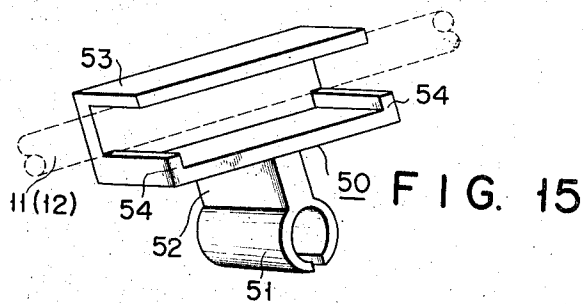
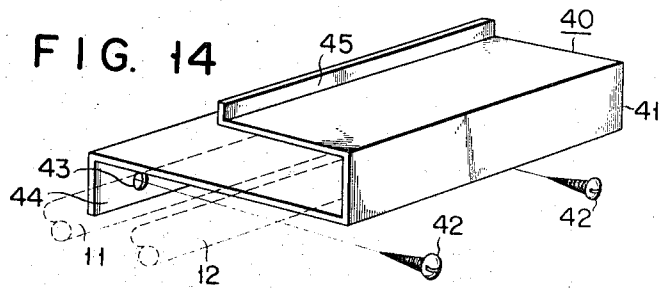


FIG. 14



DEGAUSSING DEVICE FOR COLOUR CATHODE RAY TUBES

This invention relates to a cathode ray tube and more particularly to degaussing device for a colour television picture tube.

A shadow mask type colour television picture tube used with a colour television receiver generally contains a shadow mask made of a thin steel plate disposed adjacent to the face. This shadow mask is capable of being magnetized by earth magnetism and other external magnetic fields, harmfully affecting the colour purity of the colour television receiver and its characteristic to converge electron beams. To save the shadow mask from the harmful effect of the above-mentioned magnetization, the customary practice is to surround the outer periphery of an ordinary colour television picture tube with a degaussing device consisting of a magnetic shield for shutting off the earth magnetism and the other external magnetic fields and degaussing coils, and to introduce gradually attenuating alternating current, thereby automatically attaining the degaussing effect by an alternating magnetic field resulting from said current.

Typical among such degaussing devices widely accepted to date is the one set forth in U.S. Pat. No. 3,322,998 assigned to this patent. The degaussing device of RCA consists of a frustum-shaped magnetic shield embedded in the outer periphery of the conical section of the colour television picture tube and an annular degaussing coil surrounding said magnetic shield. In this case, the degaussing coil is so positioned as to surround the magnetic shield close to its inner surfaces in the neighbourhood of both broader and narrower sections of said magnetic shield. When the power supply switch of the colour television apparatus is turned on, attenuating alternating current passes through said degaussing coil, thereby effecting the demagnetization of the magnetic shield itself and the shadow mask. With the prior art degaussing device, however, the magnetic shield and shadow mask are separated from each other near the face by the glass of the conical section of the cathode ray tube, failing to establish any magnetic connection. Accordingly, the conventional degaussing device has the drawback that due to the absence of a complete magnetic path directly connected to said magnetic shield, the important shadow mask receives only a slight degaussing effects even though the magnetic shield may be fully demagnetized.

The above-mentioned arrangement of the degaussing coil of the prior art degaussing device was intended to apply as great a degaussing effect as possible on the shadow mask. However, said arrangement of the degaussing coil for the magnetic shield was accompanied with the drawback that the coil arrangement consumed a great deal of time. To attain a greater degaussing effect, therefore, there was proposed a colour television picture tube having a magnetic shield received therein to be connected to a shadow mask. To date, however, there has not yet been developed any suitable degaussing device for such type of colour television picture tube. Accordingly, said development has been earnestly demanded.

SUMMARY OF THE INVENTION

This invention has been accomplished to meet this demand, and is intended to provide such a degaussing device for a colour television picture tube containing a

magnetic shield which is of simple construction and displays a very prominent degaussing effect. This object is attained by fitting a pair of annular degaussing coils along the outer periphery of the conical section of a colour television picture tube so as partly to surround the forward end portion of the neck section of the tube, causing said annular degaussing coils to intersect each other at two opposite points across the neck and introducing gradually attenuating current through said paired degaussing coils.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a colour television picture tube fitted with the degaussing coils of a degaussing device according to an embodiment of this invention;

FIG. 2 is a back view of the colour television picture tube of FIG. 1;

FIG. 3 is a sectional view of the colour television picture tube of FIG. 1 provided with a deflection coil;

FIG. 4 is a perspective view of a shadow mask and magnetic shield received in the colour television picture tube of FIG. 1;

FIGS. 5 and 6 illustrate conceptionally the distribution of magnetic fields along the periphery of the magnetic shield;

FIG. 7 shows the electrical connection of the paired degaussing coils;

FIGS. 8 and 9 illustrate the arrangements of the paired degaussing coils according to other embodiments of the invention;

FIG. 10 is a back view of a colour cathode ray tube provided with a single annular degaussing coil according to a further embodiment of the invention whose half portions intersect each other only at one point;

FIG. 11 is a back view of a cabinet fitted with a pair of degaussing coils according to the first mentioned embodiment of the invention;

FIG. 12 is an enlarged perspective view of part of the fitting member disposed in the cabinet, showing the condition in which the degaussing coil is fixed to the cabinet;

FIG. 13 illustrates another method of fixing the degaussing coil to the cabinet; and

FIGS. 14 and 15 are perspective views of the tools used in fixing the degaussing coils to the cabinet according to the method of FIG. 13.

DETAILED DESCRIPTION OF ILLUSTRATED EMBODIMENTS

There will now be described by reference to the appended drawings a degaussing device according to an embodiment of this invention. Reference is first made to a colour television picture tube with which the degaussing device of this invention is to be used. As seen from FIGS. 1 to 3, the conical section 2 of said colour television picture tube is connected to the neck section 1 thereof containing an electron gun member. On the inner wall of the front side of the conical section 2 is provided a rectangular faceplate 3 coated with a fluorescent layer. Thus is formed the body of a colour television picture tube. In said body are received, as shown in FIG. 4, a perforated steel plate or shadow mask 4 and a frustum-shaped magnetic shield 6 made of magnetic metal connected to said shadow mask 4 through a frame 5. As apparent from FIG. 3, the shadow mask 4 is positioned adjacent to the faceplate 3. The forward

end portion 6a of said frustum-shaped magnetic shield 6 abuts against the shadow mask 4 through said frame 5 of magnetic metal, eventually attaining a magnetic connection between said shield 6 and mask 4. Where necessary, the frame 5 may be eliminated so as to connect the shadow mask 4 directly to the magnetic shield 5. The rear end portion 6b of the magnetic shield 6 is set apart for a distance of L in the direction of the axis A of the colour television picture tube from the forward end portion 7a of a deflection coil device 7 wound about the outer periphery of that portion of an envelope which is between the rear end of the conical section 2 and the neck section 1. The intermediate portion 6c of said magnetic shield 6 is so formed as to extend substantially along the inner peripheral wall of the conical section 2. The reason why the rear end portion 6b of the magnetic shield 6 is disposed apart from the deflection coil device 7 is the object of preventing the distribution of a deflection magnetic field generated by said deflection device 7 from being obstructed by said magnetic shield 6. Said deflection coil device 7 is of ordinary construction with the horizontal and vertical deflection coils wound about a yoke to subject beams of electrons to deflection scanning. The frame 5 is mounted in the envelope by suitable supports 5a fitted to the inner peripheral portion of the faceplate. A contact strip 8 projectively formed on the edge of the rear end portion 6b of the magnetic shield 6 abuts against a layer of graphite coating on the inner wall of the conical section 2. When the colour television picture tube is in operation, the prescribed high voltage is impressed on the anode, magnetic shield 6 and shadow mask 4 through an anode button 13 disposed inside of the conical section 2. In practice, the neck section 1 is fitted with a convergence yoke and colour purity magnet (neither shown) in addition to said deflection coil device 7. To simplify the drawings, said deflection coil device 7 is only indicated in FIG. 3 and omitted in other drawings.

Demagnetization of particularly the shadow mask of a colour television picture tube requires the installation of a degaussing coil. It is generally known that the provision of a degaussing coil close to both inner and outer walls of a magnetic shield attains a prominent degaussing effect as described in connection with the degaussing device of the aforementioned RCA patent. If this arrangement is applied to the colour television picture tube, then a degaussing coil 9 will be positioned, as shown in FIG. 5, on the outside (indicated by D) of the front end portion 6a of the magnetic shield 6 and also on the inside (indicated by B) of the rear end portion 6b of said magnetic shield 6. Where the degaussing coils at the points B and D are supplied with counter streams of attenuating alternating current, namely in the direction of the indicated arrows, then there will arise magnetic fluxes H around each coil which act in the same direction as indicated by dotted lines, and there should, as naturally expected, be formed a magnetic path H1 penetrating to magnetic shield 6 acting as a magnetic core for the aforesaid degaussing coils at the points B and D, thereby attaining a prominent degaussing effect. However, a colour television picture tube used in this invention has the magnetic shield 6 received therein, preventing a degaussing coil from being disposed on both inner and outer surfaces of the magnetic shield 6. Accordingly, the degaussing coils have to be provided only on the outside the magnetic shield

6 through the glass of cone section 2. Even if degaussing coils 10 are disposed only on the outer surface of the magnetic shield 6 at two points E and F as shown in FIG. 6 and attenuating alternating current is caused to pass through said degaussing coils at the points E and F, then the magnetic fluxes Ha and Hb will appear in the forms indicated by dotted lines, acting in the opposite directions as shown by the arrows, so that the resultant magnetic fluxes H2 will offset each other. Accordingly, there will not be formed any magnetic path which will pass through the magnetic shield 6, failing to provide a sufficiently great degaussing effect to act on even the shadow mask 4.

It will be noted that the formation of a magnetic path referred to in the previous and following descriptions is simply based on an assumption desired from the present inventors' understanding so as to facilitate explanation. The reason is that it is difficult to determine how a magnetic path is actually grown.

The present inventors' experiments show that the undermentioned arrangement of degaussing coils is most effective. Namely, it is preferred that a pair of annular degaussing coils of substantially the same shape and size be fitted along the outer periphery of the faceplate and the conical section 2 of the television picture tube so as to partly surround the neck section 1 and intersect each other at two opposite points across said neck section 1, and be connected to the degaussing power source.

There will now be detailed the arrangement of degaussing coils according to this invention. As seen from FIGS. 1 to 3, a pair of annular degaussing coils 11 and 12 are fitted along the outer periphery of the colour television picture tube of this invention to spatially surround a magnetic shield 6 received in the conical section 2 such that the inner portions 11b and 12b of said paired degaussing coils partly surround the neck section 1 and intersect each other at two opposite points across the neck section 1. Further, an anode button 13 is provided in a leaf-shaped area defined by said two intersections of the degaussing coils 11 and 12 and the inner portions 11b and 12b of said coils 11 and 12 facing each other across the neck section 1 of the television picture tube. The above-mentioned position of the anode button 13 impressed with high voltage enables the inner portions 11b and 12b of the degaussing coils 11 and 12 defining said leaf-shaped area to be considerably separated from said anode button 13, preventing the high voltage supplied and the degaussing effect from being harmfully affected by each other. As seen from FIG. 3, the inner portions 11b and 12b of the degaussing coils 11 and 12 are disposed in a free space having a width L which is provided between the rear end portion 6b of the magnetic shield 6 and the forward end portion 7a of the deflection coil device 7. The remaining or outer portions 11a and 12a of the degaussing coils 11 and 12 are positioned near the forward end portion 6a of the magnetic shield 6, in parallel relationship with the inner portions 11b and 12b. Since part of the degaussing coils 11 and 12 is disposed between the anode button 13 and the forward end portion 7a of the deflection coil device 7, the deflection magnetic field of the deflection coil device 7 is not adversely affected. The annular degaussing coils 11 and 12 are connected, as shown in FIG. 7, to the degaussing power source 14 in serial relationship with each other so as to introduce current therethrough in the later described direction.

Said degaussing power source 14 is formed, as is well known, of a thermistor and varistor, and connected to the power source of a colour television receiver to generate attenuating alternating current when the power supply switch of said receiver is thrown in (i.e., turned on). (Provided current is caused to flow in the prescribed direction, it is possible to connect both degaussing coils 11 and 12 in the degaussing power source 14 in parallel relationship with each other.)

The degaussing device of this invention comprising a paired degaussing coils arranged as described above and capable of being easily located with reference to the neck section 1 offers advantages in mass production.

Where the power supply switch of a colour television receiver is turned on, attenuating alternating current I supplied from the degaussing power source 14 to the annular degaussing coils 11 and 12 flows through the inner portions 11*b* and 12*b* of said coils momentarily in the direction of the arrow indicated in FIG. 2, and through the outer portions 11*a* and 12*a* of said coils in the opposite direction, thereby producing magnetic fluxes H around the degaussing coils 11 and 12. Where the inner portions 11*b* and 12*b* of the annular degaussing coils 11 and 12 are positioned, as shown in FIG. 3, in an interspace L between the rear end portion 6*b* of the magnetic shield 6 and the forward end portion 11*a* of the deflection coil device 7, part of the magnetic shield 6. As a result, the inner portions 11*b* and 12*b* of the degaussing coils appear to present a magnetic distribution equivalent to that which would result if said inner portions 11*b* and 12*b* were positioned inside of the rear end portion 6*b* of the magnetic shield 6, namely in the position B of FIG. 5. Actually, therefore, the inner portions 11*b* and 12*b* disposed outside of the magnetic shield 6, namely in the positions Ca and C*b* of FIG. 5 generate a magnetic field having substantially the same intensity as when said portions 11*b* and 12*b* are located in the position B.

The present inventors have found that the inner portions 11*b* and 12*b* of the degaussing coils disposed in the position Ca present a greater degaussing effect than when said portions 11*b* and 12*b* are located in the position C*b*. The reason is assumed to be that though said positions Ca and C*b* are alike disposed in the interspace L, the position Ca falls within the inner diameter W of the rear end opening 6*d* of the magnetic shield 6, and that the inner portions 11*b* and 12*b* of the degaussing coils positioned within the above-mentioned range W increase the amount of magnetic fluxes which seem to intrude into the inner wall of the magnetic shield, thereby creating a condition resembling that which would occur if the inner portions 11*b* and 12*b* of the degaussing coils were placed in the position B. To attain the aforesaid desired position Ca, it is practically advised to bring the portions 11*b* and 12*b* of the degaussing coils slightly nearer to the front end portion 7*a* of the deflection coil device 7. Since the undue proximity of said portions 11*b* and 12*b* to the deflection coil device 7 harmfully affects a deflection magnetic field generated by said device 7, it is preferred that said portions 11*b* and 12*b* be so positioned as to face a given point on the outer periphery portion of the conical section 2 which extends from the inner edge of the rear end opening 6*d* of the magnetic shield 6 in the direction of the axis A of the television picture tube. At any rate, this invention enables the inner portions 11*b* and 12*b*

and the outer portions 11*a* and 12*a* of the degaussing coils to generate magnetic fluxes acting in the same direction so as to present joint magnetic fluxes with the result that there is formed, as shown in FIG. 5, a magnetic path H1 across the magnetic shield 6 and shadow mask 4, thereby forcefully demagnetizing the shadow mask 4.

As apparent from the foregoing description and appended drawings, the degaussing device of this invention comprises of a pair of annular degaussing coils fitted along the outer periphery of the conical section of a colour television picture tube and intersecting each other or two opposite points across the neck section so as to partly surround the inner end portion of the neck section. Accordingly, said degaussing device is of simple arrangement and provides a very prominent degaussing effect. Even where a colour television receiver has its position changed or is installed in a different place, the degaussing device of this invention prevents the colour purity of said receiver and the convergence of electron beams occurring therein from being deteriorated. The present degaussing device which is magnetically connected to the shadow mask 4 is adapted for use with such type of colour television picture tube as has a magnetic shield received therein. Further, according to this invention, the degaussing coils unfailingly maintain a safe position relative to the anode button even when they are superposed on each other or mutually intersected at the prescribed points on the outer periphery of the conical section.

In the foregoing embodiment, the annular degaussing coils 11 and 12 were made to intersect each other near the longer or horizontal sides of the front end portion 6*a* of the magnetic shield 6. However, with a colour television picture tube having an anode button 13 disposed, as shown in FIG. 8, at a different point from the preceding case, said anode has to be located within a leaf-shaped area defined by the intersections of the degaussing coils 15 and 16 and the inner portions 15*b* and 16*b* of said coils. In this case said intersections are positioned near the right and left sides of the faceplate of the television picture tube. Even this arrangement can attain the same degaussing effect as the first embodiment. The parts of FIG. 8 the same as those of FIGS. 1 to 3 (except for the degaussing coils) are denoted by the same notations, description thereof being omitted.

Further, according to the preceding embodiments, the degaussing coils 11, 12 and 15, 16 intersect each other over a very short part, but these intersections may extend over a considerably long part.

As shown in FIG. 9 representing still another embodiment of this invention, a pair of annular degaussing coils 17 and 18 may be disposed on the outer periphery of the conical section 2 and the faceplate 3 of the colour television picture tube without partly surrounding the neck section 1, and intersecting each other. Still, this arrangement attains the same degaussing effect as the preceding embodiments.

As illustrated in FIG. 10 denoting a further embodiment of the invention, a single annular degaussing coil 19 may be disposed on the outer periphery of the conical section 2 and the faceplate 3 of the television picture tube with the half portions of said coil intersected by each other only at one point. Even this form of a degaussing coil realizes the same degaussing effect as the preceding embodiments.

All the foregoing embodiments refer to the case where the subject colour cathode ray tube contained a dotted shadow mask. Obviously, this invention is also applicable to such a colour cathode ray tube as is provided with a slit, or grid type shadow mask. Further, the degaussing device of this invention is adapted for use with such a colour cathode ray tube as is fitted with a delta-type or in-line type triple gun assembly or a single electron gun.

There will now be described by reference to FIG. 11 the manner in which a colour cathode ray tube and degaussing coils are fitted to the cabinet of a colour television receiver. In the prescribed position of a cabinet 20 is placed a colour television picture tube 21. FIG. 11 shows the back side of the cabinet 20 containing the picture tube 21 fitted with degaussing coils. The four corners of a tightening band (not shown) attached to the outer periphery of the faceplate 3 of the colour cathode ray tube 21 are provided with fitting metal parts 22. The cabinet 20 has a pair of elongate chassis 23 fixed to both vertical sides so as to support the picture tube 21. In each chassis 23 is embedded a long threaded rod 25 projecting into the cabinet 20. With said threaded rod 25 is engaged a fitting metal part 22, which in turn is fixed to the chassis by a nut 29. The outer end of the threaded rod 25 projecting from the nut 29 (see FIG. 12) is tightly inserted or screwed into a guide tube 31 made of insulating material. The degaussing coil 11 or 12 is fixed in place with part of it stretched over the outer periphery of said guide tube 31. The intersections of the degaussing coils 11 and 12 and the central parts of the remaining side portions thereof are fixed to the cabinet by being clipped with a clamping member 30 comprised of, for example, and insulated electric wire, cord or metal part.

As mentioned above, the degaussing coils and 12 are fixed to the cabinet 20 by having the central parts of the four upper, lower, right and left sides properly clipped and the four corners engaged with the threaded rods 25. Accordingly, the support of said degaussing coils 11 and 12 can be very easily effected by a small number of parts, offering practical advantage. The guide tube 31 made of insulating material is intended to increase electrical insulation between the degaussing coils 11 and 12 and the threaded rods 25. However, provision of said guide tube 31 is not always required, because the aforesaid electrical insulation is substantially assured by the insulation coating of the degaussing coils 11 and 12.

If both ends of the guide tube 31 are fitted with a flange 32 and the degaussing coil 11 or 12 is stretched between said flanges 32, then the degaussing coil 11 or 12 will have its position secured by said flanges 32 to be prevented from falling off the threaded rod 25 or contacting the nut 29. Accordingly, the degaussing coil 11 or 12 will have greater electrical insulation from the cathode ray tube 21 and be more firmly supported. Provision of a flange 32 even at one end of the guide tube 31 attains the above object more effectively than when there is not provided any flange 32. Therefore, it is not always necessary to form such flange 32 at both ends of the guide tube 31.

The degaussing device of this invention may be fitted to the cabinet of a colour television receiver otherwise than described above. Namely, if the degaussing coils 11 and 12 are supported by special means shown in FIG. 13, then said support will be effected more reli-

ably. Throughout the description given by reference to FIG. 13 and the succeeding Figures, the same parts as those of FIGS. 1 to 12 are denoted by the same notations, description thereof being omitted. Referring to FIG. 13, the degaussing coils 11 and 12 are arranged and fitted in substantially the same manner as in FIG. 11. Namely, the degaussing coils 11 and 12 are supported by special means as in FIG. 11 where there is used the guide tube 31. Further, the clamping member 40 of FIG. 13 comprising a substantially channel-shaped frame. The degaussing coils 11 and 12 are clipped by clamping members 40 at the intersections and further supported by holding metal parts 50 provided at the four corners of the image pickup tube 21. The clamping member 40 includes an integral assembly of a channel-shaped frame 41 made of insulating material, for example, synthetic resin so as to receive the degaussing coils 11 and 12; a cabinet-abutting plate 44 perforated with a plurality of holes 43 penetrated by screws 42 to fix said clamping member 40 to the cabinet 20 and perpendicularly extending from the outer edge of the base plate of said channel-shaped frame 41; and a projection 45 formed by bending the outer side portion of the upper plate of said channel-shaped frame 41 perpendicularly in the opposite direction to said cabinet-abutting plate 44. As seen from FIG. 14, the upper plate of the channel-shaped frame 41 is made shorter than the base plate thereof so as to provide a free space by the different lengths of said both plates, thereby facilitating the insertion of the degaussing coils 11 and 12 into the interior of said channel-shaped frame 41. Obviously, where such consideration is unnecessary, it is possible to make both upper and base plates of the same length or to eliminate the aforesaid upward projection 45. After the degaussing coils 11 and 12 are properly placed in the channel-shaped frame 41, the clamping member 40 is fixed to the cabinet 20 by means of screws 42.

the four corners of an assembly of the degaussing coils 11 and 12 disposed at the four corners of the television picture tube 21 are each supported by a holding member 50 formed of electrically insulating synthetic resin which has a cylindrical member 51 fitted by proper means to the threaded rod 25 inserted into the chassis 23 fixed to the cabinet 20. As seen from FIG. 15, a notch is cut out along the full length of said cylindrical member 51 so as to easily insert the threaded rod 25. The degaussing coil 11 or 12 is firmly held by the elasticity of the cylindrical member 51. To the cylindrical member 51 is attached a connection member 52, to the outer end of which there is integrally fitted a substantially channel-shaped frame 53. The base plate of said channel-shaped frame 53 is provided at both ends with inwardly extending flexible projection 54. The connection member 52 is attached to the substantially central part of said base plate. The opening of the channel-shaped frame 53 is, as naturally expected, made to face the backside of the cabinet 20. The degaussing coil 11 or 12 is inserted, as indicated by the broken lines of FIG. 15, through the opening of the frame 53 to be held by the elasticity of the projections 54. If not particularly required, the projections 54 may be omitted. The holding member 50 is fixed to each of the threaded rods 25 disposed at the four corners of the television picture tube 21 so as to support the degaussing coils 11 and 12.

The above-mentioned arrangement causes the degaussing coils to be indirectly fitted to the threaded rod 25 in a fully electrically insulated state. Moreover, the holding member 50 is made rotatable to be finally fixed in the best position. Provision of the holding member 50 prevents the loosening or falloff of the nut 29 and, in co-operation with the clamping member 40, enables the degaussing coils 11 and 12 to be freely attached to or taken off the colour television picture tube 21, offering the advantage of facilitating the removal or replacement of said tube 21. Further, the holding member 50 concurrently attains the same effect as the degaussing coil-fitting means of FIGS. 11 and 12.

The foregoing description referred to the typical arrangements of the degaussing device of this invention. However, the invention is not limited to such applications, but may obviously be practised in various modifications or arrangements. Any other form of the degaussing device should be construed to fall within the scope of the invention, provided it does not depart from the object thereof.

What we claim is:

1. A degaussing device for a colour television picture tube which comprises a generally funnel shaped envelope portion having a faceplate at one end thereof, said faceplate having outer side peripheral portions, and a neck section at the other end thereof, the axial direction of the picture tube being defined as a direction extending substantially centrally through the funnel shaped envelope portion from the neck section to the faceplate, and electron beam deflection means (7) provided around the outer periphery of the neck section of the picture tube, and having a forward end portion which is located closer to the faceplate than the remaining portions of the deflection means (7), comprising:

a frustum-shaped magnetic shield (6) received in the colour television picture tube and formed of a forward end portion (6a) magnetically connected to a shadow mask disposed adjacent to the faceplate of the colour television picture tube, a rear end portion (6b) set apart in the axial direction of the picture tube from the forward end portion of the electron beam deflection means (7) and an intermediate portion (6c) extending substantially along an inner wall of the generally funnel shaped envelope portion of the television picture tube;

degaussing coil means (11,12) including a pair of outer coil portions (11a,12a) extending opposing each other along the outer side periphery of the faceplate and a pair of inner coil portions (11b,12b) extending opposing each other toward the neck section which passes between said inner coil portions, said inner coil portions (11b,12b)

being on the outside of, and adjacent to, the funnel shaped envelope portion of said tube and said inner and outer coil portions being coupled with each other to form at least one loop, parts of the inner coil portions (11b,12b) being disposed substantially above the edge (6b) of the rear opening of the magnetic shield (6) and being between the rear end portion (6b) of the magnetic shield (6) and the forward end portion (6a) of the deflection means (7), said outer coil portions (11a,12a) being positioned near the forward end portion (6a) of the magnetic shield (6); and

a degaussing current source (14) connected to the degaussing coil means (11,12) to supply at least one gradually attenuating alternating current to the degaussing coil means so as to produce current flow in the outer coil portions (11a,12a) in a predetermined direction relative to the tube and to produce current flow in the inner coil portions (11b,12b) in a direction opposite to said predetermined direction to thereby produce degaussing flux flow which passes through both the magnetic shield and the shadow mask.

2. A degaussing device according to claim 1 wherein the degaussing coil means (11, 12) comprises a pair of annular degaussing coils each having inner and outer portions which are connected together and stretched along the outer periphery of the television picture tube, said pair of coils being partially superposed on each other and having two opposed intersecting points between which the neck section of the television picture tube extends.

3. A degaussing device according to claim 2 wherein the tube has an anode button, and the paired degaussing coils are so stretched along the outer periphery of the conical section of the television picture tube as to cause the anode button to be enclosed in a leaf-shaped area defined by the intersections of the paired degaussing coils and the mutually facing inner parts thereof.

4. A degaussing device according to claim 3 wherein the paired degaussing coils are so connected to the degaussing power source as to cause electric current to run through the inner parts of the degaussing coils which partly surround the neck section of the television picture tube in the opposite direction to that which passes through the outer parts of said degaussing coils stretched parallel with said inner parts.

5. A degaussing device according to claim 4 including clamping means fixing the degaussing coils in place at the intersections thereof.

6. A degaussing device according to claim 5 including holding means fixing the degaussing coils in place at parts thereof other than at said intersections.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 3,872,347
DATED : March 18, 1975
INVENTOR(S) : Yoshiichi MATSUSHIMA et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Abstract, line 10, after "being disposed"
change "in" to --over--;

Column 10, line 9, before "portion (6a)" change
"endc" to --end--.

Signed and sealed this 10th day of June 1975.

(SEAL)

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents
and Trademarks

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