

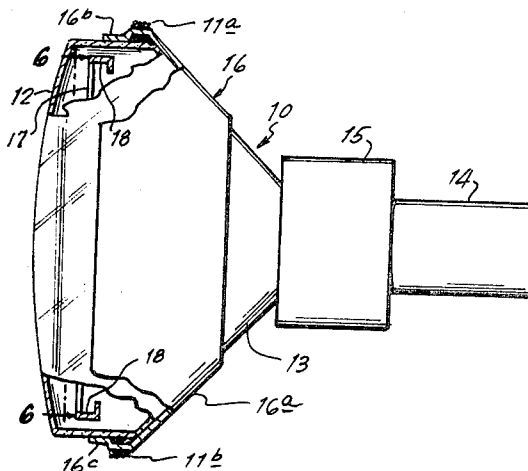
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 [73] Assignee **Sony Corporation**
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 [33] **Japan**
 [31] **43/24594**

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[54] **DEGAUSSING DEVICE FOR COLOR PICTURE**
TUBE HAVING PARALLEL-SLITTED BEAM-
SELECTING GRID
 3 Claims, 7 Drawing Figs.

[52] U.S. Cl..... **315/8,**
317/157.5
 [51] Int. Cl..... **H01j 29/06**
 [50] Field of Search..... **315/8;**
317/157.5

ABSTRACT: A degaussing structure for a video tube which serves to demagnetize the tube and an apertured beam-selecting member in the tube. A shroud surrounds the forward portion of the tube and the apertured beam-selecting member. A pair of degaussing coils which are connected in series are wrapped around cutout areas in the shroud at the top and bottom thereof such that the magnetic flux produced by the current carrying coils is in a direction to degauss the apertured beam-selecting member.



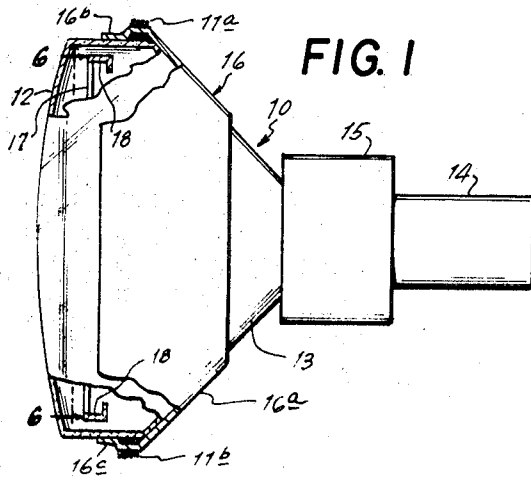


FIG. 1

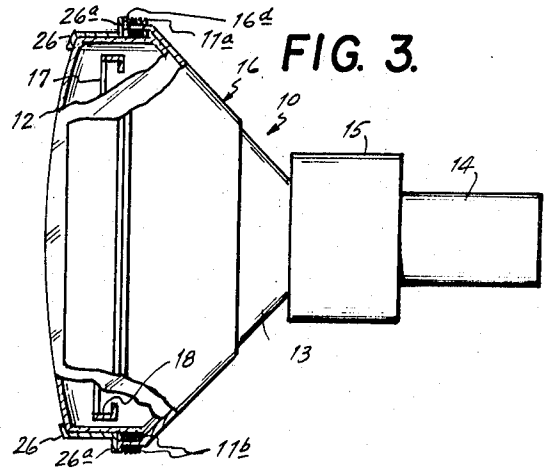


FIG. 3

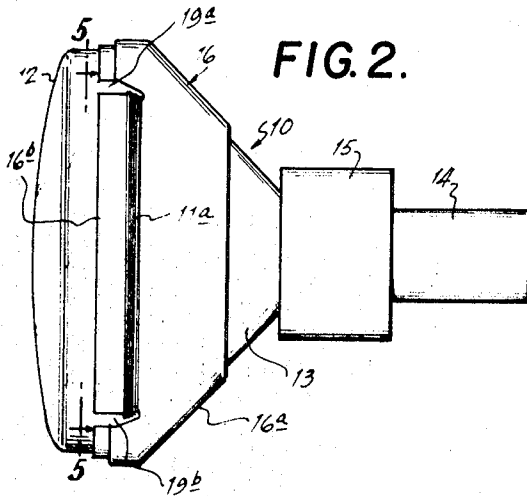


FIG. 2

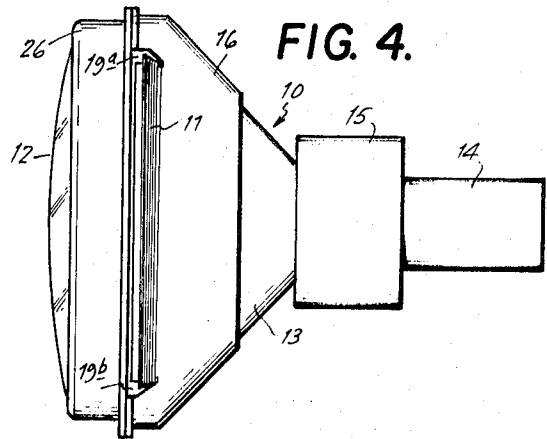


FIG. 4

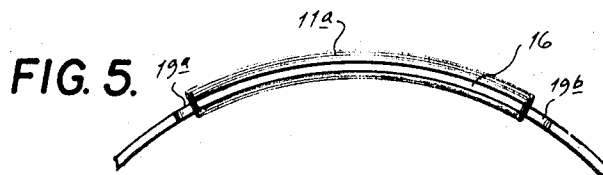


FIG. 5

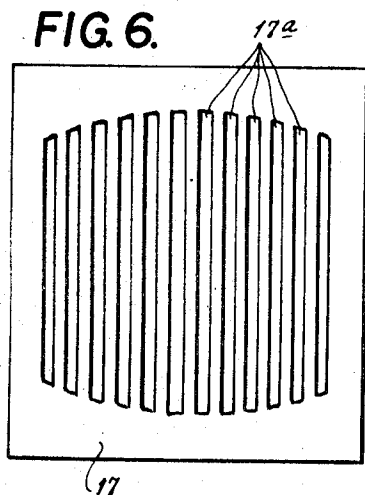


FIG. 6

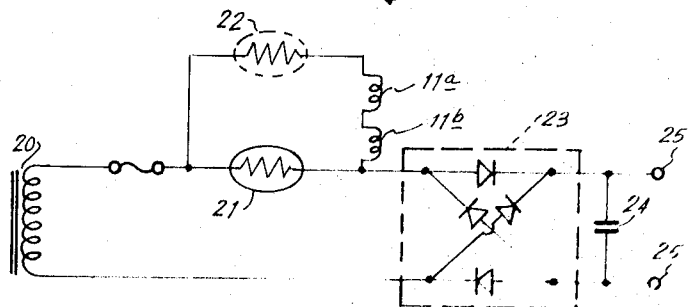


FIG. 7

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DEGAUSSING DEVICE FOR COLOR PICTURE TUBE HAVING PARALLEL-SLITTED BEAM-SELECTING GRID

This invention relates generally to video tubes of television receivers, and more particularly is directed to degaussing devices for such tubes.

The deleterious effects of the earth's magnetism and the influence of magnetic fields from motors such as found in appliances on the video tubes of television receivers are well known. Various devices have been suggested in the prior art to overcome the ill effects of stray magnetic fields; the most notable of these devices being a coil surrounding the video tube. The prior art devices did not effectively remove the effects of stray magnetic fields, however, and they required a relatively large amount of power.

The present invention seeks to improve on the prior art degaussing devices in a simple, efficient and inexpensive manner. A relatively large magnetic shroud which has a high permeability such as sheet steel is attached to and surrounds the envelope of the video tube at the forward end adjacent the screen. A pair of coils having AC current passed therethrough and being magnetically coupled to the shield are selectively mounted on the video tube. A grid such as an aperture grill or a shadow mask for attracting electrons is also included in the magnetic flux path whereby the screen and the grid in the video tube are degaussed in a highly efficient manner.

The above, and other objects, features and advantages of the invention will be apparent in the following detailed description of illustrative embodiments thereof which is to be read in connection with the accompanying drawings, wherein:

FIG. 1 is a side view partly in section showing a degaussing device mounted on a video tube;

FIG. 2 is a top view showing the structure of the degaussing shield and a portion of the coil;

FIG. 3 is a side view partly in section showing another embodiment of the invention;

FIG. 4 is a top view showing details of the FIG. 3 embodiment;

FIG. 5 is a view taken along the line 5-5 of FIG. 2;

FIG. 6 is a view taken along the line 6-6 of FIG. 1; and

FIG. 7 is a circuit diagram showing a degaussing circuit.

Referring to FIG. 1, there is shown a video tube 10 which is commonly used in television receivers. The video tube 10 comprises a screen 12 which is provided on the faceplate of a glass envelope further having a funnel-shaped section 13 and a neck 14 extending therefrom.

A beam deflection yoke 15, which is well known in the art, is circumferentially mounted on the neck 14 of the video tube. Since the beam deflection yoke 15 forms no part of this invention, further detail is not required concerning its operation.

A shroud 16 which is formed of a material having a high permeance such as annealed sheet steel surrounding it and is closely maintained on the exterior surface of the video tube 10 such that a portion 16a is designed to follow the contour of the funnel-shaped portion 13 on the tube envelope. A front portion 16b fits snugly against the flat portion of the video tube just behind the screen 12. The shroud 16 is formed with a raised portion 16c rearwardly of the front portion or flange 16b, and laterally spaced slots 19a and 19b (FIG. 2) are formed in raised portion 16c and flange 16b at the opposite sides of the top and bottom of shroud 16, with such slots opening at the free edge of flange 16b. A coil 11a is wound on the top portion of shroud 16 between the slots 19a and 19b and coil 11b is similarly wound on the bottom portion of shroud 16 between the slots 19a and 19b in such bottom portion. The coils 11a and 11b are connected in series and have an AC current passed therethrough, for example, as hereinafter described in detail.

An apertured beam-selecting member 17 which is preferably a grid having longitudinal slits 17a therein and having high permeance is arranged in proximity with the shroud portion 16b to enable the flux path from the coils 11a and 11b to pass through the grid. The details of the aforementioned grid or aperture grill are more fully disclosed in copending ap-

plication Ser. No. 790,350 filed Jan. 10, 1969, and entitled "Grid Structure For Color Picture Tubes" assigned to the same assignee as this application. A frame 18 which can be of any known construction and preferably of high permeance is mounted within the video tube in any known manner such that it supports the grid 17 in an upright position. When an aperture grill is used in which elongated slits are formed in a grid, the coils are located adjacent the upper and lower portions respectively of the slits in the aperture grill such that the flux path emanating from the coils is parallel to the longitudinal axis of the substantially parallel slits in the aperture grill. With the latter arrangement demagnetization of the aperture grill can be properly effected. Since the flux path does not extend around the peripheral portion of the tube between the coils, the reluctance of the magnetic circuit is greatly reduced, thereby decreasing the power losses which necessarily result from a longer flux path.

It will be seen that a magnetic loop is formed by the front portion or flange 16b of shroud 16, the frame 18 and the grid 17, and by the portion 16a of the shroud. This magnetic loop is formed to degauss the video tube and the grid by current flowing through the degaussing coils 11a and 11b such that the grid 17 and the frame 18 are demagnetized by the degaussing field. The reluctance of the magnetic conductive loop including the grid 17 is so small that demagnetizing is accomplished with low power loss and high efficiency.

In the embodiment of the invention shown in FIGS. 3 and 4, a peripheral ring 26 surrounds the front of the tube. The ring is also formed of a material having a substantially high permeance such as sheet metal. The ring 26 protects the tube from explosion since it serves to reinforce the latter. The magnetic conductive loop is formed as in the previous embodiment, however, the flux now passes through the ring 26. The ring has a flange 26a thereon which abuts a corresponding flange 16d on the shroud 16. Because of the added ring 26 and the additional degaussing effect therefrom, a highly effective and efficient demagnetizing operation is effectuated. The coils 11a and 11b are arranged as in the previous embodiment.

In FIG. 7 there is shown a degaussing circuit which includes a power transformer 20, a thermistor 21 and a varistor 22 in parallel therewith. The degaussing coils 11a and 11b are connected in series. A bridge rectifier 23 changes that AC input to pulsating DC and a condenser 24 removes the pulsations and completes the circuit to DC output terminals 25 which may constitute a source of DC for any desired circuit in the receiver. The circuit depicted in FIG. 7 is an automatic degaussing circuit. The coils 11a and 11b are energized through the varistor 22 while the television receiver is warming up. As the set warms up the resistance of the varistor increases until it blocks the current flowing through the coil 11, but the current through the thermistor 21 continues.

For the purpose of illustrating the present invention, a specific type of electron beam selection means has been disclosed. It should be understood, however, that the aspects of the present invention are applicable to various types of electron beam selection devices well known to those skilled in the art as well as others and it is not intended to limit the present invention to the specific type disclosed and illustrated herein.

We claim:

1. The combination of a color video picture tube comprising a tube envelope having a face plate at one end with a phosphor screen thereon, an apertured beam-selecting means mounted within said envelope adjacent said screen and having the apertures thereof in the form of parallel, elongated slits, a shroud of substantially high permeance partially covering the tube envelope and having a portion thereof adjacent said beam-selecting means, degaussing coils carried by said shroud at opposed locations on the latter such that a degaussing current passed through said coils produces a magnetic flux which passes through said tube envelope and through said beam-selecting means in the direction of said parallel slits prior to return to said coils by way of said shroud, and circuit means

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for supplying said degaussing current to said coils in the form of a progressively decreasing AC current during warmup of the color video picture tube.

2. The combination according to claim 1, in which said slits extend vertically, said portion of the shroud adjacent the beam-selecting means is an edge portion thereof and an adjacent raised portion, said shroud has cutouts extending from said edge portion into the adjacent raised portion at opposite sides of the top and bottom of the shroud, and said coils are

wrapped about the top and bottom sections of said raised portion between the respective cutouts therein.

3. The combination according to claim 2, in which said edge portion is constituted by a radial flange, and a ring of high permeance extends around the tube envelope in the region of the face plate and has a radial flange abutting said flange constituting said edge portion to provide with the latter a path for the magnetic flux.

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