

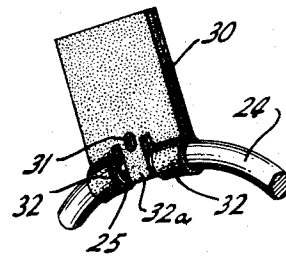
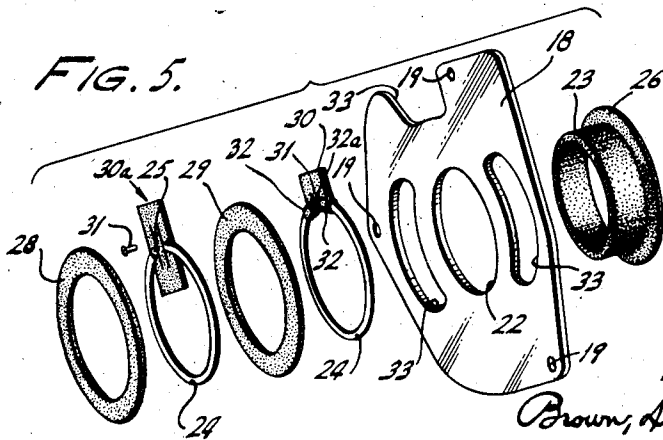
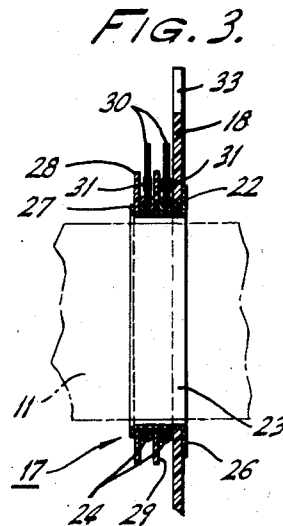
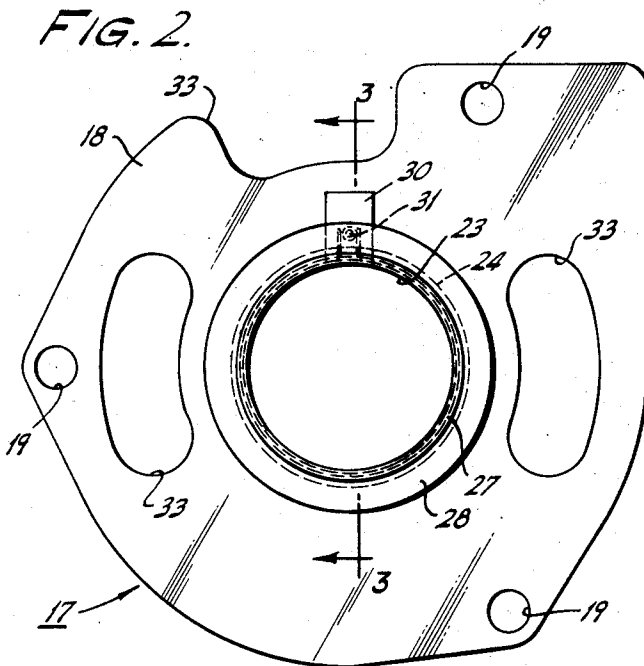
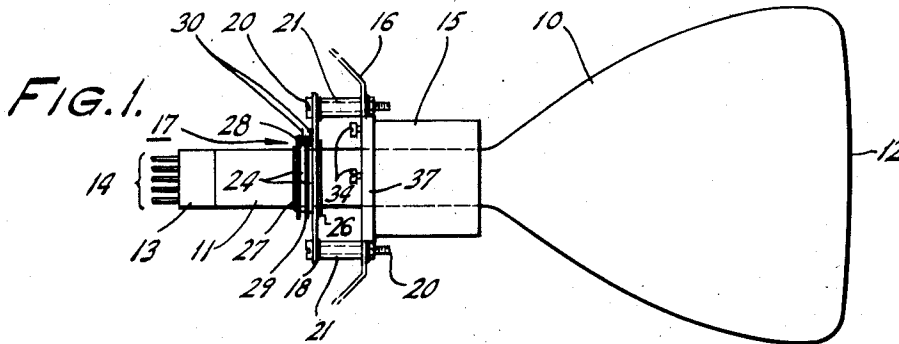
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2,653,262

CONTROL DEVICE

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UNITED STATES PATENT OFFICE

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CONTROL DEVICE

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The present invention relates to devices for controlling the electron beam in cathode-ray tubes. Particularly, the invention has to do with a device of the general kind disclosed in the Loughren Patent No. 2,525,919, dated October 17, 1950, which device employs permanent magnets to establish the position of the beam of electrons on the fluorescent screen of a cathode-ray tube.

In a device of the above mentioned variety, the permanent magnets take the form of magnetized rings which are disposed concentrically about the neck portion of the tube so as to establish a magnetic field generally transverse to the path of the electron beam. The rings are arranged for rotation with respect to each other, as well as with respect to the neck of the tube, to provide for adjustment of the strength and direction of the magnetic field to influence the directional flow of electrons and, thus, to effect centering of the beam on the screen. Difficulties have heretofore been encountered in providing suitable simplified means which, not only effectively mounts and adequately supports the magnet rings, but also affords sufficient freedom to permit rotational adjustment of such rings. For example, in an effort to simplify the device, it has been proposed to eliminate the cumbersome housing and operating gear structures used in the prior art, and to substitute simple rotatable disk-like members provided with embossed portions which receive the magnet rings to anchor them to said members for rotation therewith. However, the use of disk-like members which have ring engaging embossed portions, is apt to bring about operational troubles because, should such members become warped or otherwise accidentally distorted, the magnets are likely to leave the embossed portions and be no longer controllable by rotation of said members.

It is an important object of the invention to provide an electron beam positioning or centering device of simplified and inexpensive construction which obviates the aforesaid difficulties and operational troubles.

Other and more specific objects of the invention have to do with the provision of a beam centering device which requires no complicated parts and which make it possible to construct the parts from inexpensive readily available materials.

According to a broader aspect of the invention, the novel centering device includes a mounting panel on which magnet rings are rotatably supported by means of a supporting-insulating structure. The rings are supported in such a fashion that they can be selectively rotated either

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individually or jointly. The panel, rings and supporting-insulating structure constitute a unitary assembly which is adapted to encircle the neck portion of the tube without contacting said portion. In accordance with a narrower aspect of the invention, the ring supporting structure comprises a tubular non-magnetic core on which the rings are rotatably fitted, with an insulating annular spacer between the rings. Each ring is positively rotated by means of a manipulating tab which is rigidly secured in fixed position on the ring. An important and significant advantage of the above stated arrangement, is that the position of angular adjustment of the rings, is assured and can always be visually ascertained, because the connection between the manipulating tabs and the rings is such that said tabs and rings are prevented from becoming accidentally disassociated.

The novel features of the invention and the manner in which the above recited and other objects and advantages are best achieved, will clearly appear from the following description of the embodiment shown in the accompanying drawing, in which:

Figure 1 is a side elevational view of a cathode-ray tube of conventional design and provided with an electron beam centering device constructed in accordance with the invention;

Figure 2 is an enlarged elevational view of one face of the centering device;

Figure 3 is a vertical sectional view taken generally along line 3-3 of Figure 2, a portion of the neck of the tube being diagrammatically shown to illustrate the relationship of the centering device and said neck portion;

Figure 4 is a greatly enlarged fragmentary perspective view of a section of a magnet ring with its manipulating tab affixed thereto; and

Figure 5 is an exploded view, in perspective and on a reduced scale, illustrating the various parts which comprise the centering device.

With more particular reference to the drawing, the conventional cathode-ray tube shown in Figure 1, includes a tube envelope having an enlarged bulbous portion 10 and an elongated neck portion 11. The bulbous portion is provided with a flattened face 12, the internal surface of which is coated with a fluorescent substance forming a luminescent screen, in the usual manner. The neck portion is provided with a base 13 which supports terminals 14 leading to the gun structure (not shown) enclosed within said neck portion. As is customary, a beam deflecting and focusing unit 15 is supported about the neck por-

tion of the cathode-ray tube at a point adjacent the bulbous portion of said tube. The deflecting-focusing unit is supported by means of a bracket 16.

As seen in Figure 1, the bracket 16 also serves, in accordance with the invention, to support the novel beam centering device which is generally designated at 17. This centering device comprises a mounting panel 18 of suitable non-magnetic stiff material, such as composition or plastic board. As best seen in Figures 2 and 5, the mounting panel is provided with spaced apertures 19 disposed adjacent the marginal edge of said panel. These apertures, as is illustrated in Figure 1, receive bolts 20, or other like suitable fastening elements, to connect the mounting panel with the mounting bracket of the deflecting-focusing unit. In practice, tubular sleeves 21 of predetermined length are interposed between said bracket and panel to locate the latter in proper position with respect to the electron gun within the neck portion of the cathode-ray tube. As more clearly appears in Figures 3 and 5, the mounting panel is further provided with a generally circular opening 22 which is disposed substantially centrally of said panel.

A generally tubular core 23 of non-magnetic material, such as impregnated cardboard, passes through the mentioned opening of the mounting panel and serves to support permanent magnets 24, each of which has the form of a magnetized ring which is open or split as at 25 (see Figures 4 and 5). As more clearly shown in Figure 3, these rings are received on said core and fitted for rotation thereon. One end of the core is formed with a flange 26 which abuts one face of the mounting panel and thus prevents said core from passing completely through the opening in said panel. The magnet rings are received on that portion of the core which projects from the other face of the mounting panel, so that the innermost ring abuts said other face of the panel. Retention of the magnet rings on the core is conveniently accomplished by "rolling-up" the projected end portion of the core, as is shown at 27, and a generally annular band 28 of nonmagnetic material, such as impregnated cardboard, is advantageously used between said rolled-up portion and the outermost magnetic ring to assist in said retention. Also, a generally annular spacer 29 of non-magnetic material similar to that of band 28, fits over the core and is placed between the magnetic rings to insulate them from each other.

In particular accordance with the invention, manipulating tabs 30 are rigidly affixed to the split magnet rings 24 and extend therefrom so as to be readily grasped to impart rotational motion to said rings about their supporting core. The manipulating tabs are conveniently constructed from strips such as the one illustrated at 30a in Figure 5. These strips are made of insulating material, such as impregnated cardboard, and, as more clearly seen in Figure 4, each strip is folded and clamped in folded position by means of rivets 31, or like fastening elements, to provide spaced looped portions 32 which encircle the ring adjacent its open or split portion. Further, in accordance with the invention and as is also clearly seen in Figure 4, each manipulating tab is formed to provide a projection or finger 32 which is disposed between and projects transversely of said loops to extend between the confronting ends of said ring at said open or split portion. The finger on each manipulating

tab has a three-fold purpose: Firstly, it prevents accidental closing of the opened portion of the associated ring; secondly, it locks the tabs in position with respect to the associated ring; and, thirdly, it provides adequate visual indication of the relative position of the rings on the supporting structure. It will be understood that the mentioned finger and relieved or split portions effectually provide the folded or looped strip and the encircled portion of the ring with interengaged keying means which locks the tab forming strip in position with respect to the ring.

The simplicity with which the parts of the device can be assembled is apparent from Figure 5. From this figure, it can be seen that the strips which form the manipulating tabs 30 can be readily secured to the magnetic rings 24; that the core 23 can be readily inserted into the central opening 22 of the mounting panel 18; that said rings, with the interposed annular spacer 29 and annular end-band 28, can be readily slipped onto the core; and that, thereafter, the projected end portion of the core can be readily rolled-up to lock the parts in the unitary assembly shown in Figures 1, 2 and 3. This assembly, as appears in Figure 1, can then be readily slipped over the neck portion of the cathode-ray tube and secured in position by attachment to the mounting bracket 16 of the deflecting-focusing unit 15, through the agency of the sleeves 21 and the bolts 20. It will be noted that, as clearly shown in Figures 2 and 5, the mounting panel 18 is provided with cut-out portions 33. These cut-out portions are located to register with and to give access to adjusting means 34 (see Figure 1) with which the deflecting-focusing unit is usually supplied. The connection of the mounting panel to the mounting bracket is such that the core and supported magnet rings are disposed in generally concentric relationship with respect to the neck portion of the cathode-ray tube, the core being slightly spaced from the surface of said neck portion (see Figure 3).

When using the device, the desired centering of the electron beam is adequately obtained by rotating the magnet rings to that position which brings about the correct direction and intensity of the centering magnetic field established by said rings. The manner in which the adjustment of the ring acts on the electron beam to position it on the screen of the cathode-ray tube is well known in the art and, accordingly, needs no explanation.

From the foregoing description, it will be appreciated that the present invention provides a simple yet effective device for centering the electron beam on the fluorescent screen area of a cathode-ray tube. The fact that the centering device, in accordance with the invention, includes a mounting panel as one of its parts, is a significant feature because it makes it possible to mount and support the device in correct position without means in direct contact with the neck portion of the tube. Also, the novel mode of associating the magnet rings with the manipulating means employed to position said rings, constitutes a singularly important feature in that it insures proper engagement of said rings with said means.

I claim:

1. A control device for positioning the electron beam on the screen of a cathode-ray tube, comprising a mounting structure, magnetized split rings rotatably retained on said structure, each ring having manipulating means including spaced

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clamping portions and a projection therebetween, said clamping portions being looped about the ring adjacent its split, and said projection extending into said split.

2. A control device for positioning the electron beam on the screen of a cathode-ray tube, comprising a mounting panel, a core mounted on said panel, magnetized split rings rotatably retained on said core, and manipulating tabs attached to said rings adjacent the split thereof, each tab having a portion projected into the split of the associated ring.

3. A control device for positioning the electron beam on the screen of a cathode-ray tube, comprising a mounting panel having an opening therethrough, a core received in said opening and having a portion extended beyond one face of said panel, magnetized rings rotatably retained on said extended portion of the core, said rings being insulated from each other and having an open portion, and manipulating tabs associated with said rings, each tab being disposed at the open portion of its associated ring and having a finger projecting between the confronting ends of the associated ring at its open portion.

4. A rotatably adjustable magnet structure for a device adapted to position the electron beam on the screen of a cathode-ray tube, comprising a split magnet ring, and manipulating means carried by said ring and including spaced looped portions encircling the end portions of said ring adjacent its split, said means further including a projection extending between and transversely of said looped portions and between said end portions of the ring.

5. A rotatably adjustable magnet structure for a device adapted to position the electron beam of

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a cathode-ray tube, comprising a split magnet ring, and a manipulating tab of non-magnetic material engaging said ring adjacent its split and having a portion extended into said split and locking the tab in position with respect to the ring.

6. A rotatably adjustable magnet structure for a device adapted to position the electron beam of a cathode-ray tube, comprising a split magnet ring, and manipulating means for imparting rotational motion to said ring, said means consisting of a strip of non-magnetic material folded over said ring and fixed in folded position to engage the latter adjacent its split, said strip being formed to provide a finger extending into said split.

7. A control device for positioning the electron beam of a cathode ray tube, comprising mounting means including a core adapted to encircle the neck portion of a cathode ray tube, a magnet ring rotatably carried by said core, and manipulating means for imparting rotational motion to said ring about said core, said means consisting of a strip-like tab having a portion disposed in engagement with a portion of said ring, said tab portion and said ring portion having interengaged keying means effecting an interlocking connection between said ring and tab.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
2,513,929	Gethmann	July 4, 1950
2,544,898	Obszarny et al.	Mar. 13, 1951
2,552,342	Mucher	May 8, 1951
2,569,327	Obert	Sept. 25, 1951