Jan. 2, 1968 R. C. OELER ET AL 3,361,403

# CATHODE RAY TUBE YOKE MOUNTING DEVICE

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FIG.1

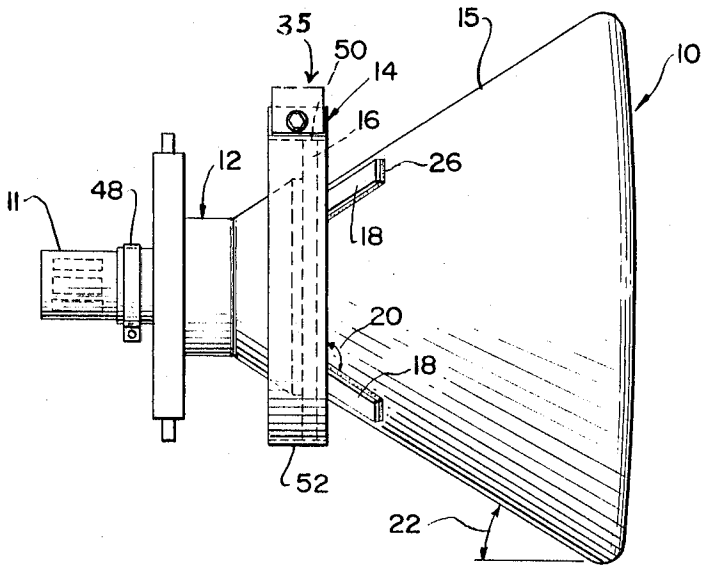



FIG.2

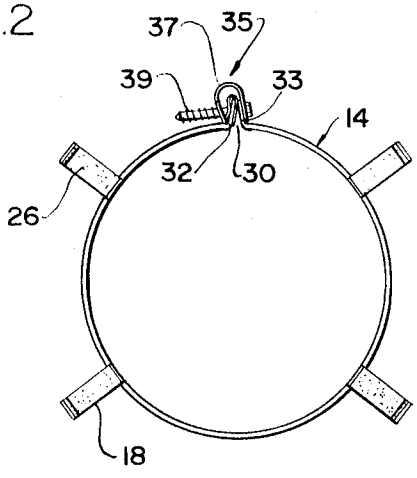



FIG.3

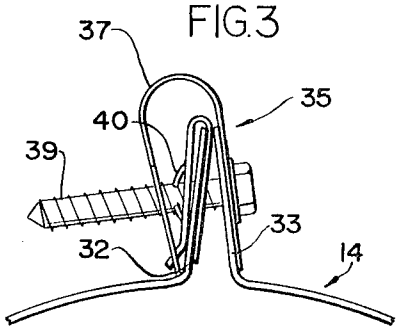
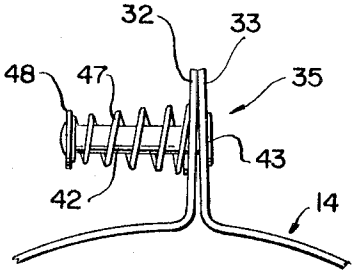



FIG.4




INVENTORS
RICHARD C. OELER
EDWARD A. SALNERS

BY Mueller, Aichele & Rauner
ATTORNEYS

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FIG. 5

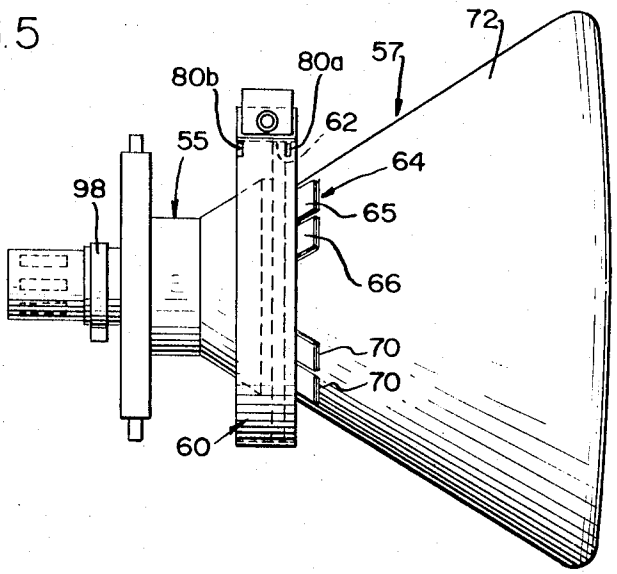
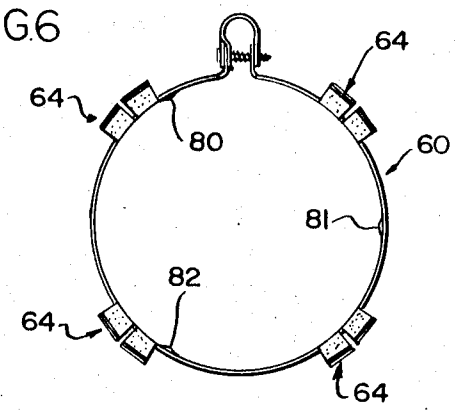



FIG. 6



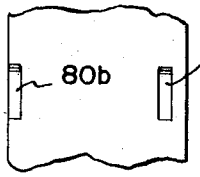




FIG. 8

FIG. 7

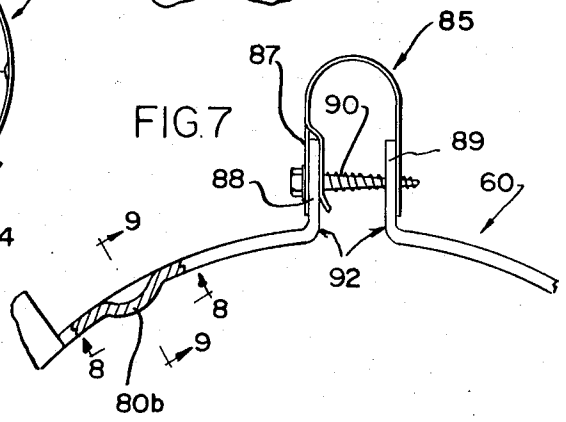



FIG. 10

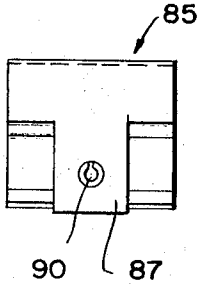
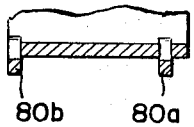



FIG. 9




INVENTORS
RICHARD C. OELER
EDWARD A. SALNERS

BY Mueller, Aichele & Rauner
ATTORNEYS.

United States Patent Office 3,361,403 Patented Jan. 2, 1968



3,361,403

# CATHODE RAY TUBE YOKE MOUNTING DEVICE

Richard C. Oeler, Elmhurst, and Edward A. Salners, Mount Prospect, Ill., assignors to Motorola, Inc., Franklin Park, Ill., a corporation of Illinois

Filed Jan. 19, 1967, Ser. No. 617,751
8 Claims. (Cl. 248—205)

## ABSTRACT OF THE DISCLOSURE

This device includes a ring that has a plurality of fingers extending therefrom at an angle substantially equal to the taper of the bell portion of a cathode ray tube. The ring is centered about the neck of the cathode ray tube by the fingers which are secured to the bell portion of the tube with a padded adhesive. The deflection yoke is received within the ring and is indexed by it coaxially to the neck of the tube.

*Cross-reference to related application*

This application is a continuation-in-part of our application Ser. No. 532,916, filed Mar. 9, 1966, now abandoned.

*Background of the invention*

This application pertains generally to apparatus for mounting and aligning a deflection yoke on a cathode ray tube.

In a television receiver, after the yoke has been placed on the neck of the cathode ray tube, it must be adjusted for example, by sliding it along the neck of the tube to locate the correct deflection center for the electron beam. This is particularly important in the case of a tri-beam cathode ray tube used in color television receivers. In the past, mountings for the yoke, which permit the yoke to be adjusted after being positioned on the tube and also which secures the yoke in place, have been complicated and expensive to manufacture and assemble.

*Summary of the invention*

In one embodiment of this invention, a deflection yoke is placed inside a ring for mounting to a cathode ray tube. The ring with the yoke inside is fitted around the neck of a tri-beam cathode tube. A plurality of fingers extend from the ring at an angle substantially equal to the taper of the bell portion of the tube. These fingers are secured to the bell portion by two sided adhesive tape having a substantial thickness and acting as a cushion to account for the tolerances between the angle of the fingers and the taper of the tube. The fingers when secured to the tapered walls of the tube act to align the mounting ring and yoke with respect to the tube neck. The ring has a gap in it which permits the diameter to be varied. A spring biased clamp connected across the gap urges the ring together at the gap to clamp the yoke in place to prevent rotational and sliding movement within the ring. The gap may, however, be forced open against the spring bias to permit sliding and rotational movement of the yoke along and about the neck of the cathode ray tube and within the ring.

In the drawings:

FIG. 1 is a side elevation view of the mounting device in accordance with this invention;

FIG. 2 is a front elevational view of the mounting device of FIG. 1;

FIG. 3 is an enlarged front elevation view of a portion of the device of FIG. 1;

FIG. 4 is an enlarged front elevation view of a second embodiment of a portion of FIG. 1;

FIG. 5 is a side elevation view of a second embodiment of the mounting device in accordance with this invention;

FIG. 6 is a front elevational view of the mounting device of FIG. 5;

FIG. 7 is an enlarged front elevation view of a portion of the device shown in FIG. 6;

FIG. 8 is a view taken along the line 8—8 of FIG. 7;

FIG. 9 is a cross-sectional view taken along the lines 9—9 shown in FIG. 7; and

FIG. 10 is a side elevation view of the clamping device shown in FIG. 6.

*Description of the preferred embodiments*

Referring to the drawings, FIG. 1 shows a shadow mask type cathode ray tube 10 having a bell portion 15 and a neck portion 11 which could be used in a color television receiver. A deflection yoke 12 is mounted to the tube 10 by mounting ring 14. The yoke has an annular portion 16 which is fitted inside the ring 14 and coaxial therewith. A plurality of fingers 18 are integral with the ring 14 and extend therefrom at an angle 20 which is substantially equal to the angle 22 which is the angle of taper of the bell portion 15 of the tube 10. A two-sided adhesive tape 26 is mounted on one side of the fingers 18, and is used to secure or glue the fingers 18 to the surface of the bell portion 15 of the tube 10. The tape 26 has substantial thickness and is made of a spongy substance that serves as a cushion between the fingers 18 and the tube 10.

The ring has a gap 30 therein (FIG. 2). The ends of the ring 14 on either side of the gap 30 are bent outward from the center of the ring in a direction to form two opposing tabs 32 and 33. A clamp 35 joins the ring at the gap 30 and provides initial clamping tension on tabs 32 and 33 so that the annular portion 16 of the yoke may be rotated or moved axially for desired adjustment. A screw 39 extends through a leaf spring 37 of clamp 35 and the tabs 33 and 32. Connected to tab 32 is a speed nut 40. Operation of the screw 39 will clamp the tabs 32 and 33 together thereby closing the gap 30 to decrease the diameter of ring 14.

FIG. 4 shows a second embodiment of the clamp 35. In this embodiment the head 32 of an elongated rivet 42 is connected to tab 33, and the rivet 42 extends through tabs 32 and 33. A spring 47 is inserted between a stop 48 on one end of the rivet 42 and the tab 32. The spring acts to bias the tabs 32 and 33 together. By grasping the ring 14, however, the tabs may be forced apart against the pressure of spring 47 to once again enlarge the diameter of the ring 14.

In operation, the yoke 12 is fitted into the ring 14 and the initial tension of clamp 35 grasps the annular portion 16 of the yoke 12 so that it may be adjusted. The ring 14 and the yoke 12 are then slid over the neck 11 of the tube 10. The ring and yoke are moved as far forward as the yoke will permit, to place the flare of the yoke concentrically against the bell of the tube. The yoke clamp 48 is tightened down to secure the yoke 12 to the neck 11 of the tube. The ring 14 is moved forward on the yoke until the arms 18 engage the tapered wall of the tube 10. The adhesive on the pad 26 will firmly secure the fingers 18 of the ring 14 to the bell of the tube.

The two sided adhesive tape 26 is sufficiently thick and of a spongy consistency to act as a cushion between the fingers 18 and the tube 10 to reduce possibility of tube damage. This also accounts for the tolerances between the angle 20, that the arms 18 make with ring 14, and the angle 22, which represents the taper of the bell 24 of the tube 10. Accounting for these tolerances eliminates the necessity of highly accurate forming of the fingers of the ring and is therefore very economical.

The arms 18 are spaced about the periphery of the ring 14 so that when the adhesive engages the bell portion 15 of the tube 10, the arms position ring 14 normal to an

axis through the center of the ring 14 and a plane having a circular cross-section passing through the tube 10 defined by the points where the arms 18 contact tube 10. It can be seen, therefore, that the ring 14 acts as a jig to position the yoke 12, when the annular portion 16 is received within ring 14, so that it is concentric with the neck 11 of the tube 10.

With the ring placed in position on the tube 10, the yoke 12 is moved in an axial direction within the ring 14 and along the neck of the tube within the limits defined by the axial dimensions of the peripheral surface 50 of the annular portion 16 of the yoke 12 and the axial dimension 52 of the ring 14. The yoke 12 is moved along the neck 11 until the desired center of deflection for the electron beams of the tube is located. The yoke 12 can also be rotated within the ring 14 about the neck 11 of the tube.

When the yoke has been properly positioned, the clamp 35 is adjusted so that the gap 30 is closed thereby clamping the ring 14 about the annular portion 16 of the yoke 12 to hold it into position and to prevent the yoke 12 from either sliding or being rotated within the ring. The yoke clamp 48 is then tightened into place and the yoke is secured in its proper position to the tube 10.

A second embodiment of the invention is shown in FIGS. 5–10. In this embodiment a deflection yoke 55 is mounted to cathode ray tube 57 by a mounting ring 60. The yoke 55 has an annular portion 62 which is fitted inside the ring 60 and coaxial therewith. A plurality of fingers 64 are integral with the ring 60 and extend therefrom in the same manner as the fingers 18 previously described in the first embodiment. Each of the fingers 64 of this embodiment, however, includes first and second portions 65 and 66. The width of the portions 65 and 66 are greater than is the length of either of the portions. This is in contrast to the fingers 18 of the first embodiment which are substantially longer than they are wide. A two-sided adhesive 70 is mounted on one side of each portion 65 and 66 of the fingers 64 and is used to secure the fingers 64 to the surface of the bell portion 72 of the tube 57. The width and length of the portions of the fingers 64 are chosen so that the area of the combined portions fastened to the tube 57 by the tape 70 is substantially equal to the area of the surface formed by the length and width of the fingers 18 that contact bell portion 15 of tube 10 in the first embodiment.

Examples of dimensions that have been successfully used with each embodiment are:

| | | |
|---|---|---|
| Finger 18: | | |
| Length | inches | 1½ |
| Width | inch | ½ |
| Area | sq. inch | ¾ |
| Each portion 65 and 66: | | |
| Length | inch | ½ |
| Width | do | ¾ |
| Combined area | sq. inch | ¾ |

Of course, these dimensions are only examples and are not intended to limit the invention in any manner.

Because the fingers are much shorter, a greater tolerance is permitted, between the angle 20 (FIG. 1) that the finger makes with the ring and the angle 22 which is the taper of the bell, than is permitted by use of the cushion tape alone as previously described.

In some applications, when sliding the yoke 55 within the ring 60 to adjust the deflection center of the electron beam, it is preferable that the yoke 55 cannot slide entirely out of the ring. For this reason, the ring 60 has three sets of equally spaced formed members 80, 81 and 82 integral with the ring which limits the amount that the yoke 55 can slide within the ring. As shown in FIG. 8 each of the members may include first and second portions such as 80*a* and 80*b*, that are formed from the ring 60 and which extend inwardly towards the center of the ring from the periphery.



The clamp 85 of this embodiment is made of a resilient metal and has a forked portion 87 that clamps over one tab such as at 88 (FIG. 7) and is folded back upon itself until it fits flush with the outward surface of the tab 89. A screw 90 is threaded through the forked portion through a hole in the tab 89 and on through the other side of the clamp 85. By simple adjustment of screw 90 the gap 92 may be adjusted to adjust the diameter of the ring 60.

The operation of the yoke mounting ring 60 is similar to that described for the ring 14 of the first embodiment. When initially assembling the ring to the tube, however, the diameter of the ring must be made a little wider so that the annular portion 62 of the yoke 55 can slide over the limiting portion 80*b*. The diameter of the ring is then closed sufficiently by turning screw 90 until the ring just slides between the stop portions 80*a* and 80*b*. By referring to FIG. 5, it is possible to see the relative movement of the yoke that is permitted within the ring by the stops 80*a* and 80*b*. When the yoke is properly positioned, the screw 90 is turned to clamp the yoke in its proper position.

What has been described therefore is an improved apparatus for mounting a yoke to a cathode ray tube that is simple and relatively inexpensive to manufacture and assemble. The apparatus permits the yoke to be adjusted after it is mounted to the tube and also secures it in place.

We claim:

1. Apparatus for mounting a deflection yoke to a cathode ray tube having a neck portion and a bell shaped portion adjacent thereto, the apparatus including in combination, a yoke, a support frame receiving the yoke, said support frame having a plurality of fingers extending therefrom, means securing said fingers to the bell shaped portion of the tube, said yoke being slidably and rotatably movable within said support frame along and about the neck portion of the tube, and clamping means cooperating with said support frame to selectively prevent the yoke from rotating and sliding within the support frame and with respect to the tube.

2. The apparatus of claim 1 wherein said support frame is an annular ring, said fingers extend at an angle from said annular ring substantially equal to the taper of the bell shaped portion, and said means for securing said fingers to the bell shaped portion include a cushioned adhesive material secured to said fingers.

3. The apparatus of claim 1 further including means integral with said support frame for limiting the sliding movement of said yoke within said frame and along the neck portion of the tube.

4. The apparatus of claim 2 wherein said support frame includes a ring having a gap and said clamping means includes an adjustable clamp joining the ring at said gap, said clamp being adjustable to vary the diameter of the ring to permit the yoke to rotate and slide within the ring and to lock the yoke within said ring to prevent the rotation and sliding thereof.

5. Apparatus for mounting a yoke to the neck of a bell shaped cathode ray tube, including in combination, a yoke, mounting means for receiving the yoke including a ring having a gap therein and a plurality of fingers extending therefrom, means for securing said fingers to the bell of the tube with said ring coaxially receiving a portion of the yoke and being mounted around the neck of the tube, said fingers being secured to the bell of the tube to align said ring and the yoke with respect to the tube neck, and clamping means joining the ring at said gap, said clamping means being adjustable to vary the diameter of the ring to permit the yoke to be rotated and slid along the neck within the ring and to lock the yoke in the ring to prevent the rotating and sliding motion of the yoke therein.

6. The apparatus of claim 5 wherein each finger includes first and second portions extending from said ring and having a combined width greater than the length of either said portion.

7. The apparatus of claim 4 wherein said fingers extend

at an angle from said ring that is substantially equal to the taper of the bell of the tube, and said means for securing said fingers to the bell of the tube includes a double coated adhesive tape, said tape forming a cushion having a thickness to account for the tolerance between the angle of said fingers extending from said ring and the taper of the bell of the tube.

8. The apparatus of claim 4 wherein said ring on each side of said gap is bent at an angle to form two opposing tabs, and said clamping means includes spring means resiliently biasing said tabs together to clamp said yoke and said ring to prevent rotational and sliding movement thereof within said ring, and means for moving said tabs



apart from one another against said spring bias to enlarge the diameter of the ring to permit sliding and rotational movement of the yoke therein.

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JOHN PETO, *Primary Examiner.*