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[54] **DEFLECTION YOKE MOUNTING**
3 Claims, 5 Drawing Figs.

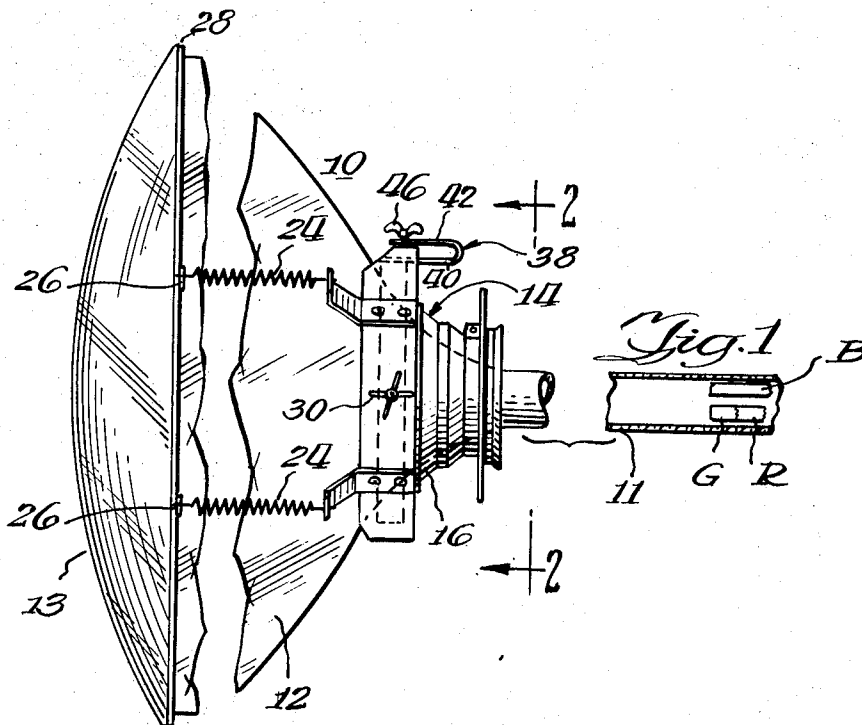
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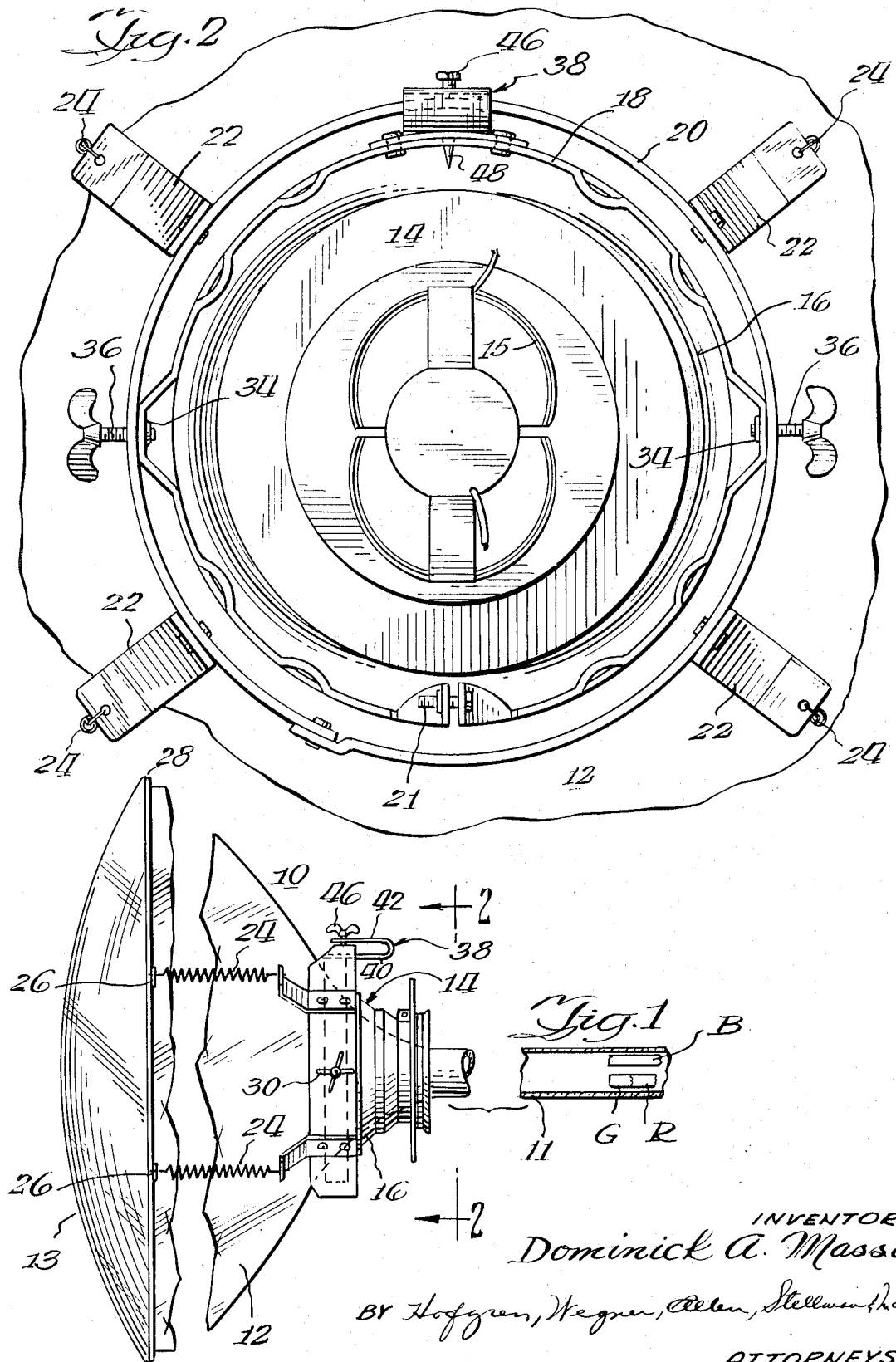
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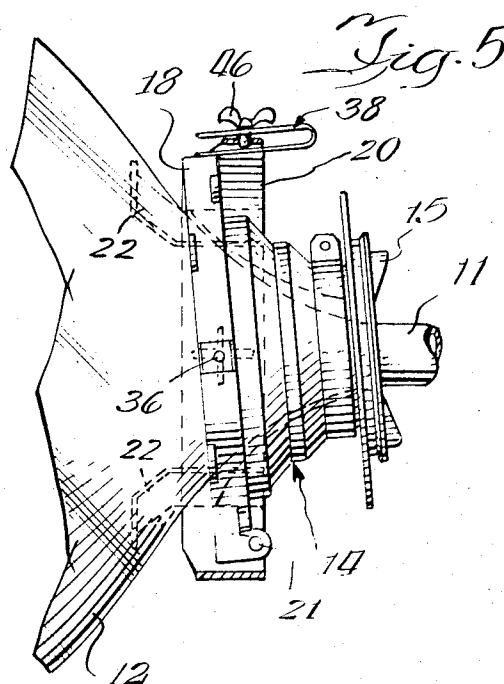
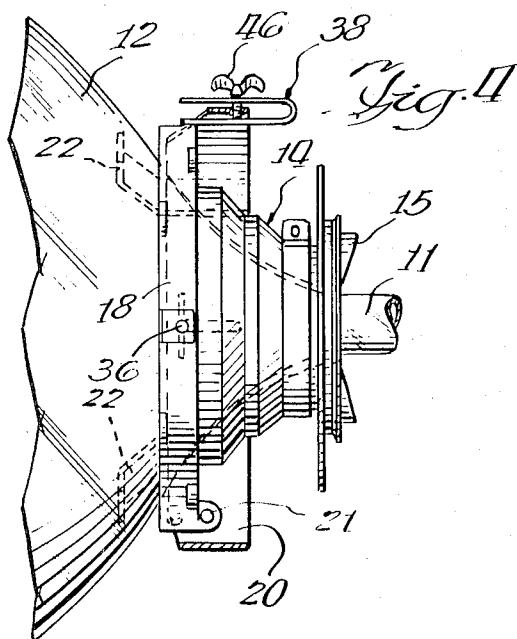
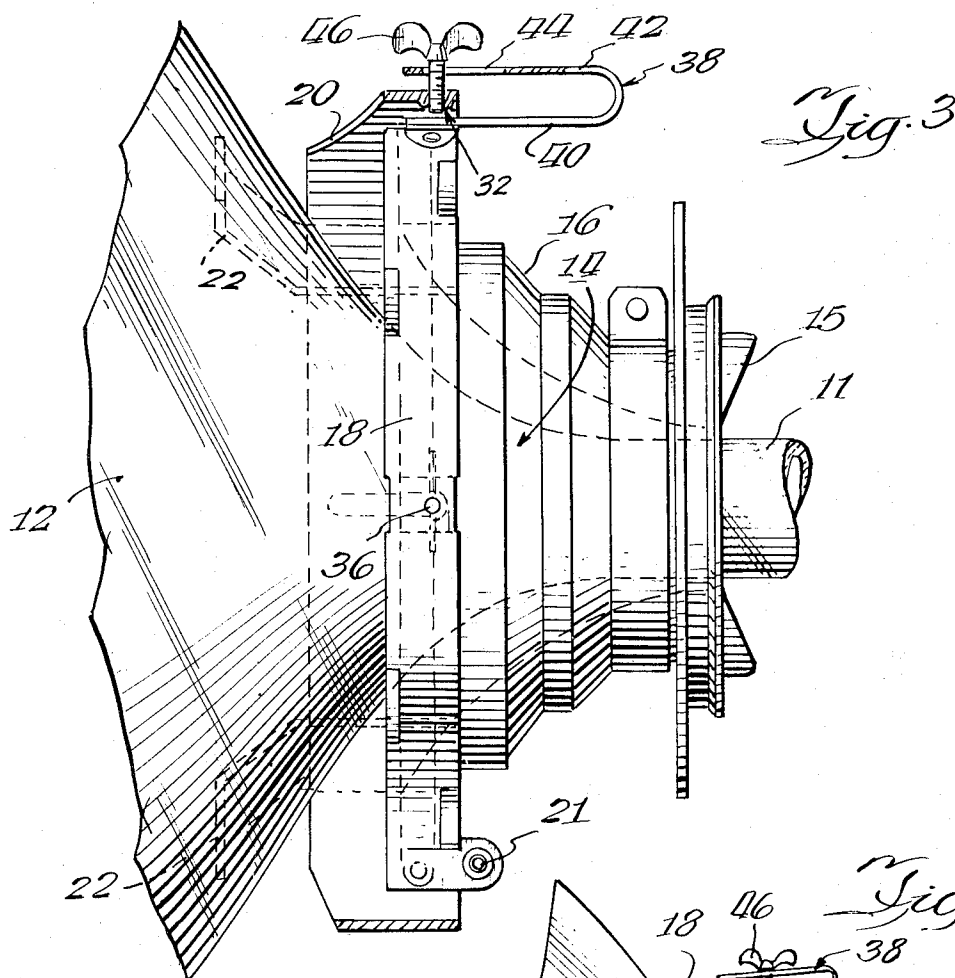
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ABSTRACT: A mounting assembly for the deflection yoke of a three-gun, color cathode-ray tube including a carrier for the deflection yoke, a support mounted on the cathode-ray tube and means mounting the carrier on the support for longitudinal and pivotal movement. The position of the deflection yoke with respect to the tube is adjusted in three steps, (1) rotate the yoke about the tube neck to square the picture with the face of the tube, (2) position the carrier and yoke longitudinally on the tube neck for color purity, and (3) tilt the carrier and yoke to equalize scan width for all colors.







DEFLECTION YOKE MOUNTING

This invention concerns means for adjusting the deflection yoke of a color picture tube.

Commercial color television receivers utilize a tricolor cathode-ray tube with three electron guns, each generating an electron beam for exciting one of a group of phosphors which produce light of three different colors. Present systems use red, green, and blue phosphors. The electron guns which produce the three beams are located on the neck portion of the cathode-ray tube and are spaced symmetrically about the longitudinal axis of the tube so that the beams can be made to converge at the inner surface of the screen. The blue electron gun is located above the horizontal axis of the tube and the red and green guns are spaced on either side of the blue gun at the same distance below the horizontal axis.

The three beams are deflected to scan the screen horizontally and vertically by deflection currents flowing through coils making up a deflection yoke. The position of the deflection yoke relative to the guns must be proper to provide the desired pattern on the screen. Circumferential adjustment of the yoke squares up the scan raster to the cathode-ray tube, longitudinal adjustment aids in establishing proper convergence for color purity and pivoting the yoke about a transverse axis through the cathode-ray tube equalizes the width of scan of each beam. Presently, adjustment consists of the steps of longitudinally moving the deflection coil along the neck of the cathode-ray tube and elevating or lowering the position of the deflection yoke on the cathode-ray tube. The adjustments interact and require several manipulations to reach a proper combination of settings. Accurate adjustment cannot be achieved with a simple alignment procedure.

A feature is to provide a mounting means for circumferentially, longitudinally and angularly adjusting the position of the deflection yoke with respect to the cathode-ray tube.

Another feature is to provide a deflection yoke mounting having three degrees of movement which permits the deflection coils to be moved circumferentially about the neck of the cathode-ray tube, longitudinally along the neck and tilted angularly with respect to the neck. More specifically, the deflection yoke in a deflection yoke carrier is held by the innermost of two rings. The outer ring is mounted on the cathode-ray tube and supports the yoke carrier for pivotal and longitudinal movement.

Further features and advantages of the invention will readily be apparent from the following specification and from the drawings, in which:

FIG. 1 is a broken side view of the deflection yoke mounting assembly on a cathode-ray tube;

FIG. 2 is an enlarged fragmentary sectional view along line 2-2 of FIG. 1;

FIG. 3 is an enlarged fragmentary side view of the deflection yoke mounting assembly with a portion of the outer ring support broken away; and

FIGS. 4 and 5 are fragmentary side views of the deflection yoke mounting structure, similar to FIG. 3, showing, respectively, the deflection yoke before longitudinal movement and with angular displacement between the yoke carrier and the outer support, respectively.

Referring now to FIGS. 1 and 2, a shadow mask color cathode-ray display tube 10, as may be used in a television receiver, is shown. The tube has a small cylindrical neck 11, a relatively large flared front section 12 and a face 13 or screen, located foremost in the flared section. Three symmetrically spaced electron guns B, R, and G are located in the neck 11. A beam from each gun strikes the appropriate phosphor elements to produce the blue, red, and green portions of the picture. The blue gun, B, is centrally located in the tube neck 11, above the axis, and the red and green guns, R and G, are below the axis and on either side of it.

A deflection yoke assembly 14 is mounted externally of the tube 10 in the region in which the neck 11 merges with the flared bulb 12. Yoke assembly 14 includes a deflection yoke 14 comprising horizontal and vertical deflection coils in a housing 16.

A ring-shaped yoke cradle strap 18 which carries the yoke assembly 14 is located within a surrounding outer ring support 20 and is pivotal about an axis extending transversely through the neck of the tube. A threaded fastener 21 joins the two ends of yoke cradle strap 18 for securely holding the yoke assembly in position.

The outer support 20 has four forwardly extending circumferentially spaced mounting legs 22 which rest on the flared front section 12 of the tube. Retaining springs 24 connected between the mounting legs 22 and anchors 26, located on the outer lip 28 of tube face 13, secure the outer ring 20 to the tube 10. The outer ring 20 has two diametrically opposed longitudinal slots 30, one on either side. The yoke cradle strap 18 has threaded openings 34, diametrically opposed on either side. Wing screws 36 extend through the two diametrically opposed longitudinal slots 30 in outer ring 20 and are threaded into openings 34 in cradle strap 18 for fastening strap 18 and ring 20 together.

The U-shaped flexible metal bracket 38 has a lower leg 40 secured at the top of strap 18 and an upper leg 42 extending forwardly over the outer ring 20. A longitudinal slot 44 in the upper leg receives a releasable wing screw 46 which fixes the angular position of strap 18 and outer ring 20. An indicator tab 48 is provided on the top of strap 18.

There are three types of movement of the deflection yoke with respect to the neck of the picture tube. First, the deflection yoke assembly 14, within strap 18, may be moved circumferentially around the neck of the picture tube. The second movement is a longitudinal positioning of the deflection yoke 15 by moving wing screws 36 along slots 30 in outer ring 20. The third movement is pivoting deflection yoke 15 about wing screws 36.

The following procedure is used in assembling the deflection yoke mounting before adjustment. The deflection yoke 15 is placed in housing 16, the combination making up deflection yoke assembly 14. Strap 18 is secured around yoke assembly 14 and indicator tab 48 mechanically aligned with the yoke. Threaded fastener 21 is tightened to hold strap 18 in place. The yoke and strap are then mounted in outer ring 20 by three wing screws 36, 46. Wing screws 36 on the side of the assembly are inserted through slots 30 into threaded openings 34 and loosely screwed in. Wing screw 46 on the top of the assembly is inserted through slot 44 in bracket 38 into threaded opening 32 in outer ring 20 and also loosely screwed in. With the wing screws loosely set the yoke assembly is slid all the way forward with screws 36 at the front end of slots 30 of outer ring 20, as shown in FIG. 4, and screw 46 at the front of slot 44 in bracket 38. The three wing screws 36, 46 are then tightened.

Pads of double-faced adhesive tape (not shown) are placed on the feet of the four fixed mounting legs 22 and retaining springs 24 are attached to the legs 22. The assembly is mounted around the neck 11 of picture tube 10 with the deflection yoke resting on bulb 12. Mounting legs 22 are free from contact with the tube as ring 20 is in its maximum rearward position.

The scan circuits of the television receiver are energized and a crosshatch pattern signal is applied to the tube input from an appropriate source (not shown). If the pattern on the face does not coincide horizontally and vertically with the geometry of the picture tube, the deflection yoke is rotated circumferentially, clockwise or counterclockwise, about the neck 11 of the picture tube 10 until the lines of the pattern are square with the geometry of the picture tube. The four retaining springs 24 are connected between the mounting legs 22 and the anchors 26. Top wing screw 46 is loosened and then, simultaneously, the side wing screws 36 are loosened. Outer ring 20 is pulled forward by retaining springs 24 until legs 22 contact the flared section 12 of the cathode-ray tube 10. The alignment of the cross-hatched pattern is then rechecked and the circumferential position of the yoke adjusted if necessary. While maintaining alignment, the mounting legs 22 are firmly contacted to the bulb 12 with the double-faced tape.

Color purity is next adjusted. The deflection yoke assembly 14, held by strap 18 and wing screws 36, is slid longitudinally along tube neck 11, the screws moving in slots 30, until the correct colors are seen on tube face 13. Upon attaining color purity, the wing screws 36 are tightened, securing the yoke at the proper longitudinal position.

The width of blue scan may differ from that of red and green. This error is next adjusted by pivoting deflection yoke assembly 14 about the transverse axis through the wing screws 36. The angular displacement, FIG. 5 is limited only by the length of slot 44 in bracket 38. Pulling or pushing U-shaped bracket 38 at the top of the assembly causes strap 18 carrying deflection yoke 15 to pivot about the transverse axis. When blue width error is eliminated, the top wing screw 46 is tightened. The deflection yoke is then properly positioned on the neck of the cathode-ray tube.

The procedure outlined above is used both for initial alignment and for subsequent service adjustment. Since physical contact is limited to the wing screws and adjusting brackets, the operator is protected from electric shock. The adjustments do not interact and the procedure need only be performed once.

I claim:

1. An assembly for mounting a deflection yoke about the

neck of a three-gun cathode-ray tube, comprising:

a support on said cathode-ray tube;

a carrier secured to said yoke; and

means for mounting said carrier on said support for rectilinear movement in a direction substantially coincident with the longitudinal axis of the yoke and for pivotal movement about an axis perpendicular to said longitudinal axis, said mounting means comprising first and second studs on one of said carrier and support, disposed on said pivot axis, first and second slots in the other of said carrier and support receiving said first and second studs, and means cooperating with said studs releasably to restrain both rectilinear and pivotal movement between said carrier and support.

2. The mounting assembly of claim 1 wherein the support is a closed frame structure having a plurality of legs adapted to contact the bulb of the cathode-ray tube.

3. The apparatus of claim 1 wherein the yoke is rotatably mounted in said carrier to permit the relative rotation of the yoke about its longitudinal axis, said axis of rotation being substantially coincident with the longitudinal axis of the neck of the cathode-ray tube when said mounting means is properly located on said cathode-ray tube.

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