Jan. 10, 1967 E. A. SALNERS ETAL 3,297,895

DEFLECTION YOKE MOUNTING ASSEMBLY

Filed Jan. 15, 1964

FIG. 1

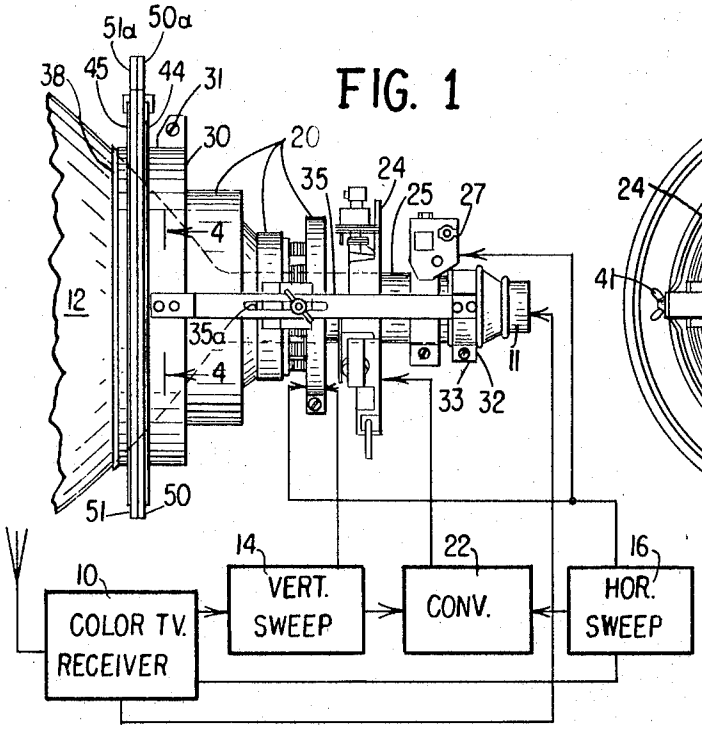


FIG. 2

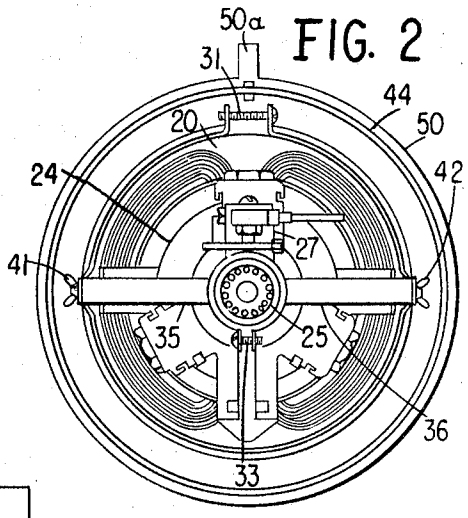


FIG. 4

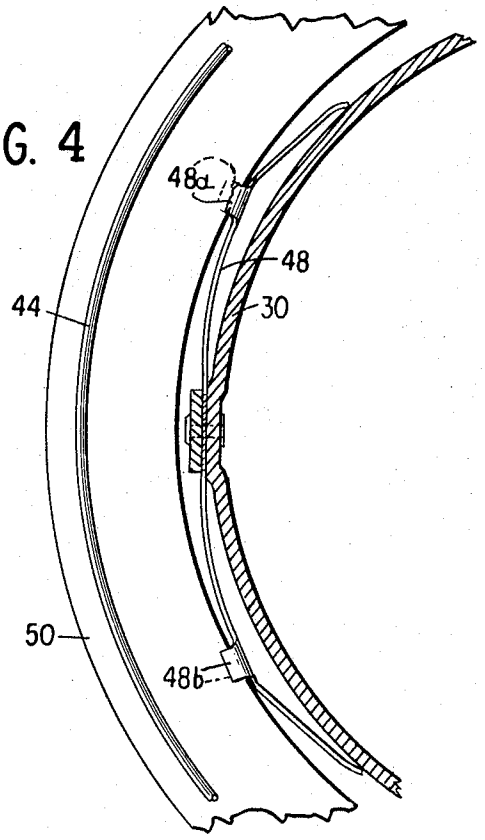
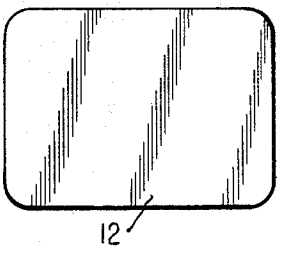


FIG. 3



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DEFLECTION YOKE MOUNTING ASSEMBLY

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5 Claims. (Cl. 313—77)

This invention relates to television receivers and more particularly to beam control apparatus for a cathode ray picture tube.

In present day television receivers there are several field producing units which are disposed on the neck of the cathode ray tube for deflection and control of the electron beam. The tube neck is generally made as short as possible in order to reduce the depth of the receiver cabinet, while at the same time it has generally not been possible to reduce the number of items disposed on the neck for control and correction purposes within the tube. The problem of satisfactorily supporting the numerous items may be difficult in the case of a color television receiver which often requires additional field producing correctors and accurate adjustment thereof, particularly in the case of a color image reproducer having a rectangular viewing screen.

In a tri-beam cathode ray tube there are a convergence yoke assembly for static and dynamic convergence of the electron beam, a blue beam positioning device, purity magnets, and a beam deflection yoke. For optimum color purity it is necessary to provide sliding adjustment of the deflection yoke toward and away from the tube funnel. Of course once adjusted, the yoke must be firmly secured in place. Furthermore, the other beam control assemblies must remain available for adjustment, but yet be mounted so that they do not shift from a desired position.

An object of this invention is to provide a simple structure to be easily fastened to the neck of a cathode ray tube for securely holding a deflection yoke in various adjusted axial positions.

Another object is to provide such a yoke retaining structure which also adjustably supports purity magnets in desired positions.

Another object is to provide a yoke mounting bracket which is simply and quickly mounted on, or demounted from, a cathode ray tube neck, and which does not interfere with the adjustability of other field producing devices on the tube neck.

A feature of the invention is the provision of a clamp and slidable support for deflection yoke to secure the same in an adjusted axial position, and which support is retained by a further clamp surrounding the neck of the cathode ray tube.

Another feature is the provision of such a yoke bracket having resilient members on the yoke clamp and a rotatable ring magnet structure supported thereby to permit color purity adjustment in a tri-beam cathode ray tube.

In a specific form of the cathode ray tube bracket there is an encircling band which is clamped to the forward portion of a deflection yoke, and a further clamp secured to the neck of the cathode ray tube. A pair of arms extend between the yoke band and neck clamp to hold the yoke encircling band against the funnel of the tube. The arms are slotted so that the yoke can be axially adjusted for color purity in a tri-beam cathode ray tube and then secured by the encircling band and fasteners in the slots of the arms. The yoke encircling band may also include resilient supports which carry a pair of rotatable annular discs to which wire purity magnets are affixed. By this overall structure, a simply fastened clamp on the tube neck retains the bracket which provides axial adjustment and support of the deflection yoke, and various rotatable settings of the purity magnets, all as a unitary subassembly, while at the same time interfering by a minimum amount with the adjustment and support of other field producing units on the neck of the picture tube.

In the drawing,

FIG. 1 is an elevational view of a portion of a cathode ray tube assembly and simplified block diagram of a television receiver to illustrate the invention;

FIG. 2 is a rear elevational view of the cathode ray tube assembly of FIG. 1;

FIG. 3 is a front view of a rectangular screen of the tri-beam cathode ray tube of FIG. 1; and

FIG. 4 is a sectional view along the line 4—4 of FIG. 1.

In FIG. 1 the color television receiver 10 may be of known construction and performs the functions of receiving, selecting and amplifying, as well as demodulating, the components of a composite television signal. The demodulated signal is applied to the connector base 11 of the tri-beam picture tube 12. Synchronizing signal components of the received signal are applied to the vertical sweep system 14 and the horizontal sweep signal to which produce suitable sawtooth deflection signals at the field and line rate to be applied to the magnetic deflection yoke 20, all in accordance with known television practice.

The sweep or deflection systems 14 and 16 are also connected to a beam convergence system 22 which is coupled to the convergence assembly 24 disposed on the neck 25 of the picture tube 12. The horizontal sweep system 16 is connected to a blue beam positioning assembly 27 which is secured on the neck 25 of the tube to produce a correcting field especially for the electron beam component which provides the color blue in the overall television image. Details of the convergence system 22, 24 are more fully disclosed and explained in Hauge Patent 2,880,360, although it will be understood other types of convergence systems may be used also. Additional details and description of the blue beam positioning assembly 27 are disclosed in Armstrong and O'Fallon Patent 2,880,366. For purposes hereof it need only be understood that the convergence assembly 24 includes three magnetic assemblies which are dynamically energized by the system 22 and three permanent magnets which are manually adjusted for static convergence of the electron beams. The assembly 27 includes a dynamically energized magnetic winding and a manually adjustable permanent magnet.

The economical and easily mounted yoke mounting bracket includes a yoke mounting band or clamp in the form of strap 30 which can be formed of aluminum, plastic, or some other non-magnetic material and which completely surrounds the forward portion of the yoke 20. The band 30 includes a pair of tabs at the ends thereof which are spaced slightly to permit a threaded fastener 31 to secure the yoke within the band.

A further encircling band or clamp in the form of strap 32 is disposed about the neck 25 of the picture tube rearwardly of the blue beam positioning assembly 27. The band 32 completely surrounds the neck and includes a pair of tabs at the ends so that a threaded fastener 33 may firmly secure the same on the neck. Support arms 35 and 36 extend between the bands 30 and 32 on opposite sides of the tube neck in a horizontal position. The support arms 35 and 36 are riveted to the bands 30 and 32 to form a fixed assembly with the band 30 urged against the bell or funnel of tube 12, and concentric therewith, by the retention of the band 32 on the tube neck 25.

It may be desirable to include tape 38 about the forward edge of the band 30 where it contacts the funnel of the tube in order to provide some cushioning effect at the contact region between the band and the bell of the tube. Preferably tape 38 would be of a foam type with pressure sensitive adhesive on two sides so that there would be a

minimum of tendency of slippage between the band **30** and the tube **12**.

A slot **35***a* is included in the arm **35** and a corresponding slot is included in the other arm **36**. The slots in the arms **35** and **36** receive bolts or threaded fasteners for additional support of the yoke **20**. The wing nuts **41** and **42** provide a convenient means for manually securing the yoke to the arms **35** and **36**.

In addition to entirely supporting the yoke **20**, the bracket **30**, **32**, **35** and **36** affords a desirable support for the annular purity magnets **44** and **45**. As shown in FIG. 4 a phosphor bronze spring clip **48** is secured to the band **30**. Another such spring clip is disposed in a corresponding position on the other side of the band **30**. The clip **48** includes ears **48***a* and **48***b*, extending outwardly from the band **30** and formed in axially spaced apart pairs to engage the outer (front and back) surfaces of the concentrically positioned annular discs **50** and **51**. Thus the pair of ears **48***a* and the pair of ears **48***b*, together with like pairs of ears associated with the other clip, form a track within which the discs **50** and **51** may be rotated. Tabs **50***a* and **51***a* are provided as handles to rotate the discs. It is contemplated that there is enough resilience in the spring clips **48** that the discs **50** and **51** may be moved independently or together to any desired rotational position.

The disc **50** carries the wire purity magnet **44** on the back surface thereof and the disc **51** carries the wire purity magnet **45** on the forward surface thereof. The annular discs **50** and **51** are, of course, made of some non-magnetic material such as pressed wood, and the magnets **44** and **45** may be secured by a suitable means such as stapling. These magnets are magnetized across the diameters thereof and can be rotatably positioned by the manipulation of the tabs **50***a* and **51***a* so that the fields of the magnets are aiding one another, canceling one another, or any variation in between these two extremes. Furthermore, for any given magnetic strength the direction of the field can be modified by merely rotating both the magnets together throughout a complete circle of 360°.

To insure desirable color purity in a tri-beam cathode ray tube, particularly in the difficult situation of a rectangular viewing screen such as shown in FIG. 3, first the deflection yoke **20** is axially positioned and then the purity magets **44** and **45** are adjusted. In accordance with known television procedure, a red field is produced on the screen of the picture tube (by operating only the red gun of the three electron guns in the tube **12**). Then the fastener bolt **31** and the wing nuts **41** and **42** are loosened and the yoke **20** is axially moved rearwardly on the tube and within the fixed bracket as far as it can go without striking the convergence yoke **24**. Then the tube adjustment tabs **50***a* and **51***a* of the purity magnetic assembly are separated so that the fields of magnets **44** and **45** are canceling and the discs **50** and **51** are rotated together until the red spot produced on the screen of the tube is positioned in the center of the screen (FIG. 3). The deflection yoke **20** is then moved forward on the tube until the optimum edge purity of the red image is obtained. Some adjustment of the purity magnets **44** and **45** may then be made through manipulation of the tabs **50***a* and **51***a* to produce the best overall purity. Of course the yoke is then resecured by the fastener **31** and the wing unts **41** and **42** so that it will maintain its adjusted position. There is sufficient friction in the spring clips **48** to retain the purity magnet assemblies in their adjusted positions. As will be understood by those familiar with this art, some slight readjustment may be necessary in the overall purity controls in case the blue and green fields are not at optimum purity, although normally establishing optimum purity for the red field is sufficient and will result in optimum purity for the blue and green fields under most situations.

It should be observed that the yoke and purity magnet assembly as described above is mounted merely by the use of a single clamp or band **32** with a single fastener **33** forming the entire support on the neck of the cathode ray tube. Thus, it is relatively simple to remove the yoke and purity magnets as an assembled unit and to reinstall them when that is necessary. Any previously made adjustment of the yoke and purity magnets within the subassembly would be maintained because the yoke bracket is installed with the yoke encircling band **30** positioned forward against the funnel of the tube and the yoke itself may or may not be against the tube when the bracket assembly is mounted.

It is advantageous to construct the purity magnets **44** and **45** of relatively inexpensive steel wire and it is convenient to have these purity magnets mounted forward of the deflection yoke in order to produce less crowding of components on the neck **25** of the cathode ray tube. The arms **35** and **36** give proper support for the rearward portion of the deflection yoke, but on the other hand, do not interfere with the mounting or adjustment of the convergence assembly **24** or the blue beam positioning assembly **27**. Accordingly the described beam control apparatus is of simple and economical construction but still provides independent axial adjustment of the deflection yoke and convenient support and adjustment for the purity magnets for a tri-beam cathode ray tube.

We claim:

1. An assembly for a cathode ray tube having a funnel portion joined to a neck portion, including in combination, a deflection yoke for the cathode ray tube, a yoke mounting structure including first yoke support means comprising first clamping means adapted to be positioned adjacent the funnel of the tube and concentric with the neck thereof, cushion means secured with pressure sensitive adhesive to and between said first yoke support means and the funnel portion, said first clamping means having an opening to secure the forward portion of said yoke and to provide sliding movement of said yoke therein, said yoke mounting structure further including second yoke support means comprising second clamping means rearwardly of said yoke and secured to the neck of the cathode ray tube, so that said yoke may be moved in concentric relation to the neck of the tube in various positions toward and away from the funnel thereof and then clamped in fixed position.

2. A device for adjustably supporting a deflection yoke on a cathode ray tube having a flared funnel joined to a tube neck, including in combination, a first encircling band adapted to be positioned adjacent the funnel of the tube concentric with the neck thereof and forming a clamp to surround the forward portion of the yoke, fastener means for securing said first encircling band to the yoke, a second encircling band adapted to be fixed to the neck of the tube in a position spaced from said first encircling band, support arms extending on opposite sides of the tube neck between said first and second encircling bands and forming the primary support for said first encircling band against the funnel of the tube, said support arms having slots for mounting the yoke thereto whereby said fastener means and said slots provide the entire mounting for the yoke and permit the retention of the yoke in various positions toward and away from the funnel of the tube, a pair of ring magnets for electron beam control in the cathode ray tube, and resilient means for rotatably supporting said magnets upon said first encircling clamp to permit manual adjustment of said magnets and retention thereof in adjusted positions.

3. A cathode ray tube assembly, including in combination, a cathode ray tube having a funnel portion joined to a tube neck, a first encircling band positioned adjacent said funnel and concentric with said neck, said first encircling band having an opening for a deflection yoke, a second encircling band clamped to said neck of said tube, first and second support arms extending on opposite sides of said neck and between said first and second encircling

bands to urge said first encircling band against said funnel, said arms having respective slots therein substantially parallel with said neck, a deflection yoke disposed within said first encircling band, manually releasable fasteners secured to said deflection yoke and disposed in said slots of said arms to retain said yoke in adjusted axial positions with respect to said neck, and fastener means for securing said first encircling band to said yoke whereby said deflection yoke is entirely supported by said arms and said first encircling band.

4. A cathode ray tube assembly, including in combination, a tri-beam cathode ray tube having a funnel portion joined to a tube neck, a first encircling band positioned adjacent said funnel and concentric with said neck, cushion means intermediate said first band and said funnel, said first encircling band having an opening for a deflection yoke, a second encircling band clamped to said neck of said tube, first and second support arms extending on opposite sides of said neck and between said first and second encircling bands to urge said first encircling band toward said funnel, a magnetic beam control unit positioned on said tube neck between said support arms and intermediate said encircling bands, said arms having respective slots therein substantially parallel with said neck, a deflection yoke disposed within said first encircling band, manually releasable fasteners secured to said deflection yoke and disposed in said slots of said arms to retain said yoke in adjusted axial positions with respect to said neck, fastener means for securing said first encircling band to said yoke whereby said deflection yoke is entirely supported by said arms and said first encircling band, a pair

of annular purity magnets, and means for rotatably supporting said magnets concentric with said tube neck.

5. A yoke mounting and purity magnet assembly for adjustably supporting a deflection yoke on a tri-beam color picture tube having a flared funnel joined to a tube neck, including in combination, a first encircling band adapted to be positioned adjacent the funnel of the tube concentric with the neck thereof and having an opening to surround and clamp the forward portion of the yoke, resilient clip means secured to said first encircling band at a position forward of the yoke, a pair of non-magnetic annular discs rotatably supported in said clip means, an annular wire magnetized across the diameter and affixed to each of said discs whereby manual rotation of said discs provides purity adjustment in the picture tube, a second encircling band adapted to be fixed to the neck of the tube in a position spaced from said first clamp, support arms extending between said first and second encircling bands for retaining said first encircling band against the funnel of the tube, said support arms having means for fixing the yoke thereto in concentric relation to the neck of the tube.

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