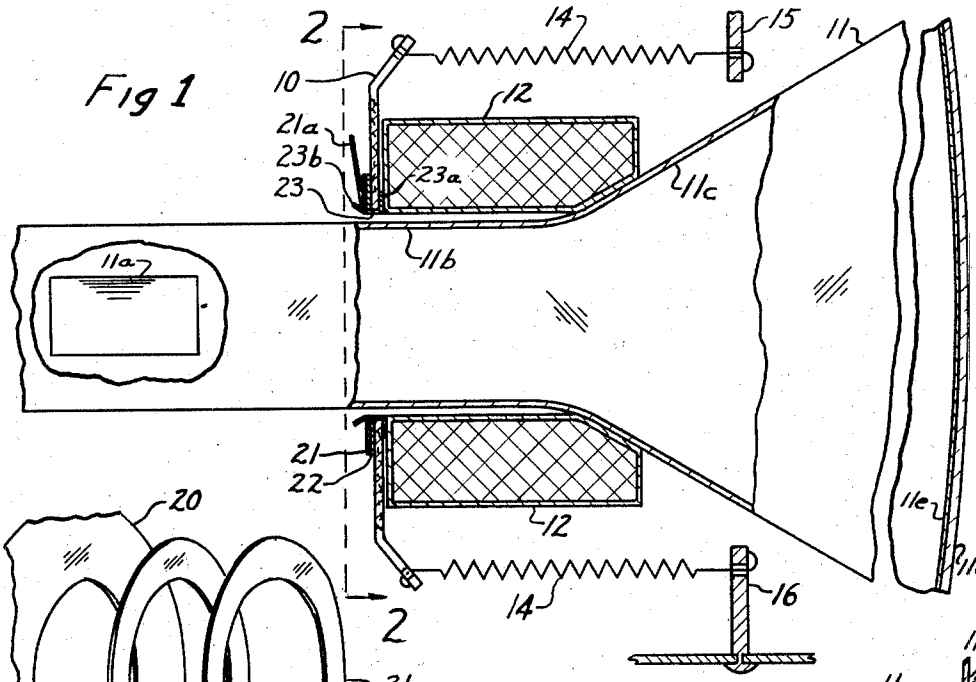
Nov. 11, 1958 S. L. REICHES 2,860,329

CENTERING DEVICE FOR CATHODE RAY TUBE AND TV RECEIVER USING SAME

Filed Jan. 18, 1955

Fig 1



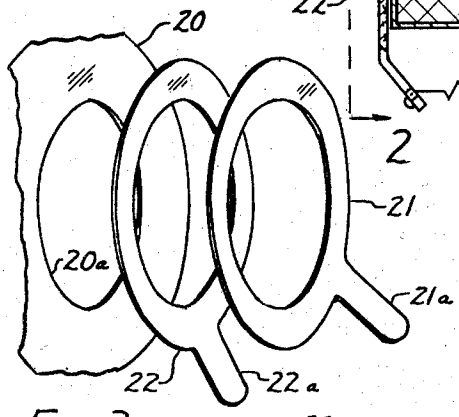


Fig 3

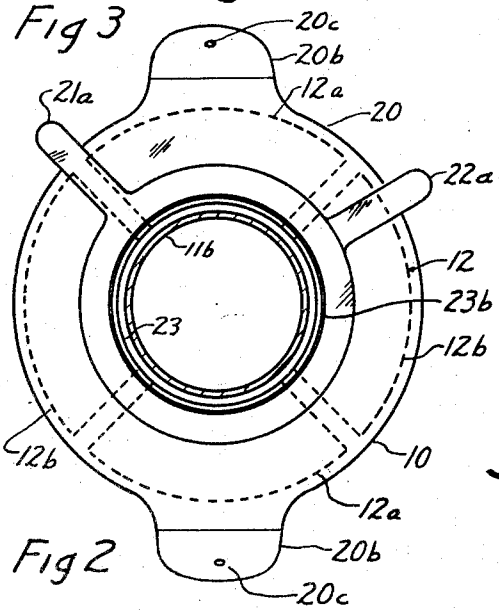


Fig 2

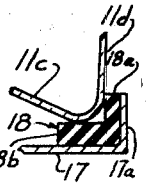


Fig 1a

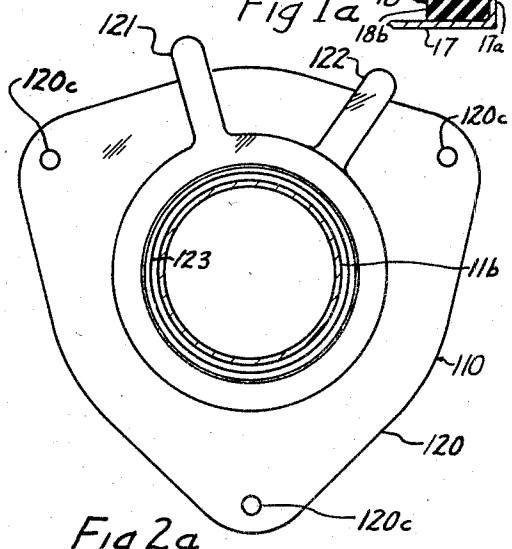


Fig 2a

SOL L. REICHES INVENTOR.

BY George E. Frost

ATTORNEY

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CENTERING DEVICE FOR CATHODE RAY TUBE AND TV RECEIVER USING SAME

Sol L. Reiches, Shaker Heights, Ohio

Application January 18, 1955, Serial No. 482,520

1 Claim. (Cl. 340—367)

My invention relates to an improved magnetic centering device unit with rotatable magnets for centering a cathode ray tube beam which not only provides ray beam centering action but also holds the magnetic deflection yoke snugly against the glass envelope.

In the conventional television cathode ray tube a stream of electrons is emitted from an electron gun within the neck of the tube and directed toward the viewing screen of the tube. Between the electron gun and the viewing screen of the tube a magnetic deflection yoke encircles the neck of the tube. The synchronizing and scanning circuit produces a sweep signal which is applied to the coils of the magnetic deflection yoke, giving rise to a time-varying sweep magnetic field passing through the neck of the tube. This changing magnetic field causes the electron beam to sweep across the viewing screen in a series of horizontal lines and vertical lines thus reproducing the picture.

In addition to the time varying magnetic field produced by the deflection yoke, means are provided in electrostatically focussed tubes to superimpose a time constant centering magnetic field. This field is adjustable in any strength and direction to permit the centering of the sweeping electron beam on the face of the viewing screen. One method for providing this time constant, but adjustable, magnetic field is by means of two identical rotatable magnetic members having diametrically opposed poles. By rotating these magnetic members with respect to each other and with respect to the cathode ray tube, a time constant magnetic field of any desired magnitude and of any desired direction may be superimposed on the time varying magnetic field produced by the deflection yoke to center the sweeping electron beam on the viewing screen.

Because of the rather heavy magnetic deflection yoke which encircles the neck of the glass envelope adjacent the flaring portion thereof, there is a tendency for any shock or impact imparted to the television set to break the glass tube. This tendency is particularly acute if there is looseness between the tube and the deflection yoke because in such case hammer action of these parts in relation to each other tends to break the glass tube. For this reason it is highly desirable to provide a mechanism wherein the tube and deflection yoke are held together at all times and no relative movement takes place under shock or blows imparted to the television set.

In accordance with the present invention an improved and simplified structure is provided to hold the deflection yoke in snug position against the flaring portion of the tube envelope. In brief, a plate of non-magnetic material is located on the rear side of the deflection yoke and has ears extending outboard the deflection yoke to receive springs or other means which pull the plate—and hence the deflection yoke—in the forward direction against the flared portion of the tube. This plate has a circular hole to receive the tube neck and additionally has a cylindrical guide received on the margin of the hole and has flange portions extending radially outwardly. A

pair of annular magnetic members are rotatably received over the guide in the rear side of the plate so that the flanges of the guide sandwich these members against the plate. Each such member has a protruding ear and is magnetized to form diametrically opposed poles so that they may be rotated in relation to each other and to the chassis to center the cathode ray beam. In the complete construction the means attached to the ears of the plate, the cathode ray tube receiving parts on the television set, and the other portions of the mechanism coact to hold the deflection yoke firmly but yieldably against the flared portion of the tube envelope.

It is therefore a general object of the present invention to provide an improved mechanism for firmly but yieldably holding the deflection yoke of a television receiver against the flared portion of the cathode ray tube envelope.

Additionally, the objects of this invention include the use of the magnetic centering device for the cathode ray beam as a mechanical pressure exerting device; the achievement of a highly simple, inexpensive and flexible construction; and the attainment of a ray beam centering and pressure exerting device which is particularly suitable for use in a home television receiver.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claim. My invention itself, however, both as to its organization and method of operation, together with further objects and advantages thereof, will be best understood by reference to the following description taken in conjunction with the accompanying drawings in which:

Figure 1 is a fragmentary elevational view of a television receiver incorporating the mechanism of the present invention with parts broken away to show more clearly their construction and relationship;

Figure 1*a* is a fragmentary view in vertical cross section showing the supporting mount for the forward, or viewing, end of the cathode ray tube;

Figure 2 is a front elevational view of the pressure plate and centering device as seen looking toward the flaring portion or bell of the tube;

Figure 2*a* shows a view like Figure 2 showing an alternate construction of the device; and

Figure 3 is an exploded view showing the permanent magnets of the centering mechanism and their relation to the pressure plate.

Referring now to Figure 1 there is shown a television receiver having a cathode ray tube **11**, consisting of a glass envelope with a neck portion **11***b* and a flared portion **11***c* and a viewing screen 11*d*, having an electron gun **11***a* inside the neck portion **11***b* of the glass envelope. A stream of electrons is emitted from the electron gun **11***a* directed toward the viewing screen **11***d* where they strike a phosphor coating **11***e* deposited on the inner surface of the viewing screen causing luminescence. This electron beam is caused to sweep horizontally across the viewing screen by a time-varying magnetic field passing through the neck **11***b* of the tube.

The time-varying magnetic field passing through the neck of the tube is produced by the magnetic deflection yoke unit **12**. This unit consists of two horizontal coils **12***a* and two vertical coils **12***b*, spaced generally in annular relationship as shown in the dotted outline of Figure 2, to encircle the neck of the tube **11***b*. These coils receive from the synchronizing and scanning circuit a varying current which causes the horizontal coils to produce the varying magnetic field causing the horizontal electron sweep and the vertical coils to produce the varying magnetic field causing the vertical sweep.

The magnetic deflection coil unit is firmly held in its proper position around the neck of the tube **11***b* and snug against the flared portion of the glass tube **11***c* by the

force exerted on it by the centering device unit **10**. The centering device is mounted on a plate **20** (see Figure 2) made of non-magnetic material, which may be, for example, a hard fibre-board. The plate has a plurality of ears **20***b* which, when the centering device unit is in position, will extend outboard of the deflection yoke. Each ear has a hole **20***c* to receive a spring or other suitable member for attachment to some convenient member of the chassis **15** and **16**. The plate **20** has an opening **20***a* (see Figure 3) sufficiently large to receive the neck **11***b* of the cathode ray tube. A cylindrical guide **23** is positioned non-rotatably in the plate opening. A pair of annular magnetic members **21** and **22** are rotatably mounted on the guide **23** on the rear side of the plate **20**. A front flange **23***a* and a rear flange **23***b* on the guide **23** extending radially outward hold the pair of magnetic members in position against the rear of the plate.

The annular magnetic members **21** and **22** are shown in Figure 3. Each has an ear **21***a* and **22***a*, respectively, extending radially outward for manual rotation. The magnetic members **21** and **22** are each magnetized to define diametrically opposed poles so that rotation of the magnetic members in relation to the tube and in relation to each other provides a ray beam centering magnetic field of adjustable orientation and intensity.

Figure 2*a* shows one possible alternative construction of the centering device unit. The plate **120**, made of non-magnetic material, has a generally triangular configuration. Three holes **120***c* are located near the outer edge to receive springs or other suitable members for attachment to the chassis. The plate has an opening to receive a cylindrical guide **123** similar to the unit shown in Figure 1 and described above. Annular magnetic members **121** and **122** are rotatably mounted on this guide.

The mounting for the front or viewing face of the cathode ray tube is shown in Figure 1*a*. The tube **11** is resiliently supported from the chassis **17** by a rubber strip **18**. This strip extends under the entire front face **11***d* to provide a large area of support. The strip **18** has an upstanding forward flange **18***a* which is sandwiched between the face **11***d* and the upturned flange **17***a* of the chassis to define a stop to prevent forward movement of the tube in relation to the chassis.

It will be noted that the springs **14**, Figure 1, pull the tube **11** forwardly to seat against the portion **18***a* of the strip **18**. Moreover, in the complete structure both the springs and the strip provide a resilient system to hold the yoke **12** in snug position without tending to break the tube.

Thus, the assembly consisting of the cathode ray tube, the magnetic centering device, and the magnetic deflection yoke is resiliently mounted in the chassis while the units of the assembly are held firmly together to prevent relative movement as to each other. Any vibration or shock reaching the glass tube or magnetic deflection yoke cannot cause relative motion between two units. Accordingly, this cause of tube breakage is eliminated.

While I have shown and described a specific embodiment of the present invention, it will be understood that numerous modifications and alternative constructions may be made without departing from its true spirit and scope. I therefore intend by the appended claim to cover all such modifications and alternative constructions as fall within their true spirit and scope.

What I claim as new and desire to secure by Letters Patent of the United States is:

A television receiver including in combination: a chassis; a cathode ray tube having an electron gun, an envelope with a neck, a flaring generally conical portion, and a comparatively flat viewing screen located at the large end of the flaring portion, a chassis, means on the chassis to receive the flaring portion of the tube adjacent the viewing screen and to hold the same against forward movement said means including resilient elements interposed between the tube and chassis; a magnetic deflection yoke received over the neck of the tube and having portions adapted to bear against the flaring portion thereof; a rigid non-magnetic plate having a circular opening through which the neck of the tube extends and a plurality of ears reaching outboard of the deflection yoke, the plate being located on the side of the deflection yoke opposite the flaring portion of the tube; a cylindrical guide snugly received against the margin of said opening and having flange portions extending in radially outward direction to secure the guide in fixed relation to the plate; a pair of annular magnetic members rotatably received on the cylindrical guide, said members being sandwiched between the face of the plate opposite the deflection yoke and the adjacent flange portion of the guide, each member having a radially extending manipulating ear to permit rotation thereof in relation to the guide, each of said members being magnetized to define diametrically opposed poles, whereby rotation of the members in relation to the guide and to each other provides a ray beam centering magnetic field of adjustable orientation and intensity; and spring means attached to the ears respectively and to the chassis to pull the plate forwardly, said means, said plate, and said means to receive the flaring portion of the tube forming a resilient system whereby the yoke is held snugly and resiliently against the flaring portion of the tube and the tube is resiliently supported by the chassis.

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