June 2, 1970 HIRONORI HISAMOTO ETAL 3,516,038

CONVERGENCE DEVICE

Filed May 20, 1968

FIG. 1

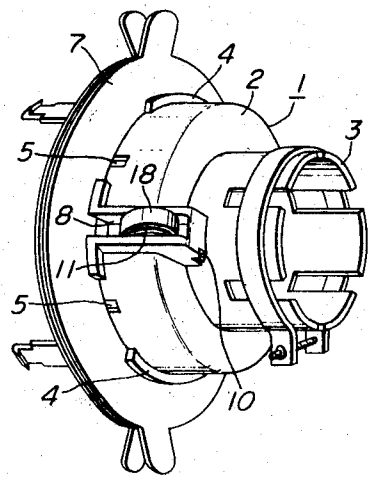



FIG. 2

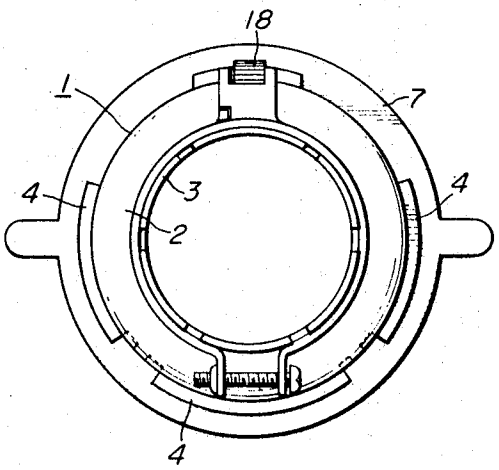



FIG. 3

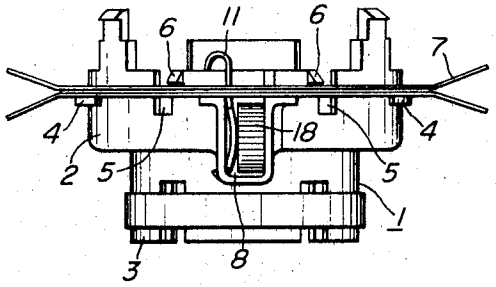



FIG. 6

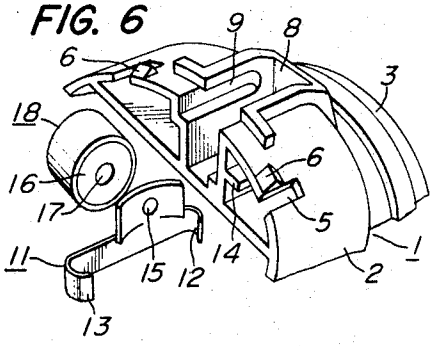



FIG. 4

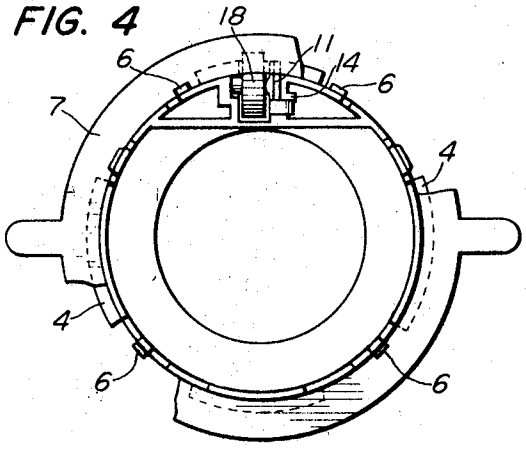



FIG. 7

PRIOR ART

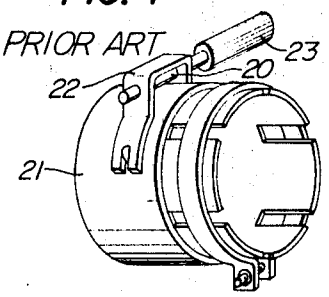
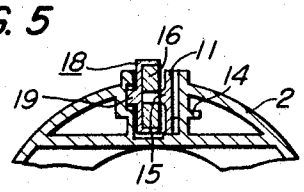



FIG. 5




INVENTORS

Hironori Hisamoto

Muneo Nishimura

Kanji Machida

BY Stevens, Davis, Miller & Mosher

ATTORNEYS

United States Patent Office 3,516,038 Patented June 2, 1970



3,516,038

# CONVERGENCE DEVICE

Hironori Hisamoto and Muneo Nishimura, Hirakata-shi, and Kanji Machida, Moriguchi-shi, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan, a corporation of Japan

Filed May 20, 1968, Ser. No. 730,291
Claims priority, application Japan, May 22, 1967, 42/43,777, 42/43,778
Int. Cl. H01f 7/00
U.S. Cl. 335—212 1 Claim

## ABSTRACT OF THE DISCLOSURE

A frame constituting the convergence device is provided with a large-diameter portion, a recess is formed in said large-diameter portion, and a disk-like blue-lateral convergence magnet is supported in said recess so that the adjustment of blue-lateral convergence can be satisfactorily effected by the rotation of said magnet.

## BACKGROUND OF THE INVENTION

This invention relates to a convergence device for use with a color television receiver, and more particularly it pertains to such device in which a blue-lateral convergence magnet can be mounted easily, thereby achieving convergence very easily and accurately.

In conventional convergence devices as shown in FIG. 7, a blue-lateral convergence magnet **20** configured in the form of a cylinder is supported by a U-shaped fitting **22** attached to a frame **21**, and it is freely rotated through a thumb **23**. With such a cylindrical blue-lateral convergence magnet **20**, however, there has been a tendency that the magnetic poles are incorrectly positioned in the axial direction of the cylinder or enlarged. Furthermore, incorrectness of the position of the magnet **20** to the frame **21** tends to be superimposed upon incorrectness of the mangetization. Due to the fact that such a incorrectness is further increased by the fitting **22**, there occurs such disadvantageous tendency that the "blue" beam is radially displaced although it should be laterally adjusted by means of the blue-lateral convergence magnet, and that an unwanted field causes deterioration in the beam focusing and has great adverse effect on the "red" and "green" beams. Even if such incorrectnesses are not taken into consideration, a complex magnetic field is established by a magnetic flux emanating from the ends of the magnet because of the cylindrical configuration of the magnet **20**. This constitutes such an inconvenience that the function of lateral adjustment cannot be achieved by the geometrically linear deflection of the electron beams so that there tends to occur unbalanced interference with respect to the "red" and "blue" beams, thus requiring a complex color adjustment.

## SUMMARY OF THE INVENTION

Accordingly, it is a primary object of this invention to eliminate the foregoing conventional drawbacks.

Another object of this invention is to provide a convergence device in which a recess for accommodating a blue-lateral convergence magnet is formed in the frame itself to greatly facilitate the attachment of the blue-lateral convergence magnet, and the magnet is configured in a disk-like shape, thereby minimizing irregularities of magnetization and attachment thereof.

Other objects, features and advantages of the present invention will become apparent from the following description taken in conjunction with the accompanying drawings.



## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a main portion of the convergence device according to an embodiment of this invention;

FIG. 2 is a rear view of the device shown in FIG. 1;

FIG. 3 is a side view thereof;

FIG. 4 is a front view, partly cut away, of the device of FIG. 1;

FIG. 5 is a sectional side view showing a main portion of the above device;

FIG. 6 is an exploded perspective view showing the main portion; and

FIG. 7 is a perspective view showing a main portion of a conventional convergence device.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the reference numeral **1** represents a cylindrical frame including a large-diameter portion **2** and a small-diameter portion **3**, **4** radially extending flanges provided on the periphery of the large-diameter portion **2**, **5** axially extending notches formed in the large-diameter portion at suitable positions, and 6 projections provided in the end portion of the large-diameter portion **2**. The reference numeral **7** denotes a purity magnet held between the flanges **4** and the projections **6**, **8** a recessed portion formed in the large-diameter portion **2** and having an axial groove **9** formed in the inner surface thereof, **10** a through-aperture formed in a corner portion of the recess **8**, and **11** a leaf spring mounted in the recessed portion **8** with a bent portion **12** at the fore end thereof inserted in said through-aperture **10** and a curved portion **13** at the rear end thereof disposed in engagement with the end portion of a side wall **14** defining the recessed portion **8**. The reference numeral **15** indicates a projection provided on the leaf spring, **16** a disk-like blue-lateral convergence magnet having a through-aperture formed in the center portion thereof, and **18** a cap-like magnet support provided in such a manner as to cover the magnet **16**.

A shaft **19** provided at the center of the support **18** is inserted in the groove **9**, and the projection **15** of the leaf spring **11** is disposed in engagement with the through-aperture **17** formed in the center portion of the magnet.

As described above, in the convergence device embodying the present invention, the blue-lateral convergence magnet is configured in disk-like shape, thus minimizing the possibility that the magnetic poles are dislocated during the magnetizing operation. Further, the device can be easily and economically manufactured since the recessed portion for holding the magnet can be formed integrally with the frame. In addition, the attachment of the blue-lateral convergence magnet is extremely simple. The position where the magnet is supported can be accurately controlled by means of the leaf spring which is fixed with the bent portion provided on the fore end thereof being inserted in the through-aperture formed in one corner of the recessed portion. Thus, the magnet can be rotated in the recessed portion in a plane which is precisely perpendicular with respect to the axis thereof, so that the direction of the resulting electric field becomes parallel to that of the electron beams, whereby a geometrically balanced adjustment can be achieved resulting in a greatly improved blue-lateral convergence.

With the foregoing arrangement, the magnetic force can be utilized efficiently so that the magnetization may be effected to the minimum required extent. Thus, it is possible to avoid adverse effect of the magnetic field such as deterioration in focusing, increased interference with respect to the "red" and "green" beams, etc. Furthermore, a smaller quantity of material is used such as in the fitting for attaching the magnet which tends to disturb the magnetic field produced by the latter, so that there is little or

no possibility that the purity magnetic field is disturbed and the focusing is deteriorated.

Because of the disk-like configuration of the magnet, miniaturization of the magnet attaching portion as well as the magnet itself can be achieved which in turn results in the convergence device being miniaturized. Thus, the adjustment of the purity magnet can be facilitated by virtue of the miniaturization of the blue-lateral convergence portion.

From the foregoing, it will be appreciated that the convergence device according to the present invention can produce the various foregoing effects and therefore it is extremely advantageous in respect of utility.

We claim:

1. A convergence device comprising a stepped cylindrical frame having a recessed portion in the larger diameter part thereof, a disc-like blue lateral convergence magnet having a central axially extending through aperture, a cap-like magnet support covering said magnet and having a protruding portion in registry with one end of said aperture, said recessed portion having a groove along one surface thereof, said magnet being rotatably supported in said recessed portion with said protruding portion of said magnet support being engaged in said groove, an elastic leaf spring engaged with another surface of said recessed portion opposite to said one surface, said spring having a projection engaging said magnet at the end of said aperture opposite to said one end whereby said magnet is elastically supported by said spring in said recessed portion.




**References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,500,455 | 3/1950 | Fisher | 313—77 XR |
| 2,717,323 | 9/1955 | Clay | 335—212 XR |
| 2,897,390 | 7/1959 | Jensen | 313—77 |
| 3,191,104 | 6/1965 | Mak | 335—210 |



GEORGE HARRIS, Primary Examiner

U.S. Cl. X.R.

313—77