United States Patent

[11] **3,567,986**

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[73] Assignee **Sylvania Electric Products, Inc.**

[54] **CATHODE RAY TUBE SHADOW MASK SUPPORTING STRUCTURE HAVING STRAIGHT SPRINGS MOUNTED UPON STRUCK-OUT PORTIONS OF THE SHADOW MASK FRAME**
2 Claims, 7 Drawing Figs.

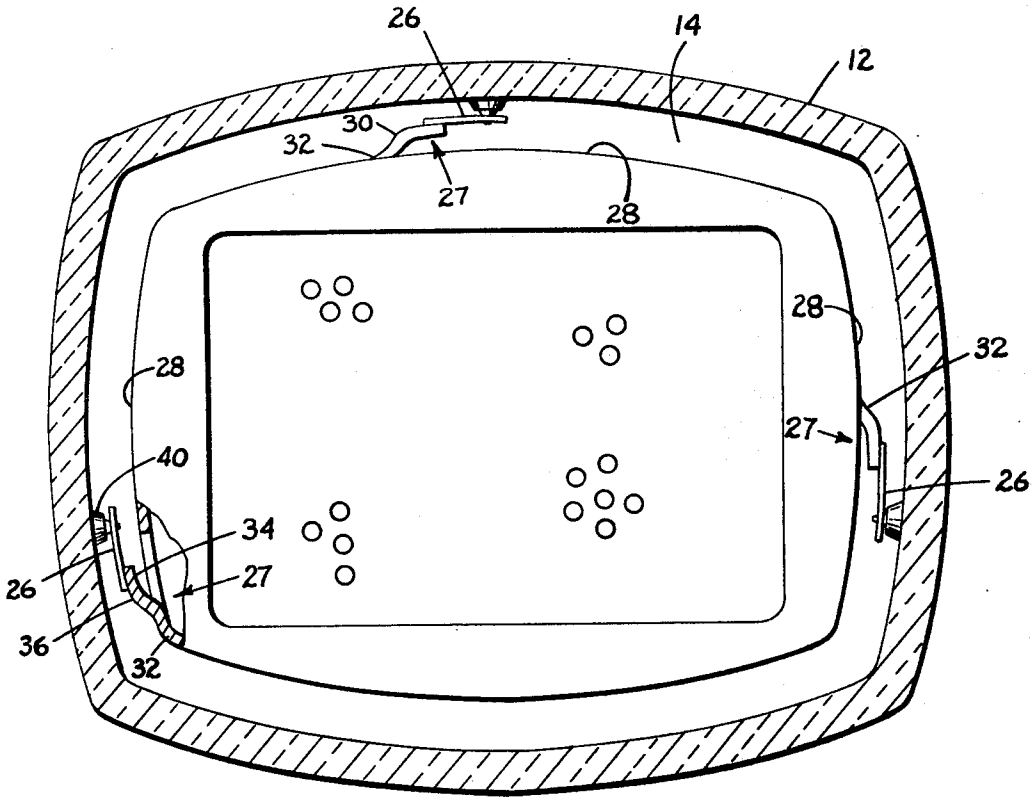
[52] **U.S. Cl.** **313/85,** 313/284, 313/292
[51] **Int. Cl.** **H01j 1/53,** H01j 29/40
[50] **Field of Search** ..... 313/85 (S), 92 (B)

[56] **References Cited**
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ABSTRACT: A mounting arrangement for parallax barriers for use in color tubes wherein relatively flat leaf springs are utilized and are mounted upon a predetermined tension determining plane which is formed in sidewalls of the parallax barrier support frame.



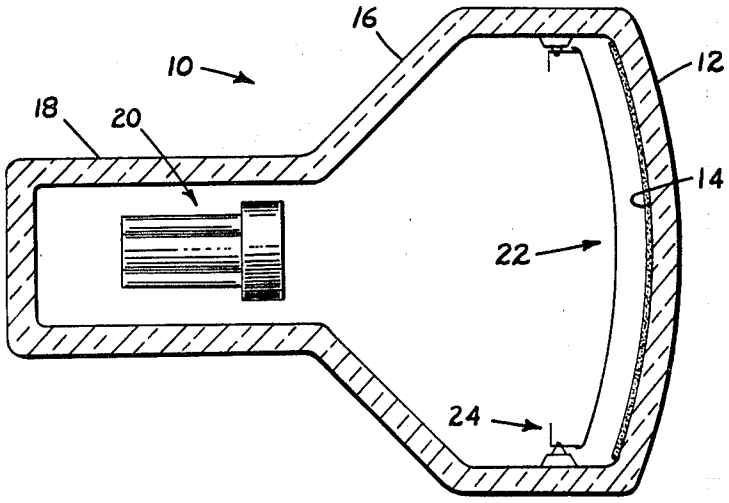


Fig. 1

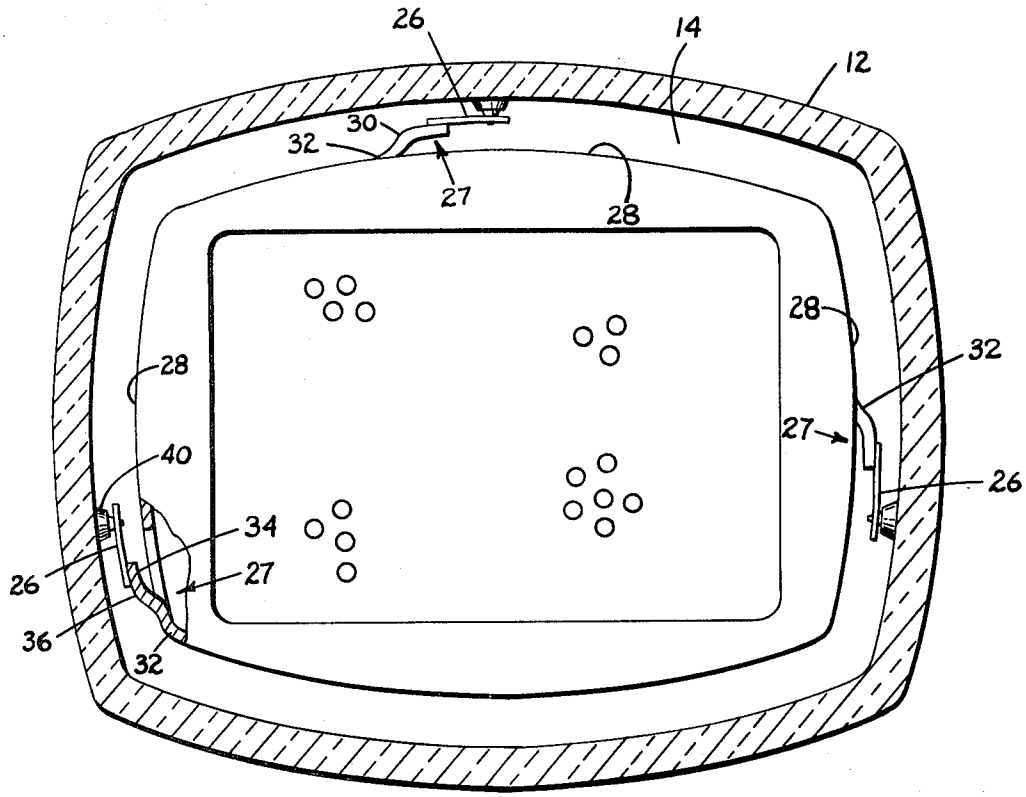


Fig. 2

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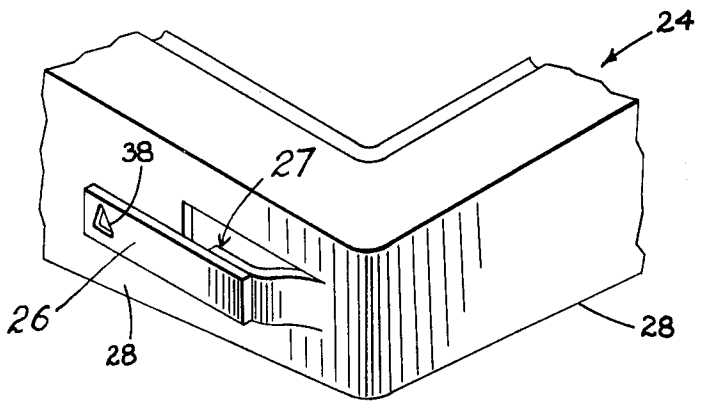


Fig. 3

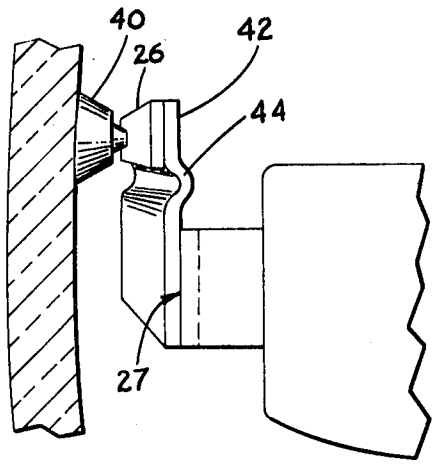


Fig. 5

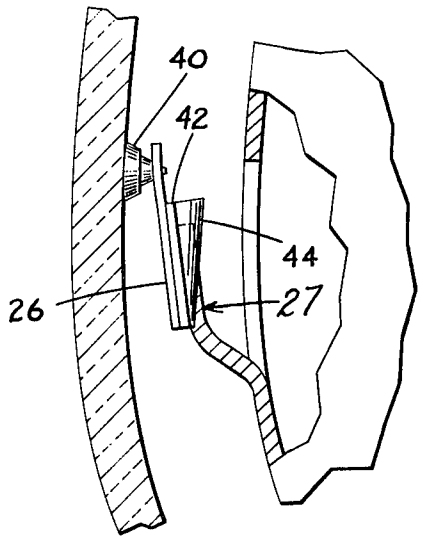


Fig. 4

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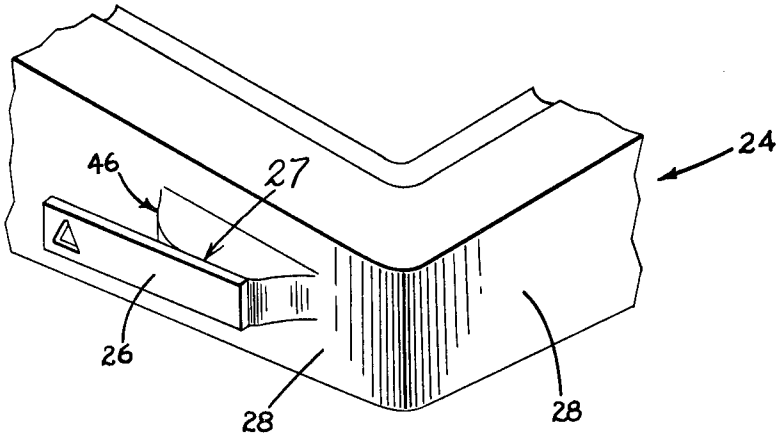


Fig. 6

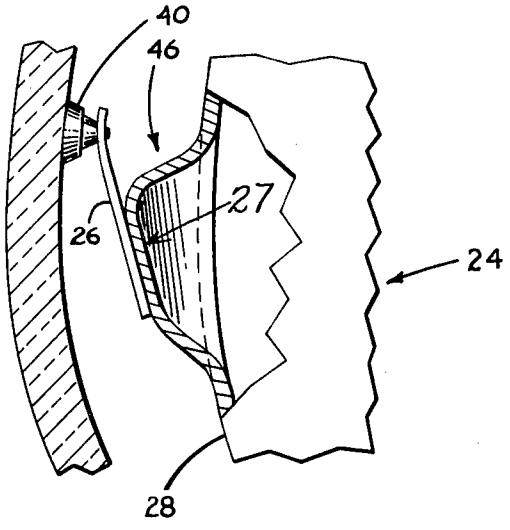


Fig. 7

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CATHODE RAY TUBE SHADOW MASK SUPPORTING STRUCTURE HAVING STRAIGHT SPRINGS MOUNTED UPON STRUCK-OUT PORTIONS OF THE SHADOW MASK FRAME

BACKGROUND OF THE INVENTION

This invention relates to supporting systems for parallax barriers utilized in color cathode ray tubes. The supporting structures utilized by the prior art are generally rectangular leaf springs which are formed with a plurality of bends to provide at one end a flat surface for attachment to the barrier frame sidewall and to cause the springs to extend away therefrom and then having the other end formed to engage a supporting stud which is positioned on an interior sidewall of the face panel. This type of mounting arrangement is well understood in the art and, for a more detailed explanation, reference may be had to U.S. Pat. No. 3,334,259. These springs are formed of relatively thin material approximately 0.032 inch in thickness. The processing temperatures involved in finishing the tube expose these springs to heat treatments which actually stress relieve the relatively thin spring material. The resulting stress relievement decreases the spring rigidity and permits mask displacement which can lead to misregistration in tube operation.

Furthermore, the type of bends required in the springs make it necessary to utilize two distinct designs of springs in some types of mounting arrangements. This, of course, is an unnecessary expense and adds to the cost of the tube.

OBJECTS AND SUMMARY OF THE INVENTION

Thus, it is an object of this invention to enhance the fabrication of color television tubes.

It is another object of the invention to enhance the supporting systems for the parallax barriers of color cathode ray tubes.

It is yet another object of the invention to reduce the amount of stress relieving of the support springs during processing.

These objects are accomplished in one aspect of the invention in the provision of a parallax barrier for a color cathode ray tube which comprises a relatively fragile barrier portion and a substantially rigid peripheral frame structure having upstanding walls mounting the barrier portion substantially at its edge. Formed on the upstanding walls of the frame are a plurality of tension determining planes. Attached to these planes are leaf springs that are substantially flat and whose tension is determined by the angle of the tension determining plane formed between the plane and the barrier wall.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic sectional view of a typical color cathode ray tube;

FIG. 2 is a plan view of a typical color cathode ray tube screen and parallax barrier assembly showing an embodiment of the invention;

FIG. 3 is a partial perspective view of a parallax barrier portion of a cathode ray tube illustrating in more detail an embodiment of the invention;

FIG. 4 is a sectional plan view with portions broken away illustrating a second embodiment of the invention;

FIG. 5 is an elevational sectional view with portions broken away illustrating the embodiment of FIG. 4;

FIG. 6 is a perspective view illustrating an alternate embodiment of the invention; and

FIG. 7 is a plan view with portions in section further illustrating the embodiment of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

For a better understanding of the present invention, together with other and further objects, advantages and capabilities thereof, reference is made to the following disclosure and appended claims in connection with the above described drawings.

Referring now to the invention with greater particularity, there is shown in FIG. 1 a diagrammatic view of a typical color cathode ray tube 10 having a face plate portion 12 with a mosaic phosphor screen 14 formed on the interior surface thereof. The face plate portion 12 is connected to a funnel-shaped body section 16 which terminates in a substantially cylindrical neck 18. Positioned in the neck 18 is an electron gun 20 which is formed to direct energy in the form of one or more electron beams to the screen 14 and energize the phosphor thereon to luminescence. A color selection medium or parallax barrier 22 is positioned adjacent screen 14 to aid in the color selection as is well known in the art.

The parallax barrier 22 is mounted adjacent the screen by means of a plurality of cooperating leaf springs and support studs. The springs are attached at one of their ends to a sidewall of a frame 24 which supports the barrier 22 at its peripheral edge and at their free ends to studs formed in a wall of the tube face plate. The amount of spring tension provided by the springs is determined, in part, by the spring material and, in the prior art devices, by the various bends formed therein which provide a tension determining plane which allows the springs to project away from the frame 24.

In a preferred embodiment of the invention, the leaf springs 26 are substantially flat throughout their entire length and the tension determining planes 27 are formed on the upstanding sidewalls 28 of frame 24, as may be seen in FIG. 2. It is to be noted that the term "substantially flat" as applied to the spring refers to that condition wherein no tension is being applied to the spring since, obviously, when the barrier is mounted within the face plate the springs will have imparted thereto some degree of curvature.

In the embodiment of FIG. 2 the tension determining planes 27 are formed as punched-out tabs 30. The tabs 30 have one end 32 contiguous with wall 28 and another end 34 extending therefrom. A flat portion 36 adjacent end 34 provides a seat for the fixed ends of springs 26. It will be seen that the angle made by flat portion 36 with the wall 28, together with the distance between wall 28 and flat portion 36 will determine the amount of tension supplied to the springs 26. The amount of stress relieving which occurs during tube processing is now reduced since the tension determining planes are formed of much thicker material than the springs (approximately 0.064inches as against 0.032inches) and consequently stress relieve less.

The configuration of tension determining planes 27 may be seen more clearly in FIG. 3. Also apparent is an aperture 38 formed in the free end of each spring 26 which cooperates with mating studs 40 provided on interior walls of face plate 12.

The tension determining plane 27 is also adaptable to other types of mounting arrangements such, for example, as that shown in FIG. 4 and 5. Herein, a temperature compensating mounting arrangement is utilized wherein the flat spring 26 is mounted upon a bimetallic device 42 embodying an expanding loop or hinge portion 44. In operation, the hinge 44 expands as the tube heats up and serves to maintain the desired screen-barrier alignment. Such devices are known to those skilled in the art and thus no further explanation of their operation is necessary.

A further modification of the tension determining planes is illustrated in FIGS. 6 and 7 wherein projections 46 are formed in sidewalls 28. The projections 46 perform the same function as tabs 30 but lend more strength to the sidewalls.

Thus, it will be seen that utilization of this invention will enhance the manufacture of color television tubes via the improvement of the supporting system. The amount of stress relieving of the springs is materially reduced as is the cost of the tube since the invention allows the use of substantially similar springs.

While there have been shown and described what are at present considered to be the preferred embodiments of the in-

vention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the scope of the invention as defined by the appended claims.

We claim:

1. A parallax barrier of the class described comprising: a fragile barrier portion; a substantially rigid peripheral frame structure having upstanding walls mounting said barrier portion substantially at its edge; a plurality of tension determining sections formed as struck-out portions projecting from said walls of said peripheral frame; and a plurality of substantially flat leaf springs having a predetermined tension when said barrier is operatively mounted each having one of their ends attached to one of said tension determining sections.

2. The invention of claim 1 wherein said springs are attached to intermediate mounting members and said members are attached to said tension determining sections.