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(71) Applicant : **NEC CORPORATION**
7-1, Shiba 5-chome Minato-ku
Tokyo 108-01 (JP)

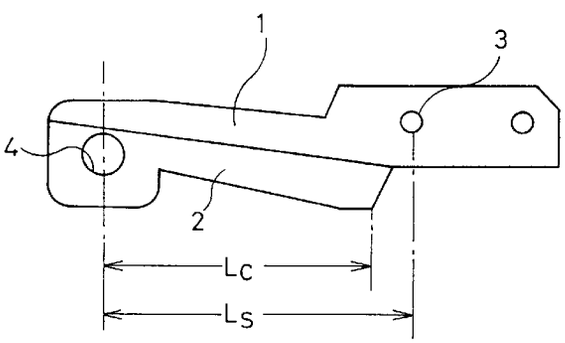
(72) Inventor : **Sasaki, Takeshi, c/o NEC Corporation**
7-1, Shiba 5-chome
Minato-ku, Tokyo (JP)

(74) Representative : **Moir, Michael Christopher et al**
MATHYS & SQUIRE, 10 Fleet Street
London EC4Y 1AY (GB)

(54) **Shadow mask assembly for color cathode ray tube.**

(57) A shadow mask assembly for a color cathode ray tube has a shadow mask (5), a frame (6) and a plurality of bimetallic spring members (7). The shadow mask is supported by the frame and is disposed behind an inner surface of a glass panel with a predetermined space being provided with respect to the inner surface. Each of the bimetallic spring members has a high expansion metal (1) and a low expansion metal (2) bonded together and supports the frame to the glass panel. The effective length of the low expansion metal of the bimetallic spring member is shorter than the spring working effective length (L_S) of the bimetallic spring member. The correction working effective length (L_C) and the spring working effective length (L_S) are functionally independent from each other, so that the correction working is not influenced by location of the welding points which are otherwise required to be disposed at precise locations.

FIG. 2



EP 0 500 312 A1

The present invention relates to a shadow mask assembly for a color cathode ray tube, and more particularly to a shadow mask assembly having a bimetallic spring member for supporting a frame to a glass panel of a color cathode ray tube.

A conventional shadow mask assembly for a color cathode ray tube of the kind to which the present invention relates employs a mask assembly in which there are disposed a large number of small apertures for having corresponding electron beams selectively excite screen elements of the three primary color light emitting phosphors deposited on an inner surface of a glass panel of the cathode ray tube.

The shadow mask assembly includes a shadow mask, a frame and a plurality of bimetallic spring members. The shadow mask contains a large number of small apertures associated with groups of screen elements of red (R), green (G), and blue (B) light-emitting phosphors. The frame is fixed to the shadow mask by means such as welding and provides structural strength to the shadow mask. Each of the bimetallic spring members supports the frame against a phosphor deposited glass panel with a predetermined space provided therebetween and has a function of self-adjustment for the thermal expansiion of the shadow mask thereby adjusting a distance between the inner surface of the glass panel and a curved surface of the shadow mask. This enables to make an appropriate correction of a relative location between the screen elements of phosphors and the electron beams to strike such screen elements.

As shown in Fig. 1, in a conventional shadow mask assembly, a bimetallic spring member has a high expansion metal 1 which extends over the entire length of a low expansion metal 2. Since the correction working effective length is determined by a point at which the bimetallic spring member and the frame are welded together, the correction working effective length and the spring working effective length naturally result in the identical working effective length. Which is denoted by L_W in Fig. 1.

In the conventional shadow mask assembly explained above, since the amount of the corrections in the positioning of the shadow mask is predetermined by the points at which the bimetallic spring member and the frame are welded together, any variations in the locations of welding cause similar variations to occur in the amount of corrections, resulting in the misalignment of the electron beam with respect to the desired phosphor element and in the inaccuracy in the working parameters involved.

It is, therefore, an object of the present invention to overcome the problems existing in the conventional shadow mask assembly and to provide an improved assembly, particularly an improved bimetallic spring assembly for use in the assembly.

One of the main objects is to provide such a shadow mask assembly in which the occurrence of misalignmetn between electron beams and phosphor elements can be avoided and the accuracy in the given working parameters can be ensured.

According to one aspect of the invention, there is provided a shadow mask assembly for a color cathode ray tube having a glass panel, said assembly having a shadow mask which is disposed behind an inner surface of the glass panel with a predetermined space being provided with respect to said inner surface;

a frame for supporting said shadow mask; and

a bimetallic member which has a high expansion metal and a low expansion metal bonded together and which is for supporting said frame to said glass panel;

said assembly being characterized in that the effective correction length (L_C) of the bimetallic member is shorter than the working length (L_S) of said bimetallic member.

In another aspect the invention provides a shadow mask assembly for a color cathode ray tube having a glass panel, said assembly having:

a shadow mask which is dispoed behing an inner surface of the glass panel with a predetermined space being provided with respect to said inner surface;

a frame for supporting said shadow mask; and

a bimetallic member which has a high expansion metal and a low expansion metal bonded together and which is for supporting said frame to said glass panel;

said assembly being characterized in that one expansion metal of the bimetallic member has its effective length in common with the effective correction length (L_C) of the bimetallic member and that such common length is shorter than the working length (L_S) of said bimetallic member.

Preferably the effective length of the low expansion metal of the bimetallic member is less than that of the high expansion metal, and is equal to the effective correction length (L_C).

The above and other objects, features and advantages of the present invention will be apparent from the following description of a preferred embodiment of the invention. with reference to the accompanying drawings, in which:

Fig. 1 is a front view of a conventional bimetallic spring member of the shadow mask of the kind to which the present invention relates;

Fig. 2 is a front view of a bimetallic spring member of the shadow mask assembly according to an embodiment of the present invention;

Fig. 3 is a perspective view of the shadow mask assembly in which the bimetallic spring member of Fig. 2 is welded to a frame of the shadow mask; and

Fig. 4 is a plan view of the shadow mask assembly of the present invention which is disposed be-

tween the shadow mask and the inner surface of the cathode ray tube.

Now, an embodiment of the present invention is explained with reference to the appended drawings.

An shown in Figs. 2 and 3, a bimetallic spring member 7 has a high expansion metal 1 and a low expansion metal 2 bonded together. A plurality of bimetallic spring members 7 are welded to a frame 6 to which a shadow mask 5 is welded. Each of the bimetallic spring members 7 has a hole 7 that receives a tapered stud 8 (see Fig. 4) projecting from a sidewall of the glass panel. In the region of the correction working effective length L_C of the bimetallic spring member 7, there extend both the high expansion metal 1 and the low expansion metal 2 and this is the region which undergoes deformation in response to changes in temperature and functions for correcting the positioning of the shadow mask assembly. The spring working effective length L_S is the region which extends between the hole 4 and the point 3 at which the bimetallic spring member 7 is welded to the frame 6. This region functions as a spring for the bimetallic spring member 7 to support the overall structure of the shadow mask assembly and, in substance, it is the high expansion metal 1 that plays the role of such a spring. The correction working effective length L_C and the spring working effective length L_S are functionally independent from each other.

The effective length of the low expansion metal 2 of the bimetallic spring member and the correction working effective length thereof are made the same length with respect to each other and such length is made shorter than the spring working effective length L_S. In this way, the correction working is not influenced by location of the welding points which are otherwise required to be disposed at precise locations.

For the bimetallic spring assembly according to the present invention, the precondition is that the low expansion metal extends through only the correction working effective length region and such region is limited within the spring working effective length region, so that the correction working effective length which requires high precision dimensions is determined by a high precision process such as a press and only the spring working effective length the characteristics of which are comparatively little influenced by any precision in dimensions is determined by location of the welding point. Thus, the invention enables to achieve the optimum correction working and enchances a high reliability of given working parameters.

Since the welding point can be freely determined, a change can be made readily in the spring characteristics independently of the required correction working, which is also an advantage in the arrangement according to the invention.

While the invention has been described in its preferred embodiments, it is to be understood that the word which have been used are words of description rather than limitation and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of the invention in its broader aspects.

Claims

1. A shadow mask assembly for a color cathode ray tube having a glass panel, said assembly having:

   a shadow mask (5) which is disposed behind an inner surface of the glass panel with a predetermined space being provided with respect to said inner surface;

   a frame (6) for supporting said shadow mask; and

   a bimetallic member (7) which has a high expansion metal (1) and a low expansion metal (2) bonded together and which is for supporting said frame to said glass panel;

   said assembly being characterized in that the effective correction length (L_C) of the bimetallic member is shorter than the working length (L_S) of said bimetallic member.

2. A shadow mask assembly for a color cathode ray tube having a glass panel, said assembly having:

   a shadow mask (5) which is disposed behind an inner surface of the glass panel with a predetermined space being provided with respect to said inner surface;

   a frame (6) for supportin said shadow mask; and

   a bimetallic member which has a high expansion metal (1) and a low expansion metal (2) bonded together and which is for supporting said frame to said glass panel;

   said assembly being characterized in that one expansion metal of the bimetallic member has its effective length in common with the effective correction length (L_C) of the bimetallic member and that such common length is shorter than the working length (L_S) of said bimetallic member.

3. A shadow mask assembly according to Claim 1 or Claim 2, wherein the effective length of the low expansion metal (2) of the bimetallic member is less than that of the high expansion metal (1), and is equal to the effective correction length (L_C).

FIG. 1 PRIOR ART

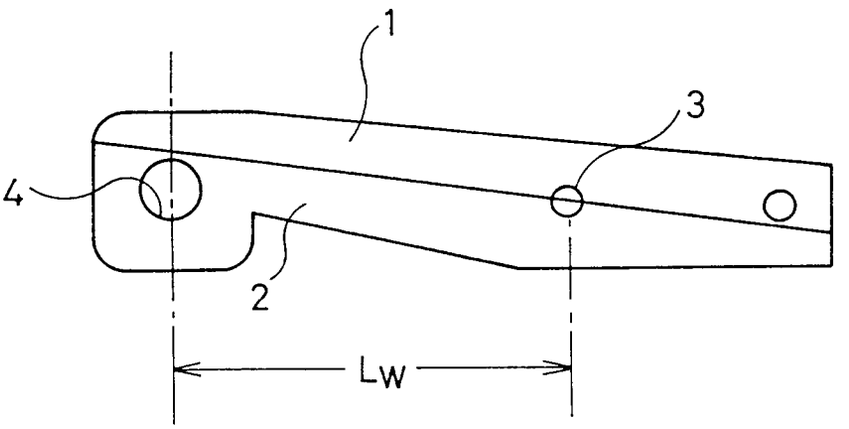


FIG. 2

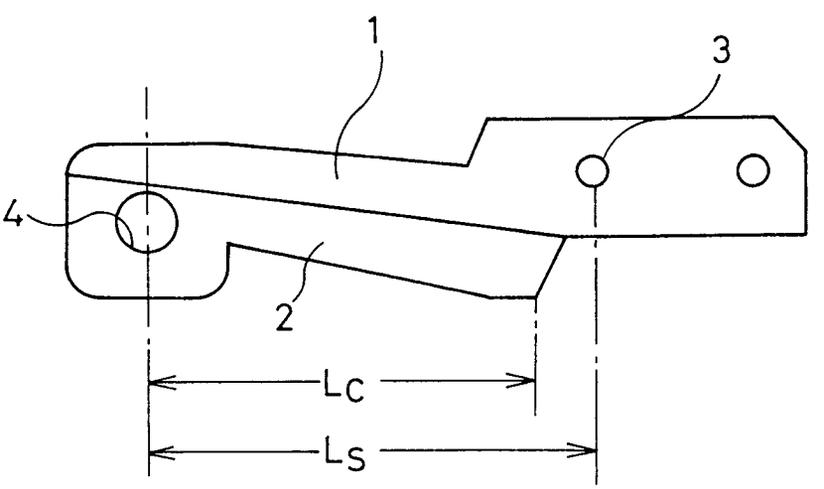


FIG. 3

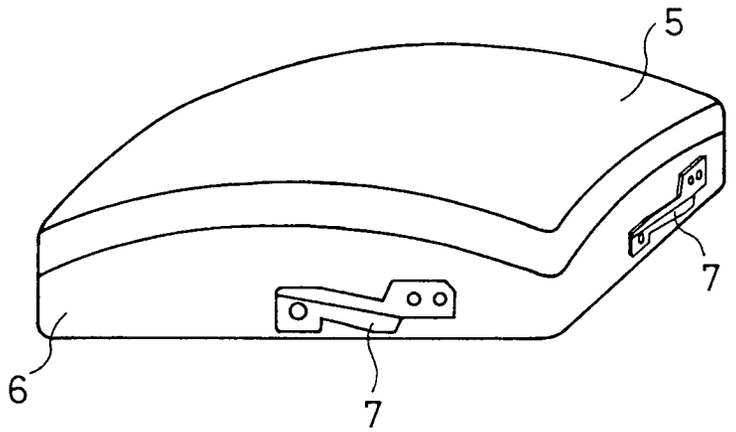
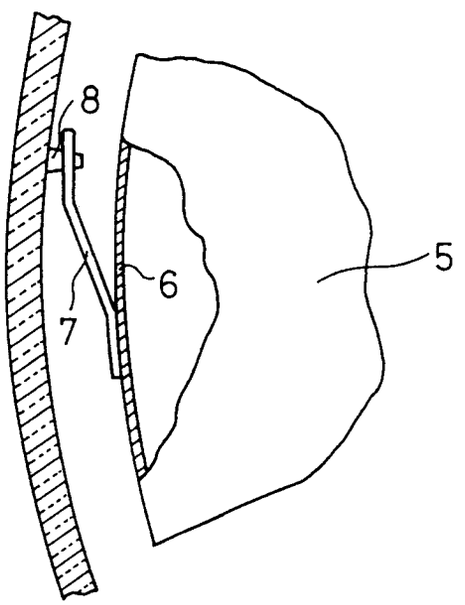


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number EP 92301308.0

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	JP - A - 62-268 040 & PATENT ABSTRACTS OF JAPAN, unexamined applications, E field, vol. 12, no. 153, May 11, 1988 THE PATENT OFFICE JAPANESE GOVERNMENT page 35 E 607 * Kokai-no. 62-268 040 (MATSUSHITA) *	1-3	H 01 J 29/07
A	US - A - 4 491 763 (FUJINUMA) * Column 6, line 55 - column 7, line 7; fig. 6 *	1,2	
A	US - A - 4 792 719 (ORNSTEIN) * Column 1; fig. 1 *	1,2	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

H 01 J 29/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	22-05-1992	SCHLECHTER

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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