

[54] **COLOUR PICTURE TUBES**
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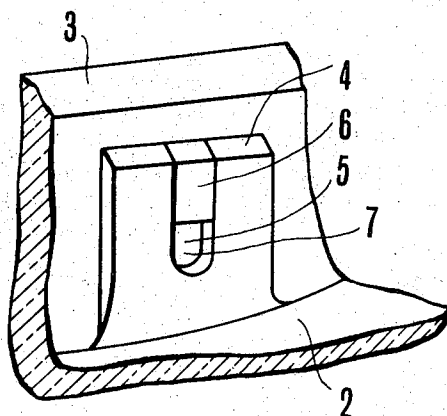
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313/292
[51] **Int. Cl.**..... **H01j 29/18**
[58] **Field of Search**..... 313/85 S, 92 B, 292, 289,
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[57] **ABSTRACT**
In a colour picture tube including a colour selection electrode assembly mounted on a panel close to a fluorescent screen, there are provided a plurality of projections on the inner surface of the vertical edge wall of the panel. Each projection is formed with a groove which is partially filled with a filler member to define a recess which is adapted to receive a mounting member of the colour selection tube.

5 Claims, 9 Drawing Figures



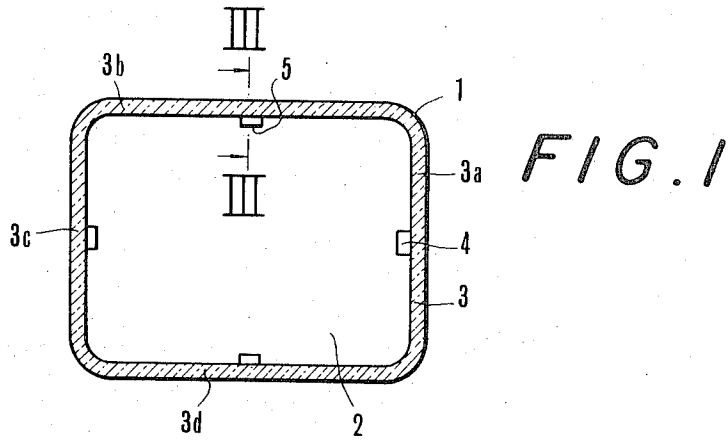


FIG. 2

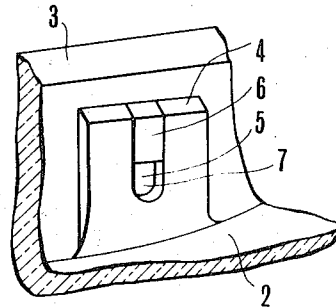


FIG. 3

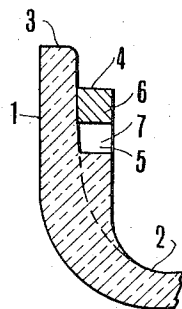


FIG. 4

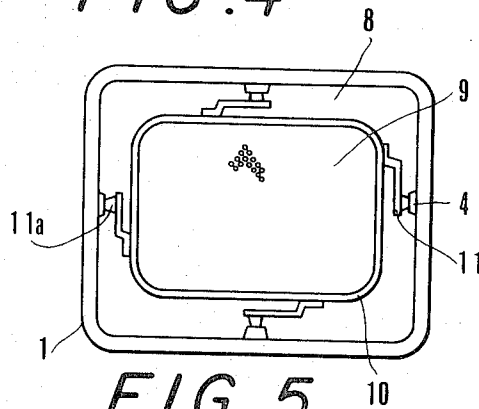
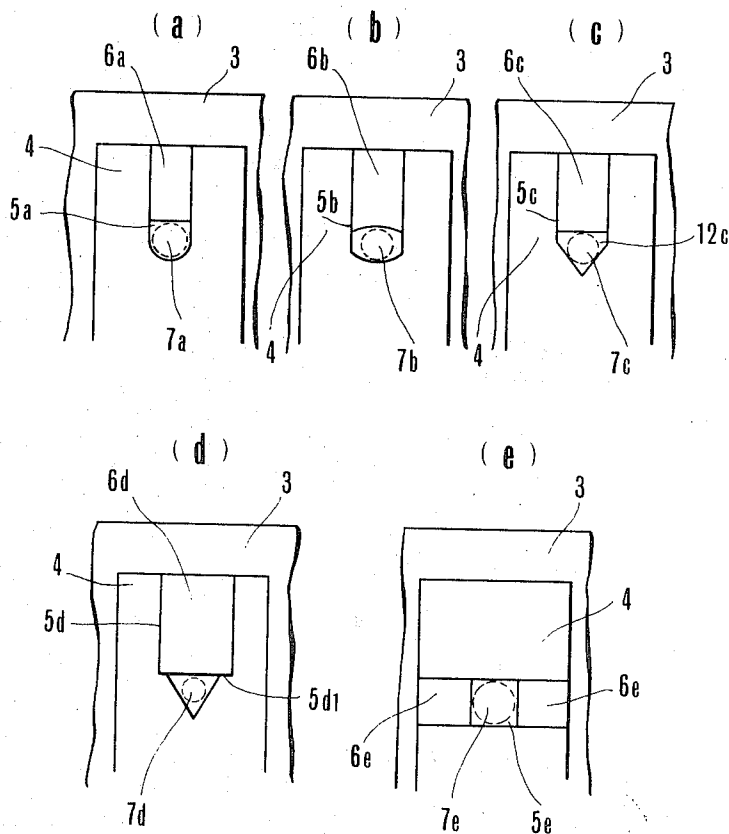


FIG. 5



COLOUR PICTURE TUBES

BACKGROUND OF THE INVENTION

This invention relates to a colour picture tube and more particularly to an improved construction of a colour picture tube wherein projections are provided for the vertical edge walls of a glass panel including a fluorescent screen and the projections are formed with grooves for supporting a colour selection electrode assembly.

According to a conventional method of supporting a colour selection electrode assembly (hereinafter termed a shadow mask structure) metallic pins are sealed in the vertical edge walls of a panel and the pins are used to engage springs secured to the shadow mask structure. With this construction pins are secured to glass panel by moulding molten glass into a desired configuration, reheating portions of the moulded glass panel to which the pins are to be secured while the panel is still hot, and embedding preheated pins in the reheated portions. According to this method, however, it has been difficult to accurately determine whether the moulded glass has the desired dimensional accuracy or not and also has the desired appearance or not because the moulding process is carried out at an elevated temperature of more than 400°C. For this reason, it sometimes happens pins are secured to defective glass panels so that it has been difficult to decrease the cost of manufacturing. In addition, there are various problems such as strain created by sealing the pins.

According to one approach to this problem, the inside wall thickness of three or four sides of the vertical edge wall of the panel is increased at portions where the shadow mask structure is to be supported and recesses for receiving the pins or springs secured to the shadow mask structure are formed in these thickened walls to extend in the axial direction of the tube. Further, grooves are formed near the recesses to extend at right angles with respect to the recesses so as to support the shadow mask structure with these recesses and grooves.

Although this method can eliminate the difficulty caused by the sealing of the pins, such arrangement complicates the construction of the shadow mask structure because with the recesses alone which are parallel with the tube axis, it is not sufficient to securely hold the shadow mask structure so that it is necessary to provide grooves in addition to the recesses. In other words, it is necessary to provide two types of engaging members for the shadow mask assembly, one to cooperate with the recesses and the other with the grooves. Such supporting means are provided for three or four sides of the vertical edge wall of a colour picture tube panel thus providing a so-called three point or four point supporting system. But such supporting means require high precisions of the dimensions and locations of the shadow mask structure, recesses and grooves because two such supporting means are provided for each side, thus requiring a total of six or eight supporting portions. Inaccurate dimensions make it difficult to correctly mount the shadow mask structure and cause degradation of the colour purity due to misalignment of the phosphor dots on the fluorescent screen with the holes of the shadow mask. In addition, use of a plurality of engaging members decreases the workability of mounting and dismounting of the shadow mask struc-

ture which are necessary in the process of forming the mosaic shaped fluorescent screen.

Further, it has been proposed to form openings in the direction parallel to the tube axis, insert pins mounted on resilient supporting members in the openings and secure the pins by means of a bonding agent.

Although this proposal can eliminate the difficulty caused by sealing the pins it creates other problems involving the deformation of the pins and inaccurate mounting due to frequent mounting and dismounting of the shadow mask structure as well as setting of the bonding agent.

SUMMARY OF THE INVENTION

Accordingly, it is an object of this invention to provide an improved colour picture tube according to which the shadow mask structure is supported by the panel by means of recesses formed in the projections of the panel without using pins which are sealed in the panel thereby eliminating above described difficulties caused by using such pins.

Another object of this invention is to provide a colour picture tube wherein instead of using pins sealed to the panel the shadow mask structure is supported on the panel by means of recesses in the projections provided for the panels thereby simplifying the mounting and dismounting operations of the shadow mask structure without the fear of deforming the pins.

A further object of this invention is to provide an improved colour picture tube capable of facilitating the mounting and dismounting of the shadow mask assembly and preventing the degradation of the colour purity due to misalignment of the phosphor dots on the fluorescent screen with the holes of the shadow mask which are caused by frequent mounting and dismounting operations thereof.

According to this invention there is provided a colour picture tube of the class comprising a neck containing an electron gun assembly, a panel including a fluorescent screen, a colour selection electrode structure disposed close to the fluorescent screen, and a funnel interconnecting the neck and the panel for completing an envelope of the colour picture tube, characterized in that a plurality of projections are provided on the vertical edge wall on the inside of the panel and that each projection is provided with a groove which is partially closed by a filler member thereby defining a recess which is used to receive a mounting member of the colour selection electrode assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

Further objects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 shows a plan view of one example of the screen of the panel of a colour picture tube embodying the invention;

FIG. 2 shows a perspective view of one portion of the vertical edge wall of the panel shown in FIG. 1;

FIG. 3 is an enlarged sectional view taken along a line III — III in FIG. 1;

FIG. 4 is a plan view showing a manner of mounting a colour selection electrode assembly on the panel shown in FIG. 1 and

FIGS. 5a through 5e are partial plan views showing modified embodiments of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As diagrammatically shown in FIG. 1, the novel colour picture tube embodying the invention comprises a panel 1 formed by moulding glass and including a screen on which is formed a mosaic shaped fluorescent screen (not shown) and a vertical edge wall 3 surrounding the panel 1. At substantially the middle on the inner side surfaces of respective sides 3a to 3d of the vertical edge wall 3 are provided inward projections 4 for supporting a shadow mask structure in a manner to be described later. As shown in FIGS. 2 and 3, each projection 4 is provided with a vertical groove 5, each being partially filled with a filler member 6 thus defining a recess 7. These projections may be provided for three sides where a three point supporting system is adapted.

As best shown in FIG. 2, each projection 4 and groove 5 extend in the axial direction of the tube and the filler member 6 made of glass, ceramic or metal is secured in groove 5 by means of fused frit glass for example. The projections 4 may be formed by reheating a moulded glass panel before it cools completely and then shaping the reheated panel by means of a press mould for example or by grinding a cooled panel. In order to prevent cracking of the panel it is advantageous to make the surface sufficiently smooth by thorough polishing or by applying thin coatings of frit glass on the ground surface and then crystallizing the frit glass. The recess 7 may also be formed by placing a removable core (not shown) at the bottom of each groove 5 and then filling the remaining portion of the groove with a filler such as frit glass. After setting the filler, the core is removed. Since the accuracy of the position of the recesses is determined by the accuracy of the press mould and the shrinkage of the glass it is easy to attain an accuracy of less than 0.1 mm.

As shown in FIG. 4, the shadow mask structure 8 is mounted in the panel 1 shown in FIG. 1. The shadow mask structure comprises a shadow mask 9 provided with a plurality of perforations for transmitting electron beams, a reinforcing frame 10 and supporting members in the form of leaf springs 11 for mounting the shadow mask assembly in the panel 1. Pins 11a on the outer ends of springs 11 are received in recesses 7 to support the shadow mask assembly in the vertical edge wall 3 of the panel 1. Although not shown in the drawing, the colour picture tube comprises a neck containing an electron gun assembly and a funnel interconnecting the neck and the panel to complete an envelope.

FIG. 5 shows modified embodiments of the invention. In FIGS. 5a to 5e, reference character 5a to 5e show grooves formed in respective projections, 6a to 6e filler members partially filling the grooves and 7a to 7e recesses. Since the configuration of the recesses has a great influence upon the assembled position of the shadow mask assembly it is important to select suitable configurations. In the embodiment shown in FIG. 5a, the

bottom of the recess has a configuration of a semicircle having the same radius as that of the pin received therein. In the embodiment shown in FIG. 5b, the upper and lower surfaces of the recess are shaped as arcuate surfaces having larger radius of curvature than the radius of the pin whereas in the example of FIG. 5c, the cross-sectional configuration is triangular so that the periphery of the pin engages the three sides of the triangular recess at three points. In the example shown in FIG. 5d, the groove 5d is stepped to make easier insertion of the filling member 6d. In this case too the recess 7d is triangular, whereas in the embodiment shown in FIG. 5e, groove 5e extends in a direction perpendicular to the tube axis for receiving two filler members 6e thus defining a square recess 7e therebetween.

The depth, width and configuration of the grooves are suitably selected dependent upon the size of the panel, the number and dimension of springs. Further, it should be understood that the configuration of the spring is not limited to that illustrated.

What is claimed is

1. In a colour picture tube comprising a neck containing an electron gun assembly, a panel including a fluorescent screen, a colour selection electrode structure disposed close to said fluorescent screen, and a funnel interconnecting said neck and said panel for completing an envelope of said colour picture tube, the improvement which comprises a plurality of projections formed on the vertical edge wall on the inside of said panel, each of said projections being provided with a groove extending in one direction to the edge of said projections; a filler member partially filling said groove and leaving a recess bounded on all sides by the walls of said groove and said filler member; mounting members on said colour selection electrode structure having a leaf spring extending adjacent each said recess; and a pin carried on the free end of each said leaf spring and urged thereby to engage said walls of said recess, said springs, pins and recesses adapted to accurately removably position said colour selection electrode structure and constrain said structure against movement in all directions relative to said panel.

2. The colour picture tube according to claim 1 wherein the groove in each projection extends in parallel with the axis of said tube.

3. The colour picture tube according to claim 1 wherein the groove in each projection extends at right angles with respect to the axis of said tube.

4. The colour picture tube according to claim 2 wherein one end of said groove is opened and said filler member closes said opened end to form said recess by said filler member and the closed end of said groove.

5. The colour picture tube according to claim 3 wherein the opposite ends of said groove are opened and said opened ends are closed by spaced apart filler members to define said recess therebetween.

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