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2,785,821

CATHODE-RAY TUBE

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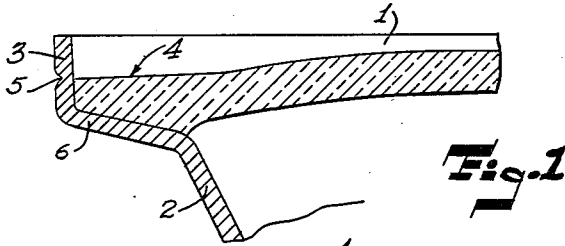


Fig. 1

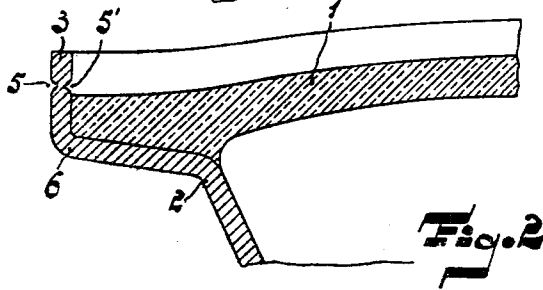


Fig. 2

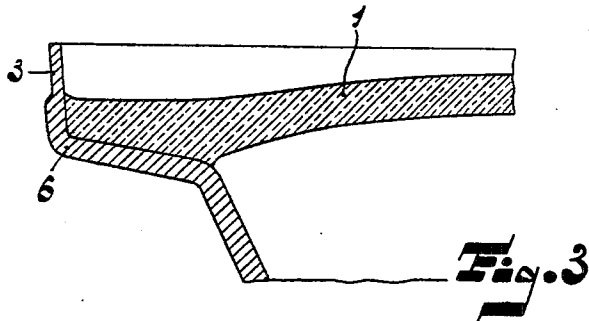


Fig. 3

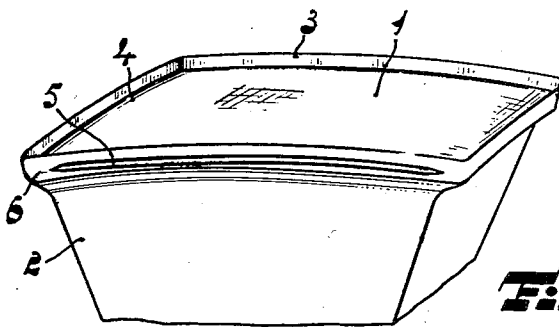


Fig. 4

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1

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CATHODE-RAY TUBE

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Claims priority, application Netherlands May 4, 1953

4 Claims. (Cl. 220—2.3)

This invention relates to cathode-ray tubes comprising a metal cone to which a glass window is sealed, more especially to a tube of this type whereof the window and the cone are substantially rectangular.

With tubes having a metal cone the window is, in general, sealed to the cone in such a manner that part of the metal edge of the cone slightly projects above the outer surface of the glass of the seal, the metal edge constituting a protecting rim for the sealing edge.

It has, however, been found that particularly in the case of a cone of substantially rectangular shape cracking of the glass is very liable to occur due to shocks on the inner wall of the rim, since tensile stress generally prevails at the outer surface of the sealing edge of the glass. This is probably due to the fact that the cone contracts on cooling and is deformed near the edge owing to the pressure of the glass, the rim slightly bending outwardly. This effect is aggravated when evacuating the tube.

It has been proposed to strengthen the edge of the cone by providing a clamping ring which is shrunk on the outer edge of the cone. However, such a clamping ring is difficult to make so accurately as to exert reproducible pressure.

With a cathode-ray tube comprising a glass window which is sealed to a metal cone so that the edge of the cone slightly projects beyond the seal said disadvantage is greatly reduced by providing that, in accordance with the invention, the wall thickness of the edge of the cone, approximately flush with the outer surface of the glass of the seal, is locally smaller than that of that part of the edge of the cone which is situated at the seal. The outer edge of the cone is preferably provided with an encircling groove, about opposite the point where the edge of the glass window is sealed to the metal wall. The invention is of particular importance for cones having a substantially rectangular shape, since in this case notably the centre of the long sides of the rectangle is very sensitive to shocks on the inner side of the rim.

In order that the invention may be readily carried into effect, it will now be described in detail with reference to the accompanying drawing, given by way of example, in which

Figures 1 to 4 show embodiments of the invention.

In all the figures the reference numeral 1 denotes the glass window which is sealed into the edge 6 of the cone

2

2 made, for example, from chrome iron. The edge of the cone slightly extends beyond the seal and constitutes a rim 3. In accordance with the invention the wall thickness of the edge 6 of the cone, which is approximately 2.5 mm., is locally reduced to say one half by means of a groove 5 shown in Fig. 1 which is provided approximately opposite the outer surface 4 of the glass of the seal. The groove 5 may alternatively be provided internally of the edge, just above the glass surface 4. The groove may be 1 to 2 mm. wide. It is found that the evacuated tube can now be tested at an excess pressure of 3.5 atmos. instead of 1.7 atmos. as customary, which confirms that the robustness of the bulb has appreciably increased. The tube is also much more resistant to impact internally of the rim 3.

In Fig. 2 two grooves 5, 5' are provided opposite each other, and in Fig. 3 the rim 3 itself is thinner than the edge 6 at the seal. According to Fig. 4 the wall thickness may alternatively be reduced only at the long sides of a substantially rectangular cone.

It will be appreciated that the invention is not to be taken as being limited to the precise constructional details referred to in the foregoing description.

What is claimed is:

1. A cathode-ray tube comprising an evacuated envelope, said envelope including a metal substantially-conical portion and a glass window sealed thereto at the larger end, the end of the metal cone slightly projecting in a direction substantially parallel to the axis of the cone beyond the area of the cone sealed to the glass window, the thickness of the end of the cone approximately aligned with the outer surface of the glass window at the seal being smaller than the portion of the cone end at the sealing area.

2. A cathode-ray tube as set forth in claim 1 wherein a groove is provided in the outer surface of the cone end to afford the reduced thickness area.

3. A cathode-ray tube as set forth in claim 1 wherein the entire end of the cone projecting beyond the sealing area is of reduced thickness relative to the area of the cone at the seal.

4. A cathode-ray tube comprising an evacuated envelope, said envelope including a hollow substantially-conical metal portion having a rectangular end with two longer sides and a rectangular glass window sealed to the rectangular end of the metal portion, the end of the metal portion slightly projecting in a direction substantially parallel to the axis of the metal substantially-conical portion beyond the area of the metal portion sealed to the glass window, a pair of grooves being provided at the long sides of the rectangular end approximately aligned with the outer surface of the window at the seal to provide areas of reduced thickness thereat.

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