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7.82; 220/2.1A, 2.3A; 24/68, 69, 70

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[54] **CATHODE RAY TUBES WITH MULTIPLE
CONVOLUTION TENSION BANDS**
10 Claims, 4 Drawing Figs.

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24/68, 178/7.82, 220/2.1
[51] Int. Cl..... H01j 29/28,
H01j 61/50, H01k 1/28

ABSTRACT: To reduce the implosion risks of the envelope of a cathode ray tube the flange of the face plate has two U-shaped metal strips cooperating to form an encircling close-fitting frame bonded to the flange. A tensioned metal band surrounds the frame and is in the form of a spiral winding of at least two convolutions.

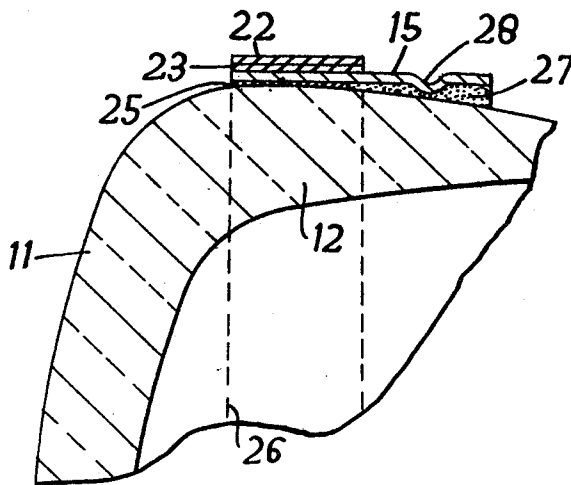


Fig. 1.

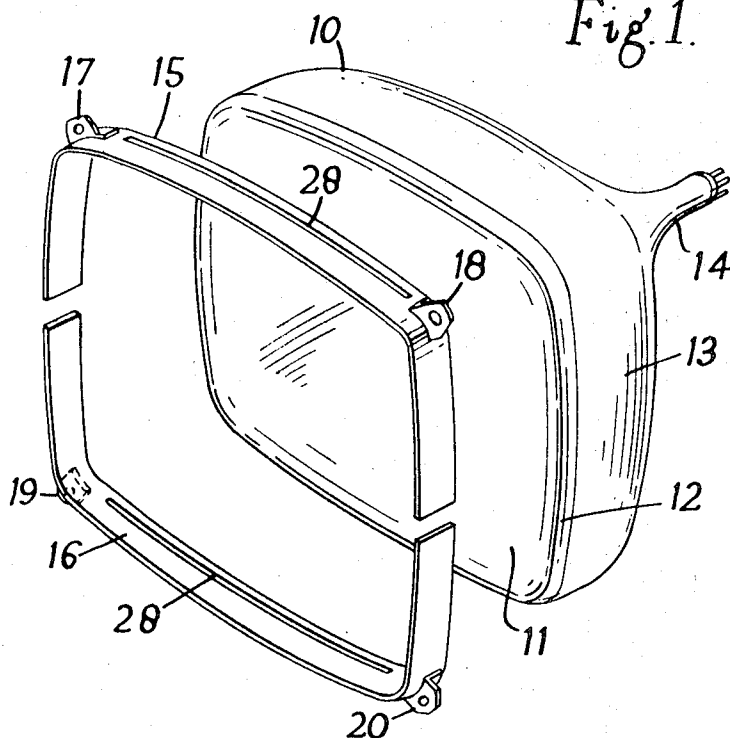
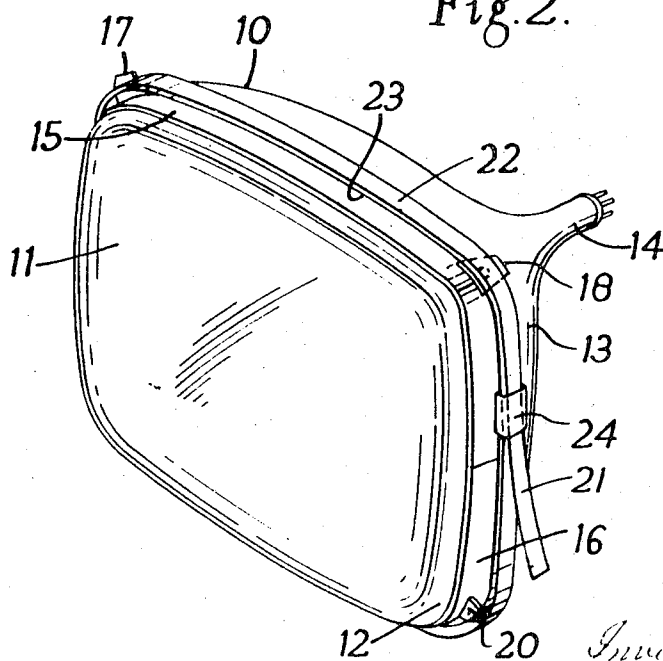


Fig. 2.



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Fig. 3.

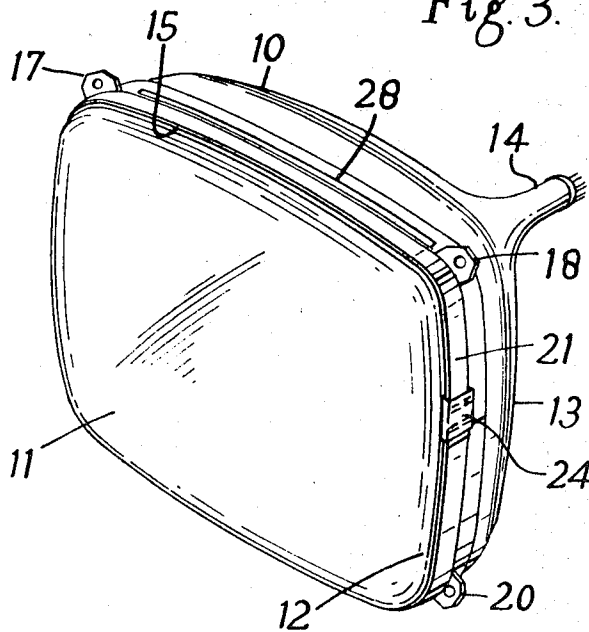
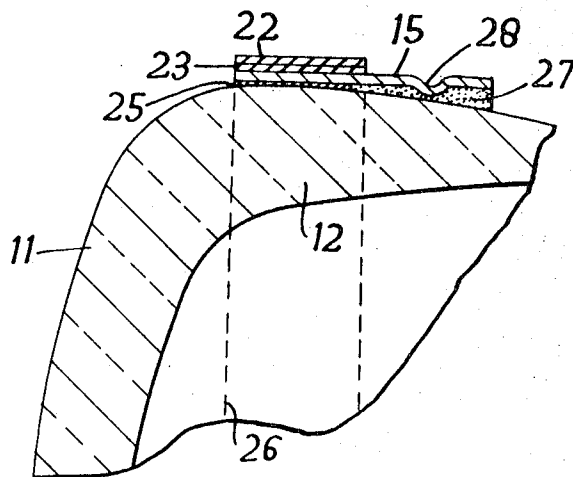


Fig. 4.



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CATHODE RAY TUBES WITH MULTIPLE CONVOLUTION TENSION BANDS

The present invention relates to cathode ray tubes and is concerned with cathode ray tubes provided with means for reducing the effects of envelope implosion.

According to the present invention a cathode ray tube comprises a glass envelope having a glass face plate with a rearwardly extending flange joined at its periphery to a flared glass portion terminating in a neck which houses an electron gun or guns, the flange having an encircling metal structure in three parts, two of the metal parts consisting of U-shaped strips cooperating to form an encircling frame which is a close fit on and is bonded to the flange, and the third metal part consisting of a metal tension band surrounding the frame and tensioned to compress the frame on the flange, the tension band being in the form of a spiral winding of at least two convolutions superposed on one another.

The invention will now be described by way of example with reference to the accompanying drawing in which:

FIG. 1 shows a cathode ray tube and two U-shaped frame members fitted thereto and a tension band ready for fitting and tensioning;

FIG. 1 shows a cathode ray tube and two U-shaped members ready for fitting thereto;

FIG. 2 shows the cathode ray tube of FIG. 1 with the U-shaped frame members fitted thereto and a tension band ready for fitting and tensioning;

FIG. 3 shows one embodiment of the invention in which the tension band of FIG. 2 is in place and tensioned; and

FIG. 4 is a cross section of part of FIG. 3.

Referring to FIG. 1 a cathode ray tube 10 is of glass and has a face plate 11 with a rearwardly extending flange 12. A flared portion 13 of the tube 10 is sealed to the periphery of the flange 12 and terminates in a neck 14 which houses an electron gun or guns (not shown).

With the aim of preventing implosion of the tube or substantially reducing the severity of implosion two U-shaped steel strips 15 and 16 are provided. These are shown in FIG. 1 separated from the tube and ready for fixing thereto. Each of the strips has two apertured lugs shown at 17 and 18 on the strip 15 and 19 and 20 on the strip 16. These lugs are for use in mounting the tube in a container such as the cabinet of a television receiver.

Referring now to FIG. 2 this shows the two U-shaped steel strips on the flange 12 of the face plate 11, the two U-shaped strips being seen to cooperate with one another to form a rectangular frame fitting closely upon the flange 12.

FIG. 2 also shows a tension band 21 of steel separate from the tube but in a position in which it is ready to be tensioned and tightened upon the front margin of the frame formed by the strips 15 and 16, the front margin being the margin nearer the front face 11 of the tube 10. The tension band 21 will be seen to consist of a spiral with two convolutions superposed on one another and both passing through a single clip 24.

Before the two U-shaped strips 15 and 16 are placed upon the flange 12 the front margins of their inner surfaces are given a coating of an adhesive in the form of a suitable synthetic resin. The strips 15 and 16 are then placed in position as shown in FIG. 2 and the tension band 21 is located over them also as shown in FIG. 2. The tension band is then tensioned to about 2,000 lbs and the clip 24 is crimped upon the

tension band to hold that tension the assembly being then as shown in FIG. 3.

The cross section of FIG. 4 shows a part of the face plate 11 and flange 12 in the final assembly. A layer 25 of adhesive is shown between the front margin of the U-shaped strip 15 and the flange 12 and the convolutions 22 and 23 of the tension band are shown over the front margin of the U-shaped strip 15. In FIG. 4 a line 26 is the mould match line of the face plate 11 and it will be seen that the front edge of the strip 15 and of the convolutions 22 and 23 are just up to the mould match line 26.

It will also be seen that between the rear margin of the U-shaped strip 15 and the glass of the envelope there is a progressively increasing gap which is filled with an adhesive 27 which is again a synthetic resin and which adheres to the strip 15 and to the glass of the envelope.

A strengthening corrugation 28 is provided in the strips 15 and 16 and can also be seen in FIGS. 1 and 3.

I claim:

1. A cathode ray tube comprising a glass envelope having a glass face plate with a rearwardly extending flange joined at its periphery to a flared glass portion terminating in a neck which houses an electron gun or guns, the flange having an encircling metal structure in three parts, two of the metal parts consisting of U-shaped strips cooperating to form an encircling frame which is a close fit on and is bonded to the flange, and the third metal part consisting of a metal tension band surrounding the frame and tensioned to compress the frame on the flange, the tension band being in the form of a spiral winding of at least two convolutions superposed on one another.

2. A cathode ray tube according to claim 1, wherein the front margin of the frame is bonded to the flange by means of a layer of synthetic resin.

3. A cathode ray tube according to claim 1, wherein each U-shaped strip includes a strengthening corrugation along its rear margin.

4. A cathode ray tube according to claim 1, wherein each of the U-shaped strips is of steel.

5. A cathode ray tube according to claim 1, wherein the tension band is of steel.

6. A cathode ray tube according to claim 1, wherein the front edges of the frame and the convolutions of the tension band lie substantially on the mould match line of the face plate.

7. A cathode ray tube according to claim 6, wherein the front margin of the frame is bonded to the flange by means of a layer of synthetic resin, the U-shaped strips and the tension band are of steel, and each U-shaped strip is formed with a strengthening corrugation along its length.

8. A cathode ray tube according to claim 1, wherein the rear margin of the frame is progressively increasingly spaced from the envelope and the space is filled with an adhesive filler adhering to the frame and to the envelope.

9. A cathode ray tube according to claim 8, wherein the adhesive filler is a synthetic resin.

10. A cathode ray tube according to claim 9, wherein the front edges of the frame and the convolutions of the tension band lie substantially on the mould match line of the face plate, the front margin of the frame is bonded to the flange by means of a layer of synthetic resin, the U-shaped strips and the tension band are of steel and each U-shaped strip is formed with a strengthening corrugation along its rear margin.