# United States Patent

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[33] **Great Britain**
[31] **10272/67**


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[54] **IMPLOSION PROTECTION APPARATUS FOR CATHODE RAY TUBES**
**8 Claims, 4 Drawing Figs.**


[52] **U.S. Cl.** ..... **178/7.8,** 178/7.82, 220/2.1
[51] **Int. Cl.** ..... **H04n 5/64**
[50] **Field of Search** ..... 220/2.1 (A), 2.3 (A); 178/7.8, 7.82; 29/25.13



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,723,044 | 11/1955 | Barasch | 220/2.3A |
| 3,200,188 | 8/1965 | Lange | 178/7.82 |
| 3,220,593 | 11/1965 | Powell | 220/2.1A |
| 3,314,566 | 4/1967 | Minneman | 220/2.1A |
| 3,422,220 | 1/1969 | Bathelt | 178/7.82 |
| 3,278,682 | 10/1966 | Panis | 178/7.8 |
| 3,340,358 | 9/1967 | De Gier | 178/7.82 |

FOREIGN PATENTS

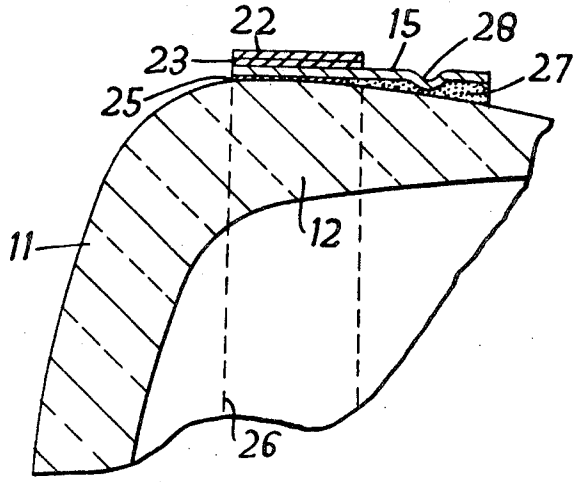
| | | | |
|---|---|---|---|
| 1,078,701 | 8/1967 | Great Britain | 220/2.1A |
| 1,040,381 | 8/1966 | Great Britain | 178/7.82 |



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**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 provide an encircling frame. The front margin of the frame is a close fit on and is bonded to the flange of the face plate whereas the rear margin of the frame has a wedge-shaped gap between it and the envelope. The wedge-shaped gap is filled with an adhesive filler and the frame has a surrounding tensioning band.

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SHEET 1 OF 2

Fig. 1.

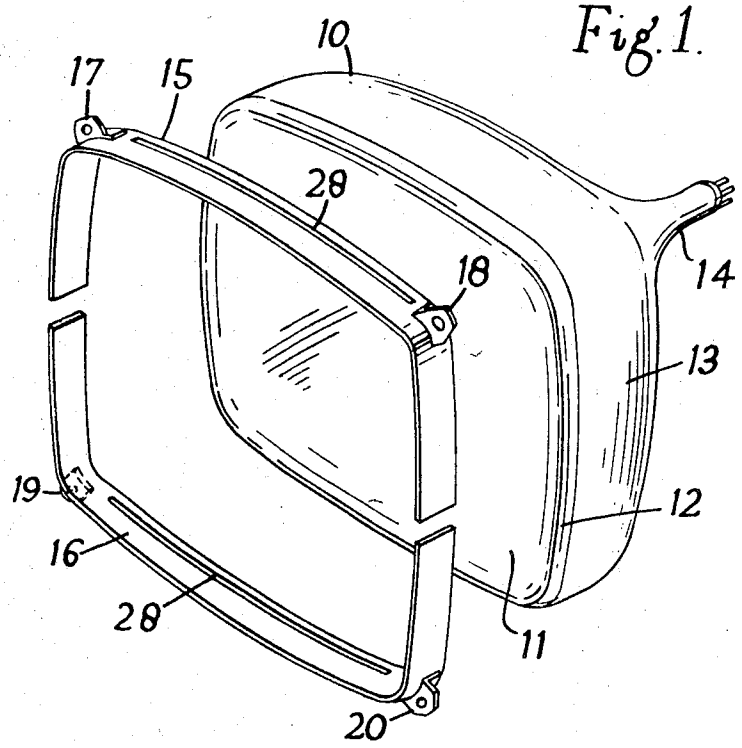
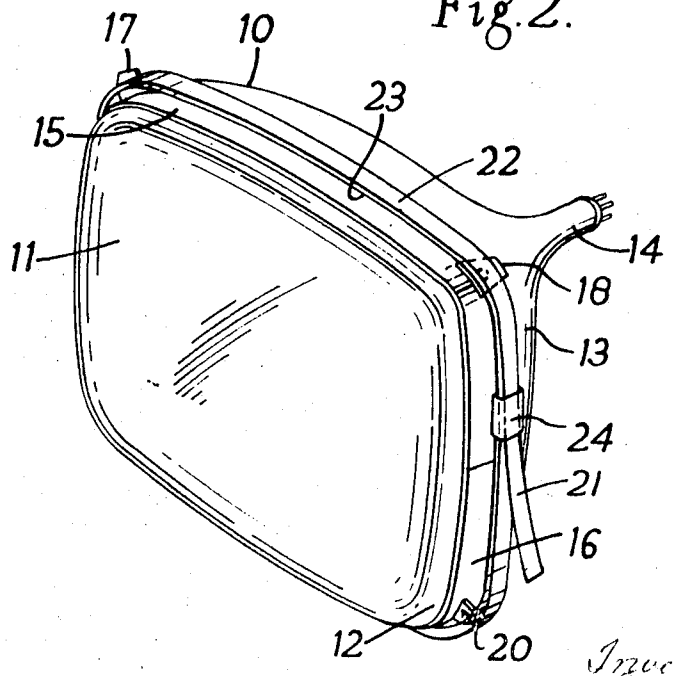



Fig. 2.




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Fig. 3.

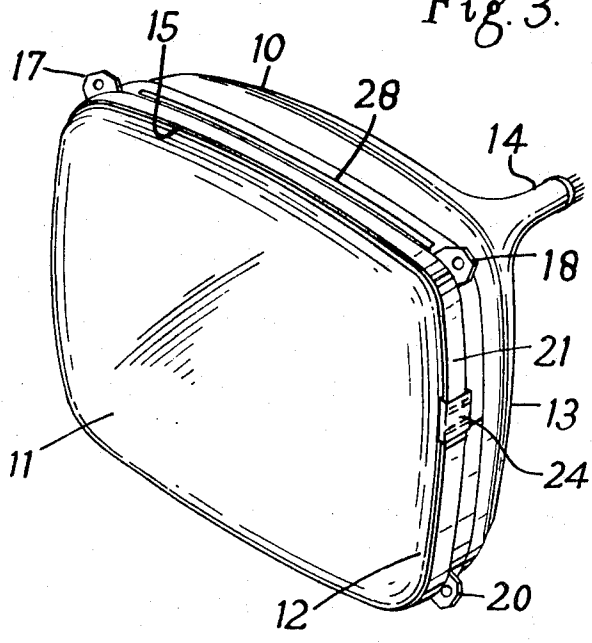
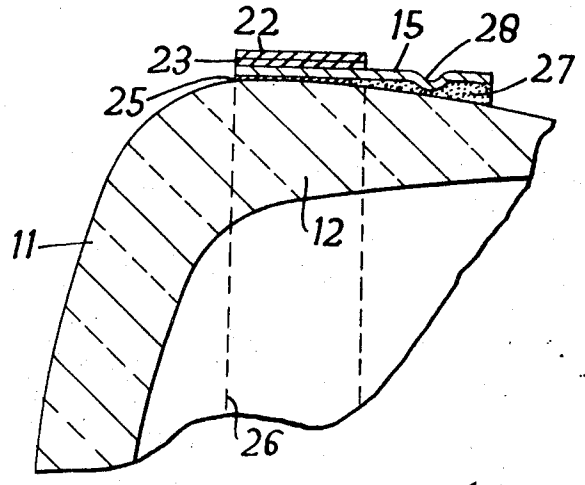



Fig. 4.




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# IMPLOSION PROTECTION APPARATUS FOR CATHODE RAY TUBES

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 of which a front margin nearest the face of the tube is a close fit on and is bonded to the flange and a rear margin remote from the face of the tube is progressively increasingly spaced from the envelope proceeding away from the face of the tube with the space filled with an adhesive filler adhering to the glass and to the metal of the frame, and a tension band encircling the front margin of the frame and tensioned to compress the front margin of the frame on the flange.

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 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 a glass 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 of which a front margin nearest the face of the tube is a close fit on and is bonded to the flange and a rear margin remote from the face of the tube is r progressively increasingly spaced from the envelope proceeding away from the face of the tube with the space filled with an adhesive filler adhering to the glass and to the metal of the frame to provide increased implosion resistance, and a tension band encircling the front margin of the frame and tensioned to compress the front margin of the frame on the flange, the front edges of the frame and the tension band lying substantially on the mould match line of the face plate.

**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 the adhesive filler is a synthetic resin.

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

**5**. A cathode ray tube according to claim **4**, wherein the U-shaped strips are of steel.

**6**. A cathode ray tube according to claim **1**, wherein said adhesive filler is a synthetic resin, and the front margin of said frame is bonded to said flange by means of a layer of synthetic resin.

**7**. A cathode ray tube according to claim **6**, wherein each U-shaped strip includes a strengthening corrugation along its rear margin.

**8**. 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 parts consisting of U-shaped steel strips cooperating to form an encircling frame of which a front margin nearest the face of the tube lies substantially on the mould match line of the face plate and is a close fit on and is bonded by a layer of synthetic resin to the flange and a rear margin remote from the face of the tube includes a strengthening corrugation and is progressively increasingly spaced from the envelope proceeding away from the face of the tube with the space filled with a synthetic resin adhesive filler adhering to the glass and to the metal of the frame to provide increased implosion resistance, and the third part consisting of a steel tension band encircling the front margin of the frame and tensioned to compress the front margin of the frame onto the flange.