

PATENT SPECIFICATION

(11)

1 347 136

1 347 136

(21) Application No. 17775/71 (22) Filed 28 May 1971

(31) Convention Application No. 7 008 027

(32) Filed 3 June 1970 in

(33) Netherlands (NL)

(44) Complete Specification published 20 Feb. 1974

(51) International Classification H01J 29/86

(52) Index at acceptance

HID 34 4A4 4A7 4K4 4X1 9A 9Y

(19)



(54) PROVIDING A CLAMPING BAND AROUND THE ENVELOPE OF A CATHODE RAY TUBE

(71) We, PHILIPS ELECTRONIC AND ASSOCIATED INDUSTRIES LIMITED, of Abacus House, 33 Gutter Lane, London, E.C.2., a British Company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

10 THIS invention relates to a method of providing a clamping band around the envelope of a cathode ray tube, such as a television display tube, and is particularly directed to providing a clamping band which
15 adjoins the front face of the tube window and extends over a mould match line in the side wall of the window.

This invention furthermore relates to a tube including a clamping band which is provided according to the method.

20 It is known from the United States Patent Specification No. 2,785,820 to arrange a profiled clamping band around the envelope of a cathode-ray tube in such manner that the
25 band adjoins the front face of the window of the envelope and extends over the sealing seam. At the area of the sealing seam the band includes a groove so as to avoid damage to the sealing seam. The window of the
30 tube is cup-shaped so that the sealing seam also constitutes the largest cross-section of the envelope.

It has also been endeavoured to make the side wall of the window wider and make the
35 cross-section thereof near the sealing seam smaller than the maximum cross-section. In order to be able to compress such a window it is necessary to manufacture a mould therefor in two parts. A small gap is always
40 present at the region where the parts of the mould adjoin each other, which results in a rib being formed in the glass of the side wall of the window, the so-called mould match line or rim. Due to wear of the mould
45 parts and inaccurate mutual centering of the parts of the mould, a mould match line a

few millimetres high can in many cases be formed.

Clamping bands which are entirely on the cone side of the mould match line must exert
50 a very high pressure on the glass if sufficient freedom from implosion is to be obtained. In certain countries, however, the requirements for freedom from implosion are so
55 stringent that they cannot be satisfied when such a clamping band is used which is situated entirely behind the mould match line.

Said requirements can be fulfilled if the clamping band adjoins the front face of the window. A construction known, for example,
60 from United States Patent Specification No. 3,220,592 may be used, in which the provision of an intermediate band avoids damage to the mould match line, or a band may be used which comprises glass fibres which
65 are soaked in a synthetic resin. However, these constructions are expensive..

Providing a clamping band over the mould match line, in particular if this is in the shape of a comparatively thick rib, presents
70 difficulties since the pressure on the rib can become so large that the glass is damaged.

The disadvantage of providing a hollow channel in the clamping band, as disclosed
75 in the said United States Patent Specification No. 2,785,820, is that the pressure on the glass on either side of the mould match line suddenly drops to zero at the edges of the hollow channel. Moreover the pressure
80 on the glass below the edges of the channel can increase as a result of deformation of the channel upon tensioning the band.

According to this invention there is provided a method of providing a clamping
85 band around the envelope of a cathode ray tube, which envelope includes a window, a cone and a neck, and in which the side wall of the window includes a mould match line, in which method the band having a ridge
90 in its cross section at the region where it is to engage the mould match line is clamped

Price 75p

on the envelope in such manner that an edge of the band adjoins the front face of the window and the hollow of the ridge engages the mould match line.

- 5 It has been found that the ridge in the cross-section of the band can be sufficiently flexible to allow a slight bending outwards, in particular in the case of bands which are clamped by contraction, as a result of which
10 the underlying mould match line experiences a smaller pressure. In any case the pressure on the glass can be made to change only gradually in the proximity of the mould match line so that no sudden changes in the
15 pressure on the glass surface occur.

Since the clamping band is preferably formed from a straight strip, and the edge of the front face does not usually lie in a plane but is bent at the corners in a direction towards the rear of the envelope, the
20 clamping band can be bent over the front face in the corners. However, the width of the band may also be chosen to be sufficient so that it can be bent over the edge of the
25 front face throughout its circumference.

In order that this invention may be readily carried into effect, an embodiment will now be described in greater detail, by way of example, with reference to the accompanying
30 diagrammatic drawing, in which

Figure 1 shows a cathode ray display tube including a clamping band.

Figure 2 is a front elevation of a clamping band prior to providing it on the tube envelope,
35 envelope,

Figure 3 is a cross-sectional view of a band clamped around the envelope,

Figure 4 shows diagrammatically the forces which act upon a cross-section of a
40 clamping band during shrinkage.

Reference numeral 1 in the drawing denotes the front face of the display tube window which has a side wall 2. The side wall 2 is connected to the cone 3 by a sealing
45 seam 5. The tube furthermore includes a neck 4 in which the electrodes of an electron gun are arranged.

A clamping band 7 is clamped around the side wall 2 of the window, for example by
50 means of thermal contraction. The dimensions of the band 7 and the temperature during providing the band around the envelope are preferably chosen to be such that, after cooling, the material of the band has
55 expanded to beyond its elastic limit. The material then flows at a substantially constant tensile stress, so that the same pressure is exerted on the envelope independent of the exact dimensions of envelope and band.

60 The band is manufactured from a straight strip which, after having been cut to size, is provided with a ridge in its cross-section throughout its length and is then bent to a rectangle having rounded corners, after which
65 its ends are welded together. The rectangle as shown in Figure 2 is then thermally ex-

panded until the desired dimensions have been obtained. The band may be slightly bent at the corners at 8 during the expansion so that at that region the edge of the band, 70 after providing it around the envelope of the tube, adjoins the edge of the front face 1 of the tube window. In any case the band 7 adjoins the front face 1 along the straight sides thereof and the hollow of the ridge 9 75 engages the mould match line 6.

The ridge 9 is provided so that, if the band exerts a large pressure on the envelope, as in the case in which the elastic limit is exceeded, the danger that the mould match 80 line 6 may be damaged is lessened. Upon contraction the ridge 9 of the band tends to move outwards, as denoted in Figure 4 by 9', the pressure on the mould match line 6 being alleviated without sudden pressure 95 surges occurring as would be the case if a hollow groove or channel had been used instead of the ridge 9.

WHAT WE CLAIM IS:—

1. A method of providing a clamping 90 band around the envelope of a cathode ray tube, which envelope includes a window, a cone and neck, and in which the side wall of the window includes a mould match line, in which method the band, having a ridge 95 in its cross-section at the region where it is to engage the mould match line, is clamped on the envelope in such manner that an edge of the band adjoins the front face of the window and the hollow of the ridge engages 100 the mould match line.

2. A method as claimed in Claim 1, wherein the clamping band is manufactured by cutting a straight strip to size, and providing a ridge in the cross-section of the 105 strip throughout its length, after which the strip is bent into a rectangle having rounded corners, the ends of the strip are welded together and the resulting band is expanded, the edge of the band which is to adjoin the 110 front face being bent during the expansion at least in the corners to conform to the transition from the front face to the side wall.

3. A method of providing a clamping 115 band around the envelope of a television display tube, substantially as herein described with reference to the accompanying drawing.

4. A television display tube having a 120 clamping band provided by means of a method as claimed in Claim 1 or 2.

5. A television display tube, substantially as herein described with reference to the accompanying drawing. 125

C. A. CLARK
Chartered Patent Agent,
Century House,
Shaftesbury Avenue,
London WC2H8AS.
Agent for the Applicants.



on the envelope in such manner that an edge of the band adjoins the front face of the window and the hollow of the ridge engages the mould match line.

- 5 It has been found that the ridge in the cross-section of the band can be sufficiently flexible to allow a slight bending outwards, in particular in the case of bands which are clamped by contraction, as a result of which
10 the underlying mould match line experiences a smaller pressure. In any case the pressure on the glass can be made to change only gradually in the proximity of the mould match line so that no sudden changes in the
15 pressure on the glass surface occur.

- Since the clamping band is preferably formed from a straight strip, and the edge of the front face does not usually lie in a plane but is bent at the corners in a direction towards the rear of the envelope, the
20 clamping band can be bent over the front face in the corners. However, the width of the band may also be chosen to be sufficient so that it can be bent over the edge of the
25 front face throughout its circumference.

- In order that this invention may be readily carried into effect, an embodiment will now be described in greater detail, by way of example, with reference to the accompanying
30 diagrammatic drawing, in which

Figure 1 shows a cathode ray display tube including a clamping band,

- Figure 2 is a front elevation of a clamping band prior to providing it on the tube envelope,
35

Figure 3 is a cross-sectional view of a band clamped around the envelope,

- Figure 4 shows diagrammatically the forces which act upon a cross-section of a
40 clamping band during shrinkage.

- Reference numeral 1 in the drawing denotes the front face of the display tube window which has a side wall 2. The side wall 2 is connected to the cone 3 by a sealing
45 seam 5. The tube furthermore includes a neck 4 in which the electrodes of an electron gun are arranged.

- A clamping band 7 is clamped around the side wall 2 of the window, for example by
50 means of thermal contraction. The dimensions of the band 7 and the temperature during providing the band around the envelope are preferably chosen to be such that, after cooling, the material of the band has
55 expanded to beyond its elastic limit. The material then flows at a substantially constant tensile stress, so that the same pressure is exerted on the envelope independent of the exact dimensions of envelope and band.

- The band is manufactured from a straight strip which, after having been cut to size, is provided with a ridge in its cross-section throughout its length and is then bent to a rectangle having rounded corners, after which
65 its ends are welded together. The rectangle as shown in Figure 2 is then thermally ex-

panded until the desired dimensions have been obtained. The band may be slightly bent at the corners at 8 during the expansion so that at that region the edge of the band,
70 after providing it around the envelope of the tube, adjoins the edge of the front face 1 of the tube window. In any case the band 7 adjoins the front face 1 along the straight sides thereof and the hollow of the ridge 9
75 engages the mould match line 6.

The ridge 9 is provided so that, if the band exerts a large pressure on the envelope, as in the case in which the elastic limit is exceeded, the danger that the mould match
80 line 6 may be damaged is lessened. Upon contraction the ridge 9 of the band tends to move outwards, as denoted in Figure 4 by 9', the pressure on the mould match line 6 being alleviated without sudden pressure
95 surges occurring as would be the case if a hollow groove or channel had been used instead of the ridge 9.

WHAT WE CLAIM IS:—

1. A method of providing a clamping
90 band around the envelope of a cathode ray tube, which envelope includes a window, a cone and neck, and in which the side wall of the window includes a mould match line, in which method the band, having a ridge
85 in its cross-section at the region where it is to engage the mould match line, is clamped on the envelope in such manner that an edge of the band adjoins the front face of the window and the hollow of the ridge engages
100 the mould match line.

2. A method as claimed in Claim 1, wherein the clamping band is manufactured by cutting a straight strip to size, and providing a ridge in the cross-section of the
105 strip throughout its length, after which the strip is bent into a rectangle having rounded corners, the ends of the strip are welded together and the resulting band is expanded, the edge of the band which is to adjoin
110 the front face being bent during the expansion at least in the corners to conform to the transition from the front face to the side wall.

3. A method of providing a clamping
115 band around the envelope of a television display tube, substantially as herein described with reference to the accompanying drawing.

4. A television display tube having a
120 clamping band provided by means of a method as claimed in Claim 1 or 2.

5. A television display tube, substantially as herein described with reference to the accompanying drawing.
125

C. A. CLARK
Chartered Patent Agent,
Century House,
Shaftesbury Avenue,
London WC2H8AS.
Agent for the Applicants.