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Kato

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[54] **PICK-UP TUBE ENVELOPE SEALANT EXTENDING INTO GROOVE OF ANNULAR TARGET SUPPORT**

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[51] **Int. Cl.**.....**H01j 29/02,** H01j 31/26, H01j 31/38

[58] **Field of Search**.....313/65 R, 65 A, 65 AB, 65 T, 313/66, 67, 283

[56] **References Cited**

UNITED STATES PATENTS

3,073,981	1/1963	Miller et al.	313/65 A
3,577,027	4/1971	Szegho	313/65
3,590,304	6/1971	Moegenbier	313/94

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[57] **ABSTRACT**

A target assembly of an image pick-up tube including a face plate hermetically fastened on one open end of a tubular envelope of the image pick-up tube through pressure welded binding member composed of indium which is interposed therebetween. A support member supporting therein a target substrate is mounted on the inner surface of the face plate and secured thereto through its peripheral wall combined with the binding member. On the peripheral wall is formed a groove extending circumferentially thereof. The binding member combines with the groove so that the support member favorably fastened to the face plate.

4 Claims, 3 Drawing Figures

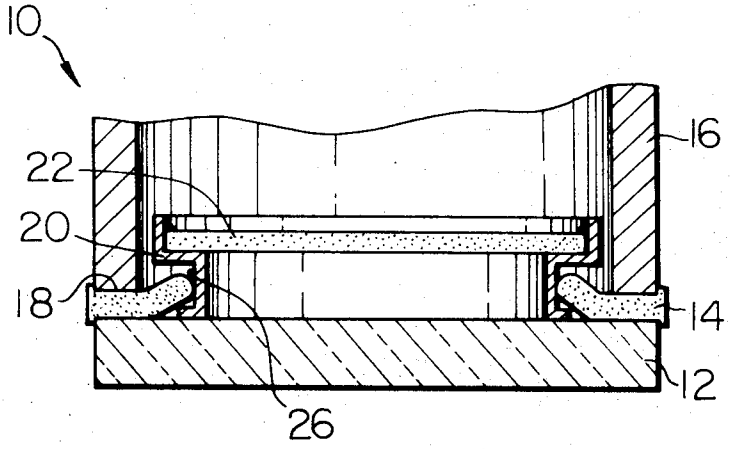


Fig. 1

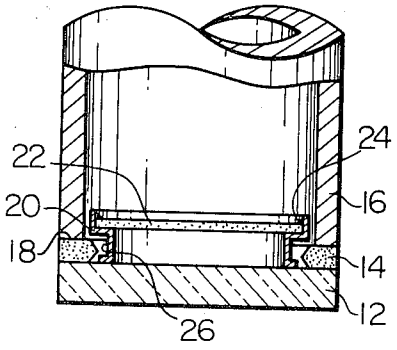


Fig. 2

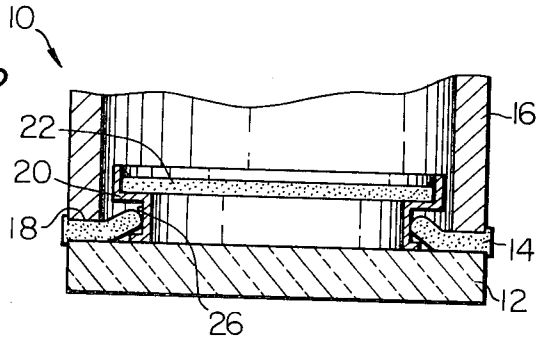
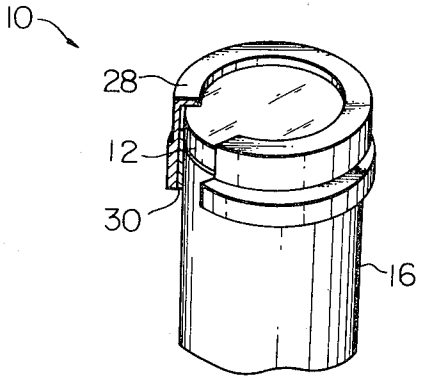


Fig. 3



PICK-UP TUBE ENVELOPE SEALANT EXTENDING INTO GROOVE OF ANNULAR TARGET SUPPORT

This invention relates to an image pick-up tube and more particularly to a target assembly of an image pick-up tube. The specific purpose of this invention is to provide a target assembly which has a robust construction and is readily fabricated without damage to its target substrate composed of a semiconductor material.

The target assembly of this invention is constructed at the end portion of a tubular envelope of an image pick-up tube, which includes a face plate hermetically fastened to the open end of the tubular envelope through pressure welding of an annular binding member composed of indium which is previously interposed therebetween.

An annular support member is mounted on the face plate and secured thereto by means of the binding member combined with the outer surface of the support member. It is important that the support member has on its outer surface a groove extending circumferentially thereof. The binding member melts into the groove so that the support member is robustly secured to the face plate.

The specific structure of this invention is read in conjunction with the drawing wherein:

FIG. 1 is a sectional view of the target assembly of this invention showing construction thereof before application of pressure welding technique.

FIG. 2 is an enlarged sectional view of the target assembly of this invention after application of pressure welding technique.

FIG. 3 is a perspective view of the target assembly capped with a signal ring.

FIG. 1 shows an arrangement to be manufactured into a target assembly according to this invention, which comprises a transparent face plate **12**. On one surface of the face plate **12** is disposed an annular binding member **14** composed of indium on which a tubular envelope **16** is placed at its one open end **18**. An annular metallic support member **20** is placed and preferably fixed with e.g., water-glass on the surface of the face plate **12**, which member carries therein a target substrate **22**. The substrate **22** is seated on a offset inner wall of the support member **20** and fixed thereto by means of an electrically conductive paint or cement, or solder **24**. The support member **20** has its peripheral wall had a groove **26** extending circumferentially thereof. The groove **26** preferably faces the inner wall of the annular binding member **14**.

A suitable pressure is applied between the face plate **12** and the tubular envelope **16** so as to manufacture the arrangement into a target assembly of this invention as shown in FIG. 2. Through the application of such pressure, the binding member **14** is deformed and thus welded hermetically with the face plate **12** and the end **18**. In this instance, the deformed binding member enters and welds to the groove **26** of the support member **20**. Therefore, the metallic support member **20** is fastened on the face plate **12**.

If desired, an amount of heat may be applied to the arrangement as well as the pressure for pressure-welding so as to make the binding member **14** readily enters the groove **26**. The wall of the groove **26** may be plated with indium, tin, or the alloy thereof so as to increase the robustness of the welded connection of the groove **26** and the binding member **14**.

FIG. 3 shows the assembly **10** of FIG. 2, which is capped with an annular signal ring in order to provide a robust construction and fine configuration of the target assembly. The signal ring **28** is fixed to the peripheral wall of the binding member **18** and the envelope **16**, and serves as an output terminal of the image pick-up tube by means of conductive paint **30**.

In this instance, it is to be noted that the tubular envelope **16** is hermetically sealed at the other end (not shown) so as to make a chamber to be evacuated for permitting an electron beam freely pass therethrough. The electron beam is deflected by a suitable means so as to scan the target substrate **22** thereby producing an electric image signal in the substrate in accordance with an optical image irradiated thereto through the face plate **12**.

It is apparent from the above-description that the particular target assembly can be fabricated through only one pressing step and the susceptible target substrate is protected by the support member, so that, the target substrate does not damaged by external mechanical force or heat for the fabrication of the assembly. The target assembly according to this invention therefore has a high productivity.

What is claimed is:

1. A target assembly of an image pick-up tube including a tubular envelope, which comprises:

a transparent face plate;

an annular binding member welded both to the inner surface of said face plate and one open end of said tubular envelope;

an annular support member supporting therein a target substrate of said image pick-up tube mounted on the back surface of said face plate, said support member having on its peripheral wall a groove extending circumferentially of the peripheral wall which groove is combined with said binding member; and

an annular signal ring capping said envelope and secured thereto through an electrically conductive paint, said signal ring being contacted at its inner surface to the peripheral wall of said binding member.

2. A target assembly according to claim **1**, wherein the peripheral wall of said support member is plated with indium.

3. A target assembly according to claim **1**, wherein the peripheral wall of said support member is plated with tin.

4. A target assembly according to claim **1**, wherein the peripheral wall of said support member is plated with an alloy of indium and tin.

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