

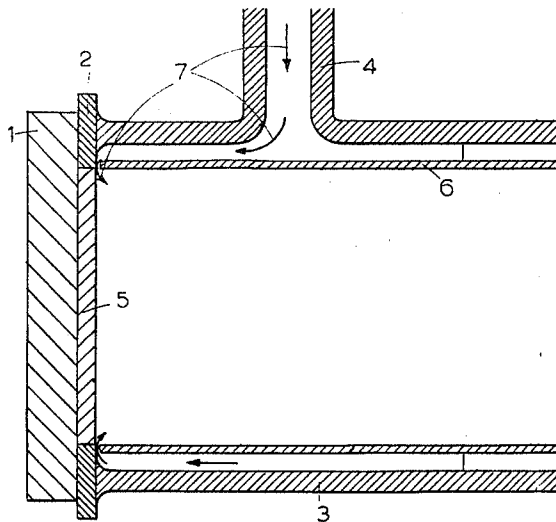
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FORMATION OF CONDUCTING LAYERS

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FORMATION OF CONDUCTING LAYERS

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1 Claim. (Cl. 118—301)

This invention relates to the formation of conducting layers by spraying.

Such layers are used, for example, to form transparent signal plates in electronic devices such as television pick-up tubes and the material to form said layer is usually in the form of a solution which is sprayed onto a hot surface of glass, frequently forming a window sealed to the end of a tubular envelope via a metal ring as in known types of photo-conductive tubes. It is essential during the spraying operation to confine the conducting layer to a predetermined area of the window since for example the presence of a conducting layer on the tube wall may cause leakage or a short circuit between the signal plate and other electrodes.

It has been suggested to insert a tubular mask into the envelope to expose only the edge of the metal ring and the window to the sprayed vapour, but it is found that some vapour leaks past the end of the mask onto the wall of the envelope.

The object of the present invention is to provide an improved method of confining the formation of a conducting layer to a predetermined area in the envelope of an electronic device with a view to alleviating the above mentioned difficulty.

According to the invention there is provided a device for spray coating the inner surface of the window of a glass tube and for preventing a coating from being deposited on the glass tube during the spraying, a metal ring sealed between the window and the end of the glass tube, a masking tube within the glass tube exposing the inner surface of said window, for preventing the coating material from being deposited on the glass tube during spraying, the masking tube being of less diameter than the glass tube and concentrically arranged within the glass tube and spaced therefrom to provide a gas pressure chamber, the masking tube having a diameter to include the inner edge of the metal ring, the inner end of the masking tube being in juxtaposition to the ring, a gas inlet duct connected with the said gas pressure chamber for supplying a gas to said pressure chamber.

The masking tube so used may be of metal, asbestos or any other suitable material, and the pressure of gas which causes said gas to tend to flow around the edges of the mask, may not only serve the purpose of preventing leakage of said substance around the edge of the masking tube but in addition may maintain those surfaces on which a conducting layer is not required to be formed at a temperature below that at which the layer formed is conductive.

In order that the invention may be clearly understood reference will be made to the accompanying drawings which illustrates one example of the invention.

The invention is particularly applicable to photo-conductive tubes and in the drawing there is shown in cross-section a portion of a tube in which a conducting layer

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forming the signal plate of the tube is formed by a method in accordance with the invention and onto which is afterwards deposited a photo-conductive layer. As shown the tube comprises a window 1 and a metal ring 2 sealed between the window 1 and the end of a glass envelope 3 the latter having a side tube 4. In order to form a conductive transparent signal plate 5 on the inner surface of said window 1 a tubular mask 6 of such diameter as to include the inner edge of the metal ring 2 is inserted into said envelope 3 with one end in contact with said ring. The conducting layer required to be formed on the inner surface of the window 1 may be formed from an aqueous solution of fused stannic chloride, for example the solution may comprise 1 part by weight of water and 10 parts by weight of stannic chloride pentahydrate with or without the addition of a small quantity of a reducing agent such as phenylhydrazine hydrochloride. A layer formed by spraying such a solution is called in the art a "NESA" layer, and substances suitable for forming "NESA" layers are obtainable from the Pittsburgh Plate Glass Co. In order to form a "NESA" layer on said window the temperature of the window is raised to that required to form such a layer and a suitable solution such as the one described above is then sprayed through the tubular mask onto the window 1. The mask 6 serves in general to prevent the sprayed solution from becoming deposited on to the inner wall of the envelope but in order to reduce the possibility of leakage of the sprayed solution past the end of the mask where it makes contact with the metal ring 2 a stream of air is introduced into the envelope 3 through the side tube 4 so as to cause the pressure of the air between said envelope 3 and mask 6 to be such that there is a tendency for the air to flow in the direction indicated by the arrows 7 between the outer surface of the mask 6 and the inner surface of the envelope 3 so opposing said leakage.

The velocity of the stream of air need not be great, and a few cubic centimeters per second has been found to be effective in preventing a conducting layer from being formed on the glass envelope.

What I claim is:

A device for spray coating the inner surface of the window of a glass tube and for preventing a coating from being deposited on the glass tube during the spraying, a metal ring sealed between the window and the end of the glass tube, a masking tube within the glass tube exposing the inner surface of said window, for preventing the coating material from being deposited on the glass tube during spraying, the masking tube being of less diameter than the glass tube and concentrically arranged within the glass tube and spaced therefrom to provide a gas pressure chamber, the masking tube having a diameter to include the inner edge of the metal ring, the inner end of the masking tube being in juxtaposition to the ring, a gas inlet duct connected with the said gas pressure chamber for supplying a gas to said pressure chamber.

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