

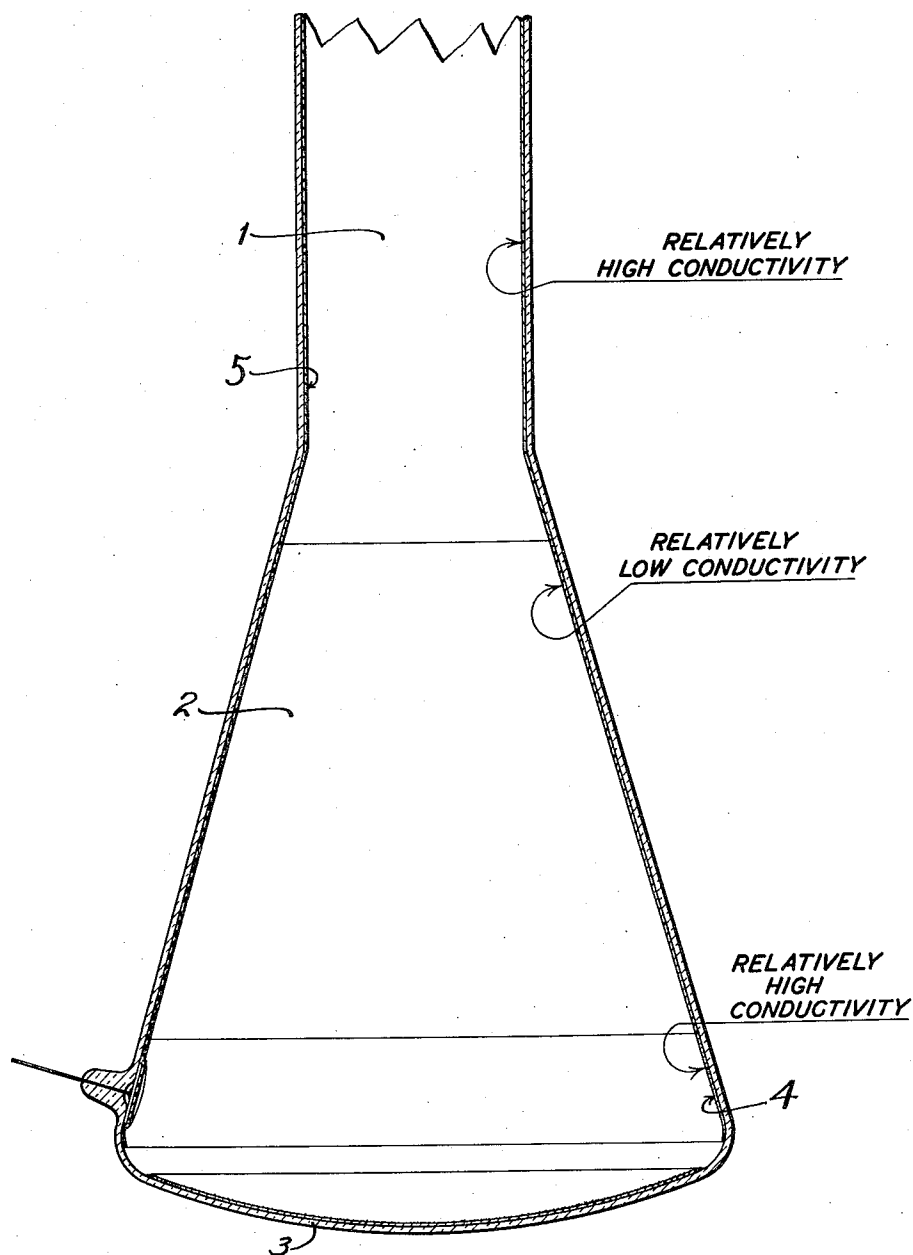
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WALL COATING FOR BRAUN TUBES

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WALL COATING FOR BRAUN TUBES

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1 Claim. (Cl. 250—160)

This invention refers to Braun tubes, and particularly to such tubes in which a conducting coating on the inner wall is desired. The use of a conducting coating is customary in many cases, particularly in the flasks of cathode ray and oscillographic tubes, and it is indispensable in high vacuum tubes.

The easiest method of obtaining a mirror-like coating in the flask is to deposit it electrochemically. The main drawback of this method is that the coated flask will then have a high optical reflective power. Fluorescent light, emitted in the backward direction, will be reflected from the coated wall and will produce a general diffused illumination on the fluorescent screen. This results in a decrease of contrast in the television or oscillographic picture. The dark portions of the image particularly, cannot be reproduced according to their true brightness. It is therefore desirable to have a black conducting coating on the inner wall of the flask.

It has been previously proposed to coat the wall of the flask with finely divided (colloidal) carbon in an aqueous solution, such layers being used in the technique of manufacturing vacuum tubes. In the industrial and practical application of this prior method, however, a difficulty is encountered; the coating will be destroyed if deposition of moisture on the inner wall results from a later glass blowing process or from some other action.

This invention provides a means and method for avoiding this trouble by adding an agent to the carbon solution, which makes the coating, after drying, sufficiently adherent, and difficult to dissolve. Such binding agents as lacquers, glues, cement type binders, or ceramic fluxes, may be used. If the coating is to resist heat during the baking of the tube, a weak solution of water glass, such as sodium or potassium silicate, is recommended. Carbon mixed into such a solution will be deposited on the wall, but with an intermediate layer of very thin silicate. However, by a correct application of this method, the over all conductivity of the deposit will still be sufficiently high, if, for instance, an addition of 15% binder is made, which will also stick sufficiently.

However, in special cases, it may be desirable to produce a wall coating of high resistance, as for instance, in conjunction with a subsequent electron acceleration or for use with acceleration electrical lenses of low refractive power which have a high drop of potential. It is desirable in both cases to adjust the distribution of the po-

tential along the envelope wall according to the distribution of potential, present or desired, in the vacuum space. This is done by inducing, in a high resistance layer mounted on the inner wall, a potential equal to the drop of potential in the vacuum space. Known methods, cathode sputtering for example, cannot be used, as a rule, for producing such layers of high resistance. If, however, the conductivity of the layer is made lower by the use of a correct ratio of binding agent and carbon, according to this invention, the production of such layers is very simple.

The production of such a layer may be carried out as follows: The inner wall of the tube is first coated with either the good or poor conducting layer. Then the coating is removed from those places which are to remain uncovered, by mechanical or chemical means. The removal may be accomplished by scraping, washing, or etching, for instance.

A special heating process should be carried out in order to make the coating more durable, before placing the luminescent screen and the electrode arrangement in the tube, because the vaporizing will produce interfering condensations. Layers of sand or whiting may be made for keeping blank those parts of the glass wall which are to remain free of the black layer.

By a previous coating of certain areas, the black layer may also be subdivided in any desired manner or it may be divided into several parts, having differing resistances, each overlapping or otherwise connected.

The figure shows an example upon which the resistance coating has been applied as follows:

The Braun tube envelope shown in the figure is composed of the usual neck 1, in which desired electrodes may be later sealed, widening flask 2, and luminescent screen 3. If, for example, there is a drop of potential of 3,000 volts along the wall between the screen 3 and the starting point of the widening flask, the resistance should be arranged so as to be small compared to the internal resistance of the tube, and, accordingly, a magnitude of from one to five megohms will be chosen.

The connection of the resistance may be made by a bordering ring, such as a carbon-water glass ring of high conductivity connected to the layer of low conductivity. These areas, close to the screen 3, shown at 4, and in the neck of the envelope, at 5, are designated in the drawing by appropriate labels.

It is advisable to deposit part of the conductive layer on a rather large metallic surface, in

order to connect it to a metallic lead. One method, for instance, is to imbed metal parts 6 in the glass wall, or to provide a small glass rod supporting a spiral-shape wire, not shown, and

5 coating metal and glass with the conducting layer.

This method may be used for any type of Braun or oscillographic tubes, such as those with a photoelectric electrode, and those used for recording or direct showing of television pictures.

10 Such wall coatings of high resistance may be manufactured easily and furthermore, will have the advantage of great sturdiness.

I claim:

15 In a tube of the cathode ray type comprising an evacuated envelope having a neck portion at one end arranged to receive an electron gun and

having a fluorescent screen disposed at the opposite end thereof, a thin light absorbing coating on said envelope intermediate said neck portion and said screen comprising a mixture including finely divided carbon and an adhesive binder, 5 the resistance of said mixture varying with the percentage of said adhesive binder, said coating having a predetermined percentage of said adhesive binder therein to determine its resistance, and means for establishing an electrical connection 10 to said coating comprising a metallic element supported by said envelope and a coating of greater conductivity than said first-mentioned coating, in contact with said metallic element and said first-mentioned coating. 15

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