Dec. 26, 1939. E. GÜNZEL ET AL 2,184,922

METHOD OF PRODUCING SECTIONAL COATINGS IN VACUUM VESSELS

Filed Feb. 11, 1937

Fig. 1.

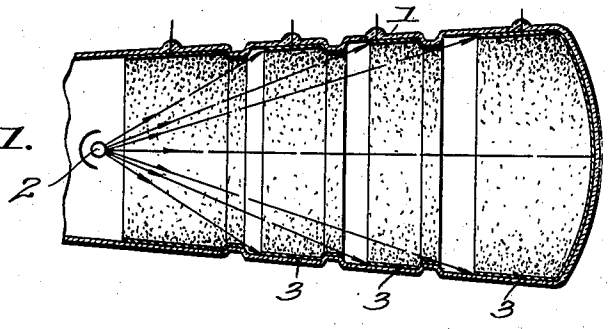


Fig. 2.

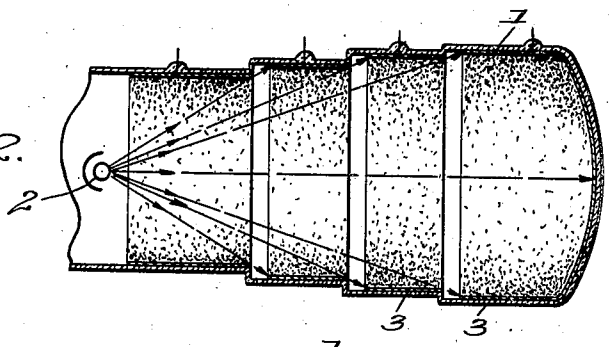
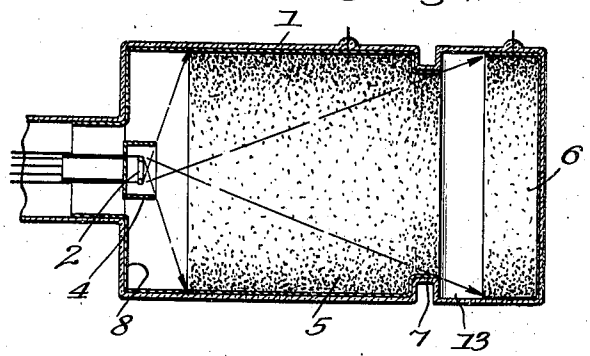


Fig. 3.



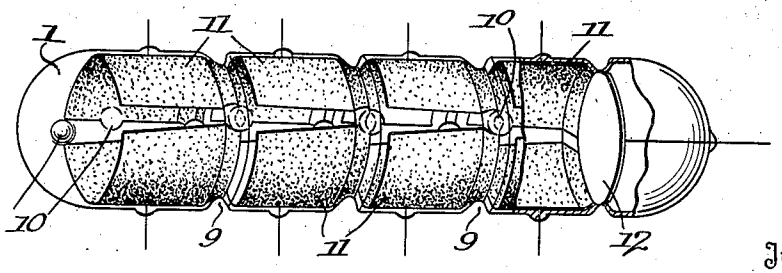


Fig. 4.

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Patented Dec. 26, 1939 2,184,922

UNITED STATES PATENT OFFICE

2,184,922

METHOD OF PRODUCING SECTIONAL COATINGS IN VACUUM VESSELS

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Application February 11, 1937, Serial No. 125,306
In Germany March 21, 1936

2 Claims. (Cl. 250—27.5)

In the production of coatings on inner walls of vacuum receptacles, for instance, of electrodes or in the production of a conductive ground layer of transparent or non-transparent fluorescent screens, or photo cathodes, the distilling method is often used, in which a material for instance, a metal, is heated in vacuum to the evaporating temperature. For instance, a comparatively small silver radiating source in the shape of a point, may be used by heating a platinum spiral around which is wound a silver wire, by sending current through the platinum wire, and thereby evaporating the silver. In many cases, it is important to obtain metallic or other coatings with clear-cut boundaries. If the evaporation source is surrounded by a stream for this purpose, which allows the radiation to enter only a certain part of the space, a coating is obtained, the boundaries of which decrease in sharpness the further the source of evaporation is away from the wall to be coated. But, in order to obtain a uniformity of the coating as required in many cases, it is necessary that the distance between evaporating source and area to be coated, is comparatively large. In order to obtain coatings with sharp and regular boundaries in these cases, screens or similar elements may be placed in the immediate vicinity of the boundary of the coating in the vacuum receptacle. However, a part of the wall of the receptacle may also be shaped in such a manner as to cast a shadow for the evaporating source on another part of the wall. This may be used in places where a boundary of the coating is to be produced or where two coatings are to be separated, for instance, because of electric isolation. In the accompanying drawing, Figures 1 and 2 are views in section depicting different embodiments of our invention as applied to a tube of the Braun type. Figure 3 is a view in section showing the application of the invention to a "Farnsworth" type of television device. Figure 4 is a view, partly in section, illustrating the application of the invention to an electron multiplier device. In accordance with the teachings of our invention, it is only necessary to provide for an increase or decrease in the diameter of the tube which will accordingly cast a shadow. This is made possible in such manner by producing a groove elevated or hollow towards the interior of the vessel, or by producing an according shape, for instance, in ceramic vessels. This case is shown in Figure 1 where layers 3 isolated from each other are produced on the wall of the vacuum receptacle 1, by means of the radiation source 2. By producing a rib or ring shaped thickening of the wall of the vessel, this shadow effect may also be produced, whereby the outer surface of the tube may remain entirely smooth. The same may be accomplished by a sudden increase in diameter in one or more stages, as is shown in Figure 2. The source of radiation then always lies in such a spot that one part of the wall casts a shadow on another part, in such a manner that an area without coating is produced. This method has the advantage over the application of screens that no difficulties exist in the production of the vessel and that no screens must be placed or afterwards removed out of the tubes. It is then also no longer necessary to provide a screen material suitable for the evacuation. In this manner, cylindrical rings or cap shaped electrodes separated from each other, can be produced, which are separated from an adjacent cylindrical electrode. An additional removal of coating material, in order to produce sharply cut boundaries, is eliminated whereby the great advantage is obtained that such sectional coatings may be produced entirely in the vacuum. In many cases, in which the coatings may not come in contact with air after forming, the method according to the invention is the only one by which coatings of this kind with clean-cut boundaries, can be produced. In these cases, the source of radiation will usually have to remain in the vacuum receptacle. The source is then arranged in such a manner that it does not disturb the operation, or in such a manner that it may serve as an electrode.

The method according to the invention is especially suitable for the production of a conductive ground coating for the fluorescent screen of a cathode ray tube, or for the photo cathode of a Farnsworth image dissector tube. Such a dissector tube is shown in Figure 3. The source of radiation 2 is placed inside of the vacuum receptacle 1, and is surrounded by a screen 4. By means of the source of radiation 2, coatings 5 and 6 are produced, which are isolated by a zone 13, which is not coated. This zone is produced by placing a groove 7 in the glass wall, so that a part of the groove wall casts a shadow on the other part. The layer 6 which covers the plane end wall of the tube is made translucent and then treated with a suitable material so that it may serve as a photo cathode. The layer 5 is in connection with a previously produced conductive coating 8, and is for instance, kept at anode potential. The device carrying

the radiating source serves later as the anode, and is provided with a scanning aperture.

The invention can be made use of in amplifiers with secondary emission. Such an amplifier tube is shown in Figure 4. The source of radiation was placed at the far left end. The vacuum receptacle 1, possesses a number of circular grooves 9, and a number of nipples 10, which protrude to the interior of the tube, 9 and 10 being arranged in such a manner that in distilling, isolated pairs of opposite electrodes 11 are produced.

Electrons are emitted in a suitable manner from an electrode at the furthest left. These electrons are directed upon one of the other electrodes and liberate a number of secondaries. A plate 12 serves as the collector.

There may be also cases in which it is necessary to produce areas separated from each other on a conductive interior wall coating produced by the evaporating method. The method of the invention is also applicable in these cases. A further possibility of application is the production of electron lenses, which consist of a number of consecutive conductive rings. Such lenses are for instance described in Archiv fur Elektrotechnik XXVIII, S. 6 and 7 (1934), especially Abb. 13.

We claim:

1. A Braun tube wherein a series of separate wall coating electrodes may be produced, comprising an envelope having an electrode for evaporating wall coating material when heated, a plurality of concentric wall portions of said envelope extending into the path of flow of such evaporated wall coating material to shade portions of said wall adjacent said concentric wall portions from said electrode, and terminal leads extending through the unshaded portions of said wall and connected with said coating electrodes.

2. A tube of the cathode ray type comprising an envelope having therein an electrode which may be externally energized to vaporize a material therefrom for deposition on portions of the inner surface of said tube isolated from each other by well defined areas having no wall coating means for precluding deposition of such wall coating material on such isolating portions comprising sections of said tube extending into the path of flow of said wall material for creating shadows on the inner surface of said tube coinciding with the desired isolating portions, and terminal leads extending through the unshaded portions of said wall and connected with the material deposited on such portions.

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