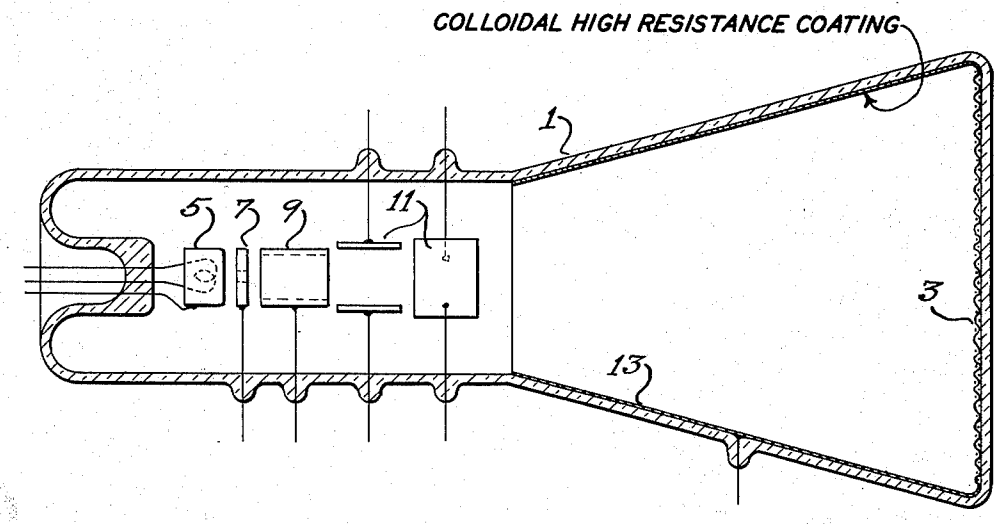
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ELECTRON TUBE WITH HIGH OHMIC WALL COATINGS

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ELECTRON TUBE WITH HIGH OHMIC WALL COATINGS

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The present invention relates to television transmitting and receiving tubes, oscillograph tubes and similar discharge tubes having a conducting coating on the inside wall of the tube.

For various purposes, e. g., in the case of supplementarily accelerated Braun tubes or accelerating lenses of low refractive power but consequently high potential power, it may be desirable to apply high ohmic resistances to the inner wall of such vacuum tube devices. It has been proposed, in producing such wall coatings, to use a process by means of which colloidal graphite is mixed with waterglass in suitable concentration and applied in fluid form to the inner walls of the tubes.

This process has the drawback that the concentration ratio of silicate and graphite is a very critical one. If the concentration of the waterglass is too low the conglomerated material practically constitutes a short circuit; if the concentration is too high, the resistance rises too rapidly, and right within the range of resistance values which such layers must have, the concentration-resistance curve runs off in very steep fashion.

In the drawing, the figure illustrates a common type of cathode ray tube including a high resistance coating on the inner wall thereof.

The tube 1 has a viewing screen 3 at one end, an electron gun 5 at the other end, and the customary intermediate electrodes such as the control grid 7, anode 9, and deflecting plates 11. A high resistance coating 13, to which the invention relates in particular, is formed on the inner wall of the tube.

Experiments have shown that a more positive and convenient result than heretofore is obtained if colloidal non-conductors in suitable concentration are added to the colloidal graphite. The use of waterglass for producing a high resistance becomes thus superfluous, and it is possible to reduce the addition of waterglass to such an extent that merely sufficient adhesion to the wall is produced. Colloidal copper oxide is particularly well adapted as a colloidal non-conductor for this purpose.

It has furthermore been ascertained that colloidal "semi-conductors" may easily be prepared which yield a high ohmic resistance of suitable value without admixture with colloidal graphite; for example, colloidal pyrolusite (MnO_2) may be applied to serve as a single component resistance. Such layers produce resistances of 2 to 7 megohms on the inner walls of ordinary tubes. If the conducting values are too low, for special cases, colloidal graphite may be added to such "semi-conductors," just as it may be added to colloidal non-conductors. Inasmuch as in nearly all applications of television tubes it is important that the colloidal inner wall be black, it is preferable to select black colored substances in choosing the colloidal material. In this respect also the three substances, copper oxide, pyrolusite, and carbon are particularly suitable.

It is known in transmitting tubes of the Farnsworth type to apply very thin metal layers upon the wall of the tube between the photo-electric electrode and the anode. In such tubes the high-ohmic layer of the invention is of particular advantage. Since caesium is generally used in forming the photo-cathode, care hitherto had to be taken of the caesium when using metallic wall coatings, since the caesium might become incorporated therewith and thus alter the resistance value. With the semi-conductor coatings of the invention the adhesion affinity for caesium is appreciably less, so that the resistance value remains constant during the photo-cathode formation process. Furthermore the light sensitive effect remains limited to the cathode surface. In this type of transmitting tubes the absorption of visible light on the inner wall is of importance since the light radiated back from the tube walls would cause a clouding of the transmitted picture. Consequently, the use of black colloids is of importance also in transmitting tubes.

We claim:

1. In a cathode ray oscillograph comprising an evacuated insulating tube having an electron gun therein and a fluorescent screen disposed in registry therewith, a coating on the wall of said tube between said gun and said screen, said coating comprising a mixture of conducting and high resistance colloidal substances to control the resistance of said coating.

2. In a cathode ray oscillograph comprising an evacuated insulating tube having an electron gun therein and a fluorescent screen disposed in registry therewith, a high resistance coating on the inner surface of said tube between said gun and said screen, said coating comprising a mixture of colloidal manganese dioxide and a binder.

3. In a cathode ray oscillograph comprising an evacuated insulating tube having an electron gun therein and a fluorescent screen disposed in registry therewith, a high resistance coating covering the inner surface of said tube between said gun and said screen, said coating comprising a mixture of colloidal copper oxide and a binder.

4. In a cathode ray oscillograph comprising an

evacuated insulating tube having an electron gun therein and a fluorescent screen disposed in registry therewith, a high resistance coating covering the inner surface of said tube between said gun and said screen, said coating comprising a mixture of colloidal copper oxide, colloidal graphite, and a binder.

5. In a cathode ray oscillograph comprising an evacuated insulating tube having an electron gun therein and a fluorescent screen disposed in registry therewith, a high resistance coating on the inner surface of said tube between said gun and said screen, said coating comprising a mixture of colloidal manganese dioxide, colloidal graphite, and a binder.

6. In a cathode ray oscillograph comprising an evacuated insulating tube having an electron gun therein and a fluorescent screen disposed in registry therewith, a high resistance coating covering the inner surface of said tube between said gun and said screen, said coating comprising a mixture of material conductive to flow of current, material highly resistant to flow of current, and a binder, said mixture being so proportioned that the conductivity is controlled by said high resistance material and is not controlled by the binder.

7. In a cathode ray oscillograph having an evacuated insulating tube enclosing an electron gun and a photo-electric screen disposed in registry therewith, a high resistance conducting layer disposed upon the inner surface of said tube between said gun and said photo-electric screen, said layer comprising a mixture of colloidal high resistance substances having a low adhesion affinity for said photo-electric screen.

8. In a cathode ray oscillograph having an evacuated insulating tube enclosing an electron gun and a photo-electric screen disposed in registry therewith, a high resistance conducting layer disposed upon the inner surface of said tube between said gun and said photo-electric screen, said layer comprising a mixture of colloidal high resistance substances having a low adhesion affinity for said photo-electric screen, and being non-sensitive to light.

9. In a cathode ray tube comprising an evacuated envelope having therein an electron gun and a screen disposed in registry therewith, and adapted to be impacted by cathode rays, a high resistance coating on the surface of said envelope between said gun and said screen, said coating comprising a mixture of colloidal light absorbing material for precluding light reflection, a colloidal high resistance material for controlling the resistance of said mixture, and a binder in sufficient amount to adhesively secure said mixture to said envelope but insufficient to control the resistance of said mixture.

10. In a cathode ray tube comprising an evacuated envelope having an electron gun and a screen therein, said screen being disposed in registry with said gun and being responsive to cathode ray impact, a high resistance coating on the surface of said envelope between said gun and said screen, said coating comprising a mixture of a conductive colloid, a high resistance colloid and a binder, said mixture being so proportioned that the coating conductivity is not controlled by the binder.

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