

Oct. 19, 1937.

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2,096,416

METHOD OF COATING HOLLOW RECEPTACLES

Original Filed Dec. 27, 1933

FIG. 1

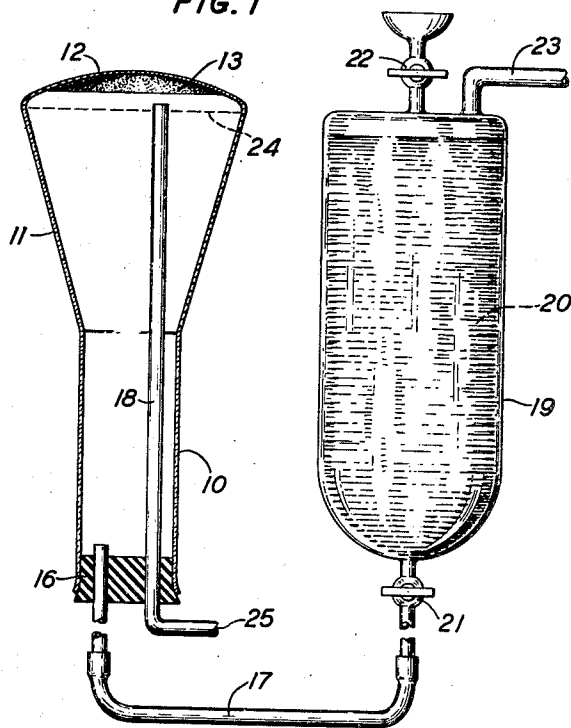
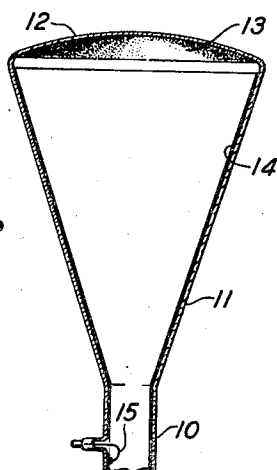


FIG. 2



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2,096,416

METHOD OF COATING HOLLOW RECEPTACLES

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Original application December 27, 1933, Serial
No. 704,101. Divided and this application
August 22, 1934, Serial No. 740,877

4 Claims. (Cl. 91-68)

This invention relates to a method of coating hollow receptacles and more particularly to a method of coating the interior wall of an electron discharge device, such as the cathode ray oscillograph device disclosed in my application Serial No. 704,101, filed December 27, 1933, of which application this is a division.

In cathode ray oscillograph devices, it has been found that portions of the enclosing vessel in the vicinity of the electron beam become electrically charged and thereby deleteriously affect the beam. In order to prevent this, it has been proposed to coat the inner walls of these portions of the enclosing vessel with a conductive material which may have a suitable potential applied thereto to provide a field for focussing the electron beam projected toward a fluorescent screen at one end of the enclosing vessel. If such coatings are of metal they have the undesirable characteristic of reflecting light thereby impairing the intensity of the image produced upon the fluorescent screen. Furthermore, metallic coatings are relatively expensive and often difficult to form.

One object of this invention is to form a continuous non-metallic coating on the inner wall of a hollow receptacle, such as the enclosing vessel of an electron discharge device.

Another object of this invention is to expedite the formation and to reduce the cost of forming such a coating.

In accordance with this invention, the enclosing vessel is provided with a removable inlet and a removable outlet, the inlet being connected to a reservoir containing colloidal graphite, known as "Aquadag". The colloidal graphite is forced into the vessel by air under pressure and caused to rise to a desired level. The air trapped above the incoming liquid is removed through the outlet pipe and when the desired amount of coating material has been introduced into the vessel, the air pressure in the reservoir is removed and applied to the outlet. This back pressure forces the coating liquid into the reservoir thereby leaving a uniform deposit of colloidal graphite adhering to the inner wall of the vessel. The deposit is dried and then baked to form a hard and adherent coating.

This method facilitates the formation of the coating and insures a uniform layer of material on all portions of the wall desired. Furthermore, the boundary of the coating is readily controllable so that the coating does not mask another coating, such as a fluorescent screen, on a different portion of the vessel.

The invention and the features thereof will be understood more clearly and fully from the following detailed description with reference to the accompanying drawing in which:

Fig. 1 illustrates one embodiment of the apparatus employed in producing a coating on the interior wall of a cathode ray discharge vessel, in accordance with this invention; and

Fig. 2 is a view in cross-section of an enclosing vessel for a cathode ray electron discharge device, coated in accordance with this invention.

Referring now to the drawing, the enclosing vessel comprises an elongated cylindrical portion or neck 10 and a flaring portion 11, terminating in a dome portion 12, which may be provided with an internal highly efficient fluorescent coating or screen 13 as disclosed in Patent 1,603,284, granted October 19, 1926 to John B. Johnson. The coating or screen 13 becomes fluorescent upon impact of an electron beam which may be produced as described in the copending application mentioned above.

In order to prevent the building-up of electrical charges on the inner walls of the portions 10 and 11, these walls are provided with a non-metallic coating 14 of colloidal graphite, commercially known as "Aquadag". This coating, as clearly shown in Fig. 2, extends up to adjacent the boundary of the fluorescent screen 13 and may have a suitable potential applied thereto through a leading-in conductor 15, sealed in the wall of the cylindrical portion 10.

In forming the coating 14 in accordance with this invention, the neck portion 10 of the vessel is provided with a removable plug 16 having an inlet tube or connection 17 which extends into the vessel a slight distance beyond the inner surface of the plug 16. An elongated outlet tube 18 extends through the plug 16 and terminates within the vessel at a point slightly beyond the line to which the coating is desired. The inlet connection 17 to the discharge vessel is an elongated U-shaped tube which is connected to a reservoir 19 containing the coating liquid, such as colloidal graphite 20. A valve 21 for the reservoir is provided between the reservoir and the tube 17. A similar valve 22 is inserted in the mouth of the reservoir and normally is in a closed condition except when it is desired to replenish the colloidal graphite material 20 within the reservoir. Adjacent the valve 22 and above the level of the colloidal graphite coating material 20 is a tubular extension 23 to which may be connected any source of pressure such as an air pump, not shown.

The method of coating the inner wall of the vessel comprises opening the valve 21 and applying air pressure through the tube 23 to inject air into the reservoir 19, whereby the coating material 20 is forced into the vessel through the inlet connection 17. The pressure of air is maintained constant until the level of the coating liquid reaches the level indicated by the dotted line 24 in Fig. 1. During the filling of the vessel with the colloidal material, all of the imprisoned air in the vessel, displaced by the liquid, is ejected through the outlet pipe 18 and when the level of the coating material reaches the line 24 the air pressure is removed from the connection 23 and applied to the open end 25 of the outlet pipe 18. The pressure of air emerging from the inner end of the pipe 18 forces the liquid in the vessel back through the U-shaped connection 17 into the reservoir 19 and, when all the liquid is removed, the plug 16 and pipe connections attached thereto may be taken out of the end of the portion 10. After the coating operation is completed the vessel 10 is dried in an oven and baked to form a hard and adherent coating on the inner wall of the vessel.

This method enables and expedites the formation of a uniform coating on the wall of the vessel and effects a uniform boundary between the graphite coating and the fluorescent screen. Furthermore, due to the black, opaque coating on the wall of the vessel no reflections altering the indication of the electrical phenomenon exhibited on the fluorescent screen are present. Another advantage is the avoidance of a difference of expansion between the glass vessel and the coating, such as might be present if a metallic coating were applied to the inner wall of the vessel.

Although specific apparatus has been shown for producing a coating in accordance with this invention, it will be understood, of course, that modifications may be made therein without departing from the scope and spirit of this invention as defined in the appended claims.

What is claimed is:

1. The method of forming a coating on the inner wall of a vessel closed at one end and having an opening at the other end, which comprises closing said opening with a stopper having

an inlet connection, coupling said inlet connection to a reservoir containing a coating liquid, raising the pressure of the liquid in said reservoir with respect to said vessel whereby said liquid flows into said vessel to a level adjacent said closed end of said vessel, and raising the pressure of the liquid in said vessel with respect to said reservoir whereby said liquid returns to said reservoir.

2. The method of forming a coating on the inner wall of a vessel which comprises inserting inlet and outlet connections into said vessel, connecting the inlet to a reservoir containing a coating liquid, flowing the liquid into said vessel, elevating the liquid in said vessel by pressure to a level intermediate the ends of said vessel, and impressing a back pressure on said liquid in said vessel through said outlet to return the liquid to said reservoir.

3. The method of forming a coating on the inner wall of a vessel which comprises inserting inlet and outlet connections into said vessel, connecting said inlet connection to a reservoir containing a coating liquid, flowing the liquid into said vessel, elevating the liquid in said vessel under pressure to a level intermediate the ends of said vessel, impressing a back pressure on said liquid in said vessel through said outlet connection to return said liquid to said reservoir, drying the residue on the inner wall of said vessel, and baking said vessel to form an adherent coating on said wall.

4. The method of forming a graphite coating on a restricted portion of the inner wall of a vessel below a boundary between the ends of said vessel, which comprises inserting an inlet pipe through one end of said vessel with its inner end below said boundary, inserting an outlet pipe through said one end until its inner end is substantially level with said boundary, connecting said inlet pipe to a reservoir containing colloidal graphite in suspension, increasing the pressure in said reservoir to flow the suspension in said vessel to said boundary, applying a pressure through said outlet to return said suspension to said reservoir, drying the deposit on the inner wall of said vessel, and baking said vessel to form a graphite coating on said wall.

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