Dec. 31, 1957 H. P. J. HESEMANS 2,818,355

METHOD OF PRODUCING A CONDUCTIVE LAYER OF GRAPHITE ON AN INSULATING SUBSTRATUM

Filed Nov. 21, 1955

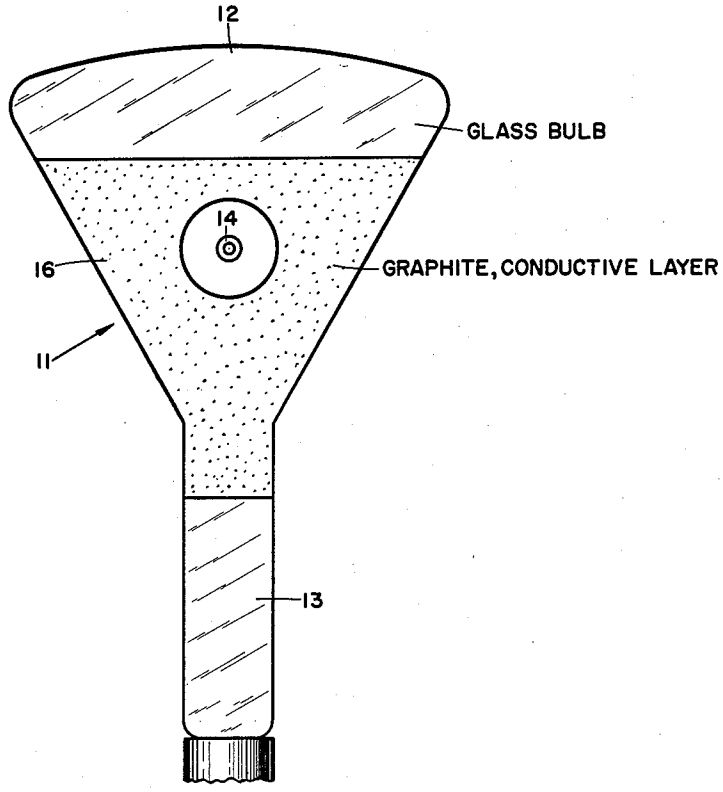


Fig. 1

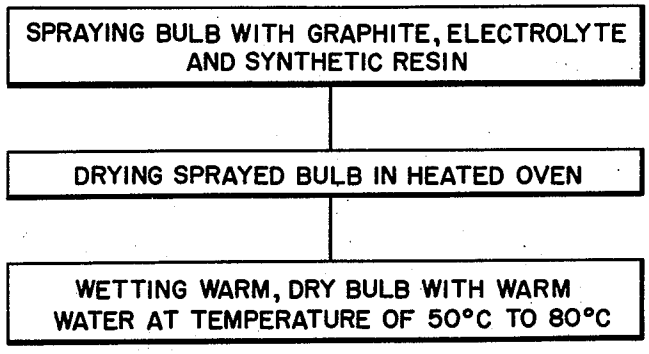


Fig. 2

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United States Patent Office 2,818,355
Patented Dec. 31, 1957

2,818,355

METHOD OF PRODUCING A CONDUCTIVE LAYER OF GRAPHITE ON AN INSULATING SUBSTRATUM

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Application November 21, 1955, Serial No. 548,266

3 Claims. (Cl. 117—226)

This invention relates to a method of producing a conductive layer of graphite on an insulating surface, more particularly on the outer surface of glass articles such as, for example, bulbs of cathode-ray tubes.

It is customary to form such layers of graphite by applying a suspension of colloidal graphite in water stabilised by means of an electrolyte and comprising a little synthetic resin as a binder, onto an insulating surface and subsequently drying said layer in an oven. A stabilised suspension marketed particularly for this purpose is that of Acheson Colloids Ltd., 18 Pall Mall, London S. W. 1 under the name "D68, CRT external wall coating compound." Such a suspension contains acetic acid as an electroylte, colloidal graphite and a synthetic resin and permits the production of conductive layers. However, such layers suffer from the disadvantage that the graphite is sensitive to moisture.

It has been found that such a graphite layer, which may have been baked for 12 minutes at 80° C., swells in a moist ambience and becomes detached from the substratum, sometimes with the formation of blisters. The present invention has for its object to render such a layer of graphite to moisture resistant.

The invention will be more fully described with reference to the drawings in which Fig. 1 shows a cathode ray tube coated according to the invention; and Fig. 2 is a flow sheet diagram of the necessary steps in carrying out the method of the invention.

In a method of producing a conductive layer of graphite, according to which colloidal graphite in the form in an electrolyte-stabilised suspension in water having a synthetic resin added to it is sprayed on an insulating surface and the layer of graphite is dried in an oven, this can be achieved, in accordance with the invention, by sprinkling the layer of graphite with warm water after drying.

Fig. 1 shows a typical glass cathode ray tube comprising a bulb **11**, a faceplate **12**, and a neck **13**. An anode contact button **14** is mounted in the wall of the bulb **11** to provide means for connecting an electrical voltage source to the anode which is within the tube. The bulb **11** is provided with a conductive coating **16** which is commonly formed of a layer of colloidal graphite.

According to well-known procedures, the layer **16** is applied to the bulb **11** and is then baked dry in an oven. It has been found that sprinkling the graphite layer **16**, preferably instantly after drying and before the layer

has cooled, with water having a temperature of 50° C. to 80° C. and preferably having a temperature of 55° C. for approximately 10 to 20 sec., favourably 12 sec., brings about such a modification of the layer as no longer to take up moisture. The layer may subsequently be wetted with water without swelling of the layer.

This may be explained by the fact that the hot water washes the electrolyte away with the result that the graphite separates as a flocculent precipitate and, together with its resin content, forms a watertight layer **16**.

Fig. 2 shows a chart listing the essential steps of the process of the invention as outlined hereinabove.

If the layer **16** is to be provided on glass articles the temperature of the water should be such as to prevent cracking of the glass or of the graphite layer due to sprinkling. The articles are preferably sprinkled upon leaving the oven. The oven has, in general, a temperature of 75° to 80° C. and it has been found that, for example a cathode-ray tube of the type shown in Fig. 1 and having a bulb **11** which consists of glass and is externally provided with such a layer **16** of graphite, and which has been dried in the oven for 10 minutes, allows of being sprayed with water of 55° C. instantly on leaving the oven and when the temperature of the glass bulb **11** is still 70° C. without cracking of the glass. When the sprinkling operation lasts more than 20 sec., there is a danger that the graphite layer **16** will chip off completely whereas sprinkling for less than 10 sec. will give poor results. The resistance of such graphite layers may remain, well below 500 Ω, measured between two points spaced 10 cms. from each other. The layer **16** is applied after the article, in the case under review the completely finished cathode-ray tube, has been evacuated and degased. Hence, in general, the method in accordance with the invention is the last treatment to which the article is subjected. Obviously, the warm water treatment of the layer may alternatively be effected in a manner different from spraying and sprinkling.

What is claimed is:

1. The method of applying a colloidal graphite layer to an insulating surface comprising the steps of forming a mixture of an electrolyte-stabilized suspension of colloidal graphite in water as one component and synthetic resin as another component of said mixture; applying said mixture to said insulating surface; heating said surface to dry the applied mixture; and, as soon as said mixture is dry and while said surface is still warm, wetting the dried layer with water having a temperature of approximately 50° C. to 80° C. for a period of approximately ten to twenty seconds.

2. The process of claim 1 in which the temperature of the water with which said surface is wetted is approximately 55° C.

3. The process of claim 1 in which the step of wetting said surface is carried on for twelve seconds.

References Cited in the file of this patent

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 2,818,355 December 31, 1957

Herman Peter Jacob Hesemans

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the heading to the printed specification, between lines 9 and 10, insert the following

Claims priority, application Netherlands
November 29, 1954

column 1, line 37, after "graphite" strike out "to".

Signed and sealed this 27th day of May 1958.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents