

UNITED STATES PATENT OFFICE.

JAMES BRYANT WHITMORE AND JOHN EBLING FERGUSON, OF BLOOMFIELD, NEW JERSEY, ASSIGNORS TO WESTINGHOUSE LAMP COMPANY, A CORPORATION OF PENNSYLVANIA.

PROCESS OF COATING INCANDESCENT LAMP BULBS.

No Drawing.

Application filed March 19, 1921. Serial No. 453,734.

To all whom it may concern:

Be it known that we, JAMES BRYANT WHITMORE, a citizen of the United States, and a resident of Bloomfield, in the county of Essex and State of New Jersey, and JOHN EBLING FERGUSON, a citizen of the United States, and a resident of Bloomfield, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Processes of Coating Incandescent Lamp Bulbs, of which the following is a specification.

This invention relates to the process of coating or painting vitreous materials, and more especially it relates to the process of affixing a coating to an incandescent lamp bulb.

One of the objects of this invention is to provide a method for rendering a preparation adherent to vitreous substances in a manner which makes it resistant to water, or its vapor, certain constituents of the atmosphere, and to mechanical rubbing.

Another object of the invention is to provide a process for affixing a coating containing commercial sodium silicate to a smooth surface such as the bulb of an incandescent electric lamp.

Other objects of the invention will be apparent from the following description.

In the use of incandescent lamps, especially those of high intensity, it is desirable under various conditions to diffuse the light rays emanating therefrom. Several methods of diffusing have been employed and some of the most common methods are: associating a separate diffusing surface with the bulb of an incandescent lamp; frosting or etching the bulb; or applying a superficial coating of a preparation, such as an enamel or the like, to the bulb of the lamp. There are several disadvantages which are inherent in these methods. While the last mentioned method is the most desirable to use, one of the difficulties encountered is that of making a suitable preparation adhere to the glass bulb of the lamp and be resistant to the solvent action of water.

For purposes of simplicity, any preparation, such as an enamel, paint, varnish or the like, will be hereinafter referred to as a coating and it is to be understood that the word coating will include any or all

of the above named materials or combinations thereof.

Any suitable coatings to be applied to lamp bulbs for the purpose of diffusing the intense light rays may be employed, and the method of applying these coatings may be varied so long as they are maintained on the lamp bulb under all conditions of operation. It is obvious that more than one coating may be applied to the body, as for instance by applying two coatings on different portions of the body, or by applying a coating of enamel and then applying a coating of varnish over the enamel. In coating an incandescent lamp bulb, it has been found that a satisfactory light diffusing surface may be obtained by first applying a prepared enamel and then by applying a varnish preparation over the enamel.

This invention, as related to the method of applying a coating to a vitreous material, such as an incandescent lamp bulb, deals with a new method of application. The employment of this method results in affixing the coating to the bulb in a manner that makes it resistant to water or its vapor, certain constituents of the atmosphere, and also resistant to mechanical operations such as rubbing or scratching.

It is well known that various coatings have been applied to the bulbs of incandescent lamps for various purposes. Most of these coatings include commercial sodium silicate containing free alkali and it is known that this sodium silicate is readily soluble in water and water vapor. It has been found that, by applying heat to the vitreous material with such a coating thereon, it becomes affixed to the material in a manner that does not permit of its ready removal.

The heat may be applied in any desired manner and for such length of time that a proper reaction takes place between the vitreous material and the coating. The heat causes reaction between the coating and the vitreous material in such manner that the coating attaches itself to the surface of the latter, so that it is not readily rubbed or scratched therefrom, and also makes the coating resistant to the action of water and certain constituents of the atmosphere.

In describing a composition of a suitable coating and its application to the glass bulb of an incandescent lamp, the coating will be considered as preferably including commercial sodium silicate, zinc oxide, French chalk and water, mixed in desired proportions. An example of a mixture which has been successfully applied is preferably prepared by mixing approximately 1.6 parts by weight of commercial sodium silicate with 1 part of zinc oxide, 1 part of French chalk and 1.75 parts of water; placing this mixture in a ball mill for approximately 24 hours, then adding 7 parts by volume of commercial sodium silicate to 12 parts of the said mixture and continuing the milling action until a homogeneous mixture is obtained.

The resulting mixture may then be applied to an incandescent lamp bulb in any desired manner such, for instance, as by spraying with a machine of the type disclosed in our co-pending application filed March 23, 1921, Serial No. 454,756, bowl enameling machines, and assigned to the Westinghouse Lamp Company.

After the application of the coating, heat is applied in any desirable manner as by passing the lamp bulb through an oven for a suitable time so that the coating will become properly affixed to the bulb in accordance with the assumed theory outlined above. It is found that satisfactory results are obtained by heating the oven from 125° C. to 250° C. It is, however, to be understood that the coating containing sodium silicate becomes affixed to the glass by the application of heat so that it is not readily removed by rubbing or scratching, and resists the solvent action of water. The present theory advanced for this result, is that a certain corrosive action takes place on the glass and that the sodium silicate is dehydrated. Further, the action of the alkali on glass acts to increase the resistance of the sodium silicate to the solvent action of water, and to water vapor, as in the reaction of the alkali contained in the sodium silicate with the glass, the soda content is reduced and thus the solubility of the silicate is materially reduced. An analysis of the finished product indicates that the glass becomes roughened and that the coating is readily affixed to this roughened surface when heat is applied. Various modifications for roughening the surface of the lamp bulb and

for applying a desired coating may be employed in order to modify the method of applying heat or reducing the time of application of the heat, but these modifications are considered to be within the scope of this invention.

While the invention has been described in connection with a process of applying a coating having free alkali as an ingredient, it is obvious that the alkali may be applied to an article independently of other ingredients of the compound.

While various other minor modifications leading to the same results will readily suggest themselves to those skilled in the art, it is to be understood that the invention contemplates such modifications as come within the scope of the appended claims.

What is claimed is:

1. The process of providing a glass bulb of an incandescent electric lamp with a translucent coating which consists in spraying thereon a coating comprising a water solution of commercial sodium silicate, and a filler, and in heating the coating to a temperature approximately between 125° and 250° centigrade to unite the coating to the bulb and render it resistant to atmospheric conditions.

2. The process which consists in mixing approximately 7 parts by volume of commercial sodium silicate with approximately 12 parts by volume of a mixture comprising approximately 1.6 parts by weight of commercial sodium silicate, approximately 1 part by weight of zinc oxide, approximately 1 part by weight of chalk and approximately 1 part by weight of water, applying to the glass bulb of an incandescent lamp the combination of mixtures thus obtained and heating said lamp bulb until the coating is firmly affixed thereto.

3. An incandescent lamp bulb having a coating thereon comprising sodium silicate and a filler united to the bulb by a heat treatment.

4. An incandescent lamp having thereon a coating comprising a composition of matter containing sodium silicate, a filler and pigment united to the bulb by a heat treatment.

In testimony whereof, we have hereunto subscribed our names this 18 day of March, 1921.

JAMES BRYANT WHITMORE.
JOHN EBLING FERGUSON.