

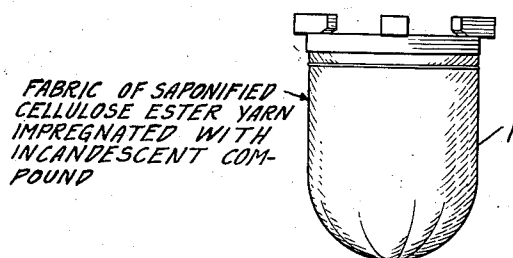
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1,993,778

METHOD OF MAKING INCANDESCENT MANTLES

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UNITED STATES PATENT OFFICE

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METHOD OF MAKING INCANDESCENT
MANTLES

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This invention relates to the manufacture of incandescent mantles.

An object of my invention is to provide a gas incandescent having superior properties to those previously made. Other objects of this invention will appear from the following detailed description.

Incandescent or Welsbach mantles have been previously made by impregnating with suitable salts a knitted fabric made of cotton, natural silk or of artificial silk of reconstituted cellulose prepared by the viscose or similar methods. However when these mantles are ignited to burn off the cellulose material, the ash or incandescent material remaining is discolored. Furthermore, such mantles shrink considerably after ignition so that their distance from the orifice of the Bunsen or other burner is varied, as is also the ratio of the area of the incandescent surface to the amount of heat applied, with the result that maximum efficiency is not attainable.

I have found that if Welsbach or other gas incandescents are made by impregnating a fabric made of saponified cellulose acetate or other organic ester of cellulose filaments or yarns with suitable salts or compounds of metals producing refractory and incandescent compounds, there may be produced in this manner incandescents having superior properties to those previously made. Among such advantages are that the ash or incandescent proper formed after ignition of the fabric is substantially free of color; and that when the mantle is ignited, it does not shrink so that the distance of the mantle from the orifice of the Bunsen burner is maintained constant and subject to exact control by the manufacturers, and the ratio of the surface of the ignited mantle to the amount of heat applied by the burner is maintained constant, with the result that maximum light-emitting efficiency may be attained.

In accordance with my invention I prepare gas or other incandescents by impregnating a fabric of suitable shape and made of yarns or filaments of a saponified organic ester of cellulose with salts or other compounds of the rare earth metals capable of forming refractory and incandescent compounds upon ignition.

Usually the incandescent material will be formed by impregnating a tubular knitted fabric made of the saponified organic ester of cellulose, but if desired fabric of other shape and either knitted, woven or netted may be employed.

The yarn employed as the starting material is made of filaments of cellulose acetate or other

organic ester of cellulose such as cellulose formate, cellulose propionate and cellulose butyrate. While I prefer to form a fabric of the unsaponified organic ester of cellulose yarn and then saponify the organic ester of cellulose by treatment of the fabric with a saponifying agent, if desired, the fabric may be made by knitting or otherwise associating together previously saponified organic ester of cellulose yarn.

The unsaponified yarn employed may be of any suitable size say 150 to 440 denier, and in the choice of the size of the unsaponified yarn employed, due regard should be given to the fact that upon saponification, the yarn suffers an appreciable loss in weight so that if the finished mantle is to be made of a yarn of a given denier, the unsaponified yarn employed as the starting material will be of correspondingly higher denier.

In order to saponify the cellulose acetate or other organic ester of cellulose in the knitted fabric or in the yarn used as the starting material, the same is treated with an aqueous, alcoholic or other suitable solution of an alkaline material of such amount and in such concentration as to cause the required degree of saponification. Examples of suitable alkaline materials are alkalies such as sodium hydroxide, potassium hydroxide or ammonium hydroxide; or alkaline salts such as sodium carbonate, potassium carbonate, sodium phenolate, potassium phenolate, sodium silicate, potassium silicate, sodium sulfite, potassium sulfite, trisodium phosphate, tripotassium phosphate, or mixtures of two or more of these. Saponification may also be caused by exposing the organic ester of cellulose material to the action of ammonia or other gaseous or vaporous base in the presence of moisture.

To produce the incandescent, the fabric of saponified organic ester of cellulose material is impregnated with any suitable compound or salt of a metal capable of producing a refractory incandescent upon ignition; especially the salts of the rare earths; e. g. a mixture of thorium nitrate and cerium nitrate, in any known or suitable manner.

The accompanying drawing shows a gas mantle of conventional form illustrating one form of my invention.

In order further to illustrate my invention but without being limited thereto the following example is given.

Example

A tubular fabric of suitable width is formed by circularly knitting yarn of 300 denier made of

filaments of acetone-soluble cellulose having an acetyl value of 54 to 55%.

The cellulose acetate knitted fabric is saponified by immersing one part by weight thereof in 50 parts by weight of water at 85° C. and containing an amount of sodium hydroxide equal to 5% of the weight of the goods for 20 minutes, after which 5 increments of further quantities of sodium hydroxide, each equal in weight to 10% of the weight of the goods, are added at 10 minute intervals. After the addition of the last increment of sodium hydroxide, the goods are permitted to remain in the bath for 30 minutes.

The saponified material is then rinsed twice in soft water and finally washed off in distilled water and dried.

The material is then impregnated in an aqueous solution of a mixture of thorium nitrate and cerium nitrate, the proportions of which are such that after ignition, the ash contains 98 to 99% of thorium oxide and 2 to 1% of cerium oxide.

After drying the tubular fabric is cut and shaped to the desired form such as is shown at 1 on the accompanying drawing.

The foregoing detailed description is given merely by way of illustration and many variations may be made therein without departing from the spirit of my invention.

Having described my invention, what I desire to secure by Letters Patent is:

1. Method of preparing gas incandescents which comprises immersing a fabric comprising an organic ester of cellulose in an aqueous bath containing an amount of alkali insufficient to saponify completely the organic ester of cellulose, adding further quantities of alkali in increments to saponify the organic ester of cellulose further, and subsequently impregnating the saponified

fabric with compounds capable of forming a refractory incandescent upon ignition.

2. Method of preparing gas incandescents which comprises immersing a fabric comprising cellulose acetate in an aqueous bath containing an amount of alkali insufficient to saponify completely the cellulose acetate, adding further quantities of alkali in increments to saponify the cellulose acetate further, and subsequently impregnating the saponified fabric with compounds capable of forming a refractory incandescent upon ignition.

3. Method of forming gas incandescents which comprises immersing a fabric comprising an organic ester of cellulose in an aqueous bath containing 5% of sodium hydroxide based on the weight of the fabric for 20 minutes, then adding to said bath at intervals of 10 minutes a further quantity of sodium hydroxide equal in weight to 10% of the weight of the fabric until five such additions are made, permitting the fabric to remain in said bath for 30 minutes and then, after the fabric is washed and dried, impregnating the same with compounds capable of forming a refractory incandescent upon ignition.

4. Method of forming gas incandescents which comprises immersing a fabric comprising cellulose acetate in an aqueous bath containing 5% of sodium hydroxide based on the weight of the fabric for 20 minutes, then adding to said bath at intervals of 10 minutes a further quantity of sodium hydroxide equal in weight to 10% of the weight of the fabric until five such additions are made, permitting the fabric to remain in said bath for 30 minutes and then, after the fabric is washed and dried, impregnating the same with compounds capable of forming a refractory incandescent upon ignition.

CARLETON S. FRANCIS, JR.

CERTIFICATE OF CORRECTION.

Patent No. 1,993,778.

March 12, 193

CARLETON S. FRANCIS, JR.

It is hereby certified that error appears in the printed specification of the a numbered patent requiring correction as follows: Page 1, second column, line 11, for "440" read 400; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of April, A. D. 1935.

(Seal)

Leslie Frazer
Acting Commissioner of Patents.

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