

UNITED STATES PATENT OFFICE.

IGNAZ KREIDL, OF VIENNA, AUSTRIA-HUNGARY.

MANUFACTURE OF INCANDESCENT GAS-MANTLES.

980,802.

Specification of Letters Patent.

Patented Jan. 3, 1911.

No Drawing.

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To all whom it may concern:

Be it known that I, IGNAZ KREIDL, chemist-manufacturer, a subject of the Emperor of Austria-Hungary, and a resident of XXI/1 Kohlgrasse 7, Vienna, in the Empire of Austria-Hungary, have invented an improvement in the Manufacture of Incandescent Gas-Mantles, in particular of artificial silk; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a process of manufacturing incandescent gas-mantles, particularly such as are made of artificial silk.

In well-known processes of manufacturing incandescent gas-mantles the salts are converted on the fiber into the hydrates in well-known manner by treating the salts, *e. g.* of thorium nitrate, with ammonia. Not only the hydrate, but also alkaline salts, such as ammonium nitrate, are formed on the fiber, and these alkali salts have to be completely removed as their presence prevents the proper formation of a mantle.

Now the present invention has for its object an improved process, in particular to avoid the formation of alkali salts by directly impregnating the raw fabric with thorium hydrate in the form of a solution of colloidal thorium hydrate ("sol") and converting the soluble form ("sol") of colloidal thorium hydrate on the fiber into the insoluble form called "gel."

According to Graham, *vide Philosophical Transactions of the Royal Society of London* 151, 183 (1861), the colloidal solutions *per se* are called "sol", and the colloidal substances which have become insoluble by mechanical treatment, or the influence of heat, or under the action of chemical agents, are called "gel".

The improved process is carried into practice by impregnating the raw mantles, preferably those composed of artificial silk, with a solution of colloidal thorium hydrate ("sol"), to which cerium oxid is added as salt, or colloid, in the quantity usual for incandescent gas-mantles, *i. e.* approximately one per cent. of cerium oxid, and subsequently drying the mantle thus treated. This impregnation may be carried out according to any of the methods usually employed in the case of thorium nitrate solutions.

The impregnation of raw mantles for incandescent gas only with a solution of colloidal thorium hydrate *per se* without subsequent treatment is not sufficient to produce available incandescent gas mantles. If such mantles, made with a colloidal solution, are subjected to the ordinary process of drying and incineration it is found that the incandescent gas mantles obtained in this way show a great number of holes, which in use of the incandescent mantle induce complete tearing of the fabric. This fact may be explained by the observation, that the colloidal thorium hydrate, being only a very fine suspension, yields on glowing an oxid of such softness and incoherency that the fabric impregnated with such colloidal solution is unable to present coherence between its meshes after incineration. By coagulating the soluble form of colloidal thorium hydrate on the fiber according to the present invention the particles are bound together, to obtain a connection which is maintained even after incineration of the fiber and produces a coherent structure of the oxid corresponding to the structure of the fabric. The coagulation performed on the fiber by means of coagulating agents which are indifferent to the fiber, and which are employed in extremely small quantities which do not need to be washed out, causes the oxid to sinter on incineration, so that a well made mantle, coherent in its meshes, is obtained.

As indicated, the present invention consists in submitting the fabric, after impregnation with colloidal thorium hydrate and drying to an additional treatment for the purpose of giving it a more coherent structure after its incineration. To this end the "sol" on the fiber is converted into the "gel"; of all coagulating agents ammonia, preferably employed in solution, is most suitable, although other coagulating agents may be employed. As salts are not formed washing after the reaction is superfluous. Whereas in the well-known process the treatment of the raw mantle with ammonia has the purpose of converting the thorium salts into the hydrates on the fiber itself the ammonia treatment is in the present invention merely a subsequent treatment, the purpose of which is to coagulate the hydrate existing already on the fiber. After the treated mantle has been dried it can be incinerated.

According to the improved process, ex-

ceedingly elastic, resisting, incandescent mantles of great illuminating power are obtained.

What I claim as my invention and desire to secure by Letters Patent is:

1. In the manufacture of incandescent gas mantles, the process which consists in impregnating the mantle with a colloidal solution of thorium hydrate in a soluble state ("sol"), and subsequently converting the colloidal thorium hydrate into the insoluble form of colloid ("gel").

2. A process of manufacturing incandescent gas mantles, in which the mantle is impregnated with a colloidal solution of thorium hydrate in a soluble state ("sol"), dried, the colloidal thorium hydrate on the mantle converted into the insoluble form of colloid ("gel") and the mantle incinerated.

3. A process of manufacturing incandescent gas mantles, in which the mantle is impregnated with a colloidal solution of thorium hydrate in a soluble state ("sol"), the colloidal thorium hydrate on the mantle converted into the insoluble form of colloid ("gel") by means of a coagulating agent, and the mantle incinerated.

4. A process of manufacturing incandescent gas mantles in which the mantle is im-

pregnated with a colloidal solution of thorium hydrate in a soluble state ("sol"), the colloidal thorium hydrate on the mantle converted into the insoluble form of colloid ("gel") by ammonia, and the mantle incinerated.

5. The process of manufacturing incandescent gas mantles which consists in forming a mantle of threads, impregnating the mantle thus formed with a colloidal thorium hydrate in a soluble state ("sol") and subsequently converting the colloidal thorium hydrate thus impregnated into the insoluble form of colloid ("gel").

6. The process of manufacturing incandescent gas mantles which consists in forming a mantle of artificial silk threads, impregnating the mantle thus formed with a colloidal thorium hydrate in a soluble state ("sol") and subsequently converting the colloidal thorium hydrate thus impregnated into the insoluble form of colloid ("gel").

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

IGNAZ KREIDL.

Witnesses:

ALBIN SCHILLER,

AUGUST FUGGER.