UNITED STATES PATENT OFFICE.

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PROCESS FOR MANUFACTURING INCANDESCENT MANTLES.

950,734. Specification of Letters Patent. Patented Mar. 1, 1910.

No Drawing. Application filed October 24, 1907. Serial No. 399,037.

To all whom it may concern:

Be it known that I, HEINRICH SÜSSMANN, a subject of the German Emperor, and a resident of Berlin, Germany, have invented a certain new and useful Improvement in Processes for Manufacturing Incandescent Mantles; 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 incandescent mantles for gas light are usually manufactured by impregnating the web, which consists of natural fibers or artificial threads with solutions of salts of luminous earth and incinerating. For the impregnating process the nitrates are used nearly exclusively. By reason of the fact, that these salts develop free nitric acid the fiber of the mantles not yet incinerated is attacked and spoiled. Moreover, the development of the nitric acid in the incinerating process of the mantles is so violent, that the mantle becomes easily destroyed, if made of artificial threads. This destruction is much more sensible than when natural fibers are employed. To avoid these disadvantages it has been proposed to introduce the impregnated and dried mantles in an alkaline bath. By this process the earths on the mantle are separated as hydroxid and the nitric acid is united with the alkali and both the acid and the alkali removed by washing.

The object of the present invention is to use organic bases instead of alkalies to separate the earths from the impregnated mantle.

The invention is based on the knowledge that in the manufacture of incandescent mantles by means of separating the luminous earth from the web it is essential to give to the precipitation a structure as tough and mucilaginous as possible, and that therefore means which separate the earths in an amorphous and pulverized state are not adapted for the purpose and that the more mucilaginous the precipitation is the better will be the physical structure of the incandescent mantle.

Experience has shown that there are a number of organic bases excellently adapted for the purpose because the products of separation are much more mucilaginous than those of the alkalies. There is another advantage in employing organic bases viz. that by proper selection it is possible to separate certain of the earths from the fiber and to leave others in solution, to be separated afterward by washing. In this manner it is possible to remove all trace of impurities or unsuitable earths which are present in the impregnating solution. The large surface of the web facilitates the removal by washing. When using alkalies, the removal of the unsuitable substances is not possible as the alkali precipitates not only the earths but nearly all other matter (impurities), so that they remain in the mantle. It is known that the impurities are extremely disadvantageous in mantles in regard to the luminosity, and durability as well as for the manufacture. In employing certain fabrics with thorium and cerium the phenomenon is observed, that notwithstanding the treatment with ammonia the mantles shrivel up very much during the process of incineration and forming by means of compressed gases but when using the same organic fibers and treating them with organic bases the shriveling is much reduced. There are a number of organic bases well adapted for the purpose, e. g. anilin, o-tolluidin, xylidin, pyridin and many others or compounds of them.

It is preferable to use the solution in a warm state for the purpose of effecting a complete solution.

The procedure under the present invention is as follows: The fabrics are in the known manner saturated with solutions of the illuminating salts and then dried. Thereupon the fabrics are placed in the precipitating medium, "the organic base" or the fabrics are exposed to the vapor of the base and remain therein for a long time so that the chemical action can take place. During this action the acid, by which the base of the illuminating salt was held combined, combines with the organic base while the illuminating earth is left behind in insoluble condition. Subsequently thereto the fabrics are washed in distilled water to remove the excess of the organic base and also the soluble acids held combined by the base. After the mantles are again dried they are ready for ashing and burning. For economical reasons a solution

of the organic bases in a suitable solvent, such as water or alcohol, may be employed in lieu of the liquid organic bases.

In an aqueous solution of pyridin, *e. g.* a certain proportion of organic bases is necessary in order to make the precipitation complete and to avoid having them again go into solution. In employing an aqueous solution of pyridin, 20% pyridin is the minimum limit. It is also possible to treat the impregnating mantles immediately after the impregnation or after drying with vapors of the organic bases. This has some advantages for economy since less separating matter is necessary than if the mantles were fully impregnated with a liquid separating matter.

Instead of treating finished webs it is possible to impregnate the threads from which the webs are manufactured and to treat these in the way shown, the mantles being afterward manufactured from the threads thus treated.

The process may be done in such a way that only one earth is separated the other earths being embodied in the mantle as soluble salts, *e. g.* to manufacture mantles of thorium and cerium and using an organic bath which separates only the thorium salts, the fiber is first impregnated with thorium salt and treated by the organic bath and then the fiber is impregnated with a solution of a cerium salt.

What I claim is:

1. The process of manufacturing incandescent mantles, which consists in saturating the fabric composing the mantle, with saturated solutions of the salts of luminous metals; in placing the fabric in the organic base; and finally in washing the fabric in distilled water.

2. The process of manufacturing incandescent mantles which consists in saturating the fabric with a salt of a luminous metal; in exposing the fabric so saturated, to the vapor from an organic base, and finally in washing the fabric in distilled water.

3. The process of manufacturing incandescent mantles which consists in saturating the fabric with the salt of a luminous metal; in exposing the fabric so saturated, to an organic base; and finally in washing the fabric in distilled water.

The foregoing specification signed at Berlin this twentieth day of July, 1907.

HEINRICH SÜSSMANN.

In presence of two witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.