

# UNITED STATES PATENT OFFICE.

LEONARD PAGET, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO  
CHARLES J. KINTNER, OF SAME PLACE.

## GAS-INCANDESCENT.

SPECIFICATION forming part of Letters Patent No. 401,899, dated April 23, 1889.

Application filed March 30, 1889. Serial No. 305,437. (No specimens.)

*To all whom it may concern:*

Be it known that I, LEONARD PAGET, a citizen of the United States, residing at New York, in the county of New York and State  
5 of New York, have made a new and useful invention in Incandescents for use with Gas-Burners, of which the following is a specification.

My invention relates particularly to that  
10 type of incandescents in which a non-friable base or support is coated with the incandescent material, and its object is to devise an incandescent which shall have great durability.

15 To this end my invention consists in the novel process hereinafter described and particularly claimed.

In the prior state of the art it was old to coat with an earthy incandescing substance—  
20 like magnesia—a non-friable base or support—such as a platinum wire—by causing the incandescing substance to adhere to the exterior surface of such base or support in several ways which are well known, and therefore  
25 need not be described here; but in all of the processes familiar to me by which the incandescing material is coated upon a base or support there is not an absolute integrality of connection between the two, by which I mean  
30 that the incandescing material does not penetrate or is not absorbed into the pores of the non-friable base or support.

In my improved incandescent there is absolute integrality of connection between the  
35 two, as I will now proceed to describe.

I take a metallic wire, preferably of steel or platinum, or any metal in which there is little or no carbon, although fair results may be had with some grades of iron wire, and I form  
40 this wire into an incandescent hood or mantle of the desired configuration or shape, either by weaving or in any preferred manner, and I then make a solution, preferably alcoholic, of some earthy material—as, for instance, an  
45 alcoholic solution of chloride of magnesium, it being preferably a saturated solution. I then connect the ends of the incandescent or hood to an electrical generator by any preferred means, said generator having sufficient  
50 current capacity to heat the entire incandescent to a dull-red temperature in air when in

operation. To avoid danger of an explosion, however, care should be taken to entirely immerse the incandescent thus connected in the electrical circuit in the solution, if of alcohol, 55 before the current is closed and the generator is operatively connected. Of course any generator of electricity giving the necessary current tension and supply may be used. When the metallic hood or incandescent becomes 60 thus heated to the desired temperature, I have discovered that its surface pores expand or enlarge very materially. The heat generated by the electrical current, besides expanding the pores of the support, volatilizes the solution 65 and causes the magnesia or oxide of magnesium held in solution to be absorbed into said pores. This process is continued until a coating of the desired thickness of the magnesia (or magnesium oxide) attaches itself to 70 those particles which have been already absorbed and to the surface of the wire itself. The hood or incandescent is now removed from the bath and is ready for use. I have obtained excellent results from an incandescent 75 prepared by this process upon a platinum wire, which after the process failed to disclose to the naked eye any coating of magnesia or magnesium oxide, thus showing that the incandescing material or magnesia was 80 absorbed into the pores of the wire.

The hood or incandescent may, if desired, be heated before immersion, and by other means than electrical, and then dipped into the solution, continuing the heating and dipping 85 alternately until the desired coating is obtained. I prefer, however, the electrical process of heating, and also to heat during the immersion of the hood or incandescent in the solution, for the reason that this process gives 90 a more even coating and the oxide appears to penetrate farther into the support, and this latter I regard a very important feature.

I obtain by this process an incandescent in which the union between the base or support 95 and the incandescing substance is so intimate that any difference in the coefficients of expansion between the two prevents rupture of the incandescing material, thereby giving increased life to the incandescent produced. 100

I do not limit myself to the use of chloride of magnesium, as I may, and sometimes do, use

nitrate of magnesium, nitrate of aluminium, and chloride of zirconium.

I am aware of a patent granted to Alexander Bernstein by the United States on the 30th of August, 1887, No. 369,091, for an improved process of coating electric incandescent filaments made of carbon with magnesium oxide. It is well known in the art of electrical illumination that carbon and analogous conducting filaments which decrease in their electrical resistance on heating to incandescence are used in preference to metal conductors, which increase their resistance under like conditions, thereby wasting electrical energy. I have discovered that this increase in the resistance of a metallic conductor is due to the increased porosity of the metal under heat, and that in carbon and analogous incandescent electric-light conductors there is decreased porosity, and have taken advantage of this discovery to cause the pores of a metal conductor to absorb an incandescing substance, as above described, and in this respect my process differs from that of Bernstein. It is also a fact that a carbon or analogous conductor of the type just mentioned would be destructible under the oxidizing influence of a gas-flame.

I am also aware that it is old to dissolve an oxide in an acid and then coat a wire with this solution and finally subject the wire thus coated to heat, as described in English patent to Edison, No. 5,306 of 1878; but this process is the reverse of mine, and cannot act to cause the oxide to penetrate the pores, as does my process, and therefore does not produce my improved incandescent.

I make no claim here to the process described, as this subject-matter is claimed by me in another application filed of even date herewith, Serial No. 305,436.

I make no claim to an incandescent of the type named, in which the incandescing material is held to a base or support otherwise than in an integral sense. By the word or expression "integral," as herein used, I mean that the incandescing material penetrates or is absorbed into the pores of the non-friable base or support.

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. As a new article of manufacture, an incandescent consisting of a non-friable base or support having an incandescing substance

embedded in its pores, whereby integrality of connection exists between the base or support and the incandescing substance, substantially as described.

2. As a new article of manufacture, an incandescent consisting of a non-friable base or support holding an incandescing substance in its surface pores and an exterior coating of said incandescing material attached to the embedded material and to the surface of the base or support, substantially as described.

3. As a new article of manufacture, an incandescent consisting of a metallic base or support having a coating of an incandescing material which penetrates the surface-pores of the base or support, substantially as described.

4. As a new article of manufacture, an incandescent consisting of a metallic base or support having a coating of an incandescing material of highly-refractory nature, which penetrates the surface pores of the base or support and forms also a coating about the exterior surface, the two being thus integrally united, substantially as described.

5. As a new article of manufacture, an incandescent consisting of a metallic wire base or support coated with an incandescing material which penetrates the surface pores of the wire and thus becomes integrally attached to said base or support, substantially as described.

6. As a new article of manufacture, an incandescent consisting of a non-friable base or support having magnesium oxide embedded in its surface pores, substantially as described.

7. As a new article of manufacture, an incandescent consisting of a non-friable base or support having magnesium oxide embedded in its surface pores and also a coating of said oxide on the surface of said base or support, substantially as described.

8. As a new article of manufacture, an incandescent consisting of a metallic base or support having magnesium oxide embedded in its surface pores and covering also the entire surface of the base or support, substantially as described.

LEONARD PAGET.

Witnesses:

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L. V. HARWOOD.