

# UNITED STATES PATENT OFFICE.

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

## PROCESS OF MAKING GAS-INCANDESCENTS.

SPECIFICATION forming part of Letters Patent No. 401,898, dated April 23, 1889.

Application filed March 30, 1889. Serial No. 305,436. (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 of New York, have made a new and useful  
5 Invention in the Art of Constructing or Making Incandescents for Use with Gas-Burners, of which the following is a specification.

My invention relates particularly to the  
10 construction of that 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, like magnesia, a non-friable base or support—  
20 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 need not be described here; but in all  
25 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  
30 mean that the incandescing material does not penetrate or is not absorbed into the pores of the non-friable base or support.

By the practice of my improved process I bring about an absolute integrality of connection between the 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  
40 be had with some grades of iron wire, and I form 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  
45 alcoholic, of some earthy material—as, for instance, an 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  
50 by any preferred means, said generator hav-

ing sufficient 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  
55 connected in the electrical circuit in the solution, if of alcohol, 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  
60 be used. When the metallic hood or incandescent becomes 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, be-  
65 sides expanding the pores of the support, volatilizes the solution 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 thick-  
70 ness of the magnesia (or magnesium oxide) attaches itself to 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  
75 use.

I have obtained excellent results from an incandescent prepared by this process upon a platinum wire, which after the process failed to disclose to the naked eye any coating of  
80 magnesia or magnesium oxide, thus showing that the incandescing material or magnesia was absorbed into the pores of the wire.

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

I obtain by this process an incandescent in which the union between the base or support and the incandescing substance is so intimate that any difference in the coefficients of ex- 100

pansion between the two prevents rupture of the incandescing material, thereby giving increased life to the incandescent produced.

I do not limit myself in the practice of this improved process 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.

I am also aware of English Patent No. 6,811 of 1886; but the process set forth in said patent does not result in the penetration of the incandescing substance into the pores of the base or support, as is the case by my process.

I make no claim herein to an incandescent as a new article of manufacture, consisting of a non-friable base or support holding the incandescing substance in its pores, such subject-matter being claimed by me in a sepa-

rate application of even date herewith, Serial No. 305,437, the present application being directed to the processes hereinafter claimed.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. The within-described process of preparing an incandescent, which consists in causing an incandescing substance to penetrate the pores of a non-friable base or support, substantially as described.

2. The within-described process of preparing an incandescent, which consists in causing an incandescing substance to penetrate the pores of a non-friable base or support and continuing this process until a coating of the desired thickness is had upon the exterior surface of the support, substantially as described.

3. The described process of preparing an incandescent, which consists in heating a metallic base or support in a solution containing an incandescing substance to the required temperature and for the necessary time to cause the expanded pores of the metal to absorb the desired quantity of the incandescing substance, substantially as described.

4. The described process of producing an incandescent, which consists in electrically heating a metallic base or support in an alcoholic solution containing an incandescing substance, substantially as described.

5. The described process of producing an incandescent, consisting in electrically heating a metallic base or support while immersed in an alcoholic solution containing a salt that will produce a highly-refractory substance, as oxide of magnesium, substantially as described.

6. The described process of producing an incandescent, consisting in electrically heating a metallic base or support therefor in a solution of alcohol and a salt that will produce a refractory substance, and continuing this action until the surface pores of the base or support are filled and a coating of the desired thickness is formed about said base or support, substantially as described.

LEONARD PAGET.

Witnesses:

C. J. KINTNER,  
A. E. McKECHNIE.