

UNITED STATES PATENT OFFICE.

ANGELO SIMONINI, OF NEW YORK, N. Y.

COMPOSITION OF MATTER FOR INCANDESCENT GAS-LAMPS.

SPECIFICATION forming part of Letters Patent No. 599,018, dated February 15, 1898.

Application filed August 19, 1897. Serial No. 648,840. (No specimens.)

To all whom it may concern:

Be it known that I, ANGELO SIMONINI, a subject of the Emperor of Austria-Hungary, residing in the city, county, and State of New York, have invented or discovered a new and useful Incandescent Lighting Compound or Substance, of which the following is a specification.

My invention relates to a new compound for incandescent gas-light, consisting, approximately, of a mixture of ninety-seven to ninety-eight per cent. thorium oxid, 0.9 to 0.7 per cent. of cerium oxid, and two to one per cent. of neodymium oxid, or, in place of the neodymium oxid, a mixture of neodymium oxid and praseodymium oxid may be employed. This new oxid compound produces a durable and powerful white incandescent gas-light with a slight pinkish tint.

I have discovered that if about 0.01 per cent. of cerium oxid is mixed with pure thorium oxid and the mixture is subjected to a high degree of heat—such as the heat produced by the Bunsen flame—the mixture will emit a violet light; that if the quantity of cerium oxid be increased to about 0.02 per cent. the light will be blue; that if the quantity of cerium be successively increased the light will become bluish-green, then green, then yellow, then orange, and then red. I have further discovered that the combination of 99.1 to 99.3 per cent. of thorium oxid and 0.9 to 0.7 per cent. cerium oxid produces a most intense light superabundant in green rays. The combination of ninety-eight to ninety-nine per cent. of thorium oxid and two to one per cent. of neodymium oxid produces a light superabundant in red rays. It is well known, however, that through combining green and red rays a white light is obtained. A white light therefore can be produced through mixing the rays, prevailing in green and red, obtained by the use of the two combinations above described. These two chemical combinations above described I have discovered are nearly complementary to each other, because the lights produced by them are nearly complementary. In other words, I have discovered that the combination of thorium oxid 99.1 to 99.3 per cent. and cerium oxid 0.9 to 0.7 per cent. produces sufficient green rays to be com-

plementary to the red rays of the thorium-neodymium combination above described.

A mixture of neodymium oxid and praseodymium oxid may be used in place of neodymium oxid in my invention and is equivalent to it.

Neodymium oxid is an active substance, the same as cerium oxid, and multiplies the lighting power of thorium oxid.

I have discovered, therefore, that if a compound or mixture consisting, approximately, of ninety-seven to ninety-eight per cent. thorium oxid, 0.9 to 0.7 per cent. of cerium oxid, and two to one per cent. of neodymium oxid, or, in place of neodymium oxid, a mixture of neodymium oxid and praseodymium oxid is used, there is produced a durable and powerful white light with a slight pinkish tint, more beautiful than any other light and very agreeable to the eyes on account of its color. In order to obtain this result, I have discovered that it is important and absolutely necessary to use perfectly pure thorium nitrate or other perfectly pure soluble salt of thorium, or thorium nitrate or soluble salt of thorium in its highest attainable state of purity, and to exclude the slightest trace of any other metal oxid—such as zirconium oxid, lanthanum oxid, yttrium oxid, ytterbium oxid, terbium oxid, erbium oxid, oxids of the elements of erbium, and samarium oxid—otherwise a successful result will be sought for in vain, because the effect of the presence of any one or more of these substances is invariably to cause a poor yellowish light and very materially to decrease the power of the light.

The compound or composition of matter for an incandescent gas-light above described can be employed in the manner in which said compounds or compositions of matter are now generally employed in the making of mantles, hoods, frames, or devices for exposure to the high temperature of a Bunsen flame. For example, nitrates of thorium, cerium, neodymium, or neodymium and praseodymium in the purity and proportions above pointed out are dissolved in water, and in the solution thus formed mantles, hoods, frames, or devices in the form of a truncated cone or other suitable form woven of some combustible fabric are saturated. The devices are then dried

and, suspended by some non-combustible material, are exposed to the Bunsen flame. The heat of the Bunsen flame consumes the combustible fabric, and there remains a device of similar form but composed now of the oxids of metals employed.

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

1. A mantle, hood, frame or device for an incandescent gas-light consisting of a compound or composition of matter of ninety-seven to ninety-eight per cent. of pure thorium oxid, 0.9 to 0.7 per cent. of cerium oxid and two to one per cent. of neodymium oxid, capable of producing a durable and powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

2. A mantle, hood, frame or device for an incandescent gas-light consisting of a compound or composition of matter of ninety-seven to ninety-eight per cent. of pure thorium oxid, 0.9 to 0.7 per cent. of cerium oxid and two to one per cent. of a mixture of neodymium oxid and praseodymium oxid, capable of producing a durable and powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

3. A mantle, hood, frame or device for an incandescent gas-light consisting of a compound or composition of matter composed of pure thorium oxid and such small complementary percentages of cerium oxid and neodymium oxid as will produce a durable and powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

4. A mantle, hood, frame or device for an incandescent gas-light consisting of a compound or composition of matter composed of pure thorium oxid and such small complementary percentages of cerium oxid and of a mixture of neodymium oxid and praseodymium oxid as will produce a durable and powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

5. A compound or composition of matter

capable of resisting a high degree of heat and emitting when heated, a powerful, white incandescent gas-light, with a slight pinkish tint, and composed of pure thorium oxid and such small percentages of cerium oxid and neodymium oxid as will be complementary to each other in the production of such light, substantially as described.

6. A combustible fabric suitable for manufacture into a mantle, hood, frame or device for an incandescent gas-light impregnated with a solution in water of a soluble, pure salt of thorium and such small complementary percentages of soluble salts of cerium and neodymium as will enable the manufactured device to produce a powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

7. A combustible fabric suitable for manufacture into a mantle, hood, frame or device for an incandescent gas-light impregnated with a solution in water of a soluble, pure salt of thorium and such small complementary percentages of a soluble salt of cerium and of a mixture of soluble salts of neodymium and of praseodymium as will enable the manufactured device to produce a powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

8. A solution in water for impregnating a combustible fabric suitable for manufacture into a mantle, hood, frame or device for an incandescent gas-light composed of a soluble, pure salt of thorium and such small complementary percentages of a soluble salt of cerium and of neodymium as will enable the manufactured device to produce a powerful, white incandescent gas-light, with a slight pinkish tint, substantially as described.

In witness whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 9th day of August, 1897.

ANGELO SIMONINI.

Witnesses:

HARRY MACK,
LOUIS HICKS.