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F. M. F. CAZIN.

ELECTRIC INCANDESCENT LAMP.

APPLICATION FILED FEB. 2, 1899. RENEWED APR. 15, 1902.

Fig. 1.

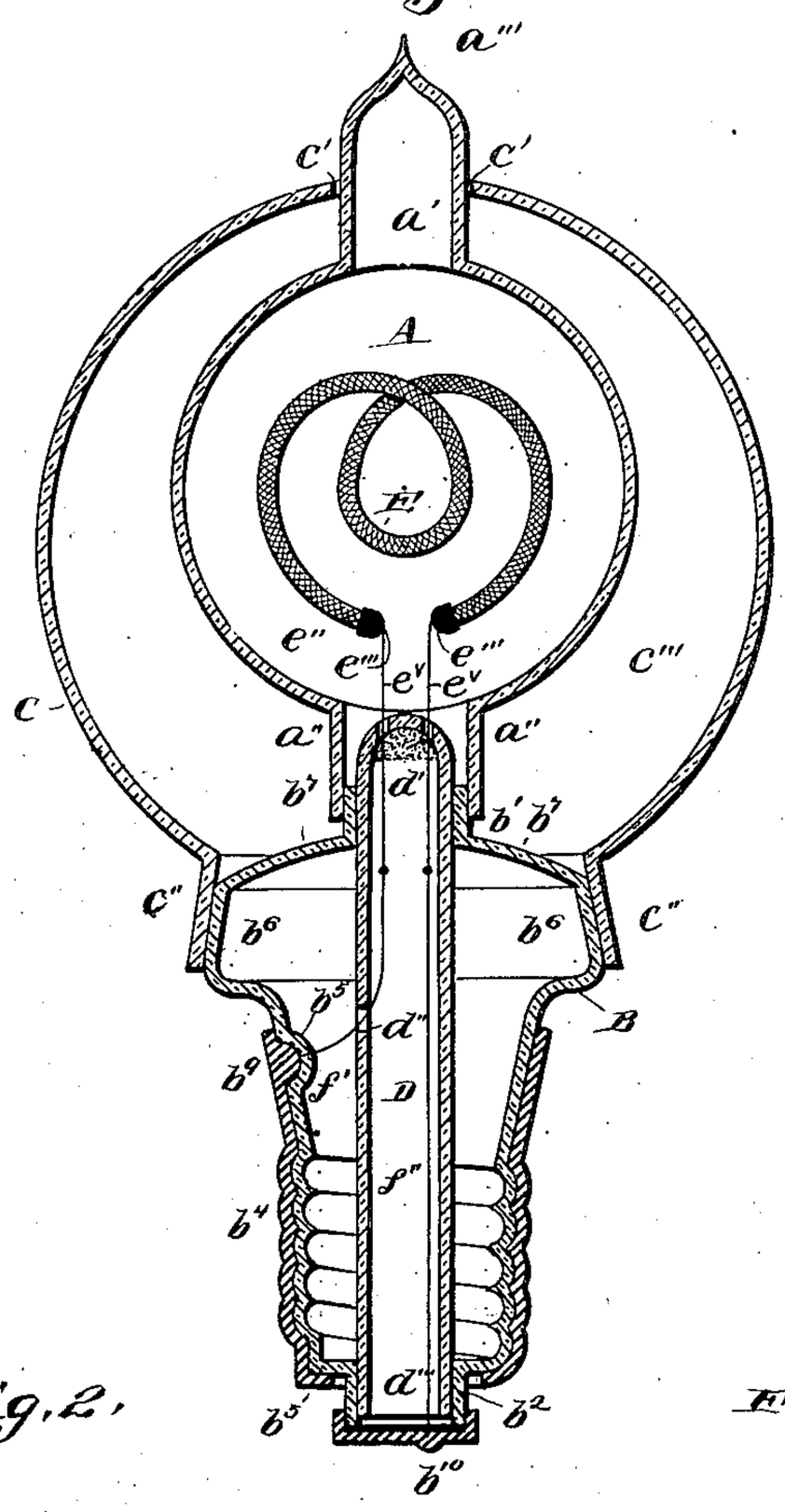


Fig. 2.

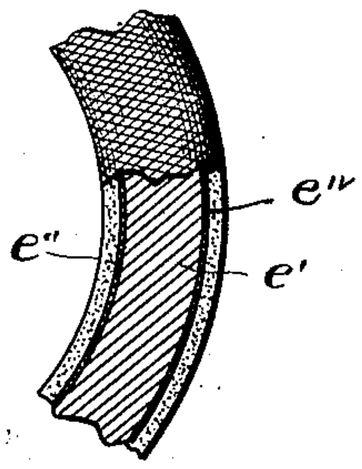
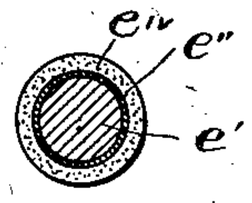


Fig. 3.v



Witnesses:

Emma E. Cazin.

Pauline Dahmen.

Inventor:

Francis M. F. Cazin

UNITED STATES PATENT OFFICE.

FRANCIS M. F. CAZIN, OF HOBOKEN, NEW JERSEY.

ELECTRIC INCANDESCENT LAMP.

No. 835,938. Specification of Letters Patent. Patented Nov. 13, 1906.

Application filed February 2, 1899. Renewed April 15, 1902. Serial No. 102,993.

To all whom it may concern:

Be it known that I, FRANCIS M. F. CAZIN, a citizen of the United States, residing at 1108 Bloomfield street, in the city of Hoboken, Hudson county, State of New Jersey, have invented a new and useful Improvement in Electric Incandescent Lamps, of which the following is a specification.

The invention for which a patent is here sought relates to certain improvements in luminous filaments and a method of making the same for that class of electric lamps for which I have heretofore obtained United States Letters Patents, to which patents reference may be had for the purpose of a better understanding of this specification and of the invention herein claimed. The patents referred to are Letters Patent No. 523,460 and No. 523,461, both of July 24, 1894; Letters Patent No. 566,285, of August 16, 1896; Letters Patent No. 620,640, of March 7, 1899, and Letters Patent Nos. 621,291 and 621,292, both of March 14, 1899.

As the particular invention claimed in this application relates to improvements on the structures described in the aforesaid patents, many features of the present embodiment of my invention are merely briefly described herein, a fuller description of the same being found in the said Letters Patent to which reference is made.

The invention more particularly relates to improvements on a filament for the lamp disclosed in my aforesaid Letters Patent No. 621,292, and is an improvement on the form of filament shown in my aforesaid Letters Patent No. 621,292.

The specific objects of this application are:

First. A metal filament—viz., a metal wire core or filament embedded in part or wholly in a stratum or strata of rare metal oxid with or without the admixture of fluor-spar in the manufacture of the oxid stratum, with or without an intermediate insulating-stratum between the core and oxid cover, such insulating-stratum covering the core in part or entirely as if it were in a shell. The filament employed may be, as shown, in the form of a linear core parallel everywhere with the surface of the luminous body or integral structure, a plurality of leading wires being used, such as is shown in the aforesaid Letters Patent No. 621,292, the filament being capable of assuming other modifications without departing from the scope of this invention, as it is of importance only as far as conditional to its clearly-defined function of heating the adjacent oxids.

Second. The insertion of an intermediate stratum, skin, coat, or film of fine metal—such as gold or silver or other metal which resist oxygenation when heated—between the metal core or filament and the embedding oxids whenever the core or filament metal used is of a kind or class which has greater affinity for oxygen than these fine metals.

Third. The use of fluor-spar in the manufacture of pseudo fibers or pseudo fabrics of mainly rare-metal oxids for the purpose of rendering these oxids cohesive by partial fusion and adhesive to an embedded core or filament of suitable material or to an insulating stratum, covering such core or filament entirely in part or parts only.

The adjoining drawing, Figure 1, is a sectional elevation of the lamp as produced by my improved methods, and is in form the same as shown in my patent issued to me on March 14, 1899, under No. 621,292, the plane of section being vertical or longitudinal and through the main centers of the two glass bulbs and in the main extension of the core or of the filament or of the luminous body. The luminous body in Fig. 1 is not shown in section, but in side elevation, and is a continuous cover of oxid in the shape of pseudo fiber or fabric. Fig. 2 is, in part, an enlarged section of the luminous body along the line of the core or filament, showing the position of an intermediate fine metal coating when used for the purpose of chemical insulation whenever as material for the core a metal is selected which has greater affinity for oxygen than the fine metals. Fig. 3 is a cross-section of the luminous body, showing the character of pseudo fibers or fabrics in the oxid cover.

As stated in my aforseaid patent, No. 620,640, I deal with exceedingly minute dimensions in making up the luminous parts of my lamps, though by the distinct nature and chemical or electrical character they are adequate in such minute dimensions to perform the functions assigned to them, and, in special, the intermediate stratum in its properly adapted and chosen dimensions or extension and material in single or in sundry layers or strata.

In the drawings accompanying this specification I have, for the purpose of facilitating its comparison with my Patent No. 621,292, designated those parts common to both by similar marks of reference, as follows:

e' signifies the core or filament with or without the fine metal or other insulating film, and *e''* signifies the embedded rare-metal oxid. *e'''* signifies a wire terminal. *e''''* signifies the insulating stratum, and *f'* and *f''* signifies the inleading wires.

The purpose of selecting, under certain conditions, material for the core or filament having greater affinity for oxygen than the fine metals, gold and silver, consists in this, that a certain class of so-qualified metals combine with such affinity, which may be counteracted by the insulating stratum generically claimed in my aforesaid patent, No. 620,640, a specific type of which is claimed herein, the other in this connection very valuable quality of having the highest possible point of fusion, not only among metals, but among the sundry materials that might perform the desired functions of a current passing and current resisting core or filament of an abnormally high point of fusion.

That which has been stated as the purpose of selecting metal or a special class of metals as the material for cores or for filaments rest, in the first place, on the same general conditions as are fully set forth in my prior patent, No. 620,640—namely, that the core or filament pass and at the same time resist the electric current to the effect of producing light or heat or either, and sufficient to cause the oxids embedding the same, as a whole or in parts, to be made luminous by the heat produced by the current, and to these general conditions material and dimensions of every part in and of the luminous body in my improved lamp must be suitable and collaterally adapted, whichever the material chosen, for any part of the luminous body might be in any one concrete case.

As the metals which I prefer to make use of without excluding others of being used—viz., as metals which have a high point of fusion to their credit, though by their affinity for oxygen they require a protective insulation as against the rare-metal oxids—I name those of the Ruthenium-Osmium class, by which words I do not intend to designate the two species of so-named metals, but their class, as characterized by the qualification, clearly expressed, of affinity for oxygen combined with exceptionally high points of fusion, a class to which such other metals, as wolfram, uranium, manganese, rhodium, iridium, and thorium, also belong.

Notwithstanding the fact that platinum shares in the physical quality of high temperature of fusion of the metals thus by me specified as of the Ruthenium-Osmium class, it is not thereof, because it does not share in the chemical quality of high affinity to oxygen.

Platinum forms a class by itself, standing between the so-called "fine metals" (gold, &c.,) and the class of Ruthenium-Osmium, just so-as zirconia belongs neither to earthy oxids nor to rare-metal oxids, because it has mainly neither the qualities of the one nor of the other mentioned class of oxids. Such division is the result of latest development in the study and industrial application of the stated materials, and older divisions must be corrected accordingly. Any one of these metals may by applying any suitable one of the many present processes for plating be chemically insulated by non-oxidizing metal whenever used as core or as filament, adjacent to such oxid as would yield their oxygen to such core under the influence of the electric current.

While a continuous tubular cover of oxids under a given current and resistance was made to glow with a dull light, a cover with interstices evolved a more brilliant incandescence, such as primarily intended, the volume of oxids being reduced to that which could be kept at proper incandescence by the heat emanating from the filament, filaments, or cores under current.

I do not claim any peculiar process of manufacturing pseudo fibers or fabrics or rare-metal oxids in general; but my invention of admixing a suitable percentage of fluor-spar with the oxids in any one of the different processes now known to the art results uniformly in this: That when the fiber or fabric is exposed to heat a partial fusion or fritting takes place, which is exclusively the result of such admixture and which does not result when other so-called "fluxes," such as silica, are substituted for the fluor-spar, the essential difference existing between the two that in the case of silica the product retains all of the admixture, though as silicate, while in the case of fluor-spar the component fluorin escapes in the gaseous or vaporous state and only the metal calcium or its oxid (by reducing other oxids) remain, and the fiber oxid preserves a desirable fluffy structure and a certain cohesiveness which is not attainable by means of any other description of flux. The original fiber or fabric or strand or thread does not bake into a solid mass, but a porous stucture is preserved, though its parts are cohesive and hardened, the structure thus obtained being highly favorable to the oxids, acquiring incandescence quicker and in a body of more voluminous appearance and greater light-emanating surface than would be obtained in a body prepared without the admixture of fluor-spar. The final point of fusion of the product is not permanently lowered by the stated admixture; but the temporary point of fusion is made lower by the admixture, while current and heat or either is first applied to the oxids, as is more fully described in my Patent No. 620,640.

It should be especially said that the desirable fluffy appearance of the pseudo fabric is not destroyed by the admixture of fluor-spar,

while the single minute strands become in themselves hardened and stable. This result is the same whether the minute strands form part of a fabric or be used as such singly or in bunches.

I desire to be plainly understood that by choosing to use metal cores or metal filaments in some modifications of my improved lamps or by choosing to admix fluor-spar in the manufacture of the covers of rare-metal oxids under certain conditions or in certain modifications of my improved lamps, or choosing in certain concrete cases to make the tubular oxid covers partially only, leaving lines, spots, or interstices of exposure on the core-surface, I do not exclude manufacturing any other modifications on my improved electric oxid lamps, as they were disclosed in my preceding patents; nor do I intend to confine myself to any of these cited features or to any other specifically.

Where in the claims I refer to metals of the Ruthenium-Osmium class as forming the filament or core it will be understood that I do not exclude the presence of such other metals which do not nullify the functional properties of the said metals as hereinbefore defined.

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

1. In an incandescent lamp a permanent metal core covered with a film of other metal of less affinity for oxygen than the metal of the core, substantially as described.

2. A filament for electric incandescent lamps consisting of a plurality of permanent layers of different metals of different degrees of affinity for oxygen, the metals of least affinity for oxygen being upon the outside, substantially as described.

3. A filament for electric incandescent lamps consisting of a plurality of permanent layers of different metals of different degrees of affinity for oxygen, the center thereof being formed by the more infusible oxygenizable metals of which the filament is composed, substantially as described.

4. In a filament for an electric incandescent lamp, a conductive element consisting of metal having affinity for oxygen and high point of fusion coated with metals of less affinity for oxygen, substantially as described.

5. A luminant for an incandescent electric lamp consisting of a conductive filament of layers of different metals, and a coating thereon of rare metal oxids, substantially as described.

6. In a luminant for an incandescent electric lamp, a filament consisting of a metal core having a high point of fusion and affinity for oxygen, and a plating thereon of metal different from that of the core and having little affinity for oxygen, embedded in rare metal oxids, substantially as described.

7. The combination in a luminant for an incandescent electric lamp, of a core of metal having affinity for oxygen and high point of fusion, an insulating coat therefor, and a surrounding light-emitting body, substantially as described.

FRANCIS M. F. CAZIN.

Witnesses:
MINNA E. CAZIN,
ADELE CAZIN.