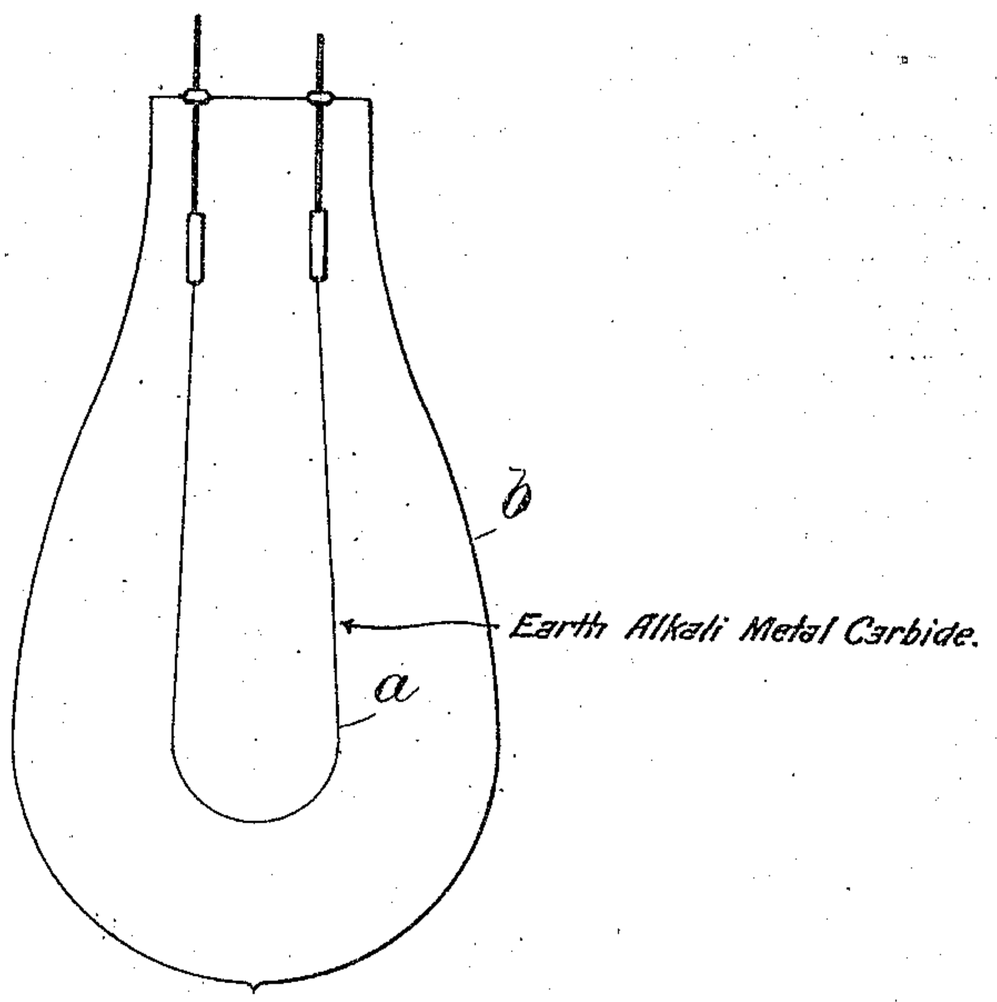
(No Model.)

L. K. BÖHM.

MATERIAL FOR INCANDESCENT CONDUCTORS.

No. 552,036. Patented Dec. 24, 1895.



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UNITED STATES PATENT OFFICE.

LUDWIG K. BÖHM, OF NEW YORK, N. Y.

MATERIAL FOR INCANDESCENT CONDUCTORS.

SPECIFICATION forming part of Letters Patent No. 552,036, dated December 24, 1895.

Application filed November 5, 1891. Serial No. 410,827. (No specimens.)

To all whom it may concern:

Be it known that I, LUDWIG K. BÖHM, of New York, county of New York, State of New York, have invented an Improvement in Filaments for Incandescent Lamps, of which the following description, in connection with the accompanying drawings, is a specification.

This invention relates to materials for conductors for incandescent electrical lamps; and it consists in making filament materials different from any heretofore used and having important advantages which will be hereinafter pointed out, and the invention also consists in the process by which these materials are produced.

It is essential that the material employed for filaments should possess some degree of electrical conductivity, and should also be highly refractory, so as not to become rapidly fused or volatilized when subjected to the high temperature produced by the passage of the electrical current through it. The material most commonly employed for filaments has been carbon, usually of as high a degree of purity as attainable. In my present invention, however, the material employed for filaments is not pure carbon. It consists of carbon in combination with a metal, as will be fully described farther on.

The present invention is based on the discovery that carbon may be made to chemically combine with some of the earth alkali metals or iron, &c., forming a carbide of the metals, which carbide is the main or sole material of which the filament is composed, although in some cases carbon may be employed in excess of that which will combine, so that the resulting incandescent conductor will consist of a homogeneous compound or mixture of the metal carbide and of pure carbon. The metal carbide has sufficient electrical conductivity to render it a suitable and efficient material for incandescent conductors, and has the advantage to possess higher specific resistance than pure carbon.

With the term "earth alkali metals," I designated that group of metals comprising barium, strontium, calcium, and magnesium. Further, iron or other metals may also be used to form the carbides by an electric process consisting simply in applying the electric current to the compounds out of which the carbide is made—that is, the metal oxide and carbon—when the metallic oxide will be decomposed and the metal therein will chemically combine with the carbon, thus forming the carbide of the metal. This process differs substantially from those heretofore proposed, inasmuch as no coating of the metal oxide is produced; but, on the contrary, there is first formed a uniform or homogeneous composition of the carbon and oxide of the metal, and thereafter a chemical combination of the carbon and metal by the action of the electric current.

The carbon and the metal oxide may be mixed, or the carbon filament or carbon may be incorporated with metal oxide in any suitable way, and the quantity and electromotive force of the current will vary in accordance with the lengths and size of the conductor being treated. In order to effect the chemical union of the carbon and the metal which are uncombined in the conductor, the metal in form of oxide and the carbon as such, the conductor is heated to incandescence when by the heat of the current chemical combination takes place, the carbon uniting with the metal and forming a carbide of calcium, iron or whatever metal is employed. The fact that such chemical combination has taken place may be shown by subjecting the resulting conductor to the action of the flame of a Bunsen burner, when it will be found that the carbon is not consumed, but the compound retains its dark color and is not decomposed, while a mechanical mixture of carbon and metal oxide—say calcium or magnesium oxide—leaves the metal oxide when subjected to a Bunsen flame, the carbon burning out.

In Letters Patent No. 464,719, dated December 8, 1891, and issued to me, I have described filaments for incandescent lamps composed of carbon and of the oxide of calcium or magnesium. It is obvious that the conductor composed of carbon and the oxide of calcium or magnesium as produced by the process described in my patent may be subjected to the final step—that is, heating the conductor to incandescence, when the compound conductor will be produced forming the subject of this invention, the same consisting then of the carbide of the metals calcium or magnesium.

Having thus described my invention, what

I claim therein as new, and desire to secure by Letters Patent, is—

1. As a new article of manufacture, a compound or substance for electrical conductors consisting of a homogeneous mass of carbon and earth alkali metals forming a carbide, substantially as described.

2. The hereinbefore described process of forming electrical conductors consisting of mixing together carbon and the oxides of the earth alkali metals to form a homogeneous composition and thereafter effecting a chemical combination of the carbon and metal by the action of an electric current, substantially as described.

3. As a new article of manufacture, a compound or substance for electrical conductors consisting of a homogeneous mass of carbon and calcium forming the carbide of calcium.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LUDWIG K. BÖHM.

Witnesses:
JOSEPH L. LEVY,
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