

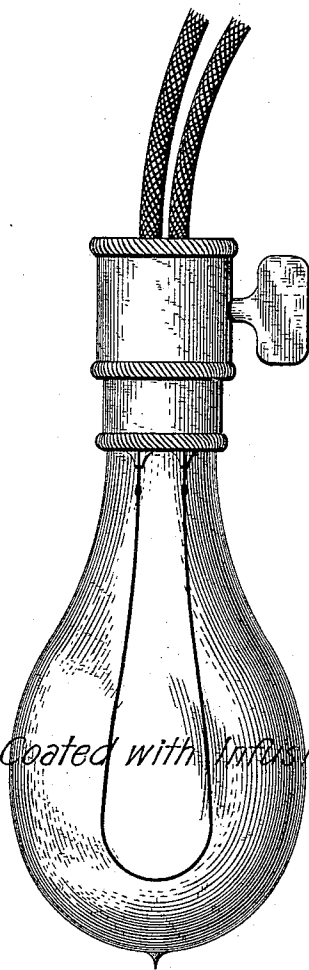
(No Model.)

G. ERLWEIN.

FILAMENT FOR INCANDESCENT ELECTRIC LAMPS.

No. 448,916.

Patented Mar. 24, 1891.



*Carbon Filament Coated with Infusible Phosphides*

*Witnesses:*

*Rey C. Bowen.*  
*Ernest Wilkinson.*

*Inventor:*

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*By*

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# UNITED STATES PATENT OFFICE.

GEORGE ERLWEIN, OF BERLIN, GERMANY, ASSIGNOR TO SIEMENS & HALSKE,  
OF SAME PLACE.

## FILAMENT FOR INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 448,916, dated March 24, 1891.

Application filed October 25, 1890. Serial No. 369,356. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE ERLWEIN, doctor of philosophy, a subject of the German Emperor, residing at Berlin, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in Filaments for Electric Glow-Lamps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to filaments for electric glow-lamps, and has for its object the providing of a suitable filament with a shell or coating therefor to protect the said filament against disintegration from the electric current and against accidental jars and shocks tending to destroy the same.

Among the best materials for the production of a solid hardly-fusible coating on incandescent materials protective against electric atomizing and the shocks of transport have proved to be hardly fusible metallic phosphides. It has hitherto been customary to coat the filaments with deposited carbon, which, being a fairly good conductor, it has been found necessary either to make the carbon filaments exceedingly fine with a sufficient protection of deposited carbon, or to make the filaments larger with an insufficient protection of deposited carbon. Both these forms are open to grave objections; but owing to the minor conductivity of the compounds mentioned above compared with carbon the coating of them may be made much thicker than the coating of carbon now in general use, admitting, therefore, the use of thicker carbon cores for glow-lamps, whereby the durability of the lamp is increased. Any of the well-known forms of filaments may be used; but I prefer a filament of approximately the shape shown in the accompanying drawing.

The phosphides are obtained in the customary preparing apparatus by a gradually-in-

creased heating to incandescence in phosphorus vapor of the filaments already provided with metallic coatings; or this may also be done in many instances by having the filaments soaked in chlorides or oxides and heated in phosphoreted hydrogen or in phosphine. Among the metals suitable for this purpose may be mentioned iron, platinum, iridium, palladium, molybdenum, chromium, manganese, and tungsten. Of these I preferably use iron.

For the production of the different metallic compounds numerous combinations may be made.

By a proper regulation of the eliminating temperature within the preparing apparatus and by a suitable dilution of the mixture of volatile compounds of phosphorus employed coatings can be produced of various degrees of conductivity.

I claim—

1. A filament for electric lamps, composed of a carbon core and a coating consisting of phosphorus, combined with a hardly-fusible metal, substantially as described.

2. A filament for electric lamps, composed of a carbon core and a coating consisting, essentially, of phosphorus and iron, substantially as described.

3. A filament for electric lamps, composed of a carbon core and a coating of phosphide of iron, substantially as described.

4. The process of preparing filaments for electric lamps, which consists in soaking a carbon core in a solution of some salt of iron and heating the soaked core in an atmosphere of vaporized phosphorus, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

GEORGE ERLWEIN.

Witnesses:

G. HENZEL,  
MAX WAGNER.