(No Model.)

# C. PAUTHONIER.

## PROCESS OF REPAIRING INCANDESCENT ELECTRIC LAMP FILAMENTS.

No. 363,909. Patented May 31, 1887.

FIG. 3

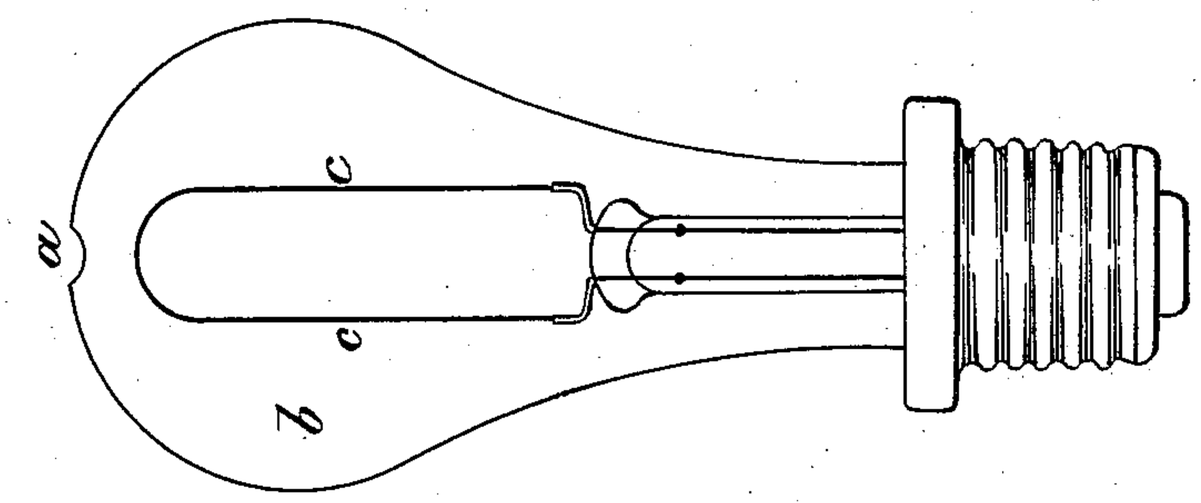



FIG. 2

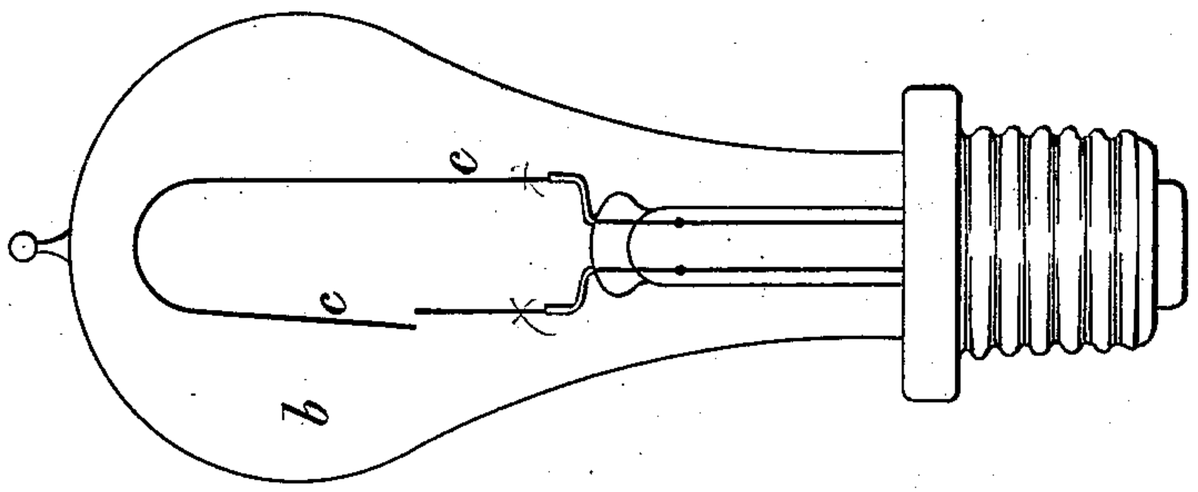
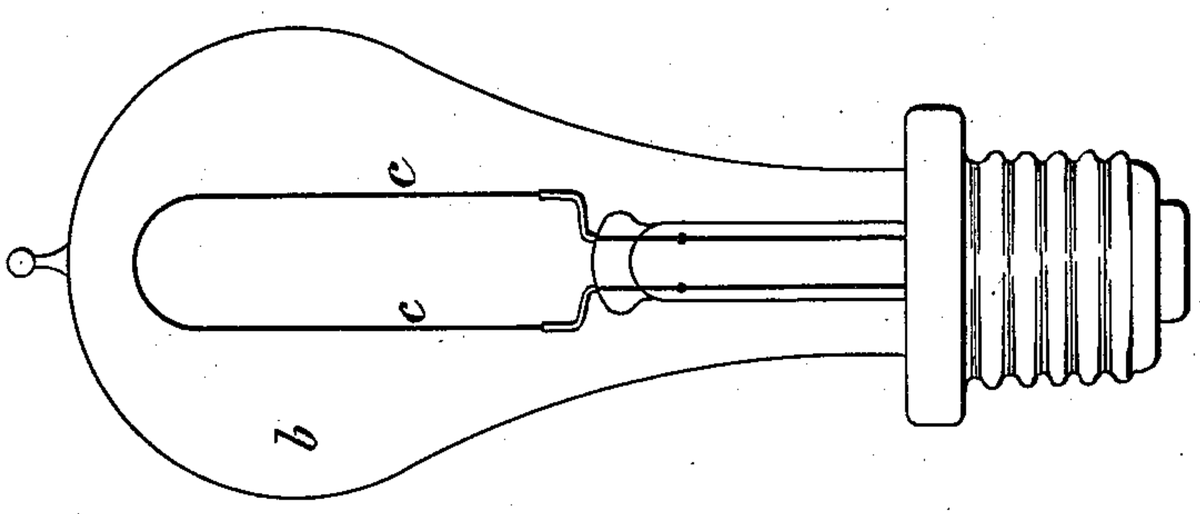



FIG. 1




Witnesses:
John M. Speer.
Gustav Schneppé.

Inventor:
Casimir Pauthonier
by Briesen & Steele,
his Attorneys.

# UNITED STATES PATENT OFFICE.

CASIMIR PAUTHONIER, OF 17 RUE DANTON, LEVALLOIS-PERRET, (SEINE,) FRANCE.

## PROCESS OF REPAIRING INCANDESCENT-ELECTRIC-LAMP FILAMENTS.

SPECIFICATION forming part of Letters Patent No. 363,909, dated May 31, 1887.

Application filed December 22, 1886. Serial No. 222,217. (No model.)

*To all whom it may concern:*

Be it known that I, CASIMIR PAUTHONIER, at present residing at 17 Rue Danton, Levallois-Perret, (Seine,) in the Republic of France, electrician, have invented a new and useful Improved Process of Repairing the Filaments of Electric Glow or Incandescence Lamps, of which the following is a full, clear, and exact description.

This invention consists in a process of repairing broken carbon filaments of glow or incandescence electric lamps. It is well known that after a certain period of service such filaments are liable to break, and no means of repairing them has heretofore been devised. To reunite the broken carbon in such a way as to permit of the current passing, and render the lamp again as serviceable as before, is the object of the process of this invention.

Reference is to be had to the accompanying drawings, wherein Figure 1 shows a glow-lamp in working order. Fig. 2 shows the same lamp with the filament broken, while Fig. 3 shows the same lamp after it has been repaired, but before the bulb has been again exhausted of air and resealed.

According to this process a hole is cut in the end of the glass bulb *b* containing the broken filaments *c*, as at *a*, Fig. 3, to allow of introducing into said bulb a hydrocarbon, such as retinaphtha, ($C_{14}H_{8}$,) retinyl, ($C_{18}H_{12}$,) retinol, ($C_{32}H_{16}$,) &c., all the hydrocarbons, whether liquid or gaseous, being capable of conducing to the desired result. The selection would depend upon the perfection of the tools employed, but liquid hydrocarbons are preferred. After the bulb is filled with a product rich in carbon, the sundered ends of the filaments are brought together by means of nippers, and the current is then passed through the filament, which immediately becomes welded or united together by a deposit of carbon which makes a good and permanent joint. The filament having been thus repaired, it is only necessary to re-establish the vacuum in the bulb, for which purpose a glass tube is joined to the bulb of the orifice *a*, and connected with a Sprengel pump by which the bulb is exhausted, and is afterward resealed in the ordinary way, which needs no description. The lamp thus repaired is again ready for service, which may exceed in duration its original period of service, and it will give a whiter light, the carbon deposited being purer than that composing the filament. The liquid hydrocarbon also serves to clean the bulbs of the carbonaceous deposit with which they become coated in consequence of the impurity of the carbon filament, and as during the welding operation the entire filament becomes covered with a light coating of carbon of greater purity, the bulb is no longer liable to become blackened in use. Moreover, the resistance of such lamps increases after prolonged use and a current of greater tension is required in order that they may produce a light of the same intensity as at first. This has a very objectionable effect where a large number of these lamps are used together, the older ones being of a reddish hue, while the others, which are new and receive the same electro-motive force, give a white light. In other words, new lamps of one hundred volts electro-motive force require, after being a certain time in use, a current of one hundred and five volts electro-motive force, and even more.

Lamps which have been repaired by this improved process are free from this objection as the deposit of carbon produced, as above mentioned, decreases their resistance, and the carbon being pure the lamp will last for a very considerable time.

The invention is applicable to filaments of vegetable origin, such as those of bamboo, (Edison lamp,) parchment paper, (Swan,) bristol-board, (Maxim,) couch-grass, (Lane-Fox,) or of animal fiber, such as hair, (Woodhouse,) or to carbon obtained by the draw-plate, as in the Gérard lamp.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

The herein described process of repairing the filaments of incandescent lamps, which consist in the introduction into the lamp containing the broken filament of a liquid or

gaseous hydrocarbon, bringing together the sundered ends of the filament, and then passing the current through the whole length of the filament, for the purpose of welding the ends by the deposit of carbon, all substantially as hereinbefore specified.

The foregoing specification of my improved process of repairing the filaments of electric glow or incandescence-lamps signed by me this 6th day of December, 1886.

CASIMIR PAUTHONIER.

Witnesses:

ROBT. M. HOOPER,

ALBERT MOREAU.