P. JABLOCHKOFF.

CARBONS FOR ELECTRIC LIGHTS.

No. 190,864. Patented May 15, 1877.

Fig. 4.

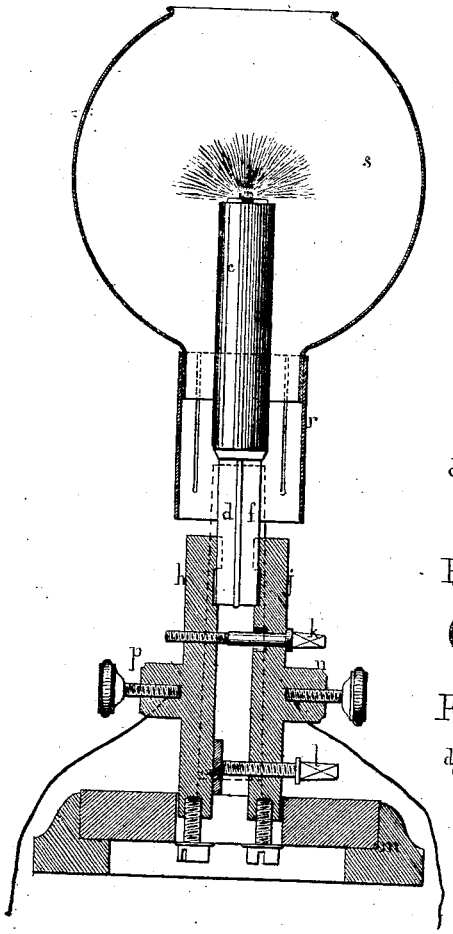

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 5.

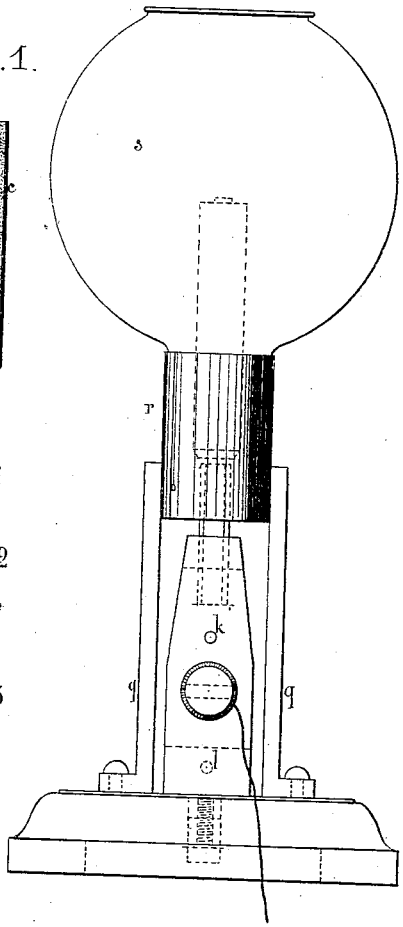

Fig 6

Fig. 7

Fig. 8

Fig. 9

Witnesses.
J. H. Chumney
Clara Broughton.

Paul Jablochkoff
Inventor.
By attys
Wm. P. Earle

UNITED STATES PATENT OFFICE.

PAUL JABLOCHKOFF, OF PARIS, FRANCE.

IMPROVEMENT IN CARBONS FOR ELECTRIC LIGHTS.

Specification forming part of Letters Patent No. **190,864**, dated May 15, 1877; application filed December 30, 1876.

To all whom it may concern:

Be it known that I, PAUL JABLOCHKOFF, of Paris, France, engineer, have invented a new Electric Lamp, of which the following is a specification:

The object I have had in view in inventing my new system of electric lamp is the absolute suppression of any mechanical regulator, which is generally used in ordinary electric lamps. Instead of realizing in a mechanical manner the automatical drawing nearer of the conductor-coals, in proportion to their combustion, I have conceived the idea of fixing them in a parallel manner at a short distance from each other, and separating them by an isolating substance which is susceptible of consumption at the same time with the coals.

As isolating substance, I may use kaolin, glass, mortar, lacs, &c.; but instead of compact substances, I prefer friable mixtures in powder, more or less fine, and composed of earthy substances, earthen alkali, silicious substances—in one word, of substances which are most infusible. These powders are put around the coals in a closed envelope—a sort of cartridge of paper or pasteboard of amianthus. As soon as the electric stream passes the voltaic arch in bursting forward, burns the coals, the powder, and partitions, the isolating substance which is the nearest to the coals melts, volatilizes, and clears slowly the double sticks of coal, as the wax of a candle sets the wick free when the burning commences from upward to downward. This lamp is, therefore, an electric candle, having over the known apparatus the advantage of a radiating flame of a certain extent, instead of giving only one luminous point. In mixing with the isolating substance particles of graphite, I obtain an extraordinary effect. The combustion of the isolating substance even permits me to change the color and shade of the light, it only being necessary to introduce into the composition a small quantity of metallic salts, such as are used in fire-works. Salts of soda, which produce yellow radiations, particularly, have the faculty of compensating the blue or violet beams which the electric light contains to excess.

In order to make use of my candle, it is put on a support, in which terminate the electrodes, or the origin of the electricity, and which forms a sort of holder, which can be handled and placed as desired. The electric light is thus made portable—a result which it has been impossible to obtain with the ordinary regulator-lamps.

Having thus described the nature of my invention, I will now, with the aid of the annexed drawing, explain the principal arrangements among all those which permit a practical realization.

Figure 1 is a vertical section of the candle; Figs. 2 and 3, transverse sections of same; Fig. 4, vertical section of the holder and candle complete; Fig. 5, side view of same; and Figs. 6, 7, 8, and 9, modifications of the candle.

These rods or sticks, *a* and *b*, of coals have the prismatic form, and are pointed at their extreme ends, and of unequal sectional area, of which the largest is that of the stick which, receiving the positive current, uses itself up more rapidly than the other. These rods or sticks are placed, vertically and parallel to each other, in a case or cylinder, *c*, formed of amianthus. The interior space around the stick is filled with a powder mixture, as described above. One of these mixtures, which I use with advantage, is composed of lime, one part; of sand, four parts; and talc, two parts. These substances are well mixed together, in order to produce a homogeneous powder. After having filled the case with this powder up to the edges, it is closed with a paste of silicate of potash.

In order to facilitate the entry of the current into the sticks *a* and *b*, I inclose them at their inferior parts in sheaths, *d* and *f*, of copper, or any other metal being a good conductor. These sheaths, which are isolated from each other by a piece of card-board, (amianthus,) *g*, are both placed between a pair of jaws, *h j*, and there secured by means of screws *a l*. This holding device is made of copper, and is mounted upon a wooden stool, or any other isolating substance, *m*, and which bears the terminals *p* and *n*, upon which I fix the positive and negative electrodes, which, respectively, communicate with the branches *h* and *j*, and consequently with the sticks *a* and *b*.

To a lamp thus constructed I can, with the aid of claws *q q*, add a ring, *r*, to serve as a

support for a globe, *s*, of opal glass, or other translucent material, in order to diminish the dazzling effect of the electric light. I do not confine myself to this sort of holder, which may vary according to the light required.

As to the different constructions of the candle, I give a sufficiently explicit idea in Figs. 6, 7, 8, and 9. In these drawings the isolating substance is supposed to be a compact substance—of kaolin, for instance. In Fig. 7 the candle is surrounded by a tube, forming the candlestick.

To light the candle I take a piece of coal, (stick,) which I hold in the hand through an isolating-handle, and which I place at one and the same time upon the two coal-points, at the moment of introducing the electric current. The circuit is thus closed, and the stick is withdrawn as soon as the candle has been lighted. In melting, under the force of the incandescence of the coal, the powder of the isolating substance forms a drop, which produces for the touched parts of coal a passage which is easier to follow than the layer of air which separates the points of the coals in the old regulators. The consequence of this facility, created for the passage of the electric current, is nothing else but the divisibility of the electric light—a problem which I am the first to solve practically. In fact, my candles can be adopted on the very same circuit, nourished by a single source of electricity. I can thus divide in several luminous focuses, each containing a small number of burners, the strong light of a hundred burners, for instance, which up to the present time were obliged to be concentrated in a single electric arch, bursting forward between the two coals, as in the former regulators.

In the case where several candles are established in the same circuit, I can apply to the surface of each candle a pulverable priming, so that the whole surface of the lights can be lighted together, by the simple current of the stream, in turning the button (handle) of one consumer.

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

1. The herein-described electric candles, composed of two sticks of coal arranged in a suitable case, and separated from each other and from the case by an isolating fusible powder or material, substantially as described.

2. The support for such candles, consisting of the pair of adjustable jaws *h j*, arranged with non-conducting base, and substantially as specified.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

P. JABLOCHKOFF.

Witnesses:

ROBT. M. HOOPER,

ARMENGAUD, Jeune.