(No Model.)

T. A. EDISON.

ELECTRIC LAMP.

No. 248,418. Patented Oct. 18, 1881.

Fig. 1.

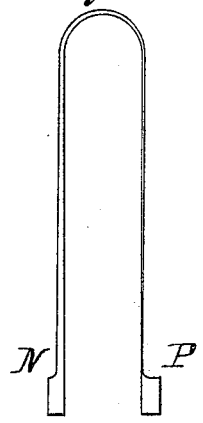
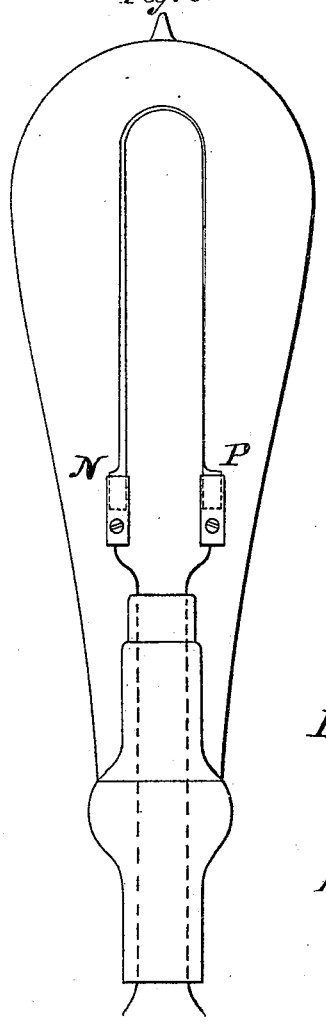


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

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ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 248,418, dated October 18, 1881.

Application filed January 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Electric Lamps; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to the carbons used as the incandescing conductors in lamps for giving light by electrical incandescence; and its object is to render more stable these carbon filaments, to the end that the life of the lamps may, on the average, be prolonged.

When carbon filaments are used for lighting by incandescence a phenomenon is found, to which may be applied the term "electrical carrying." This is an absolute carrying or moving of the carbon itself from the negative to the positive end of the carbon. This action seems to be similar to that in galvano-plastic operations. The cohesion among the molecules of the carbon seems to be so weakened by the heat of incandescence that the molecules, or a portion of them, are gradually moved from one end to the other of the carbon. The amount of such carrying depends upon the resistance of the filaments, the degree of incandescence, the electro-motive force between the clamping-electrodes, and the state of the vacuum. While its amount may vary with varying conditions of these elements, it is the great cause of the ultimate destruction of the carbons used in high vacuo, and if its degree and amount can be reduced a proportionate increase in the life of the carbons is insured.

To this end the invention consists, generally, first, in arranging the carbons in the lamps so that the strongest portion thereof, or the portion containing the most material, or the portion having the least resistance, shall be at the negative clamp; and, secondly, in constructing a carbon having a greater mass of matter and less resistance at one terminal than at the other, the matter gradually decreasing and the resistance gradually increasing from one to the other pole.

In constructing such a carbon it is made of its fullest width at the negative end, whence it gradually tapers to the positive end. This construction gives a lower resistance and a lower incandescence at the negative end, so that the carrying from such negative end by electrical action is materially reduced, while the total resistance, candle-power, and economy of the carbon may remain the same, its duration or useful period being lengthened proportionately to the reduction of carrying. In practice such carbons should be made so that the unit of incandescence at the negative pole will be about eleven or twelve candle power, rising gradually to eighteen at the positive pole, the average of the carbon or its total lighting effect being about sixteen candle power under normal conditions.

It is evident that instead of carbons being made tapering from one pole to the other, as described, the same result may be produced by taking ordinary carbons, uniform in size throughout their length, and increasing the mass of matter and conductivity of one side by a deposit of carbon thereon, or soaking certain parts in a carbonizable solution, drying, and then recarbonizing.

It often happens that carbons intended to be of uniform size throughout their length are found to be defective upon one side—that spots or weak places there appear. Such may be utilized by placing them in the lamp so that the defective side becomes the positive end of the loop, the other or perfect side, having less resistance, being made the negative side. By so using such carbons their life or duration will not be materially shortened, as the inevitable carrying then proceeds from the perfect to the imperfect side.

In the drawings, Figure 1 represents a carbon made especially to carry out this invention, and Fig. 2 the same embodied in a lamp.

In this case the end N, intended for the negative end of the loop, is made wide and tapers gradually to the positive end P.

What I claim is—

1. A carbon for an incandescing conductor for an electric lamp, having one of its ends or

portions of less resistance and greater mass of matter than the other, substantially as set forth.

2. A carbon for an incandescing conductor for an electric lamp, tapering from one end to the other.

3. The method of utilizing defective or spotty carbons for incandescing conductors in electric lamps, consisting in arranging them in the lamps, or the lamps in the circuit, so that the more perfect side is the negative portion, substantially as set forth.

This specification signed and witnessed this 19th day of January, 1881.

THOS. A. EDISON.

Witnesses:
H. W. SEELY,
ERNEST J. BERGGREN.