(No Model.)

T. A. EDISON.

INCANDESCENT ELECTRIC LAMP.

No. 379,770. Patented Mar. 20, 1888.

Fig. 1.

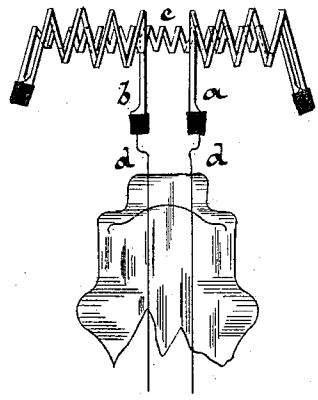
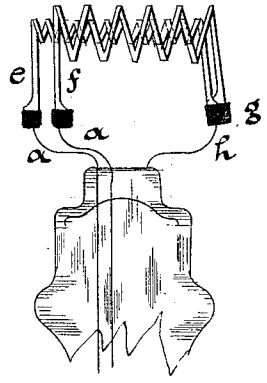


Fig. 2.



WITNESSES:

O. D. Mott
Thomas E. Birch

INVENTOR:

T. A. Edison

BY Dyer & Wilber

ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY, ASSIGNOR TO THE EDISON ELECTRIC LIGHT COMPANY, OF NEW YORK, N. Y.

INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 379,770, dated March 20, 1888.

Application filed December 9, 1881. Serial No. 47,469. (No model.) Patented in England October 23, 1878, No. 4,226; in Italy November 21, 1878, No. 4,351/10,456; in Belgium November 30, 1878, No. 46,567; in Spain February 1, 1879, No. 128; in France February 4, 1879, No. 127,341; in Sweden February 8, 1879; in Victoria March 27, 1879, No. 2,632; in Denmark May 8, 1879; in Norway May 20, 1879; in Canada May 28, 1879, No. 10,031; in Austria-Hungary June 30, 1879, No. 30/864; in Germany March 10, 1880, No. 9,165, and in Russia September 24, 1881.

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 Incandescing Electric Lamps, (Case No. 379;) 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.

The object I have in view is to produce a lamp which shall have a high resistance with a small radiating-surface. This I do by employing a great length of carbon coiled and arranged in such a way that a small radiating-surface only will be exposed.

The accompanying drawings show two forms of my invention.

In the drawings the coils are drawn apart and enlarged in order that their arrangement will be apparent; but in practice they are compactly-coiled carbon filaments.

In Figure 1 three separate spiral carbons, *a b c*, are used. The carbons *a b* are connected to the "leading-in wires" *d d*, and at their other ends to the ends of the carbon *c*, so that the current passes through all three carbons. The large coils of *a b* are so wound and coiled around the smaller ones of *c* as to hide the latter and obscure its light.

All the connections are preferably made by electroplating. The best mode of so doing is to first wrap a thin piece of metal about the two ends to be joined, and then electroplate the whole.

In the form shown in Fig. 2 only two carbons, *e f*, are used, connected together at *g*, and each having its other end attached to one of the leading-in wires *a a*, *h* being simply a support. The coils of *f* are placed above those of *e*, so as to obscure them.

It is evident that many other forms of coiled and spiral carbons could be used without departing from the principle of my invention.

The excessive length of carbon gives the proper amount of resistance, while the manner in which the carbons are coiled decreases the radiating-surface.

What I claim is—

1. In an incandescing electric lamp, the combination of two carbons, placed one within the other, for reducing their effective radiating-surface and increasing the electrical resistance, substantially as set forth.

2. In an incandescing electric lamp, the combination of two or more spiral carbon conductors, connected in series, the coils of one covering and partially hiding those of the others, substantially as and for the purpose set forth.

This specification signed and witnessed this 5th day of December, 1881.

THOMAS A. EDISON.

Witnesses:
H. W. SEELY,
WM. H. MEADOWCROFT.