(No Model.)

T. A. EDISON.

MANUFACTURE OF CARBONS FOR ELECTRIC LAMPS.

No. 263,139. Patented Aug. 22, 1882.

Fig. 1.

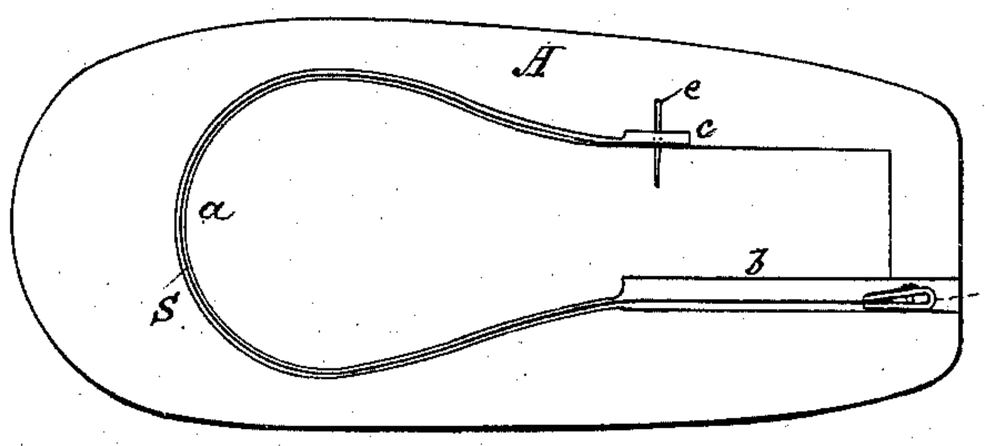

Fig. 2

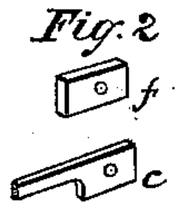

Fig. 3.

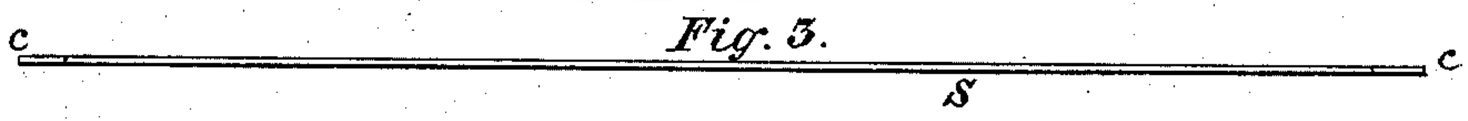

Fig. 4.

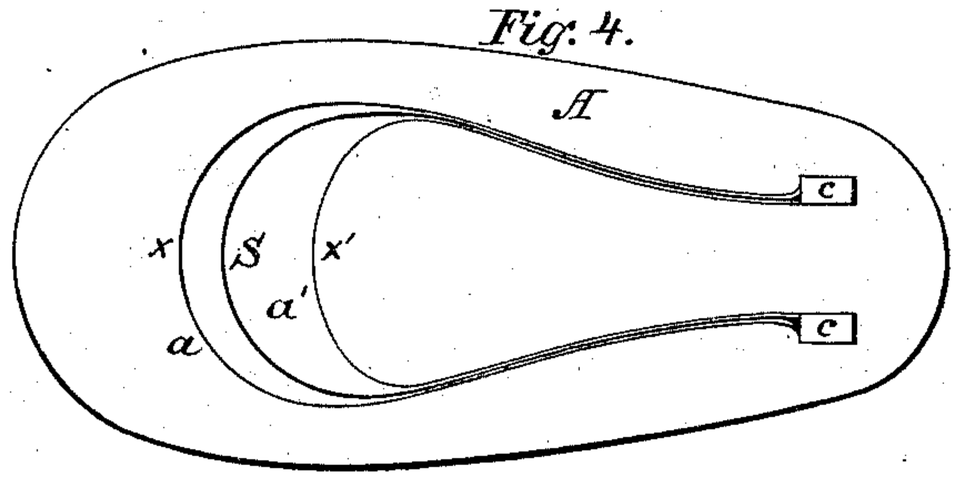

Fig. 5.

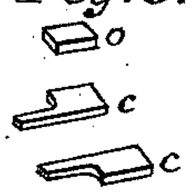

Fig. 6

Fig. 7.

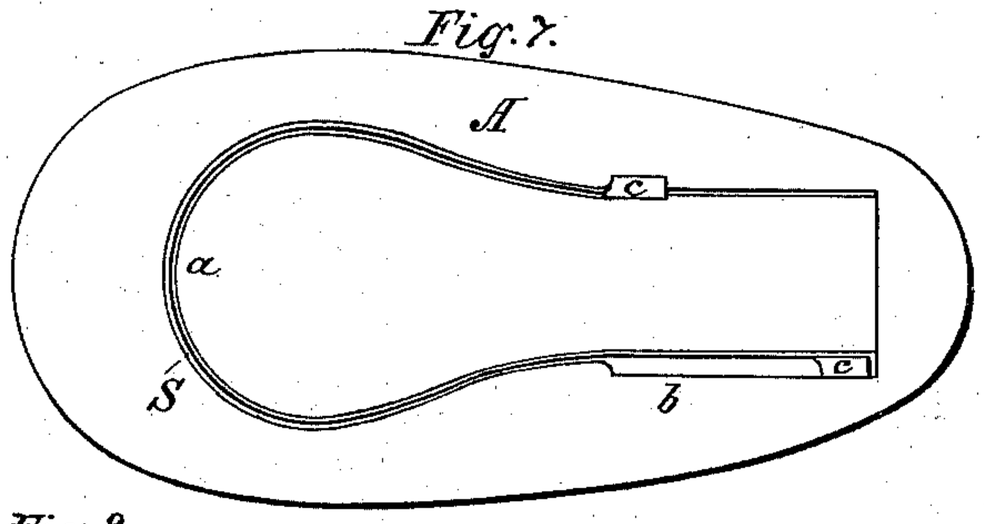

Fig. 8.

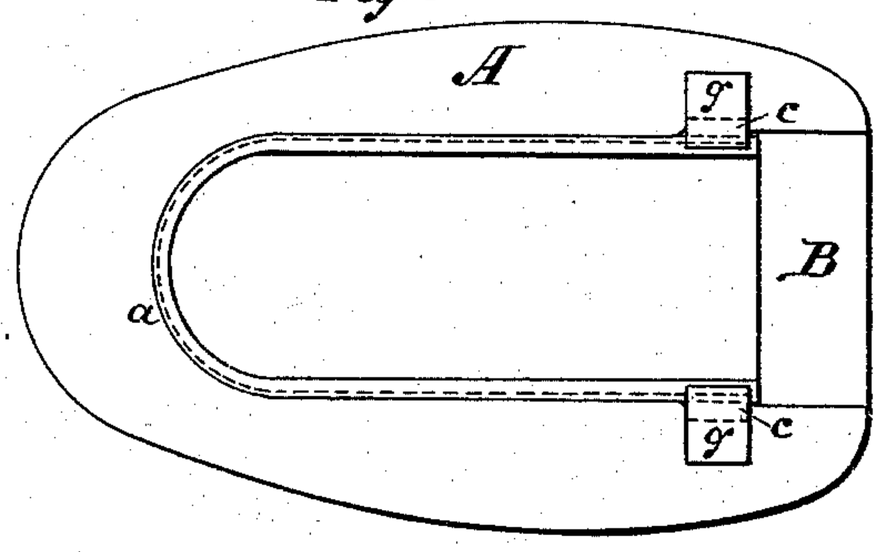

Fig. 9.

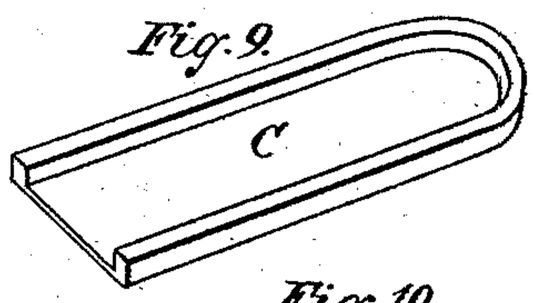

Fig. 10.

Witnesses.

F. W. Howard

P. C. Hall

Inventor:

T. A. Edison

per Dyer & Thiben

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.

MANUFACTURE OF CARBONS FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 263,139, dated August 22, 1882.

Application filed August 6, 1880. (No model.) Patented in England September 16, 1880, No. 3,765; in Italy November 6, 1880; in Canada November 11, 1880, No. 11,968; in Belgium November 15, 1880, No. 52,890; in Victoria December 13, 1880, No. 2,936; in Austria-Hungary January 7, 1881; in Queensland February 7, 1881; in New Zealand March 7, 1881, No. 510; in Portugal March 31, 1881, No. 661; in New South Wales April 2, 1881; in Spain April 26, 1881, and in India July 22, 1881, No. 535.

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 Method of and Means for Manufacturing Carbons for Electric Lamps, (Case No. 230;) 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.

It is desirable in manufacturing carbon slips or filaments of the style generally known as the "horseshoe-carbons," for use as the incandescing conductors in electric lights, that they should be carbonized evenly and uniformly, and that their shape should be preserved, that the carbonization should be effected without warping or twisting the body of the carbon. As, however, the material contracts largely in the process of carbonization, means are required which, while holding the material in position to avoid twisting or warping, shall at the same time guarantee even and thorough carbonization and permit the material to move so that the inevitable contraction during the process may proceed without danger of rupturing or otherwise damaging the carbon.

The object of this invention is to furnish such means; and to that end it consists in the features more particularly hereinafter described and claimed.

In the drawings, Figures 1, 4, 7, and 8 are plan views of carbonizing-plates unitary in principle, but differing slightly in detail. Figs. 3 and 6 are an edge and a side view, respectively, of a slip or filament ready for carbonization. Figs. 2, 5, 9, and 10 are details, more fully hereinafter referred to.

The filament preferably used is one cut or formed from a fibrous material, so that the body is perfectly uniform in size throughout its length, and with enlarged ends, the enlarged ends being upon one edge, or upon one edge and side, as fully set forth in another application of even date herewith, and also illustrated in Figs. 3 and 6.

A is a nickel plate, in which is cut the groove *a*, of the shape desired for the finished carbon, and of a depth sufficient to receive the slip or filament S. The coefficient of contraction of the fiber is determined by experiment, and the length of the groove is made equal to the length desired for the finished carbon plus the contraction of the material during the process of carbonization. In Fig. 1 this extra length is at one end of the groove. *a* is the groove, enlarged at one end into a small chamber just sufficient to receive one of the enlarged ends *c* of the filament, which is secured therein by a pin, *e*. A small wedge, *f*, may also be placed in the chamber to assist in keeping the enlarged end in shape, the pin *e* passing through both *c* and *f*. The other end of the groove *a* is made into a large chamber, *b*, whose length is equal to or greater than the amount of contraction in length of the filament in carbonization. Upon the free end of the slip or filament S the clamp *d* is secured.

The plate A, with the slip or filament secured in position, as described, is covered by a smooth plate; or a series may be used, piled one upon another, the smooth under surface of one forming the cover to the one underneath. They are then placed in a suitable nickel case, and on being subjected to the first low heat carbonization and contraction proceed evenly and equally throughout each slip or filament, the contraction drawing up the loose end in the chamber *b*, until at the conclusion of the process the end *d* is exactly opposite *c*. The cases and plates used are made of nickel, as no other metal stands the high heats necessary in the final stage of carbonization.

In Fig. 4 the groove *a* is shown formed into a chamber, *a'*, at the bow of the horseshoe. In this case the slip S is laid flatwise in the groove, the ends *c c* fitting into chambers at the end of the groove, upon which weights *o* are laid. By this means the ends are held in position during carbonization, while the contraction is from *x* to *x'* during the process.

Fig. 7 shows the same construction and method of operation as in Fig. 1, except that while

in Fig. 1 the slip is placed edgewise in the groove in Fig. 7 it is placed flat or sidewise in the groove.

In Fig. 8 the plate A is formed with a chamber in which slides a plate, C, smaller than the chamber by the size of the filament or strip, so that when the plate C is placed in the chamber a groove shall be left, in which is placed the filament or strip, its ends *c c* resting in chambers fitted for them, and held in place therein by weights *g g*, laid thereon in chambers made therefor. As the filament is thus fastened at the ends, as carbonization proceeds the ensuing contraction pulls the bow toward the ends, forcing the plate C toward the end B of A. In all these plans, however, the filament is kept under strain during carbonization, with one or more points fixed against moving, and the contraction proceeds against the strain, which constantly keeps the filament against or in contact with a former, preserving its shape and obviating any risk of warping or twisting. In all provision is made for keeping flat and in their proper relative position the enlarged ends of the carbon.

What I claim is—

1. The method of manufacturing carbons for incandescent electric lamps, uniform and regular in shape and carbonization, consisting in carbonizing filaments while one or both ends are secured in a certain definite position relatively to the amount of contraction, so that when carbonized and contracted the ends shall be in proper position to each other, substantially as set forth.

2. The improvement in the art of manufacturing carbons for incandescent electric lamps, consisting in first shaping the slip or filament therefor from carbonizable material and then carbonizing the same while under constant strain, and with one or both ends fixed, substantially as set forth.

3. The carbonizing-plate provided with a groove for shaping the material, and a chamber or chambers, permitting contraction during carbonization, substantially as set forth.

This specification signed and witnessed this 28th day of July, 1880.

THOS. A. EDISON.

Witnesses:
CHAS. BATCHELOR,
G. E. GOURAUD.