UNITED STATES PATENT OFFICE.

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

METHOD OF TREATING CARBONS FOR ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 265,777, dated October 10, 1882.

Application filed December 15, 1880. (No model.) Patented in England February 9, 1881, No. 562; in Italy May 19, 1881; in Belgium May 31, 1881, No. 54,587; in Victoria June 15, 1881, No. 3,024; in Canada July 5, 1881, No. 13,057; in France July 20, 1881, No. 142,723; in Austria-Hungary August 3, 1881; in New South Wales August 13, 1881; in Queensland August 23, 1881; in Spain September 5, 1881; in New Zealand September 15, 1881, No. 549, and in Portugal December 14, 1881, No. 715.

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 Treating Carbons for Electric Lamps, (Case No. 275;) and I do hereby declare that the following is a full and exact description of the same.

In the manufacture of my incandescing electric lamps, having for the continuous incandescing conductor a flexible carbon filament of high resistance, I have found that there is a considerable quantity of air, gas, and aqueous vapor occluded in the carbon filament and the clamps, which are not removed from the lamp by the action of the pump, but have to be driven off by raising the carbon filament to incandescence by the passage of an electric current therethrough.

In Patent No. 227,229, granted to me May 4, 1880, the method is described of driving the air from a metallic incandescing conductor by the heat of the conductor when raised to incandescence by the passage of an electric current therethrough. In applying this method to a carbon filament, however, some changes have to be made, occasioned by the increased quantity of air, gas, and aqueous vapor occluded by the carbon filament, and also by the fact that the air has to be driven from the enlarged ends of the filament and from the metal clamps wholly by conduction of heat from the incandescent body of the filament. These changes in the method consist principally in maintaining the incandescence of the carbon filament for a longer period than with a metallic incandescing conductor, and in raising the carbon filament gradually to a higher degree of incandescence than with the metallic conductor. With the carbon filament the incandescence finally produced in the process of exhaustion is always higher than the degree of incandescence to which the filament will be raised in use. With the carbon filament (in this respect differing from the metallic conductor) it is desirable that greater flexibility should be given the filament than it would have if the lamp were exhausted simply by the action of the pump, so that the carbon filament can withstand, without fracture, the jars to which it will be subjected in handling and transportation previous to the use of the lamp. This additional flexibility is given the carbon filament by the passage of an electric current therethrough, the operation being simultaneous with that of driving out the occluded air, gas, and aqueous vapor. It is also desirable to fix the shape of the carbon filament during the manufacture of the lamp, so that the character of the lamp can be determined, since some of the filaments are warped or bent more or less to one side or the other when raised to incandescence; but by raising the carbon filament to higher incandescence than that to which it will be raised in use the shape of the filament will be fixed and determined, and will not be changed by the future use of the lamp. This operation, which is peculiar to the carbon-filament operation, is also simultaneous with that of driving out the occluded air, gas, and aqueous vapor.

In carrying out the invention the parts of the lamp are assembled and united as described in my application No. 22,301, of even date with this application, or in any other suitable manner. The lamp is then attached to the exhausting apparatus, (a Sprengel drop-pump,) and when the proper high degree of exhaustion has been obtained an electric current is passed through the lamp, and by cutting resistance out of circuit the filament is gradually raised in incandescence. The filament is kept for some time at a medium incandescence, the operation of the exhausting apparatus being meanwhile continued. The filament is then raised to a much higher incandescence by the cutting out of more resistance, until the air and gas and aqueous vapor have been driven from the enlarged ends of the filament and the clamps, which can be readily determined by the disappearance of a blue or violet color which is seen at the clamps while the gas and vapor are being driven off. This high incandescence is considerably higher than that at which the

lamp is designed to be used, it being from thirty candle-power upward in a lamp designed to give sixteen candle-power.

What I claim is—

1. The method of treating the carbon filament of an incandescing electric lamp, consisting in raising such carbon filament to incandescence during the latter part of the process of exhausting the lamp-globe, whereby the air and gas are driven from the carbon filament and the flexibility of the filament is increased, substantially as set forth.

2. The method of treating the carbon filament of an incandescing electric lamp, consisting in raising such carbon filament to a higher incandescence than that at which it is designed to be used during the latter part of the process of exhausting the lamp-globe, whereby the air and gas are driven from the carbon filament and from its enlarged ends and clamps, and the flexibility of such filament is increased and its shape fixed, substantially as set forth.

This specification signed and witnessed this 11th day of December, 1880.

THOS. A. EDISON.

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