(No Model.)

T. A. EDISON.

MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.

No. 406,130. Patented July 2, 1889.

Fig. 1.

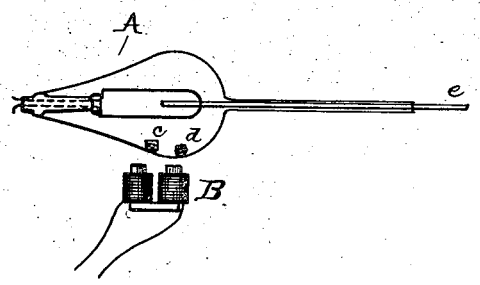
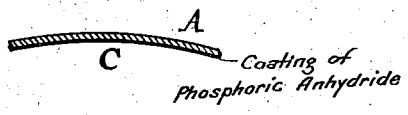


Fig. 2.



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MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 406,130, dated July 2, 1889.

Application filed August 11, 1886. Serial No. 210,607. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Incandescent Electric Lamps and the Manufacture thereof, (Case No. 678,) of which the following is a specification.

The object of my invention is to so construct an incandescent electric lamp that the "electrical carrying" or transporting of carbon particles from the filament to the glass will be greatly diminished or entirely prevented. This electrical carrying occurs ordinarily, and results in the blackening of the globe and the shortening of the life of the filament. I accomplish this by coating the inner surface of the globe with a conducting material—viz., a thin transparent adhesive semi-liquid conducting-film. The material used is of such character that it will not give off gases injurious to the filament at the temperature given to the globe by the incandescence of the filament. If the inner surface of the globe is a conductor, it will be of an electrical potential about the same as that of the filament, and consequently there will be little or no tendency for the carbon particles to pass from the filament to the glass.

The substance with which I prefer to coat the glass is melted phosphoric anhydride containing just enough water to make it run over the glass. This is a transparent gummy substance, and does not give off its water or any gases at the temperature to which the globe is raised in the use of the lamp. This substance may be introduced into the globe and allowed to run all over the glass by moving and turning the globe, so that it leaves a thin film upon the entire surface.

Where the globe is small and the filament comes close to the glass, so that the glass is more highly heated thereby, I combine a smaller amount of water with the phosphoric anhydride, so that it may not run freely, and in this case I employ the following method for producing the film upon the glass.

A piece of glass inclosing a piece of iron is placed in the globe, together with a piece of phosphoric anhydride, and the proper amount of water is added to the latter by means of a narrow glass tube passed through the exhaust-tube of the lamp. The phosphoric anhydride is then heated by holding the globe over a lamp-flame until it assumes a glossy appearance. Then by bringing near to the lamp the poles of a sufficiently-powerful electro-magnet the piece of glass and iron is moved into the mass of phosphoric anhydride, and then the piece of glass is moved all over the interior of the lamp, being brought back to the phosphoric anhydride for a fresh supply when necessary. A very thin coating is thus produced upon the glass of the lamp. The piece of glass and iron is then removed, and the lamp is now ready for exhaustion.

Where a considerable quantity of water—enough to make it run—is added to the phosphoric anhydride, the lamp should be externally heated before exhaustion to a temperature greater than that to which it will be brought in use, to make the phosphoric anhydride give up all the moisture which can be driven from it. The lamp may then be dried in any suitable manner.

Other substances than that mentioned may be used—for instance, chloride of zinc, and, for low-temperature lamps, pure sulphuric acid.

In the accompanying drawings, Figure 1 shows the process of producing the film by means of a magnet, and Fig. 2 an enlarged section of a part of the globe of the lamp embodying my invention.

A is the lamp.

B is the electro-magnet; *c*, the piece of glass inclosing iron; *d*, the piece of phosphoric anhydride, and *e* the tube for introducing water.

C is the thin transparent adhesive conducting-film produced by either of the processes described.

What I claim is—

1. The combination, with the globe of an incandescent electric lamp and the filament inclosed thereby, of a transparent conducting-film on the interior of said globe, substantially as set forth.

2. The combination, with an incandescent electric-lamp globe and the filament inclosed thereby, of a transparent adhesive conducting-film on the interior of said globe, substantially as set forth.

3. The combination, with an incandescent electric-lamp globe and the filament inclosed

thereby, of a film of adhesive phosphoric anhydride on the interior of said globe, substantially as set forth.

4. The method of producing a coating on the interior of an incandescent electric-lamp globe, consisting in placing an adhesive semi-liquid substance within said globe and moving a magnetic body into and out of said substance by external magnetic attraction, substantially as set forth.

This specification signed and witnessed this 6th day of August, 1886.

THOS. A. EDISON.

Witnesses:
WM. PELZER,
E. C. ROWLAND.