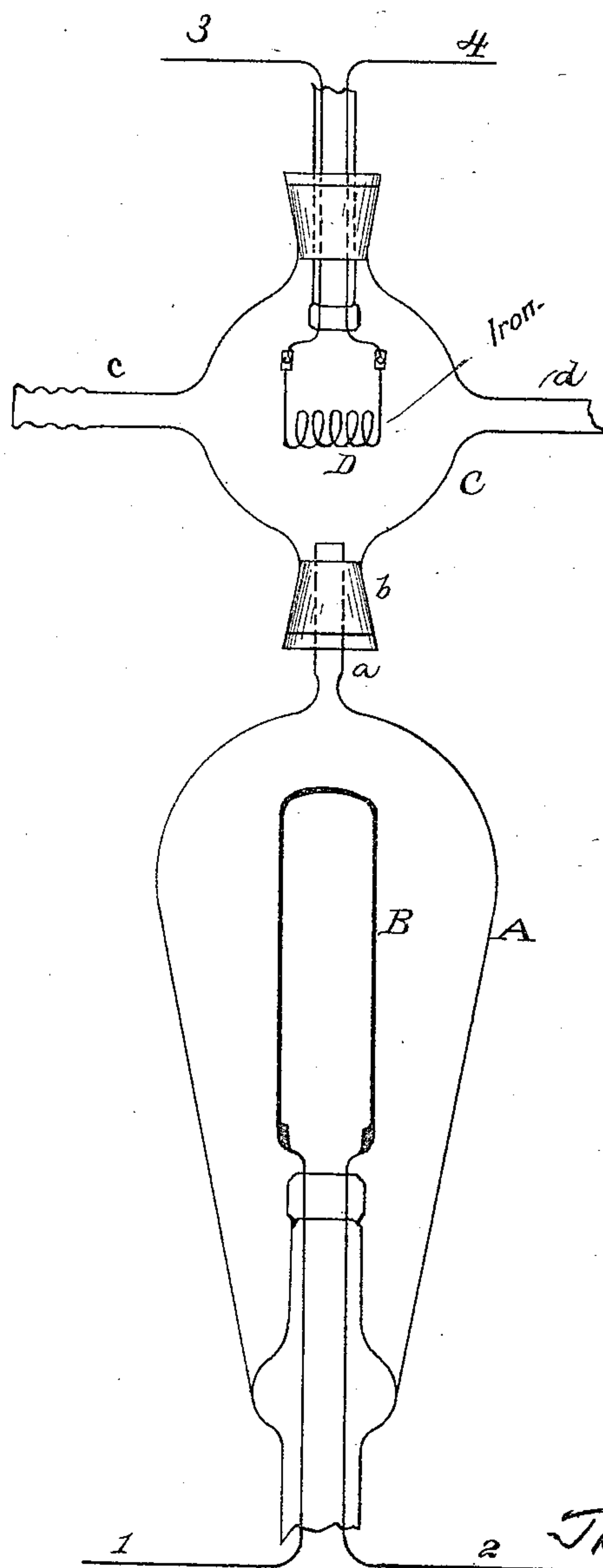


(No Model.)

T. A. EDISON.
MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.
No. 438,298. Patented Oct. 14, 1890.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY; ASSIGNOR TO THE
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MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 438,298, dated October 14, 1890.

Application filed December 8, 1882. Serial No. 78,774. (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
5 useful Improvement in the Manufacture of Incandescing Electric Lamps, (Case No. 525,) of which the following is a specification.

In my application No. 516 (Serial No. 77,526) is set forth a new form of incandescing electric lamps—viz., one whose inclosing-globe is
10 charged with an inert gas at a pressure sufficient to prevent the electrical carrying within the globe.

My present invention relates to methods of
15 charging the globe with nitrogen, which is an inert gas especially adapted to be used for this purpose. Such method consists in allowing the globe to be filled with a gas containing nitrogen and capable of being decomposed under certain conditions into its constituent parts, and applying such conditions
20 in the presence of means for absorbing or otherwise getting rid of the constituents other than nitrogen, thus leaving the globe charged
25 with nitrogen. Before the decomposition of the gas the globe should be partially exhausted—that is, to a pressure a little above that at which the nitrogen is to be used, the exact point being determined by experiment,
30 so that the withdrawal of the other constituents will leave the nitrogen at proper pressure.

My invention is preferably accomplished in one of two ways. For either of these ways the exhaust-tube of the lamp-globe is attached by means of an air-tight joint to another globe, the latter being provided with means for attaching it to an exhausting apparatus. According to one of the preferred
40 methods the second or auxiliary globe contains a spiral of iron or other readily-oxidizable metal, which is connected by leading-in wires with a source of electricity. Both globes contain ordinary atmospheric air. By means of a suitable air-pump attached to the auxiliary globe both globes are exhausted to a pressure somewhat above that at which the
45 nitrogen is to be. The metal spiral is then heated to incandescence, when the oxygen in the globes will be absorbed, oxidizing the
50 metal and leaving nitrogen at the proper pressure. The lamp-globe is then sealed off

in the usual manner. By the second method I first exhaust the lamp and the auxiliary globe to as complete a vacuum as possible by means of a Sprengel pump, and then fill both
55 globes with cyanogen gas to the proper pressure, as explained. In this case I use a filament of carbon instead of a metal wire in the auxiliary globe. Such carbon filament being heated to incandescence, the cyanogen
60 is decomposed and the carbon is deposited on the filament, while the nitrogen remains in the globe.

My invention is illustrated in the accompanying drawings.

A represents the inclosing-globe of an incandescing electric lamp, and B the flexible carbon filament thereof, connected with leading-in wires 1 2. The exhaust-tube *a* is connected by a rubber stopper *b* with the glass
65 globe C. Within such globe is connected the spiral D, which is of metal or carbon, as the case may be. Wires 3 4 connect the spiral with a source of electricity. The tube *c* is used to connect with the exhausting apparatus, while the tube *d* is for the admission
70 of gas to the globe. Where air is used, the tube *d* would of course be dispensed with.

What I claim is—

1. The method of charging the inclosing-globe of an incandescing electric lamp with an inert gas, consisting in separating or decomposing within the globe a gas of which
80 such inert gas forms a part and removing the constituents other than the inert gas, substantially as set forth.

2. The method of charging the inclosing-globe of an incandescing electric lamp with an inert gas, consisting in separating or decomposing within the globe a gas of which
90 such inert gas forms a part, such gas being before decomposition at a pressure above that desired for the inert gas, and removing the constituents other than the inert gas, substantially as set forth.

3. The method of charging the inclosing-globe of an incandescing electric lamp with nitrogen, consisting in filling said globe with cyanogen gas and decomposing said gas in the presence of a material which will receive
100 the carbon and leave the nitrogen, substantially as set forth.

4. The combination, with an incandescing electric lamp, of an auxiliary globe connected therewith, means for connecting said auxiliary globe with an exhausting apparatus,
5 means for admitting cyanogen gas to said globe, and an incandescing carbon conductor within said globe, substantially as set forth.

This specification signed and witnessed this 28th day of November, 1882.

THOS. A. EDISON.

Witnesses:

H. W. SEELY,
E. H. PYATT.