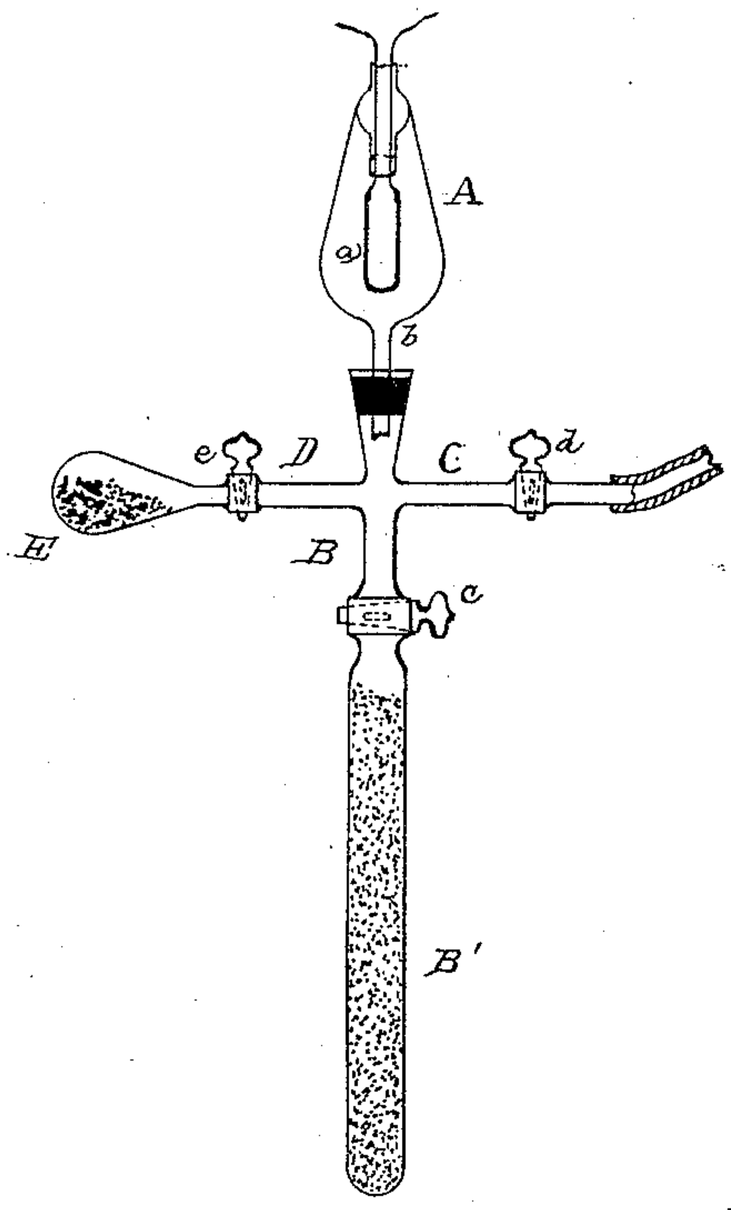
(No Model.)

T. A. EDISON.

MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.

No. 459,835. Patented Sept. 22, 1891.



ATTEST:

E. C. Rowlands

H. W. Seely

INVENTOR:

Thomas A. Edison,

By Dick & Dyer

Atty.

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 INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 459,835, dated September 22, 1891.

Application filed January 22, 1883. Serial No. 82,560. (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 useful Improvement in the Manufacture of Incandescing Electric Lamps, (Case No. 534,) of which the following is a specification.

In my application No. 525 (Serial No. 78,774) I have set forth a method by which the inclosing globe of an incandescing electric lamp can be charged with nitrogen at such a pressure as to prevent electrical carrying from the carbon filament to the globe. Such method consists in the removal of the constituents other than nitrogen of the air or other gas contained in the globe by the physical absorption or deposition of such constituents. I have since found that very satisfactory results may be obtained by the chemical removal of the oxygen from the air contained in the globe by the use of pyrogallate of potassium, cuprous chloride, phosphorus, or equivalent chemical agent, which combines with oxygen, the atmospheric pressure within the globe being first reduced to such a point that the removal of the oxygen will leave the nitrogen at the proper pressure to prevent the electrical carrying.

The desired degree of pressure is set forth in my application No. 516, Serial No. 77,526. I employ, also, a suitable drying agent—such as phosphoric anhydride—to free the nitrogen from moisture.

In carrying out my invention I may make use of an apparatus such as is illustrated in the accompanying drawing.

A represents the inclosing globe, and *a* the flexible carbon filament, of an incandescing electric lamp. An exhaust-tube *b* is provided, connected by an air-tight joint with a tube B, the lower portion B′ of which contains pyrogallate of potassium, cuprous chloride, phosphorus, or equivalent substance capable of chemically combining with oxygen. The tube B is provided with a stop-cock *c*. A tube C, provided with a stop-cock *d*, and a tube D, having a stop-cock *e*, extend from the tube B. The tube C is provided with means for connecting it with an air-pump, and the tube D terminates in a bulb E, containing phosphoric anhydride or a similar drying agent. The stop-cocks *c* and *e* being closed and the cock *d* open, such a portion of the air is removed from the globe that the removal of the oxygen from the remainder will leave the nitrogen at a pressure sufficient to prevent electrical carrying. I then close *d* and open *c*, when the oxygen remaining in the globe will combine with the pyrogallate of potassium or other substance used, the whole of the oxygen being thus gradually removed from the globe. The cock *c* is then closed and cock *e* opened, when the moisture of the nitrogen is absorbed by the phosphoric anhydride in the bulb E. The cock *e* must never be opened while cock *c* is also open, for in this case the pyrogallate of potassium or other substance would become dry and would then fail to combine with the oxygen. If phosphorus is used instead of the potassium compound, it must be heated. The removal of the oxygen in the globe reduces the pressure about one-fifth, leaving the proper pressure in the globe to prevent electrical carrying. After the nitrogen is reduced to the proper state the globe is sealed off at *b*.

What I claim is—

1. The method of obtaining a dry nitrogen atmosphere at a definite pressure in the inclosing globe of an incandescing electric lamp, consisting in producing an air-pressure in the globe slightly above the pressure of nitrogen desired, decomposing the air left in the globe, retaining the nitrogen in the globe, removing the oxygen by putting a receptacle containing a substance having affinity for oxygen into communication with the globe, and removing the moisture from the nitrogen, substantially as described.

2. The method of obtaining a dry nitrogen atmosphere at a definite pressure in the inclosing globe of an incandescing electric lamp, consisting in producing an air-pressure in the globe slightly above the pressure of nitrogen desired, decomposing the air left in the globe, retaining the nitrogen in the globe, removing the oxygen, but not the nitrogen, and removing the moisture from the nitrogen, substantially as described.

This specification signed and witnessed this 13th day of January, 1883.

THOS. A. EDISON.

Witnesses:
H. W. SEELY,
EDWARD H. PYATT.