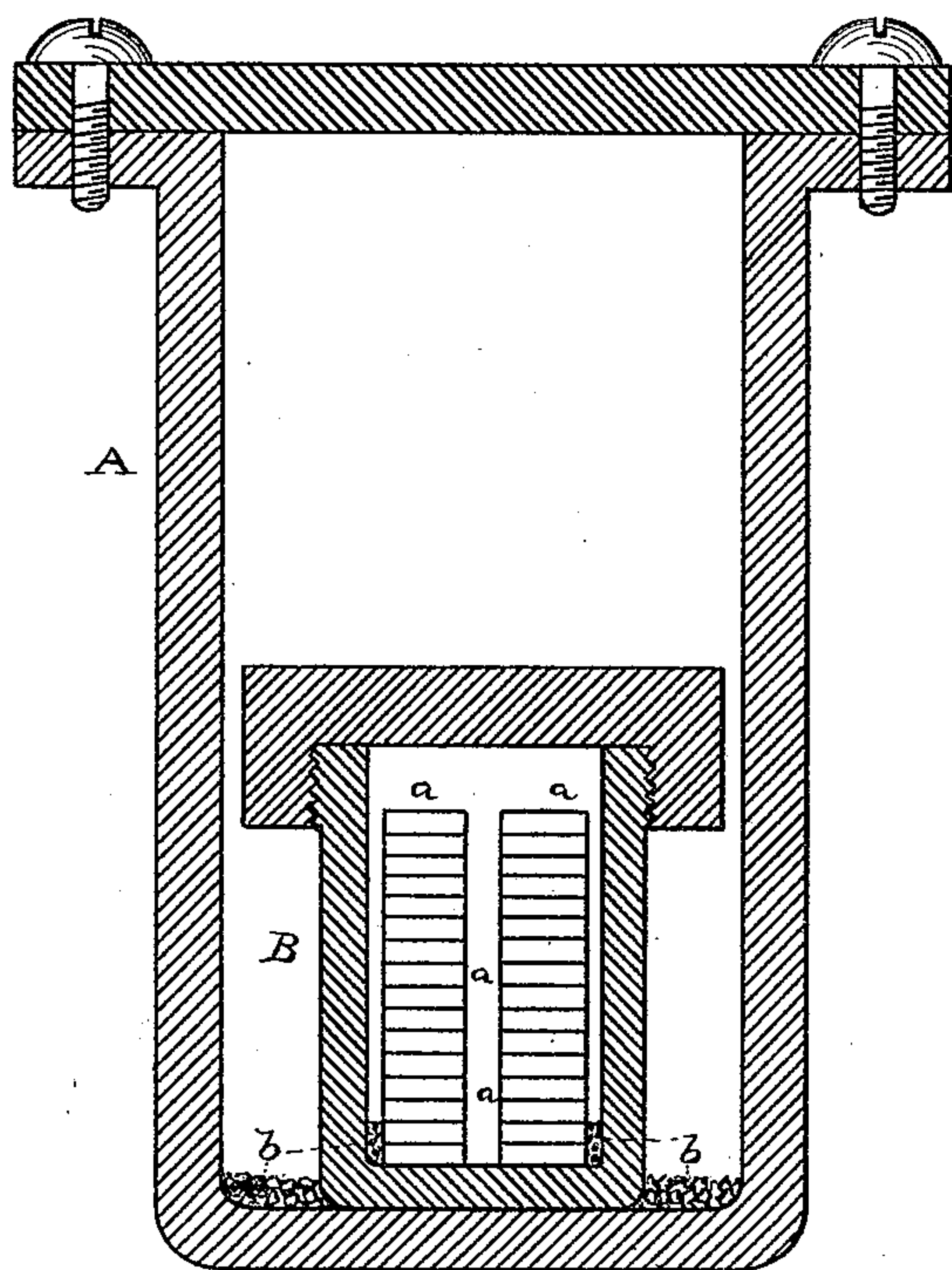


(No Model.)

T. A. EDISON.
MANUFACTURE OF CARBON FILAMENTS.

No. 438,299.

Patented Oct. 14, 1890.



ATTEST:

E. C. Reynolds
W. S. Lee

INVENTOR:

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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 CARBON FILAMENTS.

SPECIFICATION forming part of Letters Patent No. 438,299, dated October 14, 1890.

Application filed March 16, 1883. Serial No. 88,353. (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 Carbonizing, (Case No. 541,) of which the following is a specification.

My invention relates to the process of carbonizing filaments for the incandescing conductors of electric lamps. I have found that
10 the higher the temperature to which such filaments are raised before decomposition commences the more complete will be the carbonization and the more compact and homogeneous will be the residual carbon remaining after the process. By placing the filaments during carbonization under a higher than atmospheric pressure the temperature
15 necessary for decomposition is raised to a point higher than the normal one. To accomplish this result, I place the filaments in a closed flask, in which is placed a quantity of hydrocarbon or of any other substance, which when heated gives off a gas or vapor
20 other than oxygen—that is, one which will not injure the filaments during carbonization. The gas or vapor given off by this substance increases the pressure in the flask to the desired point. In order to maintain this increased pressure, I place the flask within an
30 outer closed flask or chamber, which also contains a quantity of the same or a similar substance, and the gas or vapor given off by which prevents a reduction of pressure by leakage from the inner chamber.
35

My invention is illustrated in the accompanying drawing, which is a sectional view of the apparatus employed.

A is an outer flask, and B an inner one,
40 both being made of a material—such as carbon or nickel—capable of withstanding high temperature. Each is provided with a tightly-secured cover. Within the inner flask B are placed the molds *a a*, containing the filaments to be carbonized. The whole is placed

in a suitable furnace, the outer flask A being of such height that its upper part projects well above the fire.

Within each flask is placed a portion of the hydrocarbon or other compound *b*, which upon
50 being heated in the furnace gives off a gas other than oxygen, which increases the pressure in the inner flask, while that in the outer chamber prevents the reduction of pressure by the leakage of the inner one. The pressure
55 can thus be raised to that of several atmospheres, it being, however, observed that the pressure is not so great as to injure the material of which the flasks and molds are composed. After carbonization the cover of
60 the flask A is removed and the chamber B can then be lifted out.

What I claim is—

1. The method of carbonizing, consisting in heating the carbonizable material in the
65 presence of a substance which gives off a gas other than oxygen to increase the pressure in the carbonizing-flask, and maintaining such pressure by heating a similar material in a chamber surrounding said flask, substantially
70 as set forth.

2. The combination, in carbonizing apparatus, of a flask containing the material to be carbonized and a substance which gives off a
75 gas other than oxygen when heated, and an outer inclosing-flask containing a similar substance, substantially as set forth.

3. The combination, in carbonizing apparatus, of a flask, a series of molds in said flask containing the material to be carbonized, a
80 substance in said flask which gives off a gas other than oxygen when heated, and an outer inclosing-flask containing a similar substance, substantially as set forth.

This specification signed and witnessed this
85 17th day of February, 1883.

THOS. A. EDISON.

Witnesses:

H. W. SEELY,
EDWARD H. PYATT.