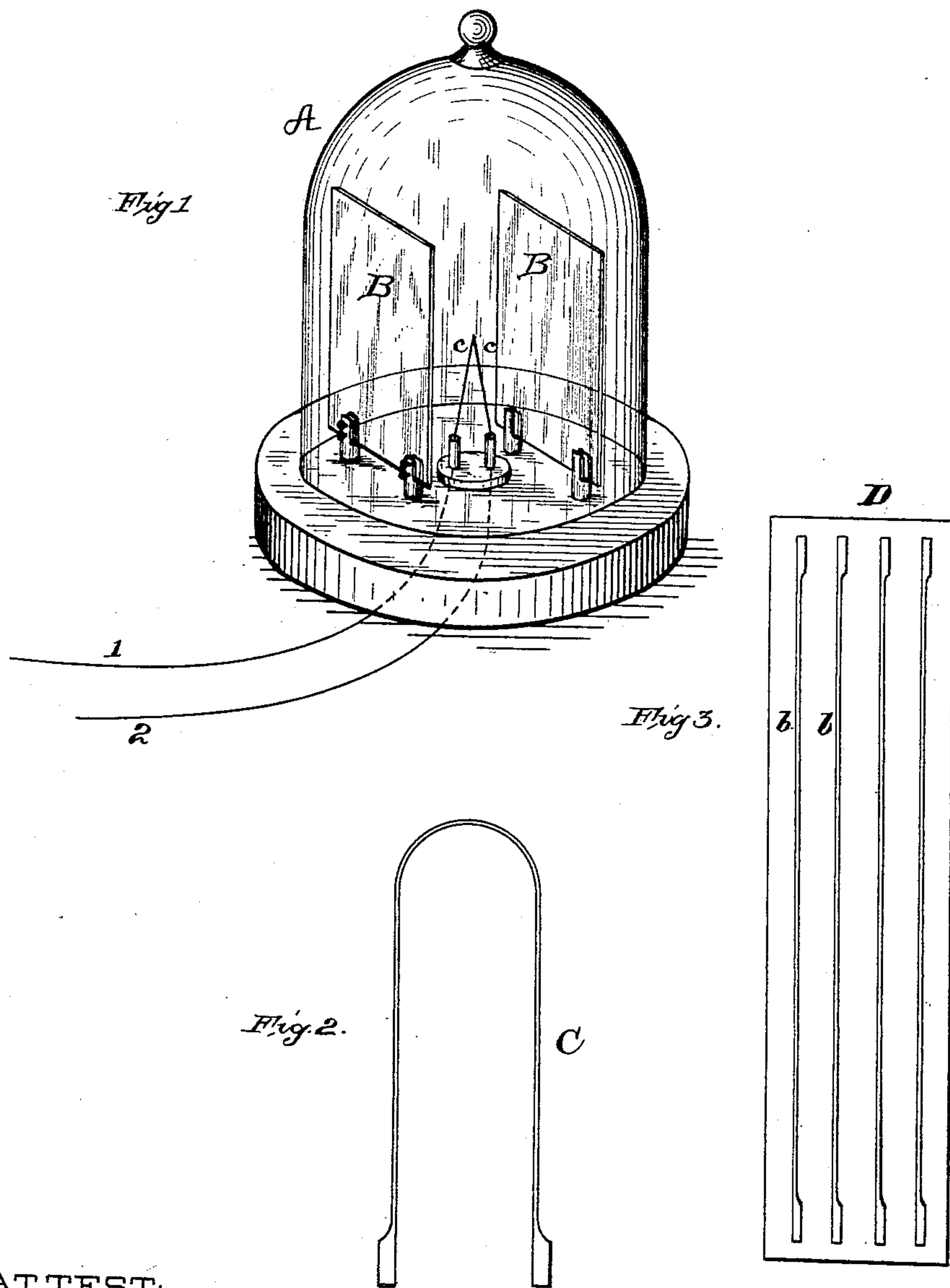


(No Model.)

T. A. EDISON.  
INCANDESCENT LAMP FILAMENT.

No. 395,963.

Patented Jan. 8, 1889.



ATTEST:  
*E. Rowland*  
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*Att'y.*

# UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF MENLO PARK, NEW JERSEY.

## INCANDESCENT-LAMP FILAMENT.

SPECIFICATION forming part of Letters Patent No. 395,963, dated January 8, 1889.

Application filed April 5, 1884. Serial No. 126,802. (No specimens.)

*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 Incandescing Conductors for Electric Lamps, (Case No. 617,) of which the following is a specification.

The object of this invention is to produce flexible high-resistance conductors for incandescing electric lamps.

In carrying out my invention I make use of the process of "electro-vacuous deposition," which is set forth in my application, No. 615, (Serial No. 118,942,) and is therefore not claimed in this application.

This process consists in vaporizing a material in a vacuum by electrical heating and causing it to be deposited from the vapor upon any object in the vacuum.

For the purposes of the present invention I either deposit carbon, silicon, boron, osmium, or other refractory high-resistance material in sheets, from which filaments for the incandescing conductors are cut, stamped, or otherwise formed; or I deposit the material directly in the filamentary form.

Within the vacuum-chamber, which is exhausted in any suitable manner, I place one or more plates of polished glass of suitable size, each preferably having a coating of a material soluble in water or alcohol—such as wax, shellac, or gelatine.

Electrodes of carbon or silicon or such other material as may be selected for the conductors enter such chamber and an arc is formed between them. An even, dense, and homogeneous coating of the material is then formed upon the plates to any desired thickness, which may readily be stripped off, and the soluble material is then removed, leaving tenacious, flexible sheets of the carbon, silicon, or other material. From these sheets the flexible filaments are formed in the desired shape. To form the filaments directly, a screen of suitable material provided with one or more apertures of the shape and size desired for the filament is interposed between the arc and the surface on which the material is to be deposited. The material then deposits through these apertures in the proper

form, the rest of the deposit being intercepted by the screen.

In the accompanying drawings, Figure 1 represents an apparatus which may be conveniently employed. Fig. 2 is an enlarged view of a filament cut from a sheet, and Fig. 3 a view of one of the screens used in depositing the filaments directly.

A is the bell-jar of an air-pump.

B B are glass plates held by suitable supports.

To the electrodes *a a* of carbon or silicon circuit-wires 1 2 lead from any suitable source of electric energy. The two electrodes are so placed that an arc is formed between them by the current, and the deposit proceeding in straight lines therefrom is formed evenly upon all parts of the plates. It is then stripped off in sheets, from which the soluble material, if such is used, is removed, and filaments *C* are readily formed by cutting or punching. I may, however, interpose a screen, *D*, between the arc and the plate, having apertures *b b*, through which apertures the deposit is made in the shape of a straight strip with enlarged ends, which may be bent into the loop form. In this way filaments of silicon may be formed, which it has heretofore been difficult to produce.

I am aware that it has been noticed as a scientific fact that films of gold will be deposited on the walls of Geissler tubes when that metal is subjected to the action of the electrical discharge in such tubes.

What I claim is—

The process of preparing material for the manufacture of filaments for incandescent electric lamps, consisting in volatilizing a substance having a high electrical resistance by electrically heating such substance in a vacuum, causing such substance to be deposited in the form of filaments or as a sheet from which filaments are formed, substantially as set forth.

This specification signed and witnessed this 22d day of January, 1884.

THOS. A. EDISON.

Witnesses:

A. W. KIDDLE,  
E. C. ROWLAND.