

UNITED STATES PATENT OFFICE.

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

MANUFACTURE OF FILAMENTS FOR INCANDESCENT LAMPS.

SPECIFICATION forming part of Letters Patent No. 470,922, dated March 15, 1892.

Application filed October 10, 1883. Serial No. 108,563. (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
5 useful Improvement in the Manufacture of Incandescing Conductors for Electric Lamps, (Case No. 594,) of which the following is a specification.

The object of this invention is to produce
10 incandescing conductors for electric lamps which shall be of even density and resistance. Heretofore in manufacturing such conductors from paper they have been cut or punched
15 from single sheets of paper of the proper thickness, or have been built up by placing together several filaments separately cut from paper sheets with the fiber in some of the filaments at an angle with those in other filaments, and which have been compressed and
20 carbonized. In the former case any defects in the texture of the paper or slight variations in the thickness of the sheet will appear in the conductors, causing differences in the density and resistance of such conductors as may
25 be cut from portions of the sheet containing the defects or variations. In the latter case the article is improved; but the process of making it is slow and difficult. I remedy the objections mentioned by employing two or
30 more sheets of thin paper placed one upon the other and formed by a carbonizable cementing material into a homogeneous sheet. From this sheet the filaments are cut or punched, as before, and are then carbonized, or the entire sheet may be carbonized and the
35 conductors formed from it after carbonization. By thus placing several sheets together the defects in any one sheet are counteracted or compensated for by the other sheets, each
40 defective portion extending through only a part of the entire sheet, from which the filaments are cut.

In placing the sheets together I prefer to place them so that the grain of the paper of
45 each sheet lies at right angles to that of the adjacent sheet or sheets. Filaments cut from a single sheet are weakened from the grain of the paper lying all in one direction, and this defect is obviated by placing the two or

more sheets together in the manner stated. 50
The cementing material used to unite the tissue-paper sheets may be gum-tragacanth or any other suitable carbohydrate or viscous substance carbonizable without entire volatilization. The sheets of tissue-paper (which 55
I prefer to use) are preferably soaked in a thick mass of this substance, or the latter may be rubbed upon the surfaces of the sheets. Two or more of these sheets are then placed together, preferably with the grain at 60
right angles, as explained. The sheet thus formed is dried under strain or pressure, or both, so that in drying it will contract evenly and produce a sheet or blank of even texture and thickness throughout. From this blank 65
the conductors are formed in the desired shape and are then carbonized in a suitable manner, or the filaments may, as stated, be formed after carbonization.

Instead of covering the sheets with a cementing material, such material may be 70
formed upon the sheets by treating them separately with the hydrofluoric acid to gelatinize the surfaces of the sheets. The sheets are then placed together and dried under 75
strain and pressure, as before.

What I claim is—

1. The method of forming blanks or sheets for the purpose mentioned, consisting in treating separately two or more sheets of paper 80
with hydrofluoric acid to form a cementing material and then placing such sheets together, substantially as set forth.

2. The method of forming carbon filaments for incandescent lamps, which consists in 85
treating two or more sheets of paper with hydrofluoric acid to form a cementing material, placing said sheets together to form a single sheet, and cutting filaments therefrom, substantially as described. 90

3. The method of forming carbon filaments for incandescent lamps, which consists in treating two or more sheets of paper with hydrofluoric acid to form a cementing material, placing said sheets together to form a single 95
sheet, and cutting filaments therefrom, substantially as described.

4. The method of forming carbon filaments

for incandescent lamps, which consists in
treating two or more sheets of paper with hy-
drofluoric acid to form a cementing material,
placing said sheets together to form a single
5 sheet, the grain in one sheet being at an an-
gle with the grain in the other sheet or sheets,
and cutting filaments therefrom, substantially
as described.

This specification signed and witnessed this
14th day of September, 1883.

THOS. A. EDISON.

Witnesses:

H. W. SEELY,
EDWARD H. PYATT.