(No Model.)

T. A. EDISON & C. BATCHELOR.

Testing Electric Light Carbons.

No. 239,372. **Patented March 29, 1881.**

Fig. 1.

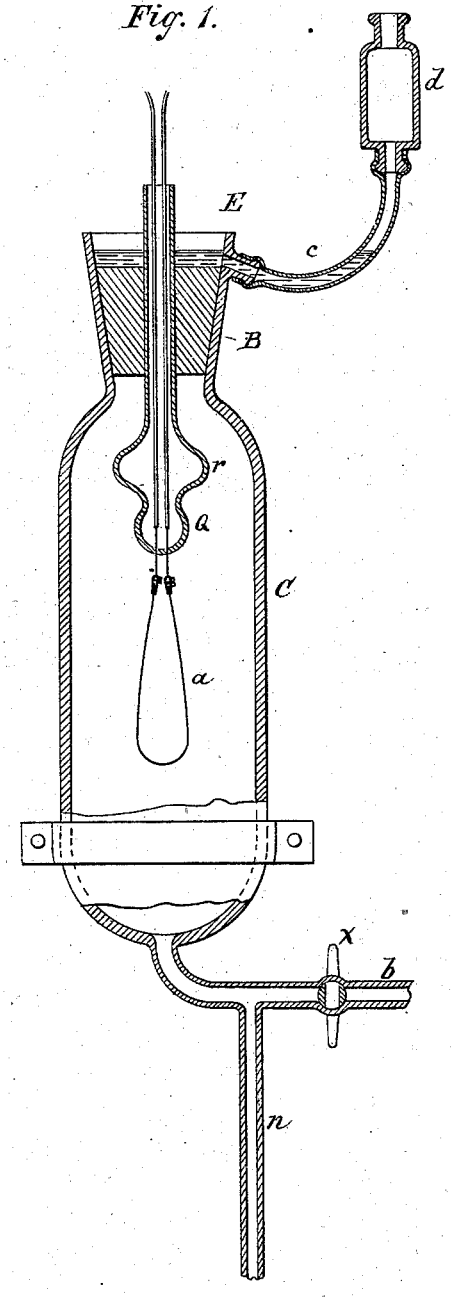
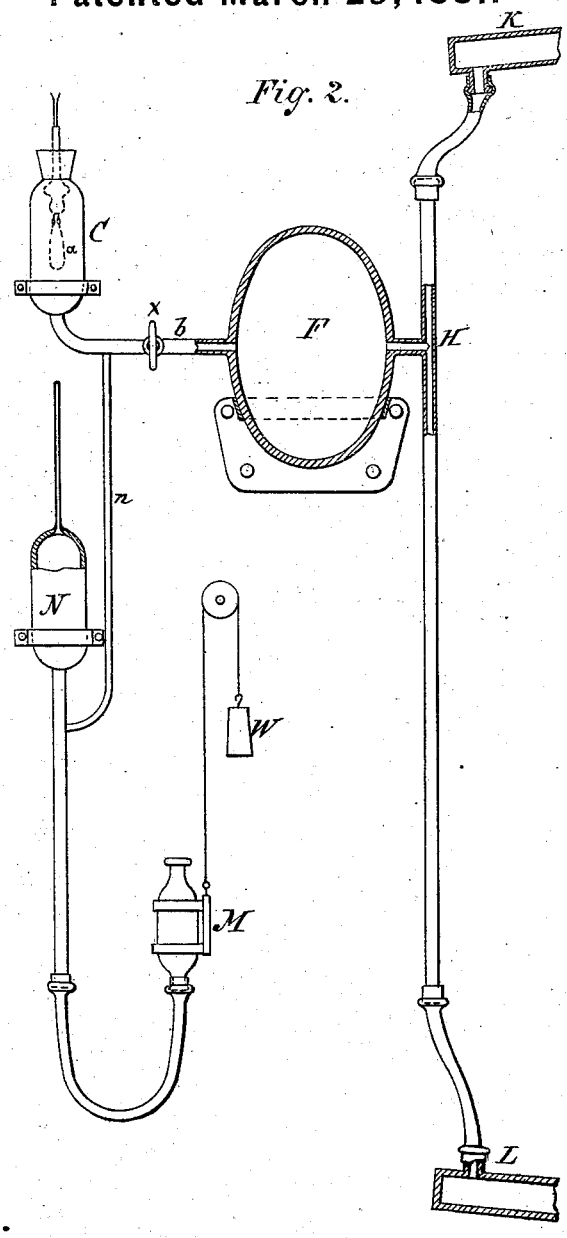


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON AND CHARLES BATCHELOR, OF MENLO PARK, N. J.

TESTING ELECTRIC-LIGHT CARBONS.

SPECIFICATION forming part of Letters Patent No. 239,372, dated March 29, 1881.

Application filed August 9, 1880. (No model.)

To all whom it may concern:

Be it known that we, THOMAS A. EDISON and CHARLES BATCHELOR, both of Menlo Park, in the county of Middlesex and State of New Jersey, have invented new and useful Means and Methods of Testing Electric-Light Carbons; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

As explained in patents hitherto granted T. A. Edison, and also in applications for patents by him made, he uses in his lamps a very small carbon slip or loop, now ordinarily called a "horseshoe-carbon," which is secured in a hermetically-sealed glass vessel, giving light by its incandescence under the action of an electric current.

Hitherto, in manufacturing the lamp, the carbon, having been prepared from paper, wood, or a suitable fiber, was placed in the lamp, whose parts were then sealed. The lamp was then exhausted of air, a current being applied during the process of exhaustion, heating the carbon. Prior to sealing in the lamp and the process of exhausting the completed lamp the carbons were not heated, and prior to heating, any defect therein could not be discovered. It is practically impossible to produce all the loops or slips of absolute uniformity or homogeneity or to carbonize all of them absolutely uniformly throughout their entire mass. When heated to redness throughout their length, some show spots either less red or of a lighter red than the average of the carbon, indicating for the first time faults in the carbons. Where there is a bad fault in the carbon a white incandescence appears, determining the life of the lamp, and also affecting its resistance. Such lamps are unfit for use, and the entire cost of their manufacture has proved a loss.

The object of this invention is to furnish a simple and easy method and means of testing the carbons before they are put in the lamps proper, and so prevent defective or unsuitable carbons from being embodied in completed lamps to be only thrown away upon discovery of the faults, increasing, in fact, the net cost of the faultless ones. This is accomplished by a preliminary heating of the carbons in vacuum, which, by the means hereinafter shown, can be cheaply, rapidly, and effectually done.

In the drawings, Figure 1 is a sectional view of the preliminary proving-lamp, and Fig. 2 is a view of the preliminary proving-lamp and vacuum apparatus complete.

Q is the usual glass carbon-support, which is sealed to the glass globe in the completed lamp at *r*, as set forth in prior patents granted to me. *a* is the carbon to be proved, secured thereto in the usual way.

C is the temporary proving-lamp, having at its upper end an aperture sufficiently large to admit the carbon and its support, and provided with a soft-rubber cork, B, through which the neck of the carbon-support Q passes. The cork B fits tightly in the aperture, the sealing being further rendered secure by a mercury-seal, E, a mercury-reservoir, *d*, being elevated when necessary, so that the mercury therefrom flows down through a tube, *c*, over the top of the cork. From the bottom of the proving-lamp C proceed two tubes, one, *h*, connecting with a McLeod gage, N, provided with a weight, W, for easy handling of the mercury-reservoir M of the gage. The other tube, *b*, leads to and connects with the vacuum apparatus F.

The chamber F is preferably of glass, and of very large capacity compared to that of lamp C—say one hundred times its capacity. Connected to F are several Sprengel drop-tubes, one of which, H, is shown, which constantly maintain a high degree of exhaustion in F.

K is the mercury-reservoir for the Sprengel drops, which, passing through the drop-tubes, collect in the mercury-well L, whence it is pumped back to K.

In operation, the carbon to be tested is placed in the proving chamber or lamp C and the mouth hermetically sealed. The stop-cock *x* in tube *b* is then opened, giving free communication between the chambers C and the exhausted receiver F, whereupon there is an immediate equalization of atmospheric tension between C and F. As F, however, is, say, one hundred times the capacity of C, ninety-nine one-hundredths of the air in F is instantaneously exhausted therefrom, giving ordinarily a degree of exhaustion in C sufficient for the proving of the carbon, the McLeod gage N being used to determine whether such degree of exhaustion

has been reached. If the carbon proves defective, it is discarded, the only loss being the labor and material (which are small) involved in the manufacture of the carbon, and not, as hitherto, the labor and material (which were many times greater) necessary to a completed lamp.

It is evident that the vacuum apparatus herein shown for effecting a speedy exhaustion of the proving lamp or chamber may be used with completed lamps for effecting speedily and economically a partial exhaustion of the lamp-chamber, the exhaustion being then completed by the action of suitable exhaust apparatus directly upon the lamp-chamber.

It is evident that several carbons may be tested at once in the proving-chamber or temporary lamp.

What we claim is—

1. The combination, with a globe or chamber, of a much larger chamber or reservoir connected to air-exhausting apparatus, which maintains therein a high degree of exhaustion, substantially as set forth.

2. The combination of a proving chamber or globe, a mercury-reservoir for sealing the same, and exhaust reservoir or chamber and means for exhausting the same, substantially as set forth.

3. The combination of a globe or chamber, a second and much larger globe, chamber, or reservoir, a valved tube connecting them, means for maintaining a high degree of exhaustion in the larger reservoir or chamber, and connected thereto, and a gage for determining the degree of exhaustion, substantially as set forth.

4. The combination, with the globe or chamber of a proving-lamp, of a mercury-reservoir connected to the globe or chamber, so that the stopper thereof may at will be covered or not covered by mercury, substantially as set forth.

5. The method of testing carbons consisting in subjecting them to the action of a current in a temporarily-exhausted globe or receiver prior to their embodiment in completed lamps, substantially as set forth.

This specification signed and witnessed this 28th day of July, 1880.

THOS. A. EDISON.
CHAS. BATCHELOR.

Witnesses:
G. E. GOURAUD,
WM. CARMAN.