(No Model.)

T. A. EDISON.

MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.

No. 248,428. Patented Oct. 18, 1881

Fig. 1.

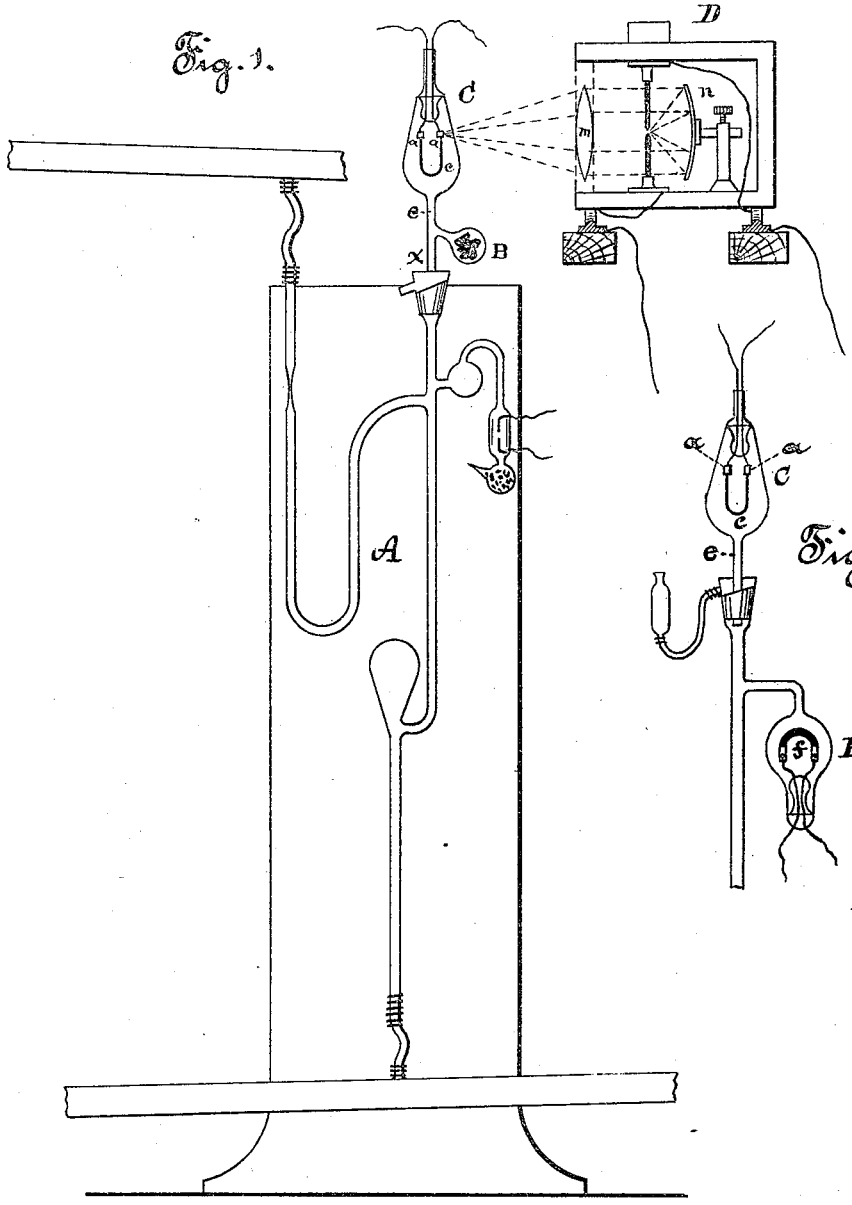

Fig. 2.

Attest:

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MANUFACTURE OF INCANDESCENT ELECTRIC LAMPS.

SPECIFICATION forming part of Letters Patent No. 248,428, dated October 18, 1881.

Application filed January 11, 1881. (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 Incandescent Electric Lamps; and I 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.

My invention relates to that class of electric lamps in which the light is caused by the incandescence of a filament of carbon inclosed in a glass globe. In these lamps it is necessary that the interior of the inclosing-globe should approach as nearly as possible to being a perfect vacuum. A nearly-complete vacuum may be formed in the globe by the use of mercury-pumps; but in the carbon filament and the platinum clamps which hold it there is always a certain amount of occluded air and other gases, which, if they were not removed, would escape, on the carbon becoming heated, into the globe, and thus lower the vacuum therein. These occluded gases may be removed from the carbon itself by simply heating it to incandescence before sealing off the glass; but that portion of the carbon which is held within the clamps, and the clamps themselves, are heated to a less degree than the remainder of the carbon, and consequently the gases are not driven off. It is necessary, therefore, to provide some means whereby these gases may be removed before sealing the globe. To do this I concentrate on the clamps the heat from some external source—as, for instance, from the sun or from a voltaic-arc lamp—which has the effect to drive off the occluded gases therefrom, and these gases are then absorbed by a quantity of heated charcoal, the globe afterward being sealed off. Arrangements for this purpose are shown in the accompanying drawings, in which—

Figure 1 is a view of my apparatus for this purpose, and Fig. 2 a view of a modification thereof.

C is the inclosing-globe of the electric lamp, *c* being the carbon, and *a a* the platinum clamps, in which the enlarged ends of the carbon are held. The lamp is attached at *x* to the mercury-pump A.

B is a glass bulb, containing a quantity of charcoal, preferably a dense cocoanut-charcoal. This bulb is arranged so that it may be heated by means of a lamp.

A is the mercury-pump, by means of which air is exhausted from the lamp. After as near an approach to a vacuum as possible has been attained, the carbon is heated to incandescence by means of a current of electricity, and the occluded gases therein are thus driven off. There still, however, remains, as stated, a quantity of gas in the clamps and the enlarged ends of the carbon, which are never heated to incandescence by the passage of the current.

D is an electric-arc lamp, having a reflector, *n*, placed behind the light, and a lens, *m*, before it, so that the full force of the rays will be concentrated on the clamps *a a*, and they will be heated to a high degree, driving out the occluded gases, which, as they are driven out, are removed by the mercury-pump; but a small amount of gas will still remain in the globe, and to remove it another operation is necessary. The bulb B is heated to a very high temperature, after which the lamp and bulb are sealed off from the pump at *x*. They are then laid aside for twenty-four hours, during which time the carbon filament *c* is occasionally heated, after which the charcoal in the bulb will be found to have absorbed the residual gases from the globe while cooling off. The lamp and bulb may then be separated at *e* by sealing off.

The bulb B may be used for another lamp, the absorbed gas therein being driven off by the application of heat to the bulb.

In Fig. 2 an arrangement is shown which takes the place of the bulb B, and which may be a permanent fixture of the pump A.

E is a glass bulb, and *f* an arc composed of a large piece of cocoanut-charcoal, which is the absorbing material in this case. This does not require a lamp to heat it, as an electric current may be used instead.

Of course the chamber E need not necessarily be permanently attached to the pump, but may be sealed off and again attached, as in the case of the bulb B.

What I claim is—

1. The within-described method of removing the occluded gases or vapors from the incan-

descent conductor of an electric lamp, consisting in heating the same in as near a vacuum as is attainable in the presence of material which will absorb the gases or vapors thereby eliminated, substantially as set forth.

2. The within-described method of removing occluded gases or vapors from the enlarged ends and clamps of the incandescent conductor of an electric lamp, consisting in heating such parts by external heat, focused or centered thereon, in the presence of a material which will absorb the gases or vapors thereby eliminated, substantially as set forth.

3. The combination of an incandescing electric lamp, means for producing a vacuum within its inclosing-globe, and means for concentrating external heat upon the incandescent conductor, and means for absorbing any gases or vapors given off by the incandescent conductor, substantially as set forth.

This specification signed and witnessed this 16th day of December, 1880.

THOS. A. EDISON.

Witnesses:
H. W. SEELY,
ERNEST J. BERGGREN.