(No Model.)

L. SAUNDERSON.

ELECTRIC LIGHT CARBON.

No. 418,474. Patented Dec. 31, 1889.

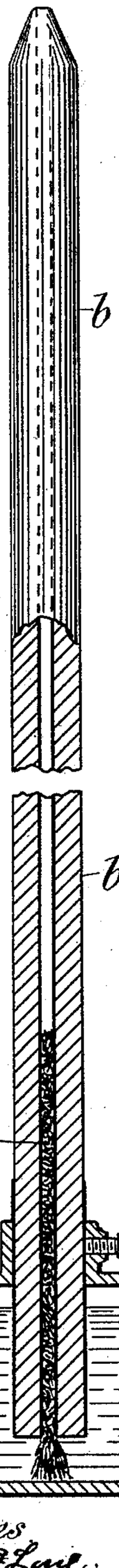

Fig. 1.

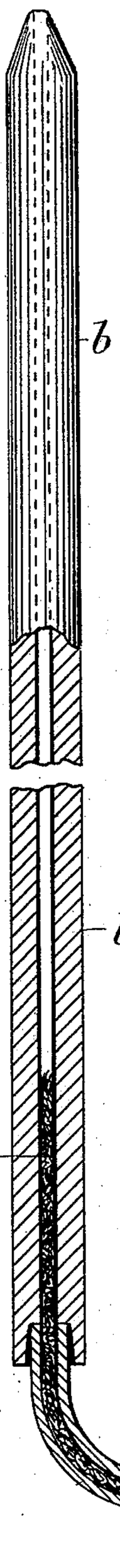

Fig. 2.

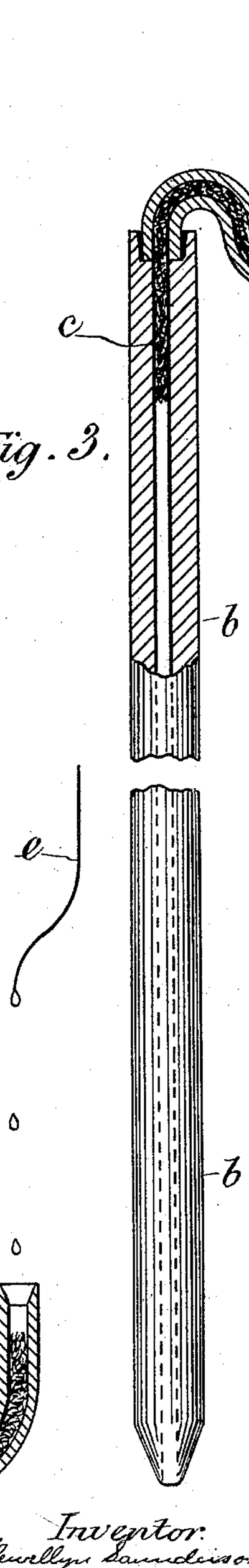

Fig. 3.

Witnesses
Baltus D. Lang.
L. M. Burke.

Inventor:
Llewellyn Saunderson,
By his attys.
Baldwin Davidson & Wright.

UNITED STATES PATENT OFFICE.

LLEWELLYN SAUNDERSON, OF KINGSTOWN, COUNTY OF DUBLIN, IRELAND.

ELECTRIC-LIGHT CARBON.

SPECIFICATION forming part of Letters Patent No. 418,474, dated December 31, 1889.

Application filed December 4, 1889. Serial No. 332,556. (No model.) Patented in England September 28, 1888, No. 13,987; in France February 13, 1889, No. 196,061, and in Belgium May 20, 1889, No. 86,299.

To all whom it may concern:

Be it known that I, LLEWELLYN SAUNDERSON, esquire, J. P., a subject of the Queen of Great Britain, residing at 10 De Vesci Terrace, Kingstown, county of Dublin, Ireland, have invented a certain new and useful Improvement in Electric-Arc Lighting, (for which I have obtained Letters Patent in Great Britain, No. 13,987, dated September 28, 1888; in France, No. 196,061, dated February 13, 1889, and in Belgium, No. 86,299, dated May 20, 1889,) of which the following is a specification.

The object of my invention is to produce an intense yellowish-white light of great illuminating-power in foggy as well as in clear weather between the electrodes of the arc lamp by adding to the arc flame light-rays of long wave length, in which rays the arc light as usually exhibited between carbon electrodes is deficient. I attain this end by supplying to the arc a minute quantity of highly-heated carbonaceous vapor.

My invention is illustrated by the annexed drawings.

Figure 1 is an elevation, partly in section, of the lower carbon for an arc lamp. Fig. 2 is also an elevation, partly in section, of a lower carbon, and shows a modification. Fig. 3 is an elevation, partly in section, of an upper carbon, and shows another modification.

I employ, as shown in Fig. 1, a small box *a*, with a hollow or tubular carbon electrode *b* inserted securely into it through the cover. This box is filled with vaseline or some other semi-liquid hydrocarbon. The electrode has a tightly-packed plug *c* inserted at the end farthest away from the arc. This plug extends two or three inches up the electrode, and is composed of fibrous material, such as cotton, sponge, &c. One end of this fibrous plug is in contact with the vaseline or some other semi-liquid hydrocarbon in the box *a*. This plug will at one end be continually kept slightly moistened with the hydrocarbon, and the remainder of the plug acts as a retarder to the vapor arising from this moistened end produced by the heat of the carbon electrode. A minute quantity only of hydrocarbon vapor is by these means formed at any one time, in consequence of the difficulty the liquid meets with in entering the electrode, and in consequence of the fibrous plug opposing a resistance to the passage of the vapor. This small quantity of vapor in its passage up the electrode, before it enters the arc, becomes highly heated, for the electrode gradually increases in temperature as it approaches the arc, and is enabled to raise this minute quantity of vapor to a very intense heat before it enters into the arc. In this way, without cooling the carbon in the neighborhood of the arc, a small quantity of hydrocarbon vapor is applied at intense heat, which is perfectly consumed at the arc, adding to the light those rays of long wave length which would be otherwise deficient, producing an intense yellowish-white light. These electrodes are capable of being used in an electric-arc lamp of ordinary construction. The upper electrode may be a solid carbon, or it may be an electrode such as is shown by Fig. 3. I, however, consider it unnecessary that hydrocarbon vapor should be supplied simultaneously through both electrodes.

In Fig. 2 I employ a bent tube *d*, preferably of metal closely packed with a fibrous substance. This is inserted into the end of the electrode *b* farthest away from the arc. The fibrous plug *c* is allowed to continue a short way up the hollow electrode, and it is moistened with paraffine-oil or like carbonaceous liquid in the following manner: Four to six drops per minute of the oil are allowed to drop from a reservoir, and are led by a wire *e* upon the upper end of the plug. This is for the purpose only of causing one end of the plug to be continually moistened. The remainder of the plug acts as a retarder to the vapor arising from this moistened end, produced by the heat of the electrode. A minute quantity only of hydrocarbon vapor is by these means formed at any one time, and in consequence of the obstruction it meets with from the plug in its passage up the electrode, before it enters the arc, the vapor is detained in the electrode sufficiently long to cause this minute quantity of vapor to be raised to a very intense heat before it is allowed to enter into the arc.

In Fig. 3 the arrangement is similar to that described in respect to Fig. 2; but, this being an upper electrode, the form of the tube at its end is different.

In order to prevent the hydrocarbon from being absorbed by the porous carbon electrode and to saturate the same, and so to escape in vapor before it reaches the arc, I line the interior passage in the electrode with an enamel consisting of hard pitch or bitumen dissolved in a solvent. This enamel I apply with a brush and allow it to harden. In the same way I coat the end of the electrode where the same is inserted into the box, and the exterior surface of the carbon may be similarly coated, if desired. Thus the hydrocarbon liquid is kept from contact with the porous surface of the electrode.

I would state that I am aware of the patent granted to Orazio Lugo, No. 207,754, in which hollow electrodes are proposed to be employed with wicks, which convey hydrocarbon oil from end to end of the electrode and up to the point of the electrode where the oil is vaporized and ignited. The effect of this is to cool the electrode where it should for my purpose be most intensely heated, and also to deposit carbon upon it, while in my case the hydrocarbon is all consumed. My invention differs essentially from this, in that I do not permit the liquid to be conveyed to the point of the electrode where the light is exhibited. I do not cool the point of the electrode, nor do I deposit carbon upon it, for I find if these things be done that (although no doubt the electrode is rendered more durable) the light is greatly decreased. I therefore, while supplying to the arc a limited quantity of hydrocarbon vapor and that at an intense heat, not only carefully maintain the heat at the point of the electrode, but also greatly intensify it, not permitting the liquid to approach it, and substituting for a wick a tight fibrous plug a short way only up the interior of the electrode.

What I claim is—

1. In an arc lamp, the combination consisting of carbon electrodes (one or both hollow) connected with an electric source and usual devices for the production of the electric arc between the electrodes, a box containing vaseline or other semi-liquid hydrocarbon attached to the end of the hollow electrode farthest away from the arc, and a tightly-fitting fibrous plug inserted a short way up the electrode at the end which enters the box, and a space within the electrode void of fibrous plug or packing between the packing at one end and the arc at the other.

2. In an arc lamp, the combination consisting of carbon electrodes (one or both hollow) connected with an electric source and usual devices for the production of the electric arc between the electrodes, a tightly-fitting fibrous plug inserted a short way up the hollow electrode, a space within the electrode void of fibrous plug or packing between the packing at one end and the arc at the other, and means for supplying liquid hydrocarbon to the plug or packing at the end farthest away from the arc.

3. In an arc lamp, the combination consisting of carbon electrodes (one or both hollow) connected with an electric source and usual devices for the production of the electric arc between the electrodes, a tightly-fitting fibrous plug inserted into the hollow electrode, a lining of bituminous enamel to the passage in the hollow carbon electrode, and means for supplying liquid hydrocarbon to the plug or packing at the end farthest away from the arc.

LLEWELLYN SAUNDERSON.

Witnesses:
ROB. H. GRATTAN,
A. WM. LABERTOUCHE.