

(No Model.)

W. S. RICHARDS.
ARC LAMP ELECTRODE.

No. 458,376.

Patented Aug. 25, 1891.

Fig. 1.

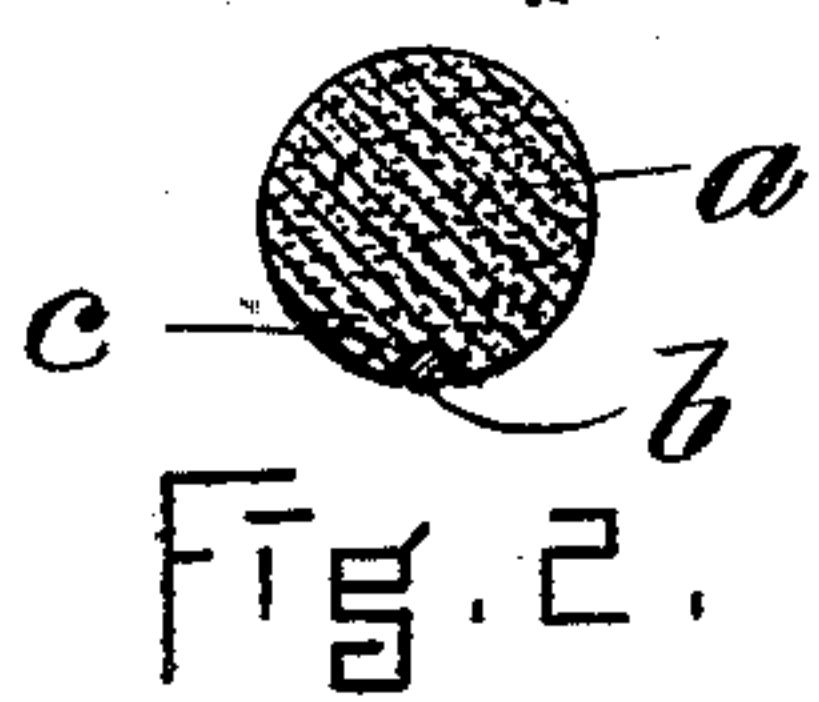
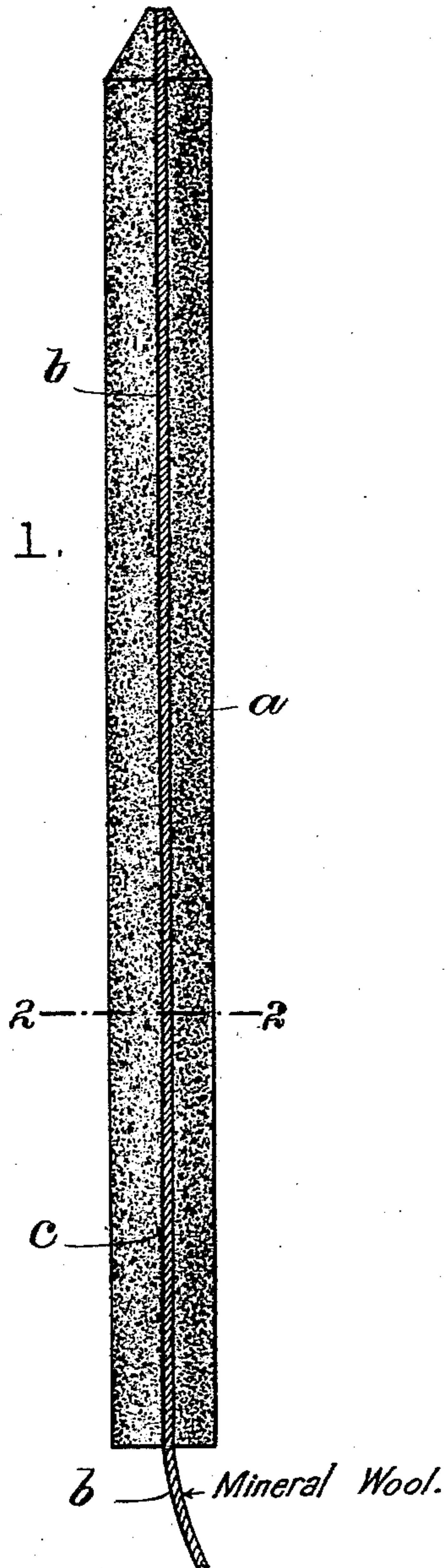
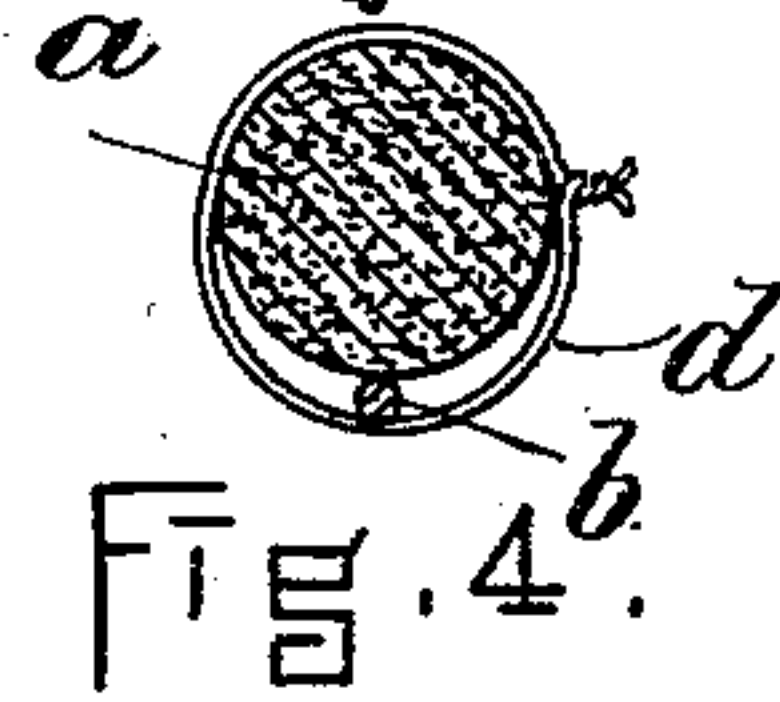
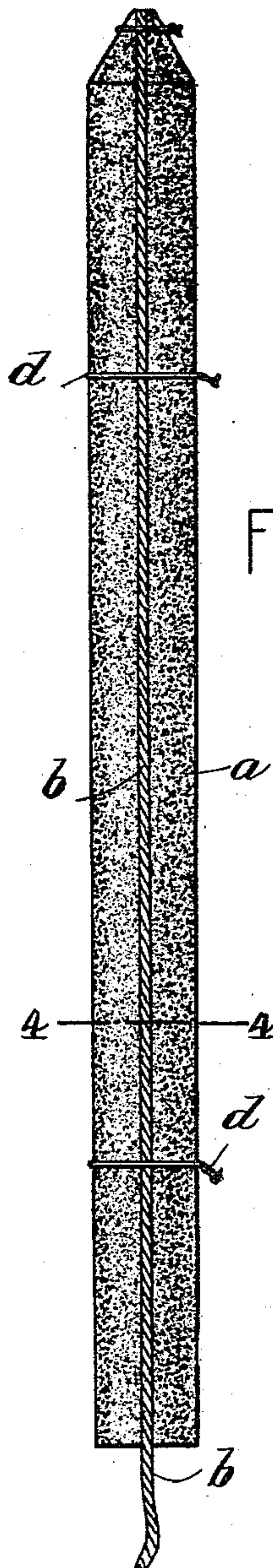


Fig. 3.



WITNESSES.

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UNITED STATES PATENT OFFICE.

WALTER S. RICHARDS, OF NATICK, ASSIGNOR OF ONE-HALF TO GEORGE B. JAMES, OF BOSTON, MASSACHUSETTS.

ARC-LAMP ELECTRODE.

SPECIFICATION forming part of Letters Patent No. 458,376, dated August 25, 1891.

Application filed January 8, 1891. Serial No. 377,143. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. RICHARDS, of Natick, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electrodes for Arc Lamps, of which the following is a specification.

This invention relates to carbon electrodes for arc lamps which are provided with capillary conductors of refractory material adapted to conduct a liquid hydrocarbon to the arc or burning end of the electrode, where said hydrocarbon is converted into gas, which intensifies and improves the quality of the light. Carbon electrodes to which this principle is applied have heretofore been made hollow or tubular, each electrode having a central longitudinal passage entirely surrounded by the material of the electrode and containing a capillary conductor of refractory material, such as asbestos, said conductor extending through the center of the burning end of the electrode at a point where the heat attending the production of the illuminating arc is the greatest. Two serious objections attend this construction of the electrode, namely: first, the capillary conductor being entirely surrounded by the burning mass of carbon is so acted on by the intense heat that it soon becomes entirely consumed and rendered useless for a considerable distance into the body of the electrode, and therefore fails to conduct the hydrocarbon or other agent into the necessary proximity to the arc to give the desired increased illumination; second, the hydrocarbon passing through the capillary conductor being entirely surrounded by the material of the electrode has no access to the atmosphere until it reaches the arc, so that it does not assume a gaseous form as readily and rapidly as it would do if the air had freer access to the hydrocarbon passing through the capillary conductor.

My invention has for its object to overcome the above-mentioned objections; and to this end it consists in a carbon electrode having a capillary conductor of refractory material arranged at the exterior of the electrode and extending lengthwise thereof, the said capillary conductor being exposed along its entire length to the atmosphere, so that it is not at-

tacked and destroyed by the heat, excepting at the immediate point where the arc is formed, and exposes the hydrocarbon conducted thereby to the action of the air to such an extent that the conversion of the hydrocarbon into gaseous form is more rapid than it would be if the capillary conductor were entirely surrounded by the material of the electrode, as heretofore.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side view of a carbon electrode and a capillary conductor thereon, the electrode having in its surface a longitudinal groove, which receives the capillary conductor or a portion thereof and retains the same in place, at the same time exposing it to the atmosphere. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a side view of an electrode having the capillary conductor placed upon its surface instead of in a groove and secured by external fastenings. Fig. 4 represents a section on line 4 4 of Fig. 3.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents a carbon electrode of the general form ordinarily used in electric-arc lamps, and *b* represents a capillary conductor or wick of any suitable refractory material, such as mineral wool. The said capillary conductor extends the entire length of the electrode, and preferably projects beyond the end of the same opposite the end where the arc is formed so that it may enter a suitable reservoir containing a liquid hydrocarbon.

My invention, as above indicated, is carried out by locating the capillary conductor *b* upon the exterior of the electrode, so that its entire length will be exposed to the atmosphere instead of being surrounded by the material of the electrode, as heretofore.

In Fig. 1 I have shown the capillary-conductor located in a shallow longitudinal groove *c* in the surface of the electrode, said groove receiving the capillary conductor, but not excluding the air therefrom. The object of the groove is simply to retain the capillary conductor in place, and this may be accomplished by making the conductor of such size that it requires to be compressed to

enter the groove, or the conductor may be fastened by any suitable means to the surfaces of the groove.

5 In Figs. 3 and 4 I show the conductor *b* as bearing on the surface of the electrode, no grooves being provided in the latter. In this case the conductor may be held in place by independent fastening *d d*, which are here shown as pieces or bands of wire. These fast-
10 ening will be readily consumed by the electric action when the electrode burns down to the point where they are located. It will be seen that by locating the conductor *b* at the exterior of the electrodes the conductor is so ex-
15 posed to the atmosphere that it cannot be destroyed by the heat at a point far enough from the arc to prevent the hydrocarbon gas carried by the conductor from properly entering the arc. It will also be seen that the free ac-
20 cess of the atmosphere to the conductor *b* fa-

cilitates the conversion of the liquid hydrocarbon into gaseous form.

I claim—

1. An electrode having a capillary conductor of refractory material extending along 25 its exterior, said conductor being exposed to the atmosphere, as set forth.

2. A carbon electrode having an open longitudinal groove in its surface, combined with a capillary conductor of refractory material 30 contained in said groove and exposed to the atmosphere, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 2d day of 35 January, A. D. 1891.

WALTER S. RICHARDS.

Witnesses:

EWING W. HAMLEN,
C. F. BROWN.