No. 889,937. PATENTED JUNE 9, 1908.

G. M. LITTLE.

ELECTRODE FOR ARC LAMPS.

APPLICATION FILED MAY 10, 1906.

Fig. 1.

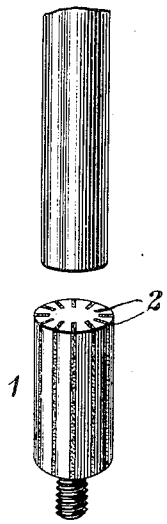


Fig. 2.

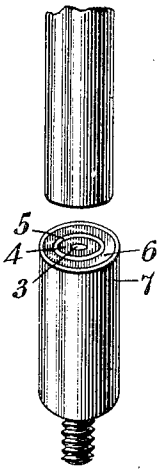
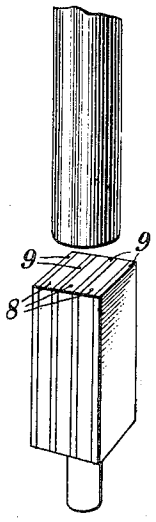


Fig. 3.



WITNESSES:

C. L. Belcher

Otto S. Schairer

INVENTOR

Geo. M. Little

BY

Kirkpatrick

ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE M. LITTLE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

ELECTRODE FOR ARC-LAMPS.

No. 889,937. Specification of Letters Patent. Patented June 9, 1908.

Application filed May 10, 1906. Serial No. 316,131.

To all whom it may concern:

Be it known that I, GEORGE M. LITTLE, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Electrodes for Arc-Lamps, of which the following is a specification.

My invention relates to arc lamps and particularly to those in which one of the electrodes is composed of materials which cause the arc to be "luminous".

The object of my invention is to provide an anode for a lamp of the character indicated which will enable ready starting of the lamp under all conditions as well as the production of a steady, uniform light.

Arc lamps are now frequently provided with composition electrodes of such character that the arcs produced are more luminous than those produced between ordinary carbon electrodes and also such that they are very much less rapidly consumed. An electrode which has been found suitable in practice has been composed of a mixture of magnetic oxid of iron which is a conductor both when hot and when cold and which gives conductivity to the electrode, oxid of titanium which imparts appropriate color and brilliancy to the arc, and oxid of chromium which steadies the arc and prevents the electrodes from being rapidly consumed, these substances being combined in various and suitable proportions. Other compositions of these metals or of others having similar or suitable properties may also be employed. Such an electrode has usually been employed as the cathode in combination with a copper positive electrode which is but very slowly consumed. In operation of the lamp, however, a slag forms on the anode that is composed of the oxid of copper, a very poor conductor when cold, which prevents electrical contact between the electrodes and consequently interferes with ready starting of the lamp after it has once been in use. For this reason it has been proposed to employ iron for the positive electrode or some other metal, the oxid of which is a conductor. Iron, however, is more rapidly consumed than copper and what has been termed "pooling" frequently occurs when it is employed; that is, the arc plays upon a comparatively small portion of the end of the composition electrode until the surface becomes hollowed and a depressed pool of the molten oxids forms, upon which the arc moves rapidly, resulting in flickering of the light.

I have found that the advantages pertaining to both copper and iron, when employed as the positive electrodes in lamps of the character indicated, may be secured and the disadvantages of both be obviated or reduced by providing a positive electrode that is composed of both of these metals in the proper relations and proportions.

Figure 1 of the accompanying drawing is an isometric view of the electrodes of an arc lamp, one of which is constructed in accordance with my invention, and Figs. 2 and 3 are similar views of modifications.

As here shown in Fig. 1, the anode 1 comprises a rod or cylinder of iron or other metal, the fused oxid of which is a conductor when cold, having longitudinal radial slots or recesses in which strips 2 of another metal, such as copper, are located. While I prefer that the main portion of the anode be composed of iron and that the copper strips be placed in the radial slots, a reversal of this arrangement may be employed, if desired. Other metals than copper and iron may also be employed without departing from the spirit of the invention so long as the fused oxid of one of the metals is a conductor when cold while the fused oxid of the other may or may not be a non-conductor when cold. For instance, silver may be conveniently employed instead of iron since the fused oxid thereof is a conductor. The electrode may also be formed, if desired, as shown in Fig. 2 in which cylinders 3, 4, 5, 6 and 7 that are composed alternately of copper and iron placed one within another, or it may be formed of plane strips or laminations 8 and 9 of copper and iron, as indicated in Fig. 3, or in any other suitable manner, it being preferable, however, in all cases, to make the outer layer or the larger portion of the superficial area that is not exposed to the arc of iron. With such an electrode, I have found that pooling does not occur and that consequently a steady arc results. The rate of consumption of the electrode is also considerably less than that of iron alone, and it has been found that, if the larger portion of the exposed area is composed of iron, the life of the electrode may even be greater than that of copper alone, the iron serving as mechanical means

for preventing scaling of the oxid that forms upon the surfaces of the copper unexposed to the arc, thereby preventing continued oxidation of the copper.

I claim as my invention:

1. An arc lamp electrode composed of copper and iron.

2. An arc lamp electrode comprising a rod of iron and strips of copper embedded therein.

3. An arc lamp electrode comprising a plurality of layers composed alternately of iron and copper.

4. An arc lamp electrode comprising a plurality of layers composed alternately of a metal the fused oxid of which is a conductor and a metal the fused oxid of which is a non-conductor when cold.

In testimony whereof, I have hereunto subscribed my name this 1st day of May, 1906.

GEORGE M. LITTLE.

Witnesses:

OTTO S. SCHAIRER,

BIRNEY HINES.