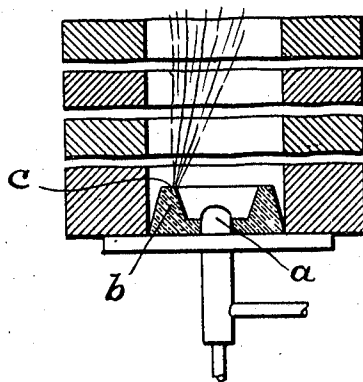


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ELECTRODE FOR PRODUCING ARCS.
APPLICATION FILED MAY 1, 1912.

1,055,295.

Patented Mar. 4, 1913.



WITNESSES:

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ELECTRODE FOR PRODUCING ARCS.

1,055,295.

Specification of Letters Patent.

Patented Mar. 4, 1913.

Original application filed November 22, 1911, Serial No. 661,763. Divided and this application filed May 1, 1912. Serial No. 694,436.

To all whom it may concern:

Be it known that I, GUSTAV WAGENER, a subject of the Emperor of Germany, residing at Schlebusch-Manfort, Germany, have invented a new and useful Improvement in Electrodes for Producing Arcs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of the specification.

My invention relates to certain improvements in electrodes used for producing arcs, and principally for the production of long arc lights for carrying out gas reactions. Its object is to considerably reduce the wear and tear of such electrodes where made of metal. This wear and tear of metal electrodes is due to the heat of such arc lights for which they are the starting point, and occurs even when these metal electrodes are hollow and are internally cooled by some cooling medium, for instance, water.

In an application filed November 22, 1911, Serial No. 661,763, of which this application is a division, I described and claimed an electrode for minimizing or eliminating said wear and tear, said electrode comprising a water-cooled metallic electrode embedded in and surrounded by a body, preferably conical-shaped, of cement, clay or similar refractory non-volatile material which, although a non-conductor of electricity at ordinary temperature, is rendered conductive by heat and acts, after being so heated, to maintain the arc. In said application a modification is set forth in which the surrounding body is shaped so as to form a cup through the base of which the metallic electrode extends and the upper rim of which extends beyond the end of the metallic electrode. It is this and similar embodiments of my broad invention which is the subject matter that I desire to protect in this patent.

The construction will be clear from the drawing, in which the figure represents a sectional view of an electrode embodying my invention.

a is a water-cooled metallic electrode.

b is a surrounding body of cement, clay or other non-volatile refractory earths. This body is preferably conical in shape, but as shown the cone is hollowed out to form a cup whose inner wall slopes inwardly toward the base. As shown, the internal di-

ameter of the cup at its base—where its diameter is least—is greater than the diameter of the metallic electrode; and the internal diameter of the cup at its mouth is of substantially greater diameter than that of the metallic electrode. The metallic electrode is embedded in, and projects above the level of, the base of the cup, but the rim of the wall of the cup projects substantially beyond the end of the metallic electrode. The end of the metallic electrode is thus surrounded by, and spaced from, a wall of refractory earth which projects beyond the end of the metallic electrode.

It will be understood that the arc is initially formed by the metallic electrode, the surrounding body *b* being, when cold, a nonconductor. As soon, however, as the body *b* has been heated sufficiently to cause it to act as a conductor, the arc forms at the point *c* from the rim of the wall of the body. The fresh air entering from the side tends to press the arc toward the metallic electrode; but not only is the affinity of the arc for the surrounding body greater than for the metallic electrode due to the cooling of the latter, but the metallic electrode is so remote from the rim of the wall of the body *b* as to prevent the arc reforming from its original point of departure. During the maintenance of the arc it assumes different positions along the rim of the body *b*.

The metal electrode, itself, is affected but little by the arc, and its wear and tear reduced to a minimum. The surrounding body is of such material as to be well able to withstand the action of the arc, and furthermore, due to the frequent changing of the starting point of the arc, the full effect of the arc is distributed over a considerable area.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. An improved electrode for producing arcs for carrying out gas reactions, comprising an artificially-cooled metallic electrode and a surrounding body of material normally non-conductive but adapted to be rendered conductive by heat, said surrounding body projecting beyond the end of the metallic electrode and adapted, after its ele-

variation in temperature following the initial formation of the arc by the metallic electrode, to maintain the arc by reason both of the distance between the rim of the body and the metallic electrode and because of the greater affinity of the arc for said surrounding body due to the cooling of the metallic electrode.

2. An improved electrode comprising a metallic electrode and a surrounding body of material normally non-conductive but adapted to be rendered conductive by heat, said surrounding body comprising a wall spaced from and projecting beyond the end of the metallic electrode.

3. An improved electrode comprising a body of material normally non-conductive but adapted to be rendered conductive by heat, said body having a cup-shaped recess, and a metallic electrode extending through the base of the cup into said recess.

4. An improved electrode comprising a cup-shaped body of material normally non-conductive but adapted to be rendered conductive by heat, and a metallic electrode extending through the base of the cup and projecting above the base a distance less than the height of the wall of the cup.

5. An improved electrode comprising a

metallic electrode and an exteriorly shaped conical body, said body having a recess formed in its narrowest end, of substantially greater diameter than the diameter of the metallic electrode and into which recess the metallic electrode extends.

6. An improved electrode comprising a metallic electrode and an exteriorly-shaped conical body, said body having a recess formed in its narrowest end, said recess having a wall sloping inwardly toward the base and said metallic electrode extending through the base and extending above the base a distance substantially less than the height of said wall.

7. An improved electrode comprising a metallic electrode and a surrounding body of refractory earth in which the electrode is embedded, said body having a wall surrounding and spaced from the projecting end of the metallic electrode.

In testimony of which invention, I have hereunto set my hand at Cologne, Germany, on this 15th day of April, 1912.

GUSTAV WAGENER.

Witnesses:

LOUIS VANDORY,
BESSIE F. DUNLAP.