

UNITED STATES PATENT OFFICE.

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ARC-LIGHT ELECTRODE.

1,147,422.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, WILLIAM ROY MOTT, a citizen of the United States, and a resident of Lakewood, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Arc-Light Electrodes, of which the following is a clear and exact description.

This invention relates to arc lamp electrodes of the inclosed vertical-feed type, and has for one of its objects the-absorption of harmful vapors that attack the globe and other lamp parts.

Another object is to improve the steadiness and increase the amount of light emitted.

Another object is to decrease the slagging tendency.

Another object is to use a material in the electrodes that will produce a white deposit on the economizer and other lamp parts so that a good reflecting surface will be had.

Other objects will appear in the appended description.

Certain compounds such as calcium fluorid, strontium fluorid and the rare earth fluorids greatly increase the light, but they often cause etching of the globe and other lamp parts due to a small quantity of hydrofluoric acid and other fluorin vapors formed during the burning in the lamp. Other harmful vapors such as hydrochloric acid is also formed in some instances. The etching of the globe decreases the efficiency of the light and this together with the corroding of the lamp parts by such vapors greatly increases the cost of repairs of inclosed arc lamps. The salts referred to also have slagging tendencies that are very objectionable. Slag is liable to congeal on the electrode ends and prevent the arc from re-starting, since it is practically non-conducting when cold.

Many flaming materials deposit out on the economizer and other lamp parts as a dark deposit which absorbs light and decreases the efficiency. Such deposits are often in the form of slag making it inconvenient to clean the parts. The addition of flaming materials to the electrodes also tends to cause repeated flickering of the arc making it unsuitable for some forms of illumination. Any one of these difficulties may be overcome by the addition of certain materials, but such addition greatly aggravates the remaining difficulties. After long research I

have discovered that all these objections can be remedied by combining, within certain limits, a number of materials, and in addition such combination causes an increase in candlepower. I have found that if the electrode contains from 2 to 8% of zinc material; preferably the oxid, the fluorid and other harmful vapors will interact with the zinc in the arc and prevent the etching of the globe or other corroding of the lamp parts. The zinc from the oxid exists as zinc vapor in regions of the arc and the combining tendency between zinc and fluorid vapors is very great. By making provision for the existence of zinc vapor in the arc, the elimination of the harmful fluorid and other vapors is assured.

If the zinc materials are added in excess of the amount ordinarily required to absorb the vapors mentioned it will combine with oxygen to form the oxid in the outer regions of the arc and this gives out heat which tends to raise the temperature of the cooler portion of the arc. The reaction between the zinc and the fluorid vapors also results in liberating heat. Such chemical reactions in the arc are beneficial, as an increase in temperature of the arc increases the light emitted. The zinc oxid formed from the excess zinc vapor deposits on the economizer and other lamp parts in a powdery form which can be readily removed. The deposit, being snow white, acts as a good reflecting surface. The zinc oxid also materially reduces the slag formation on the electrode tips which in itself is a very desirable feature. Another advantage of zinc oxid is that it is non-hygroscopic and will not absorb moisture. Some materials that have advantages in lamp electrodes as flaming materials such as calcium oxid, cannot be used on account of being hygroscopic. The water absorbed causes the disintegration of the carbons.

As an example of a preferable mixture for electrodes the following is given: calcium fluorid 26%, rare earth oxids 5%, zinc oxid 5%; potassium chlorid 4% and carbon 60%. The proportions given may vary, the above being only a typical example. The amount of zinc oxid depends principally upon the amount of fluorid forming and slag forming compounds in the electrode. I find that 5% of the oxid is a satisfactory amount for compositions approximately as given above,

though the content may vary between 2 and 8%.

Instead of calcium fluorid, the rare earth fluorids or strontium fluorid may be used.

- 3 Other alkali salts may be used in place of potassium chlorid and I sometimes add sulfates to the amount of one-fourth of the weight of the calcium or other fluorid.

10 Having described my invention what I claim is:

1. In an arc lamp, the combination with a compound containing fluorin, of a zinc material, to prevent the formation of glass-etching vapors in the arc.
- 15 2. An arc lamp electrode containing a fluorid and zinc material to combine therewith in the arc vapors to prevent the formation of glass-etching vapors.

3. An arc lamp electrode containing a fluorid and zinc oxid.

4. An arc lamp electrode containing carbon, a fluorid and zinc oxid. 20

5. An arc lamp electrode containing a fluorid, zinc oxid and rare earth oxids.

6. An arc lamp electrode containing a fluorid, zinc oxid, rare earth oxids and potassium chlorid. 25

7. An arc lamp electrode containing carbon, fluorin compounds and zinc oxid.

In testimony whereof I have hereunto signed my name. 30

WILLIAM ROY MOTT

Witnesses:

HOWARD L. BARKDULL,
EDWARD M. SPELMAN.