# UNITED STATES PATENT OFFICE.

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## ELECTRODE.

1,093,957. Specification of Letters Patent. **Patented Apr. 21, 1914.**

No Drawing. Application filed April 6, 1912. Serial No. 689,056.

*To all whom it may concern:*

Be it known that I, EZECHIEL WEINTRAUB, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electrodes, of which the following is a specification.

My invention has reference to an electrode of the flaming or luminous type, in which substantially all of the light is emitted from the arc itself, as distinguished from an incandescent electrode tip. An arc of this character is long and is apt to be unsteady.

I have found that cyanids or materials containing the cyanogen group exert a marked and unexpected steadying influence upon an arc of the above character. These materials while not limited to such use, are particularly beneficial when used in conjunction with titaniferous materials and especially titanium oxid, which form an arc that is white and efficient, but which is long and slender and has a tendency to be unsteady; the addition of cyanids to the arc overcomes this defect. But cyanids themselves produce poisonous vapors during the operation of the lamp, and while it is possible to burn such electrodes in inclosed flame lamps that are known at the present time and in which the vapors carrying products of combustion are confined within a closed space, and so do not vitiate the surrounding atmosphere during the operation of the lamp, such poisonous vapors are still dangerous to the lamp trimmer; and in the present state of the art, such compounds would not be permitted. Cyanamids, however as distinguished from cyanids, are not poisonous, and I find that they exert the same steadying influence upon a flame arc of the above character as is exerted by the cyanids and by using compounds in which the cyanamid group is combined with suitable metals, I am enabled to obtain the beneficial light resulting from the use of such metals, and at the same time to obtain the steadying effect of the cyanamid group.

I have made a good and useful electrode by thoroughly mixing together in a finely divided condition, calcium cyanamid 150 parts, titanium oxid, $TiO_2$, 250 parts, cryolite 150 parts and carbon 800 parts. This mixture is thoroughly mixed with a suitable binding material, such as pitch. The mixture is then squirted and baked in a manner well understood in the art. I have also made a good electrode without using any flux whatever, by mixing together titanium oxid ($TiO_2$) two parts and calcium cyanamid one part; of this mixture I take thirty parts and thoroughly mix it with seventy parts of carbon and incorporate therewith a suitable binding material and squirt and bake as before.

As calcium cyanamid is very cheap, an electrode made in accordance with my invention is inexpensive. My invention, however, is not confined to the use of any particular cyanamid, although calcium cyanamid has proved to be exceptionally good. Other cyanamids, such as cerium cyanamid and other compounds of this group, might be used.

While I have given as an illustration a method by which my electrode may be made, it will be understood that the electrode may be manufactured in accordance with any method known to the art. It will also be understood that while I have given the proportions of ingredients that may be used in the preparation of the electrode, such proportions are given by way of illustration only and may vary greatly, and while an electrode containing a much smaller proportion of total salts would give a smaller amount of light and be a less efficient one than an electrode having the proportions of salts that I have above indicated, it is obvious that such an electrode would at the same time be more efficient than a plain carbon electrode. The proportion of total salts should not, however, in general exceed in amount about 50% of the total electrode, as above this amount an excessive amount of slag is formed, which seriously interferes with the proper operation of the lamp, and usually I prefer not to use more than about 40% total salts.

An electrode made in accordance with my invention may be used in open flame lamps if desired, but it is particularly valuable for use in an inclosed lamp. It may be used on alternating or direct currents and may

be combined with another electrode of the same character or in combination with a plain carbon electrode, as desired.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. An electrode containing calcium cyanamid, titanium oxid and carbon.

2. An electrode containing calcium cyanamid, titanium oxid, carbon and a flux.

3. An electrode containing a predominating amount of carbon as a vehicle for the arc, calcium cyanamid and rutile.

In witness whereof, I have hereunto set my hand this fourth day of April, 1912.

EZECHIEL WEINTRAUB.

Witnesses:

JOHN A. MCMANUS, Jr.,

JOHN G. CALLAN.