106-84 CROSS REFERENCE EXAMINER

No. 788,493. PATENTED APR. 25, 1905.

H. C. PARKER.

INCANDESCENT ELECTRIC LAMP.

APPLICATION FILED JULY 2, 1904.

313-315

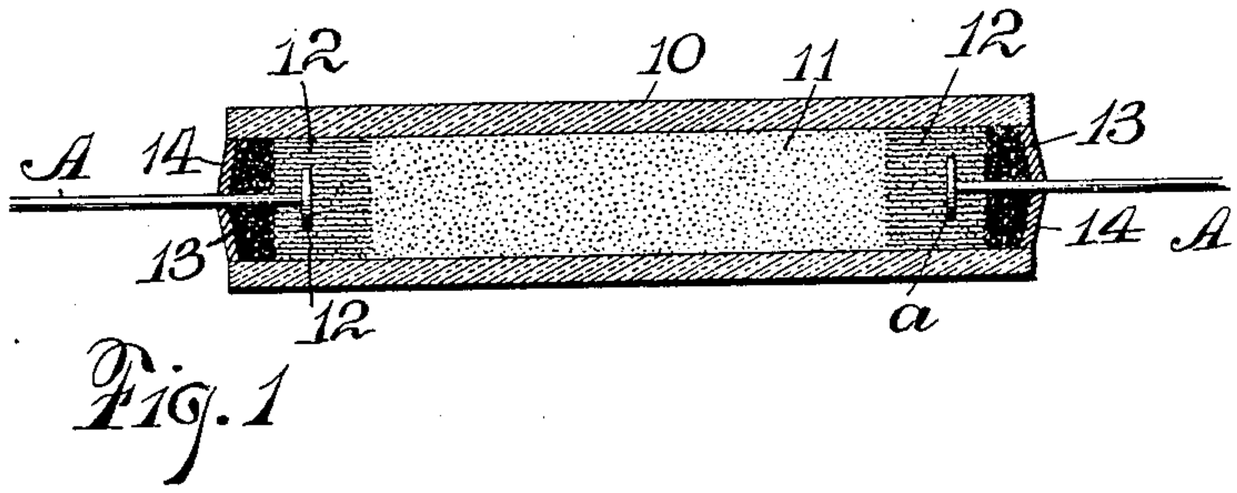

Fig. 1

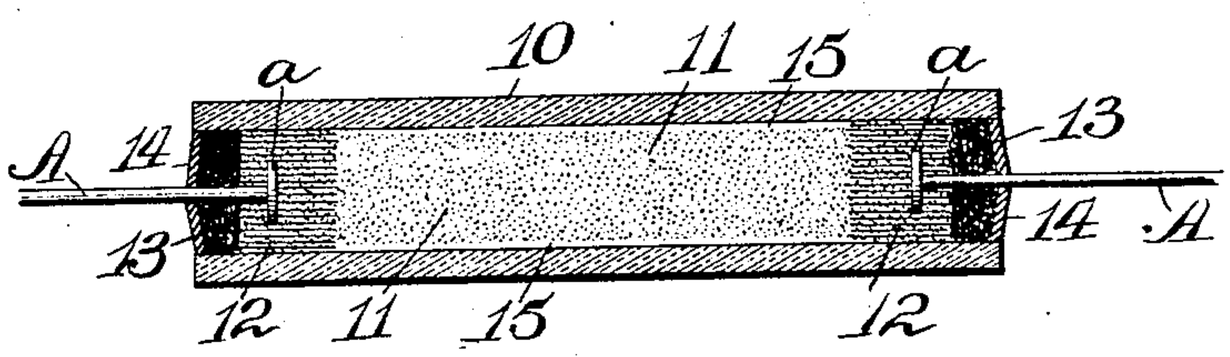

Fig. 2

WITNESSES:

Wm. H. Canfield.

J. C. Banta.

INVENTOR.

Herschel C. Parker.

BY W. B. Hutchinson.

ATTORNEY.

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No. 788,493. Patented April 25, 1905.

UNITED STATES PATENT OFFICE.

HERSCHEL C. PARKER, OF NEW YORK, N. Y.

INCANDESCENT ELECTRIC LAMP.

313-315

SPECIFICATION forming part of Letters Patent No. 788,493, dated April 25, 1905.

Continuation of Serial No. 201,643, filed April 5, 1904. This application filed July 2, 1904. Serial No. 216,043.

To all whom it may concern:

Be it known that I, HERSCHEL C. PARKER, of New York, in the county of Kings and State of New York, have invented a new and Improved Incandescent Electric Lamp, of which the following is a full, clear, and exact description.

My invention relates to improvements in incandescent electric lamps; and the object of my invention is to produce a practically indestructible lamp which has a higher efficiency than the lamp in general use and which is likewise cheaper to manufacture.

My invention is especially intended to produce a lamp in which the incandescent material is arranged in the core formed inside of a refractory translucent tube and in which the incandescing material is raised to a heat sufficient to melt any kind of glass. As the amount of light increases greatly with the increase of heat, to produce a bright light in lamps of high resistance a state of heat is required which is so much higher than that necessary to melt the most refractory glass that if an attempt is made to heat the resisting matter in a glass tube the latter almost instantly slags and renders the lamp useless. It has been discovered, however, that quartz tubing has the transparent effect of glass and that it will stand the most intense heat to which a contained resisting-body is subjected in producing a light of high efficiency, and it is necessary to employ a tubing capable of withstanding (without slagging) the intense heat indicated. I have found, further, that if the tube is essentially straight the resisting-body can be packed in powdered or granulated form so closely that there is little chance of combustion.

In the drawings I have shown the parts greatly exaggerated in order that the construction can be understood; but in practice I use a refractory translucent or transparent tube, preferably of very small bore and of a nature to withstand a heat sufficient to slag glass. In this I pack closely a resisting-body, such as a stable oxid like thorium oxid or carborundum, and at the ends of the tube I pack graphite or some better conductor, so that the terminals may connect with this conductor and not be unduly heated. With the resisting matter I also incorporate sufficient graphite to cause the current to pass through it, but not sufficient to reduce resistance too much. Obviously the end portions of the lamp should be of less resistance than the body portion, so that the terminals may not be affected and that the body part will give an efficient light.

With these ends in view my invention consists of an incandescent electric lamp the construction of which will be hereinafter described and the novel features claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which the letters and figures represent corresponding parts in both the views.

Figure 1 is a longitudinal section of a simple form of lamp embodying my invention; and Fig. 2 is a similar view, but showing the effect of crystallization of the resisting part of the lamp.

The tube 10 is preferably, and I believe necessarily, of quartz, as I have found that this resists perfectly the high heat of the body portion 11 of the lamp, and it has the necessary light-permeable qualities. It is possible that a refractory non-conducting light-permeable tube can be made of other material; but the essential thing is to have the tube capable of withstanding a heat higher than that required to slag glass. I have tried many kinds of glass to see if any efficient results could be attained with it; but as glass melts at approximately 1,200° Fahrenheit and the heat required to produce a lamp of high efficiency is vastly higher than this it is obvious that the use of glass is out of the question. I am aware also that certain forms of crystals have been used for producing a lamp, the crystals having channels in them in which a conductor is laid; but this is impractical, first, for the reason that such a lamp is enormously expensive, and, second, that it is impractical to keep out the oxygen.

In producing my lamp the tube has the resisting-body 11, preferably of a stable oxid such as described, with a small percentage of graphite mingled with it hammered into the

tube, so that it is packed as tightly as possible. In order to secure the results desired, it is important that the materials forming the core be free—that is, that they have no binder by which the materials are stuck together. Hence the term "free" in this connection will be understood as meaning independent particles which are not united by a binder. At the ends of this portion 11 I place graphite 12 or other conductor. Behind this I pack asbestos 13 to hold the powder in place. Before packing the asbestos, however, the terminals *a* of the wires A are embedded in the graphite, and then after the asbestos is in position the ends of the tube are sealed, as at 14. Any suitable cement having the proper coefficient of expansion and the necessary elasticity can be used for this purpose. I have used carborundum with a suitable binder, such as silica or water-glass.

The particular form of connection is not essential; but it is essential that the wires have an excellent contact with the graphite 12.

When the current is turned on, the resistance offered by the body portion 11 causes the latter to be quickly raised to a high heat, and consequently the lamp is made bright instantly. I find that there are practically no chemical changes, and so far my experiments have shown merely a slight crystallization, as indicated at 15, on the inner surface of the tube 10; but this takes place at the first heating and does not in any way impair the subsequent efficiency of the lamp.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In an electric lamp, a highly-refractory non-conducting tube, permeable to light, a conductive but resisting core of free particles tightly packed within the tube, the ends of the core offering less resistance to current than the intermediate portion thereof, and circuit-terminals held in the end portions of the tube.

2. An electric lamp comprising a tube of quartz, a tightly-packed resisting but conductive core of free particles within the tube, the said core being less current resistant at the ends than at the middle portion and circuit-terminals connected with the end portions of the core.

3. An electric lamp comprising a tube of quartz, a conductive but resisting filling of free particles tightly packed in the tube, the filling at the ends of the tube offering less resistance to a current than the filling in the intermediate portion of the tube and suitable terminals connected to the said conductors.

4. An electric lamp comprising a tube of quartz, a conducting but resisting filling of free particles in the tube, the said filling comprising a stable oxid with a small percentage of graphite, the filling near the end portions of the tube containing a greater percentage of graphite than the filling in the intermediate portion of the tube, suitable conductors having their ends embedded in the filling at the ends of the tubes, and suitable seals for inclosing the ends of the tube.

5. An electric lamp comprising a tube of quartz, a conducting but resisting filling of free particles in the tube, the said filling comprising a stable oxid with a small percentage of graphite, the filling near the end portion of the tube containing a greater percentage of graphite than the filling in the intermediate portion of the tube, suitable conductors having their ends embedded in the filling at the ends of the tubes, packing at each end of the filling and suitable seals for inclosing the ends of the tube.

6. An electric lamp comprising a tube of quartz, a conducting but resisting filling of free particles in the tube, the said filling comprising a stable oxid with a small percentage of graphite, the filling near the end portion of the tube containing a greater percentage of graphite than the filling in the intermediate portion of the tube, suitable conductors having their ends embedded in the filling at the ends of the tubes, asbestos packing at each end of the filling and suitable seals for inclosing the ends of the tube.

HERSCHEL C. PARKER.

Witnesses:
W. B. HUTCHINSON,
JOHN T. CAROLAN.