No. 761,380. PATENTED MAY 31, 1904.

J. A. HEANY.

ELECTRIC ARC LIGHTING.

APPLICATION FILED FEB. 4, 1904.

NO MODEL.

Fig. 1.

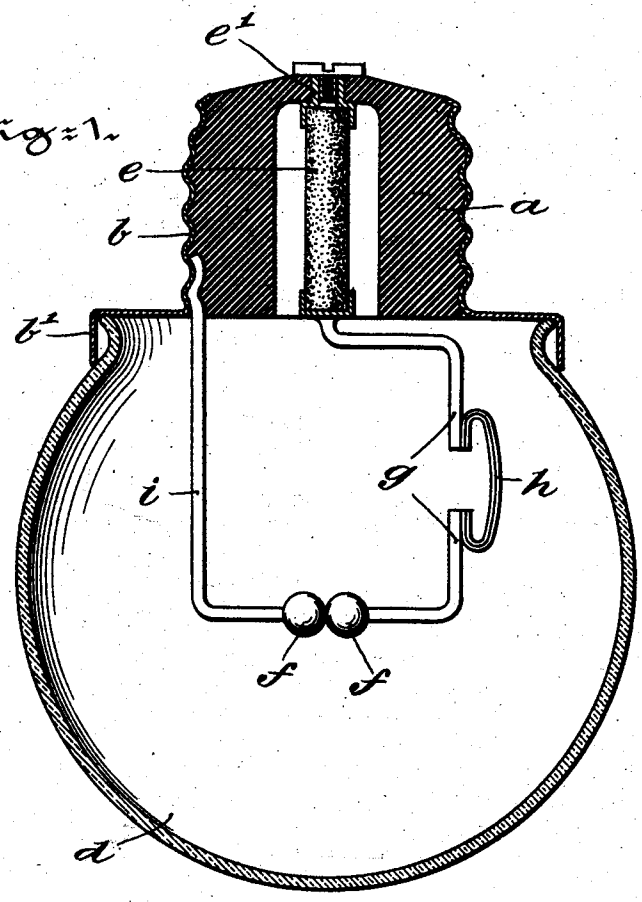
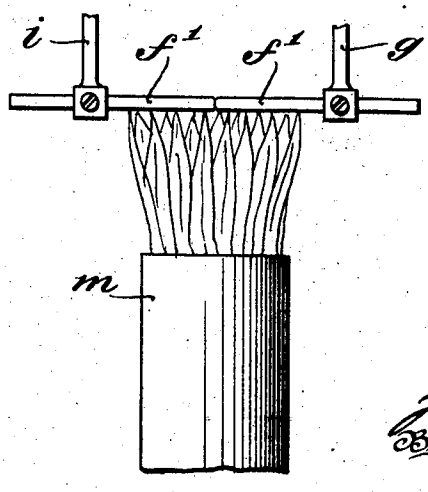


Fig. 2.



Witnesses.
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No. 761,380. Patented May 31, 1904.

UNITED STATES PATENT OFFICE.

JOHN ALLEN HEANY, OF YORK, PENNSYLVANIA, ASSIGNOR TO THE TETER-HEANY DEVELOPING COMPANY, OF CHARLESTON, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA.

ELECTRIC-ARC LIGHTING.

SPECIFICATION forming part of Letters Patent No. 761,380, dated May 31, 1904.

Original application filed December 4, 1903, Serial No. 183,703. Divided and this application filed February 4, 1904. Serial No. 191,946. (No model.)

To all whom it may concern:

Be it known that I, JOHN ALLEN HEANY, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Electric-Arc Lighting, of which the following is a specification.

My invention has relation to electric lighting in which an arc-lamp is provided with electrodes formed of materials which normally are non-arcing, and in such general connection it relates to means whereby, in such a lamp, the electrodes may be brought to and maintained in condition for arcing.

The present application is a division of an application for patent filed by me under date of December 4, A. D. 1903, and under the Serial No. 183,703.

To those skilled in the art it is well known that certain substances—such as metallic oxids, metallic salts, &c.—are normally non-arcing when used as the electrodes or terminals for the current. While such substances with currents of high tension may, perhaps, when brought close together discharge the current in disrupted arcs or sparks, yet such disrupted arcing or sparking is not useful in the production of a light such as is emitted from the ordinary arc-lamp having carbon electrodes. I have discovered how these normally non-arcing materials may be brought to a condition wherein an arc of appreciable size and continuity can be formed and maintained between electrodes composed of these materials, so that a light of greater luminosity and sharpness can be obtained at much less amperage than the amperage required in either the ordinary incandescent or arc lamp.

The principal object of my present invention is to provide, as an improvement in electric lighting, for the production and maintenance of an arc upon a normally non-arcing electrode with a current of relatively low amperage.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a sectional view illustrating diagrammatically an arc-lamp embodying main features of my invention, and Fig. 2 is a front elevational view of a modified form of electrode.

Referring to Fig. 1 of the drawings, *a* represents a hollow plug, of di-eletric material, surrounded by a screw-cap *b*, of metal, having a downwardly-projecting flange *b'*, into which a globe *d* is fitted. Within the hollow of the plug *a* is secured a carbon or graphite resistance *e*, connected by a metallic plug *e'* with one terminal of the circuit. The screw-cap *b* is connected with the other terminal of the circuit. The electrodes *f f* of the lamp are respectively connected with the resistance *e* by a divided wire *g*, the ends of which are connected by a thermostat *h* and a continuous wire *i*, depending from the screw-cap *b*. So far as described the parts and their arrangement are comparatively unimportant and embody merely one of many forms of lamps in which my present invention may be embodied or carried out. In Fig. 1 the electrodes *f f* are sperical, or substantially so, in shape. In Fig. 2 the electrodes *f' f'* are pencils of the materials. One or both of each of the electrodes *f f* or *f' f'* is or are formed of a material non-arcing at ordinary temperatures—such, for instance, as the metallic oxids or salts of metals, as cerium, thorium, calcium, magnesium, yttrium, &c. Where these oxids or salts are sufficiently coherent to be molded or formed into the shape required and to maintain the same under the influence of high heat, they may be used alone; otherwise a binding agent—such as a borate, carbonate, phosphate, sulfate, or even boracic acid—should be used. When the electrodes are formed of such non-arcing materials, no appreciable continuous or luminous arc will be produced at ordinary temperatures of the electrodes with a current of even a high or relatively high tension. When, however, the electrodes of non-arcing materials are first

heated to redness or substantially to incandescence, an arc of appreciable size and continuity will be formed and maintained between the electrodes when the tension of the current is relatively low—say about one hundred and ten volts—and the amperage much less than is required in the ordinary incandescent or filament lamp—say from one-tenth to one-half of an ampere or from eleven to fifty-five Watts. Not only is such a continuous arc formed or maintained, but the luminosity and sharpness of the light are materially greater than that which the incandescent lamp gives under greater consumption of current. One means of initially heating the electrodes *f f* or *f' f'* may be a spirit-lamp or Bunsen burner *m*, as illustrated in Fig. 2. Another which is not extraneous to the lamp, and therefore preferable, is to incorporate in the electrodes a highly-conductive material—such, for instance, as platinum, gold, iridium, &c., which, as is well known, are good conductors within ordinary temperatures. The effect of combining or incorporating such a good conductor with the non-arcing material or materials is to render such material or materials a partial conductor or conductor of high resistance. When the electrodes *f f* or *f' f'* touch, as illustrated in the drawings, the passage of the current through the electrodes *f f* and *f' f'* of high resistance serves almost instantaneously to heat the electrodes to redness or incandescence. By including a resistance *e*, of graphite or similar material, in the circuit the flow of current to the electrodes will be regulated inversely to the distance the electrodes are separated from each other to form the arc. The inclusion of a thermostat *h* or equivalent arc-adjusting means in the circuit renders the regulation of the size of the arc automatic.

Having thus described the nature and object of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The improvement in electric-arc lighting, which consists in first heating the electrodes or terminals of normally non-arcing material to arcing temperature, and then establishing and maintaining an arc between them.

2. The improvement in electric-arc lighting, which consists in first heating by a small current the electrodes or terminals of normally non-arcing material to arcing temperature, and then establishing and maintaining an arc between them.

3. The improvement in electric-arc lighting, which consists in first heating the electrodes or terminals of normally non-arcing material to arcing temperature, and then establishing and maintaining an arc between them by a current of one ampere or less.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

JOHN ALLEN HEANY.

Witnesses:

J. WALTER DOUGLASS,

THOMAS M. SMITH.