(No Model.)

T. A. EDISON.

INCANDESCENT ELECTRIC LAMP.

No. 476,528. Patented June 7, 1892.

Fig. 1.

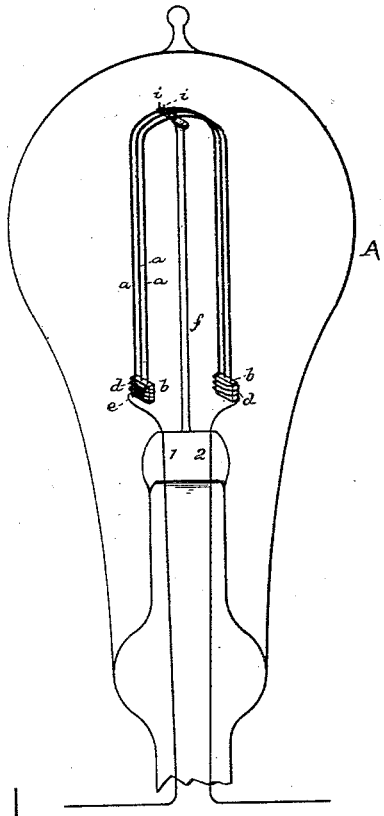


Fig. 4.

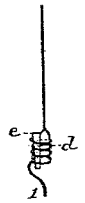


Fig. 2.

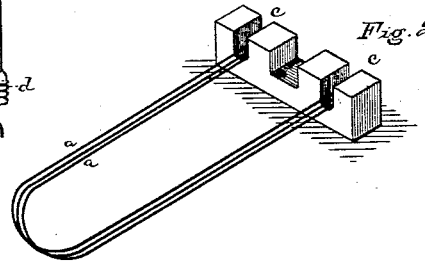
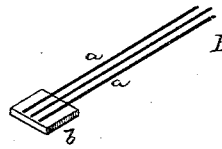


Fig. 3.



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INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 476,528, dated June 7, 1892.

Application filed March 16, 1883. Serial No. 88,358. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, of Menlo Park, in the county of Middlesex and State of New Jersey, have invented a new and useful Improvement in Incandescing Electric Lamps, (Case No. 547,) of which the following is a specification.

The object of my invention is to combine in an incandescing electric lamp two or more flexible carbon filaments in such manner that the light produced will be the total effect of all the filaments, while if one of such filaments is broken a light will be produced of proportionately lower candle-power than before, but with the same economy of energy.

A further object is to produce a good mechanical and electrical connection between the enlarged ends of the filaments and the leading-in wires of the lamp.

I accomplish the first-named object by connecting the two or more filaments in multiple arc to the leading-in wires. To accomplish this, I first secure the corresponding ends of the filaments together by molding or otherwise securing upon them a viscous carbonizable substance before carbonization. I then carbonize the whole together. This attaches the filaments together in multiple arc. To connect them to the leading-in wires these ends are first preferably electroplated with copper, and are then placed in a loose or flexible metallic holder attached to the leading-in wires. A wedge of suitable material is then driven tightly in between the holder and the carbon, so as to make a good electrical contact and a secure mechanical attachment. The lamp should be provided with means for supporting the slender filaments used in an upright position.

In the accompanying drawings, Figure 1 is a view in perspective of a complete lamp embodying my invention. Figs. 2 and 3 are views illustrating methods of joining together the ends of the filaments; and Fig. 4, a view of the clamp or holder, which forms a portion of my invention.

A is the inclosing globe, and 1 2 are the leading-in wires of an incandescing electric lamp. The incandescing conductor is formed of the three fine flexible filaments of carbon *a a a*, all connected to the leading-in wires. The ends of these filaments are joined together by the viscous carbonizable material *b*. Suitable materials are gum-tragacanth, bassorine, or vegetable mucilage. The substance may be applied in the manner illustrated in Fig. 2. Here the ends of the filaments are laid in suitable molds *c c*, and the viscous substance, in a soft condition, is packed or poured around them, securing them together; or, as in Fig. 3, a small plate or slab of the substance may be laid down and moistened to make it soft and the ends of the filaments passed into it. The enlarged ends thus formed are preferably electroplated with copper. If desired, the fine filaments might be separately provided with thickened ends and carbonized and the ends then electroplated together.

The end of each leading-in wire is formed into a spiral coil *d*, in which the enlarged end connecting the filaments is placed somewhat loosely, and a copper wedge *e* is then inserted tightly, so as to hold the end within the coil. This wedge may, however, be made of any material which will withstand the heat. A glass arm *f* extends upwardly from the wire-support *g*, having an enlarged end *h*, in which are sealed metal wires *i i*, between which the filaments are placed to preserve them in an upright position the proper distance apart. Supposing each filament adapted to give a light of five-candle power, the whole would produce fifteen candles, and if any filament should be broken the others will produce a ten-candle light, while the resistance of the lamp would be so increased that less current would pass through the lamp than before, so that the same proportion of electric energy and light is maintained.

What I claim is—

1. In an incandescent electric lamp, two or more separate filamentary conductors connected in multiple arc and a support consisting of a central arm having pins or devices between which the filaments are separately held, whereby they are steadied and maintained at the proper distance apart, substantially as set forth.

2. In an incandescent electric lamp, two or

more separate filamentary electrical conductors arranged side by side and substantially parallel, masses of carbonized material at the ends of said conductors, and an intermediate support for holding the several filaments in position, substantially as set forth.

3. In an incandescing electric lamp, the combination, with the masses of carbonized viscous material forming the enlarged ends of the incandescing conductors, of the loose holders attached to the leading-in wires and the wedges inserted therein, substantially as set forth.

This specification signed and witnessed this 17th day of February, 1883.

THOS. A. EDISON.

Witnesses:
WM. H. MEADOWCROFT,
H. W. SEELY.