(No Model.)

T. A. EDISON.

INCANDESCENT ELECTRIC LAMP.

No. 534,209. Patented Feb. 12, 1895.

Fig. 1.

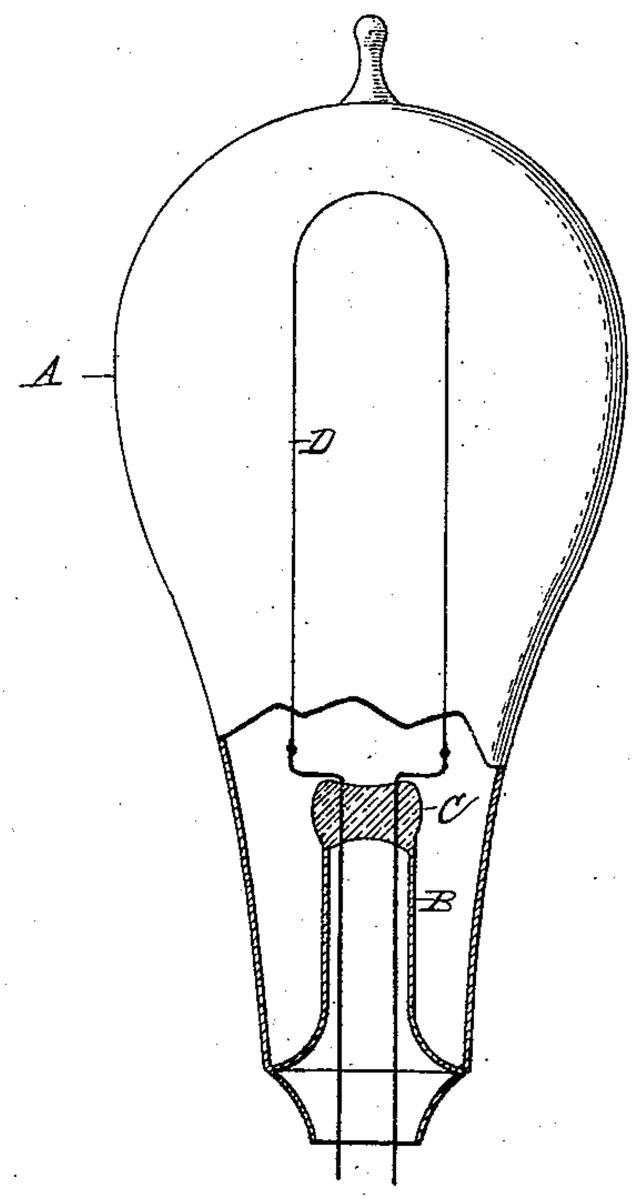
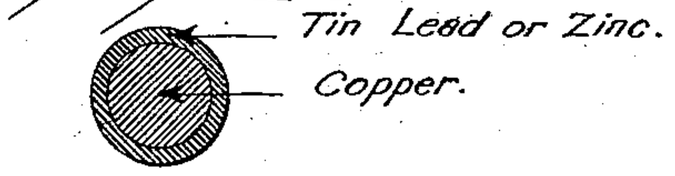


Fig. 2.



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UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 534,209, dated February 12, 1895.

Application filed September 17, 1890. Serial No. 365,260. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Incandescent Electric Lamps, (Case No. 876,) of which the following is a specification.

The object of my invention is to diminish the cost of incandescent electric lamps by dispensing with the use of so expensive a metal as platinum for the leading-in wires which pass through and are sealed into the glass of the inclosing vacuum globe and support and convey the current to the incandescent conductor within the globe. Platinum has hitherto been the only metal used for this purpose because its coefficient of expansion when heated is practically the same as that of glass. I have found, however, that an effective seal can be obtained by the use as a leading-in wire of a compound wire whose outer portion is composed of a readily fusible metal such as tin, zinc or lead, or alloys of which such metals are the principal ingredients, this being placed upon an inner base or core of a metal having a comparatively high fusing point, such as copper, silver, nickel, cobalt, iron or steel. Of these metals I prefer copper because this metal gives off scarcely any air or occluded gases when heated, and because its fusing point is so high as to make it convenient to handle in the operation of fusing the glass upon the wires. For the outercovering or envelope I prefer tin.

In putting said invention into practice I take pieces of the compound wire described, of sufficient length and lay them within the glass tube which is to form the inner stem or wire support, and I seal such wires in the end of the tube—with their ends projecting therefrom—in the usual manner, that is to say, the glass is melted by a blow-pipe flame and is then pinched or pressed down upon the wires by means of a suitable tool, so that a solid flat end is produced on the tube in which the wires are held in a fixed position. At the moment of sealing, the wires should be quickly drawn forward a short distance so as to bring a fresh and cooler portion of them into the seal. Since the specific heat of the fusible metal is very low, it sets instantly when the seal is made, so that an intimate union is formed between the wires and the glass resulting in an effective seal for the purpose of maintaining the vacuum.

The copper or other core or base of the compound wire gives the necessary mechanical strength to the structure.

The wires are attached to the filament or incandescent conductor and the glass tube or stem is inserted in the globe and sealed therein in the usual or any suitable manner.

The compound wires may be formed in any effective way—for instance, by drawing the copper wire through a bath of melted tin or other metal which adheres to its surface; the whole being then drawn through a die plate to remove the superfluous metal. The proportion in size of the two metals may be, for a copper wire twelve one-thousandths of an inch in diameter a coating of fusible metal two one-thousandths thick.

In the accompanying drawings, Figure 1 is a view in elevation of an incandescent electric lamp embodying my invention; and Fig. 2 an enlarged cross-section of one of the leading-in wires.

A is the globe, B the inner stem, and C the flattened seal through which the leading-in wires pass to the incandescent conductor D, such wires being each composed of a central core of copper or other wire of high fusing point, and an outer covering of tin, lead, zinc or equivalent metal or alloy.

What I claim is—

In an incandescent electric lamp, the combination with the glass stem or wire support of leading-in wires passing through the same and held therein by the fusing of the glass tube upon them and each composed of an outer covering of readily fusible metal or alloy and an inner core or base of metal of comparatively high fusing point, substantially as set forth.

This specification signed and witnessed this 13th day of September, 1890.

THOS. A. EDISON.

Witnesses:
W. PELZER,
RICHD. N. DYER.