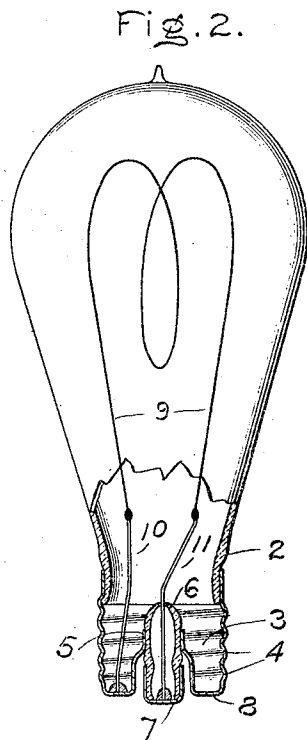
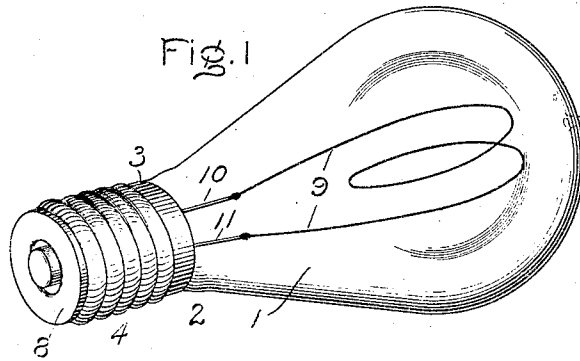


W. R. WHITNEY.
INCANDESCENT ELECTRIC LAMP.
APPLICATION FILED OCT. 31, 1904

902,032.

Patented Oct. 27, 1908.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIS R. WHITNEY, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

INCANDESCENT ELECTRIC LAMP.

No. 902,032.

Specification of Letters Patent.

Patented Oct. 27, 1908.

Application filed October 31, 1904. Serial No. 230,685.

To all whom it may concern:

Be it known that I, WILLIS R. WHITNEY, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Incandescent Electric Lamps, of which the following is a specification.

My invention relates to electric lamps, and more especially to the means whereby current may be conveyed into the exhausted chamber containing the incandescing filament. To effect this result I make use of sealing devices in which metal having a different coefficient of expansion from glass is sealed against glass so as to form a tight and permanent joint. The means whereby this result is accomplished I have set forth with particularity in the following description which is to be taken in connection with the accompanying drawings.

The novel features of my invention I have pointed out with particularity in the appended claims.

In the drawings, Figure 1 is a perspective view of a lamp embodying my invention, and Fig. 2 a view, partly in section, of the lamp.

In Fig. 1 the usual bulb of an incandescent lamp is indicated at 1. The lower end of this bulb is open and is of thickened glass as at 2. A cap 3 of suitable metal, such as copper, brass or iron, is provided with the usual external screw-thread 4 by which it may be screwed into the usual receiving socket. This cap is sealed about the lower end of the portion 2 of the lamp bulb and forms a tight and permanent joint therewith. The sealing operation is performed by inserting the glass portion 2 into the cap 3, with which it makes a fairly loose fit, and then carefully heating the parts in the usual glass-blowers' gas jets to a temperature sufficient to soften the glass. Air pressure is then applied so as to expand the glass into intimate contact with the metal shell or cap. The parts when cool will be found to make intimate contact with each other and to form a strong and air-tight joint. The metal cap ordinarily has a higher coefficient of expansion than the glass so that when the parts cool, after having been expanded into intimate contact with each other when heated, the metal contracts tightly about the glass. The metal is made thin enough so that it will stretch or give as it comes under tension, and thus prevent a

fracture of the glass tube. If the metal is too thick the glass will be sheared off, but if thin enough will stretch without injuring the glass. A thickness of metal in the neighborhood of one-hundredth of an inch gives satisfactory results. The glass may be of varying thickness but should be sufficient to withstand the pressure exerted upon it by the metal cap.

The central portion of the cap 3 I provide with a reëntrant tubular member 5. A tube of glass 6 is sealed into the open end of this member 5 in substantially the manner already described. The inner end of this tube 6 is open but the outer end is closed by means of a small cap 7 of a metal such as described. This cap is sealed over the end of the glass tube in the manner before mentioned, and is arranged so that in the completed article it projects somewhat beyond the level of the end 8 of the screw cap 3.

The filament 9 of the lamp is carried by metal standards or wires 10 and 11. These wires are connected electrically, one to the cap 3 and the other to the cap 7, and thus serve, when these two caps are connected to the supply circuit by screwing the lamp into the usual socket, to convey current to the filament 9.

The lamp which I have above described is intended merely as illustrative of one of the various embodiments which my invention may assume in practice. It is evident, however, that numerous modifications thereof may be made without departing from the spirit of my invention, for which reason I do not wish to be limited to the exact details shown and described.

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

1. In an incandescent lamp, the combination of a lamp bulb, a metal cap sealed about the end of said lamp bulb, the metal forming the seal being under tension, a glass tube sealed through a tubular reëntrant portion of said cap, that portion of the cap forming the seal being under tension, and a metal cap sealed about the exposed end of said glass tube and being under tension.

2. The combination of a glass bulb, a combined seal and attaching device therefor consisting of a screw cap of thin metal surrounding a portion of the bulb and being under tension, a filament in the bulb, terminals for the filament, one electrically connected to

the screw cap and the other insulated therefrom by a glass tube tightly clasped under tension by a portion of said screw cap.

3. In an incandescent lamp, the combination of a bulb, a screw cap of thin metal tightly inclosing the contracted portion of the bulb so as to be under tension, a glass tube tightly inclosed by the screw cap, the latter being under tension about the tube,

and a metal cap tightly closing the outer end of said tube and being under tension.

In witness whereof I have hereunto set my hand this 29th day of October, 1904.

WILLIS R. WHITNEY.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.