

No. 843,054

PATENTED FEB. 5, 1907.

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

Fig. 1.

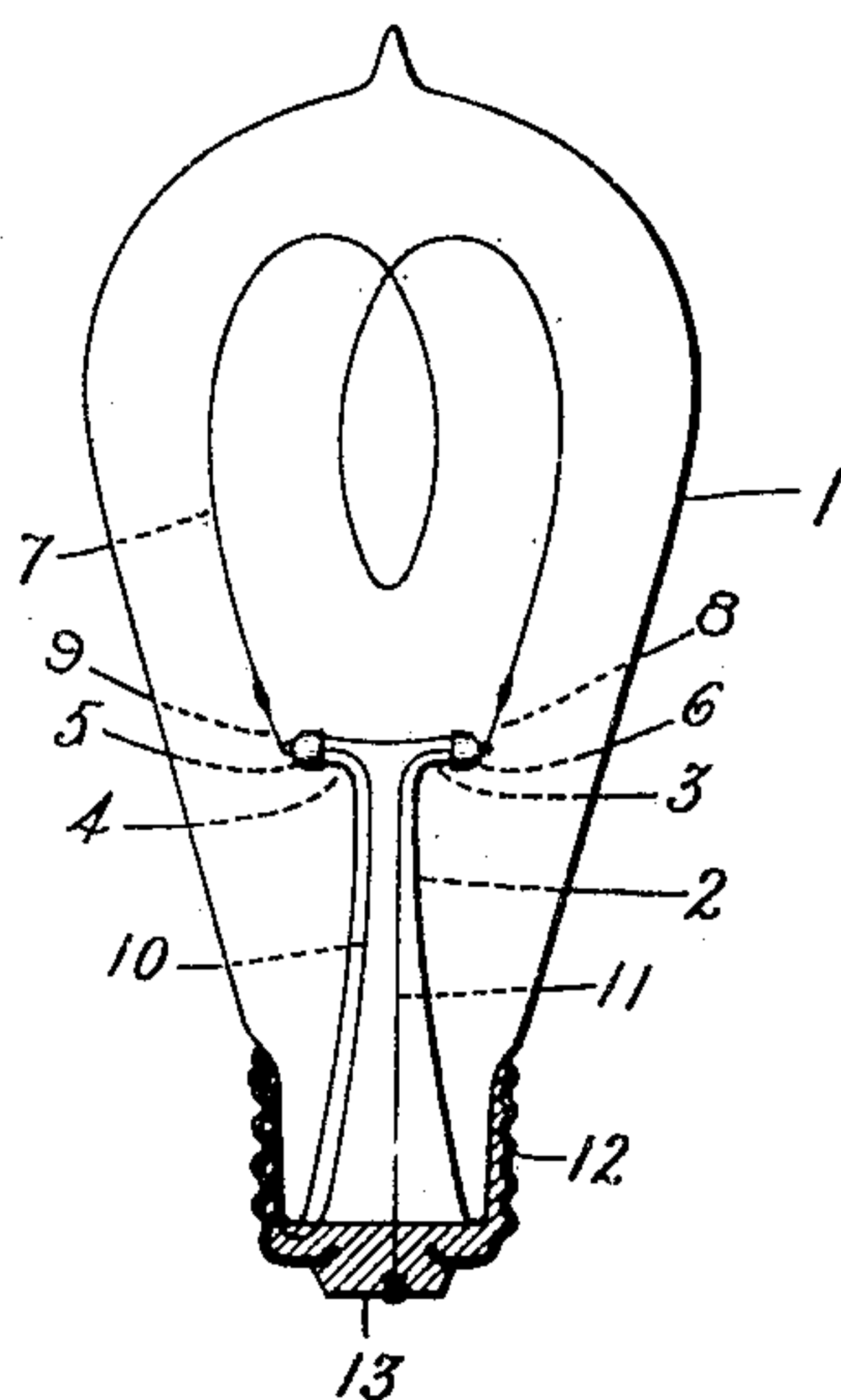
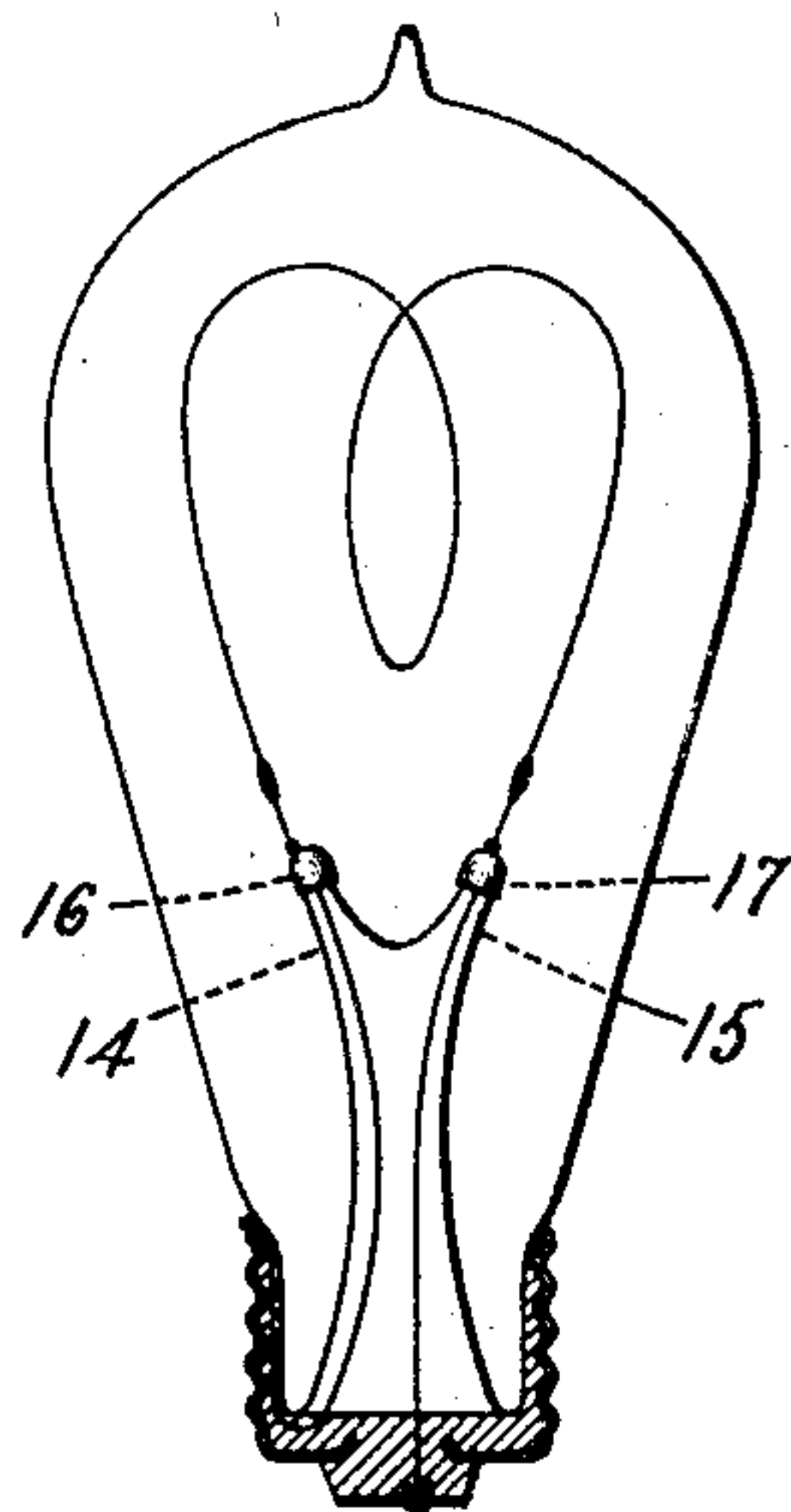


Fig. 2.



Witnesses:

*George H. Tilden.*  
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Inventor:

Willis R. Whitney,  
by *Albert B. Davis*  
Att'y.



# 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. 843,054.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed October 31, 1904. Serial No. 230,686.

*To all whom it may concern:*

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

My present invention relates more especially to incandescent electric lamps, and comprises improvements in the means for conveying the current through the walls of the glass envelop. Heretofore it has been the usual practice to employ platinum leading-in conductors. In accordance with my invention I provide the glass bulb or envelop with tubes opening into the interior thereof. The open ends of these tubes I seal into caps of a metal—such as copper, iron, or the like—having a higher coefficient of expansion than glass. The filament in the bulb is connected to these caps on one side, while wires or other conductors are connected to the caps on the other or outer sides.

The novel features characteristic of the invention are pointed out with particularity in the appended claims. The invention itself, however, will be better understood by reference to the following description, taken in connection with the accompanying drawings, in which—

Figure 1 represents one embodiment of my invention and Fig. 2 a modification.

In the drawings the bulb 1 of an incandescent lamp of the usual shape is provided with the reëntrant tubular member 2. Ordinarily the upper end of this tube 2 is pressed while hot around the platinum leading-in wires, and thus forms a tight seal therewith. In the present case the upper end of the tube 2 is provided with separate tubular extensions 3 and 4, projecting in this case one to the right and the other to the left. The open ends of these small tubes I close hermetically in the following manner: Over each I place a cap, as at 5 and 6, of copper, iron, or other suitable metal. The parts are then heated in the ordinary glassblower's gas-jets to a temperature sufficient to soften the glass. A gentle air-pressure is then exerted, so as to bring the glass into intimate contact with the sides of the cap. Upon cooling the cap shrinks tightly about the glass and forms a perfect vacuum-tight joint about the same.

The tightness of the joint is probably assisted by some combination between the oxidized surfaces of the metal and the parts of the glass in contact therewith. The metal should be sufficiently thin so that it will stretch and will thus not exert such a pressure upon the glass as to shear or break the same. A thickness of metal of one one-hundredth of an inch or less I have found to be satisfactory.

The carbon filament 7 of the lamp may have its ends joined by the usual cement, either directly to the caps 5 and 6 or, if desired, to wires 8 and 9, which are in turn joined to the caps or integral with the same.

The interior portions of the caps 5 and 6 are joined to wires 10 and 11, by which connections are made respectively to the usual screw-threaded shell 12 and contact-plug 13. The connections between the wires 10 and 11 and the caps 5 and 6 may be made by electric welding or by other suitable means and preferably before the caps have been sealed in place. The wires on either side of a cap may, however, be formed integrally therewith.

Instead of having the tubular extensions 3 and 4 project in opposite directions, as shown in Fig. 2, I may of course arrange them parallel to each other, or nearly parallel, as shown in Fig. 2, in which the glass tubes 14 and 15, with their respective caps 16 and 17, correspond to the tubes 3 and 4 in Fig. 1. In all other respects the lamp shown in Fig. 2 is the same as that shown in Fig. 1, and therefore requires no further description as to details.

I am aware that my invention may be embodied in other forms than that shown, and for this reason it will be understood that the representations in the drawings are merely illustrative of my invention. I therefore 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. The combination of a lamp-bulb having a reëntrant tubular portion, tubular extensions thereof terminating within the lamp-bulb, metal caps having a coefficient of expansion greater than that of the material of the lamp-bulb and tightly clasping the ends of these tubular extensions and in intimate contact with the glass, and electrical connections on either side of each of said caps.

2. The combination of a lamp-bulb having



a reëtrant portion, small tubular extensions of said reëtrant portion, and seals for said tubular extensions each consisting of a cap of metal having a coefficient of expansion greater  
5 than that of the material of the lamp-bulb and tightly clasp ing the end of the tube.

3. The combination of a lamp-bulb having a reëtrant portion, small tubular extensions of said reëtrant portion, seals for said tubu-  
10 lar extensions, each consisting of a cap of metal having a coefficient of expansion greater

than that of the material of the bulb and tightly clasp ing the end of the tube, and a filament electrically connected to said metal caps.

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

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WILLIS R. WHITNEY.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.