

No. 654,208.

Patented July 24, 1900.

S. D. WASHBURN & C. H. TINKHAM.
INCANDESCENT ELECTRIC LAMP:

(Application filed Jan. 23, 1899.)

(No Model.)

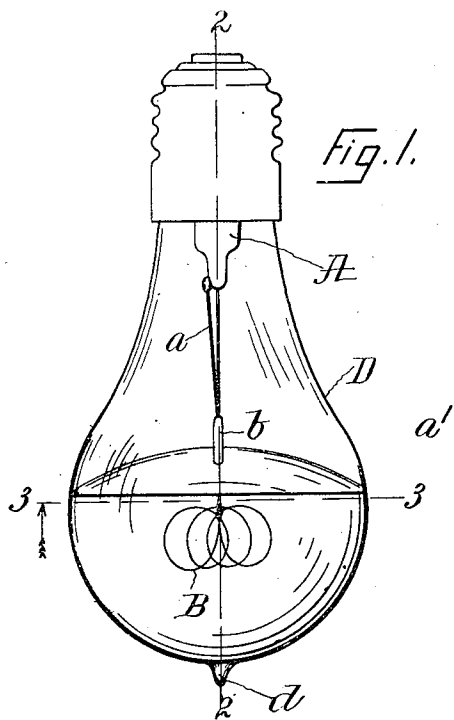


Fig. 1.

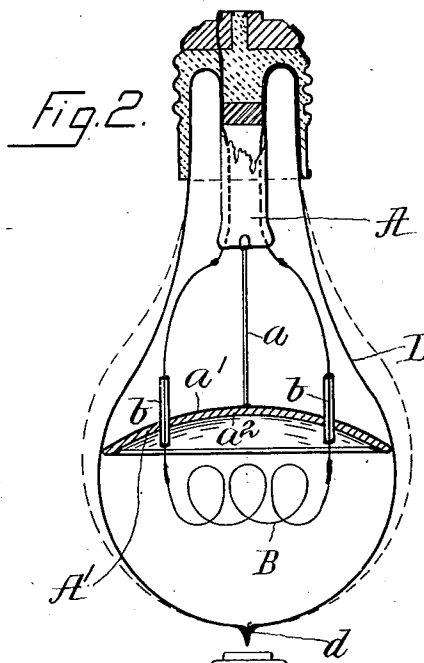


Fig. 2.

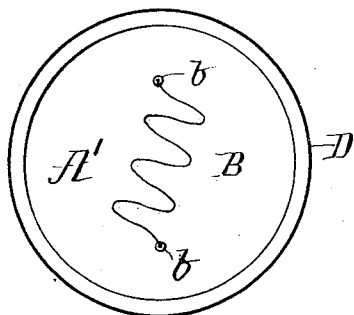
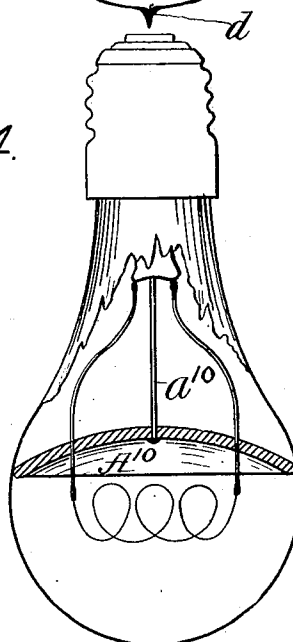


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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INCANDESCENT ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 654,208, dated July 24, 1900.

Application filed January 23, 1899. Serial No. 703,064. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL DEXTER WASHBURN, of Boston, in the county of Suffolk, and CLARENCE HERBERT TINKHAM, of Cambridge, in the county of Middlesex, in the State of Massachusetts, have invented an Improved Incandescent Electric Lamp, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation of one of our lamps. Fig. 2 is a section on line 2 2 of Fig. 1. Fig. 3 is a section on line 3 3 of Fig. 1. Fig. 4 is an elevation, partly in section, of another form of our lamp.

In our pending application, Serial No. 684,456, filed June 25, 1898, we have described a lamp consisting of a glass bulb sealed to a glass vessel, the base of which is a mirror, and a zigzag filament across the concave face of that mirror; and our present invention is an improvement on that lamp which while retaining both of those features in substance is a practical improvement, as it facilitates the manufacture, thereby decreasing the cost and also increases the life of the lamp and in some degree increases the candle-power, as our new mirrors are practically more efficient than that described in our pending application.

In the drawings, A is a tube of glass closed at its inner end, and A' a mirror connected by the wire *a* to the inner closed end of tube A. This mirror A', as described in Figs. 1, 2, and 3, is formed of a thin disk *a'* of metal, capable of a high polish, spun over a thin disk *a''*, of glass, concave on one side and convex on the other side, like the ordinary watch-crystal. One end of the wire *a* is soldered to the metal disk *a'* and the other end covered with glass, which is fused to the inner end of tube A.

The leading-in wires pass through tube A and are sealed in the closed end of that tube and united to the filament B in the usual way. Small insulating-tubes *b b* are formed about the leading in wires to prevent electrical contact with the metal disk *a'*, and these insulating-tubes *b b* occupy holes through the metal disk *a'* and the glass disk *a''*.

In assembling the parts bulb D is first made and the capillary *d* attached in the usual way,

except that the neck of bulb D is left of sufficient diameter to enable tube A, with the leading-in wires and mirror A attached, to be dropped into bulb D. Then the neck of bulb D is drawn down to the desired shape and its mouth sealed to the mouth of tube A after tube A has been properly placed to bring mirror A' into the desired position. The capillary *d* may of course be attached to the neck end of bulb D, as is now often practiced. The bulb D is then exhausted and the lamp finished as usual.

In some of our lamps embodying the present invention the bulb D was broken into two parts along the line 3 3, and the tube A, with the leading-in wires and mirror A' attached, was dropped in and the two parts of bulb D then sealed together; but while this is a convenient and excellent way of assembling the parts it requires the bulb D to be made of a greater diameter toward the neck end, as indicated by the dotted line of Fig. 2, and this requires the wire to be heavier in order to give a proper support to the mirror.

In the lamp described in our pending application, Serial No. 684,456, we describe the filament as zigzag, and while this is an important matter we have discovered that a helical filament has all the advantages of our zigzag filament and, as will be clear from Fig. 3, is in point of fact zigzag, and this discovery is one feature of our present invention.

For certain uses a mirror made of porcelain glazed in its concave surface is better than the metal and watch-crystal mirror above described, and this form of our invention is shown in Fig. 4, but needs no description, except that the supporting-wire *a''* is headed and passed through a hole in the mirror A' instead of being connected by solder as before; but this is of course a mere detail of construction.

What we claim as our invention is—

1. In an incandescent electric lamp in combination, a bulb; a tube of glass closed at its inner end and sealed to the bulb; leading-in wires sealed in the tube; a mirror; and a wire one end of which is fast to the tube and the other end to the mirror, substantially as described.

2. In an incandescent electric lamp in com-

5 bination a bulb; a tube closed at one end and sealed to the bulb; a mirror crosswise of the bulb; a wire one end of which is fast to the tube and the other end to the mirror; a filament in the form of a helix the axis of the helical filament being substantially parallel with the surface of the mirror; and leading-in wires sealed in the tube and passing through the mirror and insulated therefrom to the terminals of the helical filament.

10 3. In combination, the bulb; the tube of

glass closed at its inner end and sealed to the bulb; the mirror; the wire fast at one end to the mirror and at the other end to the tube; the helical filament; and the leading-in wires sealed in the tube and connected to the terminals of the helical filament.

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