

J. W. HOWELL.
FILAMENT SUPPORT.
APPLICATION FILED APR. 6, 1910.

1,040,333.

Patented Oct. 8, 1912.

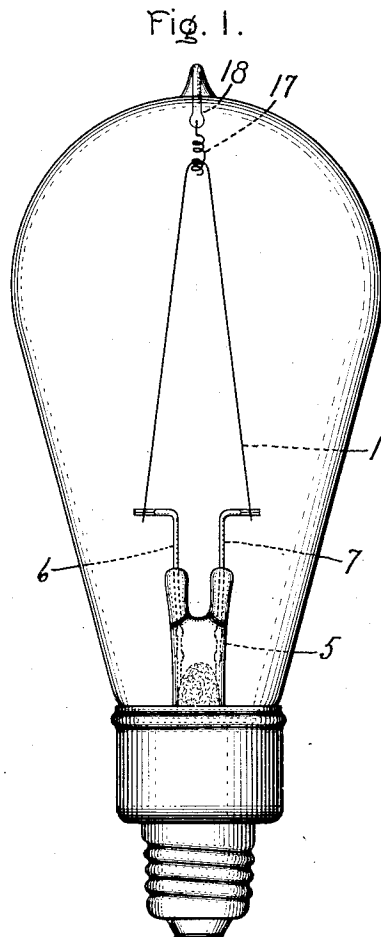


Fig. 2.

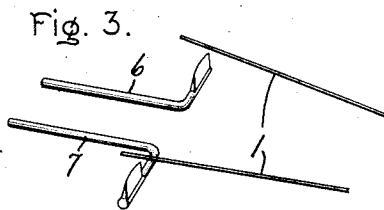
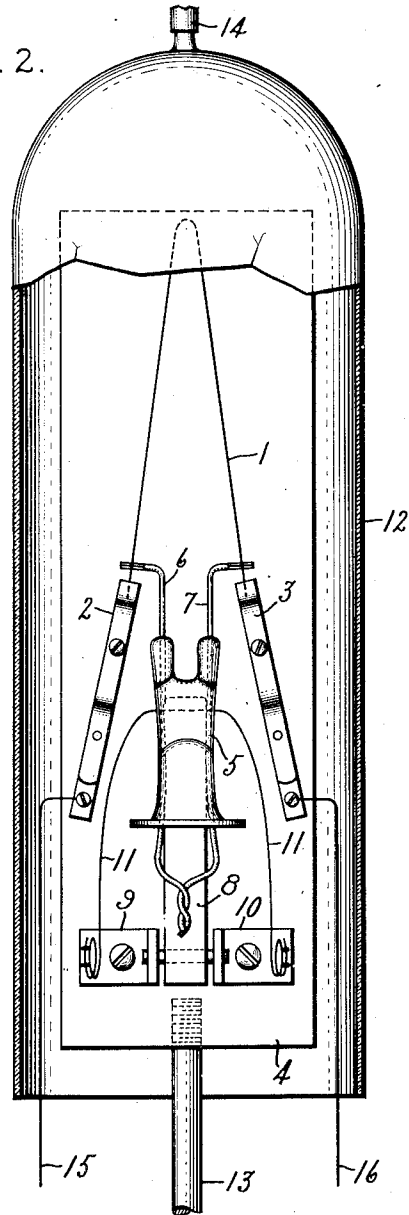
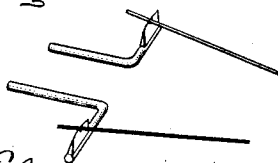


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

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FILAMENT-SUPPORT.

1,040,333.

Specification of Letters Patent.

Patented Oct. 8, 1912.

Application filed April 6, 1910. Serial No. 553,742.

To all whom it may concern:

Be it known that I, JOHN W. HOWELL, a citizen of the United States, residing at Newark, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Filament-Supports, of which the following is a specification.

This invention relates to the welding of metallic articles and in particular to the production of a welded joint between an incandescent lamp filament and its support.

In accordance with my invention, the support is given a sharp knife-edge, against which the filament is gently pressed, thereupon a welding current is passed between the filament and the support across the knife-edge. The knife-edge being melted by the heating action of the current at this point of high resistance, the filament is pressed into and welds firmly to the knife-edge.

In the accompanying drawings Figure 1 is a perspective view of a finished incandescent lamp containing a filament supported in accordance with my invention; Fig. 2 is a view of an apparatus for making the weld; Fig. 3 is an enlarged detail view showing the knife-edge support before the filament is connected thereto; and Fig. 4 shows the completed joint.

The filament 1, which, for example, may consist of some refractory metal such as tungsten, is inserted in the clamps 2, 3 which are mounted upon an insulating base 4. The stem 5 of the lamp, into which the leading-in and supporting wires 6 and 7 have been sealed, is placed upon the movable finger 8, the wires 6, 7 being slipped under the filament. The wires 6, 7 are each provided upon one side with a sharp knife-edge, as clearly shown in Fig. 3. The edges are turned so as to contact with the filament. The wires with the knife-edges consist of some material which readily welds to whatever refractory metal the filament is composed of. The alloy commonly known as constantan, consisting of about 60 per cent. copper and 40 per cent. nickel, can be used in connection with tungsten filaments. The finger 8 is rotatably mounted between supports 9, 10 and is gently pressed against the filament by the spring 11. The leading-in wires 6, 7 are twisted together at the outer end of the stem 5, as indicated, so that a

complete circuit is formed from the clamp 3 through a short portion of the filament to the wire 7, thence to the wire 6 and through another short portion of the filament to the clamp 2. The filament and supporting wires thus mounted upon the base 4 are then inserted in an envelop 12 by means of a handle 13 as shown in the drawing. The envelop is provided at its upper end with an inlet 14 through which hydrogen, or other protective gas, is continually supplied. Current is now applied to the clamps 2, 3 by means of wires 15, 16. This current, of course, passes between the filament and the supply wires 6, 7 across each of the knife-edges where it encounters high contact resistance. Heat is developed at these points, causing the knife-edge to soften and melt at the region immediately in contact with the filament, which welds with the material of the edge, as shown in Fig. 4, making a firm joint. The current is then interrupted and the filament, now attached to the wires 6, 7, is removed from the clamps 2, 3 and is ready to be mounted in a lamp.

The advantages of this type of support are: first, the ease with which it is made; second, the fact that the contact between the filament and the support is a small but firm contact of a small part of the support which therefore reduces the conduction of the heat from the filament to the support to a minimum; third, the temperature of the weld is less than the temperature unavoidably attained when an arc is used to make the weld and therefore there is little danger of the filament being injured when being attached to its support.

When mounted in the bulb of the lamp as shown in Fig. 1, the closed end of the filament loop is preferably attached to a helix 17 consisting of some refractory metal such as molybdenum, tungsten or tantalum which is in turn fastened at one end into a glass support 18 attached to the top of the lamp. The filament is slipped upon one of the coils of this helix and mounted so that a certain amount of tension is exerted upon the filament by the helix.

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

1. The method of joining a refractory filament to a supply wire, which consists in

shaping one part of the supply wire into a sharp edge, gently pressing the filament against said edge, and passing between the filament and said wire current sufficient to
 5 soften and melt the edge of the wire so as to allow the filament to be forced into the same but not sufficient to fuse the filament.

2. A method for securing lamp filament ends to their current leads after the latter
 10 have been secured in the lamp stem which consists in reducing the cross-section of the current leads and pressing together such reduced portions of the leads and the respective filament ends to which they are to be
 15 united and passing a suitable current from one filament end through the said leads in

series to the other filament end so as to form a fused joint through the heating action of said current at each contact.

3. In an incandescent lamp, the combination of a support, having a sharp edge, and a filament welded thereto. 20

4. In an incandescent lamp, the combination of a knife-edged support, and a tungsten filament welded thereto. 25

In witness whereof, I have hereunto set my hand this 4th day of April, 1910.

JOHN W. HOWELL.

Witnesses:

S. N. WHITEHEAD,

J. HARRY ELKINS.