Jan. 11, 1944. L. G. LEIGHTON 2,338,855

FILAMENT CONNECTION FOR ELECTRIC LAMPS

Filed June 19, 1943

Fig. 1.

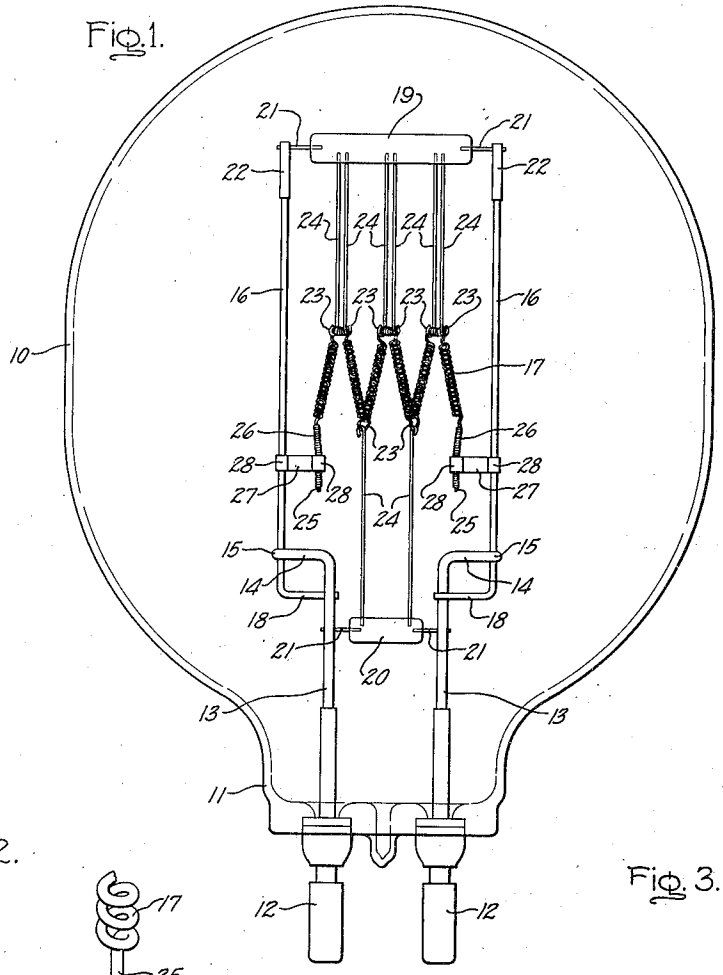


Fig. 2.

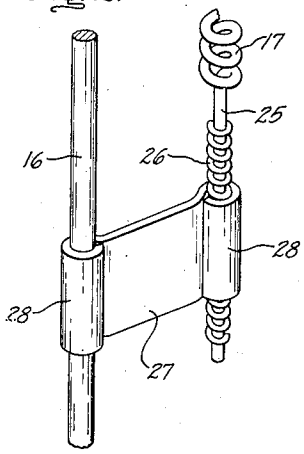


Fig. 4.

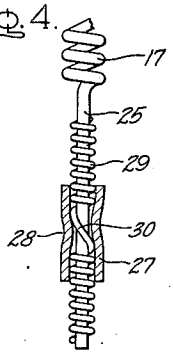
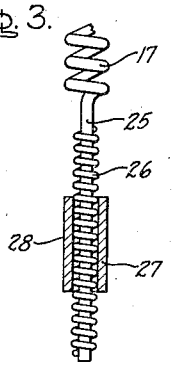


Fig. 3.



Inventor:
Leroy G. Leighton,
by John H. Anderson
His Attorney.

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2,338,855

UNITED STATES PATENT OFFICE

2,338,855

FILAMENT CONNECTION FOR ELECTRIC LAMPS

Leroy G. Leighton, Cleveland, Ohio, assignor to General Electric Company, a corporation of New York

Application June 19, 1943, Serial No. 491,434

5 Claims. (Cl. 176—38)

My invention relates in general to electric incandescent lamps and similar devices, and more particularly to high wattage lamps and devices.

Still more particularly my invention relates to an improved joint or connection between the filament and leading-in conductors of such devices.

In high wattage incandescent lamps, it is necessary to employ side leading-in conductors or supports made of a metal which will withstand the heat radiated by the lamp filament during operation. At present, molybdenum is used for such purpose because it possesses the necessary heat-resisting properties.

Where the connection of the tungsten filament to such molybdenum lead-in conductors or side supports involves a welded joint, the welding operation tends to make the tungsten filament and the molybdenum lead-in conductors brittle at points adjacent the weld so that they are liable to break off at such points if the lamp is jarred.

One object of my invention is to provide an improved form of joint or connection between the filament and leading-in conductors of electric incandescent lamps and similar devices which joint provides a good mechanical and electrical connection of the filament to the leading-in conductors.

Another object of my invention is to provide a a strong joint between the filament and leading-in conductors of electric incandescent lamps of the high wattage type.

Still another object of my invention is to provide a joint between a tungsten lamp filament and a molybdenum leading-in conductor which can be formed without embrittling either the tungsten filament or the molybdenum conductor at points adjacent the joint so as to render them mechanically weak and therefore liable to breakage at such points.

A feature of the invention is the use of a metal connector clip or lug, one end of which is pinched onto the leading-in conductor and the other end of which is pinched around a slip-over coil on the end leg of the filament.

Further objects and advantages of my invention will appear from the following description of a species thereof and from the accompanying drawing in which:

Fig. 1 is an elevation of an electric incandescent lamp having a filament joint construction comprising my invention; Fig. 2 is a perspective view, on an enlarged scale, of the filament joint of the lamp shown in Fig. 1; Fig. 3 is an elevation, partly in section and on an enlarged scale, of a portion of the filament joint; and Fig. 4 is a view similar to Fig. 3 of a modified form of my invention.

Referring to the drawing, the lamp there shown comprises a glass bulb 10 having a base construction of the type shown and claimed in U. S. Patent No. 2,098,080—D. K. Wright, and consisting of a pressed glass cup portion 11 to which is sealed a pair of metal contact terminal devices or prongs 12, 12 which serve for mounting the lamp and for conducting current thereto. Secured to the metal terminals 12, 12 and extending into the bulb 10 in parallel relation are a pair of rigid metal leading-in conductors or supports 13, 13. The inner ends of the said conductors 13, 13 are bent outwardly away from each other to form laterally-extending portions 14, 14 the outer ends of which are provided with hooks or eyes 15, 15. The conductors 13, 13 may be made of nickel-plated iron and are provided with rigid rod or wire extensions 16, 16 of molybdenum which are securely fastened to the conductors 13, 13 and extend parallel to one another on opposite sides of the tungsten filament 17. The molybdenum extensions 16, 16 extend through the loops 15, 15 which are pinched tightely onto the said extensions. The lower ends of the extensions 16, 16 are bent toward one another to form laterally-extending portions 18, 18 which are spot-welded to the conductors 13, 13.

The leading-in conductors are held in rigid spaced relation by upper and lower insulating bridges or cross bar members 19, 20, respectively, of suitable insulating material such as glass, which extend between and are secured to the leading-in conductors by short fastening wires 21. The fastening wires 21 for the upper bridge member 19 may be spot-welded to short tip extensions 22, 22 of nickel-plated iron which are butt-welded to the molybdenum side rods or conductor extensions 16, 16. The fastening wires 21 for the lower bridge member 20 may be spot-welded to the nickel-plated iron conductors 13, 13.

The filament 17 is of the high wattage type, the particular filament illustrated being of the type shown in U. S. Patent No. 2,288,499—I. H. Van Horn and comprising a plurality of coiled segments successive ones of which are arranged triangularly in a helix defining a triangular prism extending transversely of and between the conductor extensions 16, 16. The coiled segments are joined by bight portions 23, and the filament is supported in place by means of a plurality of upper and lower anchor wires 24 having hooked ends engaging the bights 23 and their other ends

rigidly secured to the insulating bridge members 19, 20, as by embedding therein.

In accordance with the invention, each end of the filament 17 is provided with a straight or uncoiled end section or leg portion 25 (Figs. 2–3) over which is slipped a coil 26 preferably of molybdenum or tungsten wire. The said slip-over coil 26 is wound with a fairly close pitch, i. e., closely coiled, and is preferably made just large enough in diameter to fit more or less snugly around the filament leg 25. Each end of the filament 17 is connected to the adjacent molybdenum side rod or conductor extension 16 by a connector or clip 27 of a metal, preferably nickel, which will satisfactorily withstand the heat attending lamp operation. The connectors or clips 27 are made of strip metal of a suitable width (in the instance shown around ⅛" or so) and are each formed with hooks or eyes 28 at their opposite ends which are tightly pinched or clamped one around the slip-over coil 26 on the filament leg 25 and the other around the adjacent conductor extension 16 by means of a pinching tool or pliers having suitably shaped pinching jaws. The mechanical attachment of the filament 17 to the leading-in conductors by the connector clips 27 eliminates all welded joints between the tungsten filament and the molybdenum conductor extensions 16, 16 together with all the disadvantages which would result from the welding operation.

In the modification shown in Fig. 4, the slip-over coil 29 differs from the coil 26 in Figs. 1–3 in that it is wound with a widely open center section 30 instead of being wound with a uniform pitch throughout as in the case of the coil 26. This opened center section 30 insures a firmer attachment or clamping of the slip-over coil 29 onto the filament leg 25 so as to prevent its slipping off the end thereof, and for that reason enables the use of slip-over coils which are wound to a larger inside diameter and which, therefore, fit more or less loosely over the filament leg 25.

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

1. In an electric incandescent lamp, the combination of a conductive lead, a filament having an end portion, a slip-over coil on the said end portion of said filament, and a metal connector having one end secured to said conductive lead and the other end formed with a hook which is tightly clamped around the said slip-over coil and the enclosed filament end portion.

2. In an electric incandescent lamp, the combination of a conductive lead, a filament having an end portion adjacent to but spaced from the said conductive lead, a slip-over coil on the said end portion of said filament, and a metal connector extending between the said conductive lead and the filament end portion, said metal connector having one end clamped to said conductive lead and the other end clamped around the said slip-over coil and the enclosed filament end portion.

3. In an electric incandescent lamp, the combination of a molybdenum lead-in conductor, a tungsten filament having an end portion adjacent to but spaced from the said lead-in conductor, a slip-over coil on the said end portion of said filament, and a metal connector extending between the said lead-in conductor and the filament end portion, said metal connector having one end clamped to said lead-in conductor and the other end clamped around the said slip-over coil and the enclosed filament end portion.

4. In an electric incandescent lamp, the combination of a conductive lead, a filament having an uncoiled end portion, a wire slip-over coil on the said end portion of said filament, and a metal connector strip having spaced hooks one of which is tightly clamped to said conductive lead and the other of which is tightly clamped around the said slip-over coil and the enclosed filament end portion.

5. In an electric incandescent lamp, the combination of a conductive lead, a filament having an uncoiled end portion, a wire slip-over coil on the said end portion of said filament and having closely-coiled end sections separated by an open-coiled center section, and a metal connector strip having one end secured to said conductive lead and the other end formed with a hook which is tightly clamped around the open-coiled center section of the slip-over coil to securely fasten said coil in place on the uncoiled wire end portion of said filament.

LEROY G. LEIGHTON.