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FILAMENT CONNECTION FOR ELECTRIC LAMPS

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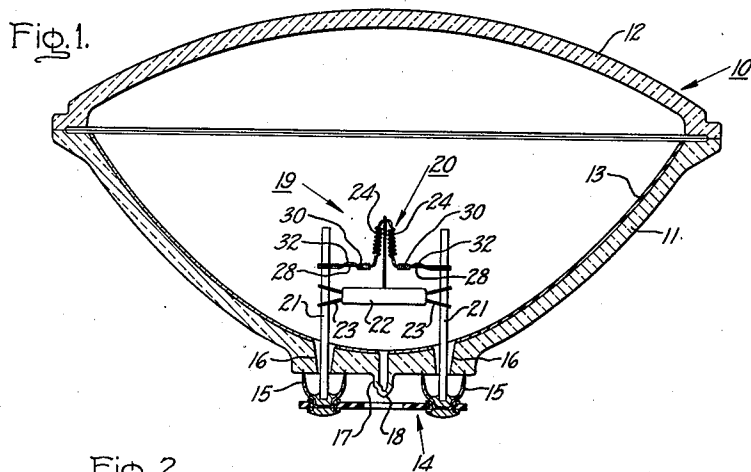


Fig. 2.

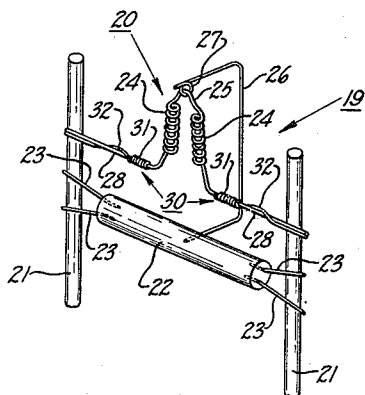
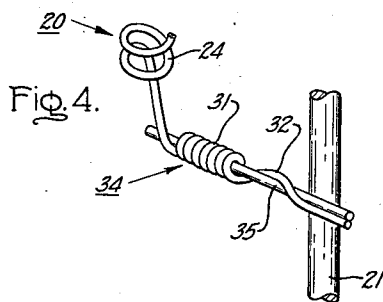
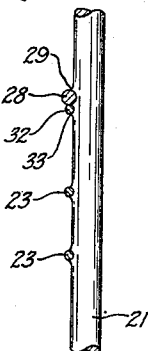


Fig. 3.



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FILAMENT CONNECTION FOR ELECTRIC LAMPS

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6 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 lead-in wires of such devices.

In certain types of electric incandescent lamps, particularly lamps of the high wattage type, it has been found advantageous to increase the current-carrying capacity of the filament wire at and near the welded connections thereof to the lead-in wires. This is usually accomplished either by providing a slipover coil on each of the end legs of the filament, or by coiling the end legs of the filament and inserting a spud wire therein. Both of these methods, however, have the disadvantage that a more or less heavy weld resulting in excessive movement or embedding of the filament end legs into the lead-in wires is necessary if a good, strong welded joint is to be obtained therebetween. Where the filament is held in a jig during its attachment to the lead-in wires, such excessive movement of the filament end legs is then apt to set up stresses in the filament which tend to pull the segments thereof out of correct position upon removal of the filament-holding jig after the completion of the joint welding operation.

One object of my invention is to provide an improved joint or connection between the filament and lead-in wires of an electric incandescent lamp or similar device.

Another object of my invention is to provide, in an electric incandescent lamp of the type having a filament provided with a composite end conductor consisting of a coil with a core extending therethrough, a strong welded joint between the filament end conductor and a lead-in wire which can be produced with a minimum amount of movement of the composite conductor relative to the lead-in wire during the welding operation.

Still another object of my invention is to provide a strong welded filament joint between a jig-held filament of the above type and an electric lamp lead-in wire which joint can be produced without setting up excessive stresses in the jig-held filament such as might result in displacement of the filament from its jig-held position upon completion of the joint and removal of the filament-holding jig.

A feature of the invention is the use of a composite filament end conductor comprising a slipover coil provided with an open-coiled outer end portion which is welded to the lamp lead-in wire

alongside the conducting core member that passes through the slipover coil.

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

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

Referring to the drawing, the lamp there shown is of the self-contained reflector type described and claimed in U. S. Patents Nos. 2,148,314 and 2,148,315—D. K. Wright, issued February 21, 1939, and assigned to the assignee of the present invention. The lamp comprises a bulb or envelope 10 consisting of a preformed pressed glass reflector section 11 fused around its periphery to a preformed pressed glass cover section 12. The interior surface of the reflector section 11 is of a light-concentrating shape, preferably paraboloidal, and is covered with a reflecting coating 13, preferably of aluminum, constituting a reflecting surface. Mounted on the reflector section 11, exteriorly thereof and at the apex of said section, is a base structure 14. The said base structure 14 is suitably secured, as by soldering, to metallic cups or thimbles 15 having their edges sunk and embedded in the glass of the reflector section 11 around openings 16 therein, the cups or thimbles 15 thus hermetically closing the openings 16. The envelope 10 is exhausted and filled with a suitable gas through an exhaust tube 17 attached to the reflector section 11 at its apex. After the gas filling is introduced into the lamp envelope, the exhaust tube 17 is tipped off, as indicated at 18, to hermetically seal the envelope.

Mounted within the envelope 10 and supported therein from the metal thimbles 15 is a mount structure 19 comprising an electric energy translation element or filament 20 disposed between and connected to a pair of rigid lead-in wires or conductors 21, 21. The lead-in wires 21 are rigidly secured at their outer ends to the metal thimbles 15, as by soldering, and extend through the openings 16 in the reflector section into the interior of said envelope in parallel relation to one another. The lead-in wires 21 are held in rigid spaced relation by an insulating bridge or cross bar comprising a glass rod 22 extending

between and secured to the lead-in wires 21 by short fastening wires 23 which may be spot-welded to the lead-in wires.

The filament 20 is of the high wattage type comprising a plurality of coiled wire segments 24 of tungsten which extend in the general direction of the reflector axis and are joined by a bight portion 25. The filament segments 24 are preferably disposed in the plane of the lead-in wires 21 and in a position in definite optical relation to the focus of the reflecting surface 13, preferably symmetrically about the reflector focus. The filament is supported in place at the bight portion 25 thereof by means of a support or anchor wire 26 having a hooked end 27 engaging the bight 25 and its other end rigidly secured to the glass rod 22 of the insulating bridge, as by embedding therein.

Each end of the filament 20 is provided with a straight uncoiled end section or leg portion 28 extending laterally of the adjacent lead-in wire 21 and welded thereto, as indicated at 29 in Fig. 3. A slipover coil 30, of a suitable heat-resisting metal such as tungsten, molybdenum or an alloy thereof, is mounted on each filament end leg 28. The said slipover coil 30 is preferably made just large enough in diameter to fit more or less snugly around the filament end leg 28. The filament end legs 28, together with the associated slipover coils 30, thus form composite end conductor portions for the filament, the filament end legs 28 serving as core members for such composite conductors.

In accordance with the invention, each slipover coil 30 is wound with a closely-coiled inner end section 31 and a widely open-coiled outer end section 32. The open-coiled outer portion 32 of each slipover coil extends adjacent the lead-in wire 21 and is welded thereto alongside the filament end leg 28, as indicated at 33 in Fig. 3. This open-coiling of the outer end portion of the slipover coil, in addition to providing a more economical construction, also enables the welding of the filament legs 28 to the lead-in wires 21 with a minimum amount of movement of the filament legs relative to the lead-in wires. This is of considerable importance where the filament is to be attached to the lead-in wires in a predetermined position (such as at the focus of the reflector section 11) and for that reason is held in a jig during the attachment of the filament to the lead-in wires, for in such case the small or negligible movement of the filament legs 28 relative to the jig-held segments 24 of the filament during the joint welding operation sets up little, if any, stress in the filament tending to pull the segments 24 thereof out of their original jig-held position upon removal of the jig following completion of the filament joint.

In the modified form of filament joint shown in Fig. 4, each end of the filament 20 is formed with an end coil 34 conforming in construction to the slipover coil 30 of Figs. 1-3. A straight spud wire 35 of a suitable metal such as tungsten or molybdenum is inserted within the said end coil 34 to form, together with the filament end

coil 34, a composite end conductor portion for the filament. The spud wire 35 and the open-coiled outer end section 32 of the filament end coil 34 are welded to the adjacent lead-in wire 21 in the same manner as the slip-over coil 30 and filament end leg 28 in Figs. 1-3 to thereby form the connection between the lead-in wire and the filament.

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

1. In an electric lamp, the combination of a lead-in wire, and a filament having a composite end portion comprising a coil with a core member extending therethrough, said core member and coil having portions thereof extending transversely across said lead-in wire in side-by-side relation and being individually welded thereto at different points along the length of said lead-in wire.

2. In an electric lamp, the combination of a lead-in wire, and a filament having a composite end portion comprising a core member and a coil snugly fitted on said core member and having an open-coiled section, the core member and open coil section having portions thereof extending transversely across said lead-in wire in side-by-side relation and being individually welded thereto at different points along the length of said lead-in wire.

3. In an electric lamp, the combination of a lead-in wire, a filament having an end section, and a slipover coil snugly fitted on said end section, said coil and filament end section having portions thereof extending transversely across said lead-in wire in side-by-side relation and being individually welded thereto at different points along the length of said lead-in wire.

4. In an electric lamp, the combination of a lead-in wire, a filament having an uncoiled end leg, and a wire slip-over coil snugly fitted on the said filament end leg and having a widely open-coiled section, the filament end leg and open coil section having portions thereof extending transversely across said lead-in wire in side-by-side relation and being individually welded thereto at different points along the length of said lead-in wire.

5. In an electric lamp, the combination of a lead-in wire, a filament having an end coil, and a conductor extending through the said end coil, said conductor and filament end coil having portions thereof extending transversely across said lead-in wire in side-by-side relation and being individually welded thereto at different points along the length of said lead-in wire.

6. In an electric lamp, the combination of a lead-in wire, a filament having an end coil provided with a widely open-coiled section, and a spud wire extending through the said end coil, the spud wire and open coil section having portions thereof extending transversely across said lead-in wire in side-by-side relation and being individually welded thereto at different points along the length of said lead-in wire.

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