July 30, 1946. J. E. STONE 2,404,992

LAMP FILAMENT CONNECTION

Filed Feb. 21, 1945

FIG. 1.

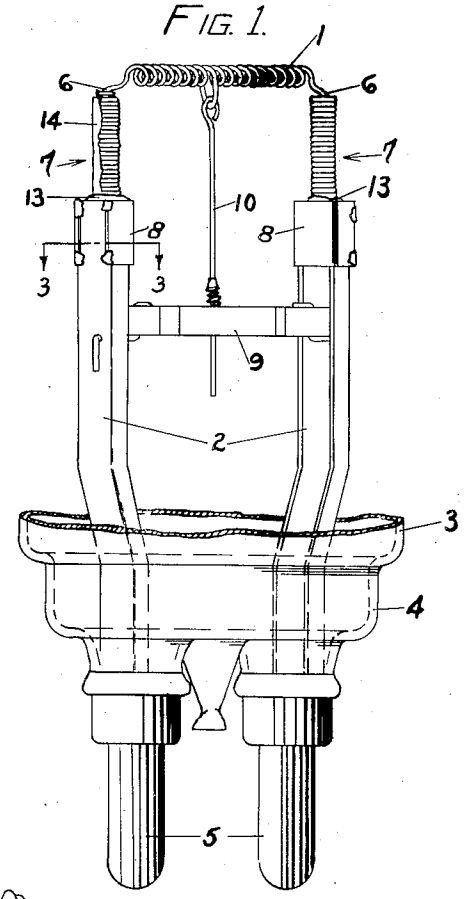


FIG. 3.

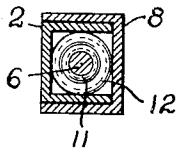


FIG. 2.

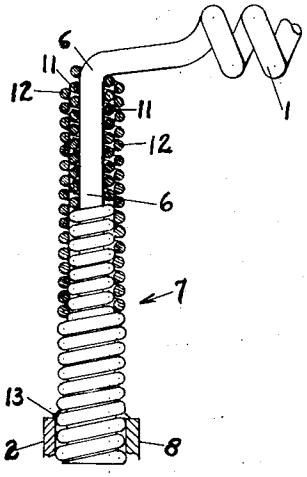
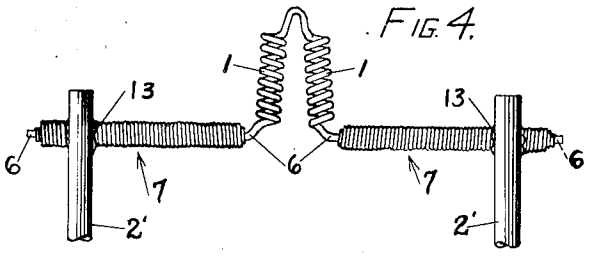


FIG. 4.



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LAMP FILAMENT CONNECTION

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3 Claims. (Cl. 176—38)

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This invention relates to electric lamps and filament mounts, and especially to current connections and supports for filaments. The invention is especially useful for current lead connections of filaments that carry fairly heavy currents, and is hereinafter explained with particular reference to a coiled incandescent lamp filament of this character. However, the invention is not essentially limited to incandescent lamps, but is also applicable to filaments serving as electrodes in electric discharge devices, for example. Various features and advantages of the invention will become apparent from the description of species and forms of embodiment, and from the drawing.

In the drawing, Fig. 1 is a side view of a coiled filament mount for a high current incandescent lamp that embodies the invention, portions of the lamp bulb being also shown; Fig. 2 shows an axial section through one of the current lead connections in Fig. 1, on a larger scale, before some of the welding shown in Fig. 1; and Fig. 3 is a section taken along the line 3—3 in Fig. 1.

Fig. 4 is a side view of a filament and associated end connections suitable for a type of mount different from that shown in Fig. 1.

The mount here illustrated is that of a high-current incandescent lamp of fairly high wattage, comprising an incandescent filament of stout tungsten wire coiled into a transverse helical coil 1 and connected between current lead supports 2, 2 that extend inward into a tubular bulb or envelope 3 from its base structure 4. This base 4 is shown as of a general "bipost" type such as disclosed in U. S. Patents Nos. 1,967,852 and 2,069,638 to D. K. Wright, with tubular post-thimbles 5, 5 in which members 2, 2 of channel section are secured. The end portions or legs 6, 6 of the filament 1 carry wire reinforcements 7, 7 which overlap the ends of the leads 2, 2 and are welded to them. As shown in Figs. 1 to 3, these parts 7, 7 fit into the upper ends of the channels 2, 2 and are securely held by reverse channel clamps 8, 8 embracing the channels 2, 2 and welded to them. A transverse insulative cross-bar 9 has its ends engaged in the channels 2, 2 and secured to them; and an auxiliary (molybdenum) supporting wire 10 has an eyeleted upper end hooked into an elliptic mid-convolution of the filament coil 1, and has its lower end suitably mounted or secured in the cross-bar 9.

As thus far described, the construction corresponds essentially to what has already been used in lamps of the types hereinbefore referred to.

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It differs from prior constructions, however, as regards the wire end-reinforcements 7, 7 for the straight, uncoiled filament legs 6, 6, as will now be explained.

Instead of consisting of a single (molybdenum) helical wire coil slipped over the filament leg 6, as heretofore, each of my reinforcements 7 consists of a plurality of helical wire coils (of any suitable metal(s)) one around another, two such coils 11, 12 being shown in Fig. 2. As shown in Fig. 2 the coils 11, 12 are of substantially finer wire than the filament 1. The inner coil 11 is a close-wound wire helix which embraces and grips the filament wire 6 so as to make good electrical contact with it, and is preferably wound to an internal size slightly less than that of the wire 6, so as to fit and grip it elastically. The coil 12 outside the coil 11 embraces the latter and makes good electrical contact with it, being preferably wound to an internal size likewise entailing an elastic grip on the coil 11. It is shown as wound in the same helical sense and to the same pitch as the coil 11, and as of wire of the same size as that of coil 11. Its internal size is such that it "screws" on the coil 11 rather snugly when the latter is on the filament leg 12, with a slight elastic grip: i. e., it fits into the thread formed by the convolutions of coil 11, over and between the latter. As shown, the coils 11, 12 are both tight-wound, with their adjacent convolutions in lateral contact, and are of the same size wire. In manufacture, the coils 11, 12 may be separately wound and then screwed together before slipping over the wire 6; or they may be wound concurrently and continuously in the screwed together relation on a single mandrel, cut to lengths, and afterward slipped on the wire 6. In either case, they may of course be set by heat treatment in the usual way after coiling. Since coil 12 forms (as here shown) the outside of the reinforcement 7, it is welded as indicated at 13 to the lead 2 and to its clamp 8. In addition, adjacent convolutions of this outermost coil 12 are welded to one another as indicated at 14, thus greatly enhancing the effective conductivity of this outer coil.

It will be seen that with this multiplex construction of the reinforcement 7, the inner and outer coils 11, 12 elastically grip the wire 6 when they are put on it, and also exert elastic pressure against one another, thus assuring good contact. While the elasticity of the outer coil wire 12 may be largely lost or impaired in making the welds 13, 14, the elasticity of the internal coil wire 11 remains largely or substantially unimpaired, as-

suring continued elastic pressure and contact throughout the life of the lamp between this coil 11 and the parts 6, 12. The multiplex construction of the reinforcement 7 has the further advantage of greater flexibility, greater strength, and greater ease of manufacture. In fact, the plurality of coils allows of an aggregate net equivalent thickness of reinforcement around the wire 6 exceeding what could practically be obtained with the largest wire that could be coiled into a single slipover coil of the required internal size.

As shown in Fig. 4, the filament embodies two coil sections 1, 1 extending nearly parallel and interconnected by a U-bend, and the uncoiled ends or legs 6, 6 extend substantially in line with one another to opposite sides of the sections 1, 1. These legs 6, 6 carry wire coil reinforcements 7, 7 each of multiplex construction such as illustrated in Fig. 2 and described above. Such a filament assembly is suitable, for example, for the lamp mount shown in U. S. Patent No. 2,351,299 to R. E. Smith. As shown, the slipovers 7, 7 are welded at 13, 13 to current leads 2', 2' consisting of suitably stout wires.

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

1. The combination with a filament of stout metal wire having an end leg, and a current lead for connection to said leg, of a flexible coil on said leg of finer wire than the filament with its convolutions gripping the said leg and thus making electrical connection to said leg, and a second flexible coil of finer wire than said filament around said first-mentioned coil gripping the same and welded to said lead.

2. The combination with a filament of stout metal wire having an end leg and a current lead for connection to said leg, of a flexible helical coil on said leg of finer wire than the filament gripping the said leg and thus making electrical connection to said leg, and another flexible coil of finer wire than said filament screwed on the thread formed by the convolutions of said first-mentioned coil and welded to said current lead, and also having its own convolutions welded to one another.

3. The combination with an incandescent filament coil of stout metal wire having an uncoiled leg, and a current lead for connection to said leg, of a tight-wound slipover coil on said leg of finer wire than said filament with its convolutions gripping the said leg and thus making electrical connection thereto, and a second flexible coil of substantially corresponding pitch and of finer wire than said filament screwed over and between the convolutions of said first-mentioned coil and welded to said lead.

JOSEPH E. STONE.