

Feb. 8, 1938.

L. R. PETERS

2,107,903

METHOD OF MANUFACTURING AN ELECTRIC DEVICE

Filed Jan. 3, 1934

Fig. 1

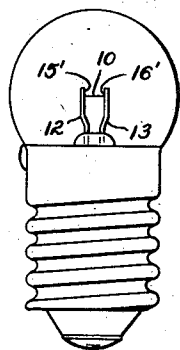


Fig. 2

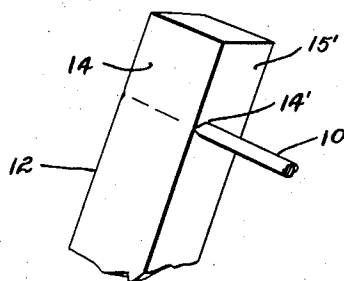


Fig. 3

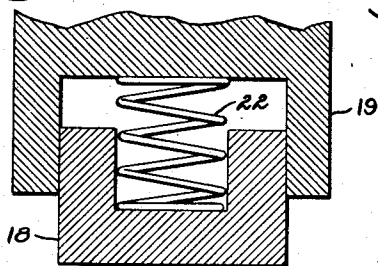


Fig. 4

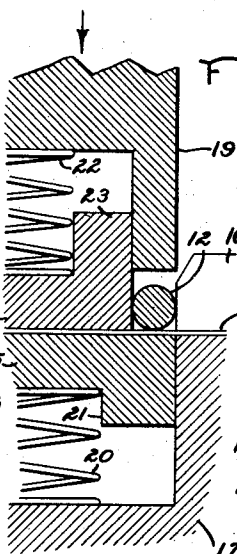


Fig. 5

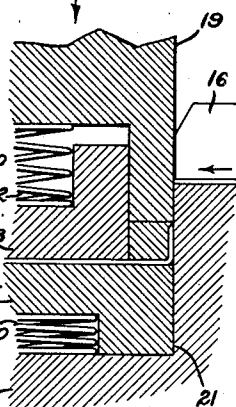
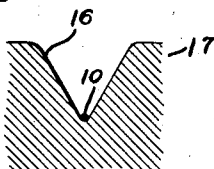


Fig. 6



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UNITED STATES PATENT OFFICE

2,107,903

METHOD OF MANUFACTURING AN ELECTRIC DEVICE

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Application January 3, 1934, Serial No. 705,067

2 Claims. (Cl. 29—155.5)

My invention relates to electric incandescent lamps and similar devices comprising an electric energy translation element, such as a filament, mounted on leading-in wires and sealed in a bulb. More particularly my invention relates to an improved joint or connection between the energy translation element and the leading-in wires in such devices and to the method of manufacture thereof.

Considerable trouble has been experienced with so-called miniature incandescent lamps such as those used in flashlights due to irregularity of performance. Heretofore the filament was generally clamped in a hook formed at the end of the leading-in wires or welded thereto. These methods are satisfactory where comparatively long filaments are used, although poor connections are sometimes obtained and the actual point of contact between the filament and lead wire cannot be accurately controlled. Taking as a specific example of present manufacture a miniature lamp which operates on one and one-half volts, the filament is designed to have a length of .055 inch and is clamped in a hook formed from a flattened end portion of a leading-in wire of .010 inch diameter. Such a construction may result in as much as a twenty per cent difference in operative filament length (i. e., that length of filament which becomes incandescent during operation) more or less than the designed length, since the actual contact between the filament and leading-in wires may exist at either edge of the flattened hook portion. Such differences in filament length result in irregular performance of the lamps.

One of the objects of my invention is to provide a construction in which the filament length is accurately controlled. Another object is the provision of a reliable joint between the filament and leading-in wires.

Further features and advantages of my invention will appear from the following description of species thereof and from the drawing.

In the drawing, Fig. 1 is an elevation of a lamp comprising my invention; Fig. 2 is a detailed view in perspective and at an enlarged scale showing a connection between the filament and lead wire; Figs. 3, 4 and 5 are elevations, in section, of apparatus for forming the filament and lead wire connection in successive operating steps; and Fig. 6 is a section along line 6—6 of Fig. 3 showing filament supporting grooves.

Referring to Fig. 1, an incandescent lamp is shown comprising a filament 10 mounted on leading-in wires 12, 13. The said filament 10 in

this case consists of a straight wire, the ends of which are embedded in the said leading-in wires. As shown in Fig. 2, the ends of the leading-in wires have a definite predetermined form, preferably rectangular in cross-section, and the filament 10 is embedded in at least one face of the square section, such as the face 14 of leading-in wire 12. Since the filament consists of a hard metal such as tungsten and the leading-in wires are made of a comparatively soft metal or alloy, such as copper or "Dumet" wire, the said filament may be readily embedded in said leading-in wires which "flow" readily around said filament during the pressing. The joint thus formed is very secure and insures a good electrical contact between the leading-in wire and the entire length of that portion of the end of the filament which is to be clamped thereto, namely, the portion of the filament from the point 14' to the end thereof. Thus the operative portion of the filament extends a definite distance between the inner faces 15', 16' of the leading-in wires 12, 13.

The method of forming the joint between the filament and leading-in wires is shown progressively in Figs. 3, 4 and 5. Referring to Fig. 3, the filament wire 10 lies on the face of a spring actuated block or jaw 15 and in V-shaped grooves 16 (Fig. 6) in a lower die 17 in which the block 15 is mounted. A spring actuated block or jaw 18 is mounted in the plunger or upper die 19, the width of said block 18 being equal to the desired length of the operative portion of the filament, and the width of the upper die 19 being equal to the length of the operative portion of the filament plus twice the leading-in wire diameter. The upper die 19 is lowered so that the block 18 engages and firmly and immovably holds the filament wire 10, after which the upper die enters the lower die 17 and engages the circular leading-in wires 12, 13 which lie in the spaces between the sides of the block 18 and lower die 17. As the downward movement continues, the upper die 19 severs the filament wire 10 and the block 15 is forced down against the action of spring 20 until feet 21 thereon engage the die 17. As the upper die 19 continues to move down against the action of spring 22, located between the block 18 and said upper die, and spring 20, the leading-in wires 12, 13 are pressed or molded into the rectangular or square space between lower die 17, block 15, upper die 19 and block 18. The extreme ends of the filament are turned upward as shown in Fig. 5, and the leading-in wires are securely molded around the ends of said filament. It is apparent that by this method the length of the

filament between the lead wires is very accurately controlled since the said lead wires are so confined in the dies during the swaging and embedding step that they are not permitted, due to their tendency to flatten, to encroach upon the intended effective length of the filament.

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

1. The method of mounting an electric energy translation element on a pair of leading-in wires which consists in clamping a portion of the translation element between a pair of jaws with the ends thereof extending from opposite sides of one of said jaws and then pressing and molding a por-

tion of a leading-in wire against each side of said jaw and around the translation element end extending therefrom to embed said ends of the translation element in the leading-in wires.

2. The method of mounting a filament on a pair of leading-in wires by embedding the ends of said filament therein which consists in so confining the said leading-in wires in dies during the swaging and embedding step that they are not permitted, due to their tendency to flatten, to encroach upon the intended effective length of the filament.

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