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ELECTRIC INCANDESCENT LAMP WITH INTEGRAL FUSE

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FIG. 1.

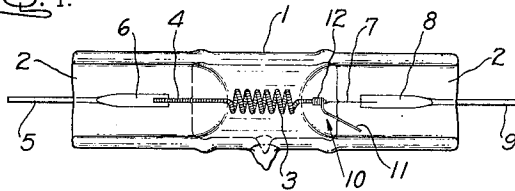
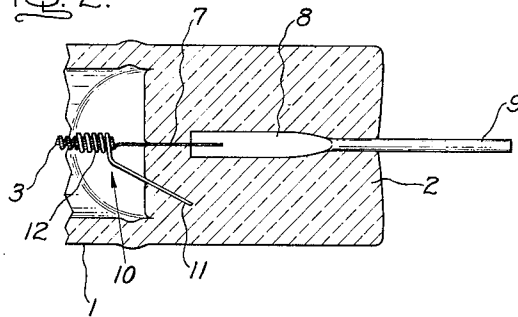


FIG. 2.



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ELECTRIC INCANDESCENT LAMP WITH INTEGRAL FUSE

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3 Claims. (Cl. 315-74)

This invention relates generally to electric incandescent lamps and more particularly to a support structure for a lamp having a fuse end or leg as part of the filament.

In connection with electric incandescent lamps which have an elongated tubular envelope and a filament extending axially therethrough, it has become common to have a straight end, or leg, of the filament serve as a fuse for the lamp. This invention is especially concerned with the supporting of the fusible portion of the filament in such an elongated tubular envelope. The fuse leg of the filament must, of necessity, be fusible during an inrush of current such as occurs in the case of formation of an arc upon breakage of the filament, and therefore is of narrow cross-section wire, so as to properly serve its fusing purpose. This makes the fuse leg structurally, as well as electrically, the weakest part of the filament structure in the lamp. The fuse leg therefore is relatively easily broken during handling and shipping. While it is apparent that to obviate this problem the fuse leg of the filament must be mechanically supported or relieved of the stresses placed thereon in some manner, the type of support necessary to fulfill this function in a satisfactory manner is not as readily apparent. Since the filament is a rather delicate structure, it is not simply a matter of welding a brace or some such device thereto.

It is an object of this invention to provide a new and novel fuse support for a tubular incandescent lamp having a fuse leg which is economical in design and is easily manufactured.

It is a further object of this invention to provide a fuse support for an incandescent lamp which is easily assembled to the filament and into the lamp envelope.

It is important that the fuse support does not interfere with the lamp operation and hence a further object of this invention is to provide a support which is electrically insulated from the filament circuit and which does not interfere with the operation of the lamp.

Further features and advantages of the invention will appear from the following detailed description of the preferred embodiment thereof and from the drawing wherein:

FIG. 1 is a side view of a lamp provided with a fuse support member in accordance with the invention; and

FIG. 2 has an enlarged side view of the end of the lamp provided with the fuse support member, better illustrating the preferred embodiment of the invention.

Referring to FIG. 1 of the drawing, the lamp comprises an elongated tubular envelope 1 of vitreous material such as glass or quartz, having a flat pinch seal 2 at each end thereof which may be pressed to an I-shaped cross-section giving strength and rigidity. A filament 3, preferably a helical coiled coil of tungsten wire, extends axially of the envelope 1 and a helically single coiled end leg 4 is connected to lead-in conductor 5, which extends through and is hermetically sealed in one of the pinch seals 2. When the envelope 1 is of quartz, the lead 5 preferably consists of molybdenum wire having an extremely thin foliated portion 6. A straight leg 7 on the other end of the filament is preferably attached to another foliated portion 8 of lead-in conductor 9 within the other pinch seal 2, preferably by welding, and may have a tab of platinum or molybdenum interposed therebetween.

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The envelope preferably contains an inert gas filling and may also contain a reactive atmosphere such as iodine, as disclosed and claimed in Patent 2,883,571, Fridrich et al.

The straight end portion 7 of the filament within the interior of envelope 1 acts as a fusible element, which at the end of lamp life, prevents violent failure of the lamp by quenching any tendency of the lamp to arc in the pinched seal portion of the lamp and is sometimes referred to as a fuse leg. The fuse leg, which as shown, is provided only at one end of the lamp, may also be provided at the other end; thus, creating two fusible portions of the filament. However, this is not generally considered necessary in practice and the sealing of coil end 4 into pinch seal 2 makes the lamp much stronger. The fuse leg of the filament is mechanically weak and must be supported by some means which does not deleteriously affect the operation of the lamp.

In accordance with the invention, the fuse leg 7 is supported at a point remote from its anchor in pinch seal 2 by a fuse support member 10, preferably of tungsten. A first end 11 of fuse support 10 is embedded in the adjacent pinch seal at the side of, and spaced away from, the fuse leg 7. The second end 12 of the support 10 is interwound, i.e., helically wound with the same pitch as the coil and with an inside diameter slightly smaller than the outside diameter of the coil so that the support 10 is in effect screwed on the helical single coiled leg portion of the coiled coil 3, with the coiled portion of the support firmly anchored to the coiled leg portion of the filament. It will be evident that the support member 10 is firmly anchored in the pinch seal 2 and thus provides a support for the coiled end leg of the filament adjacent fuse leg 7 which, in effect, relieves the mechanical strain from this fusible portion of the filament while at the same time reducing the unsupported length of lighted filament with its accompanying reduction in filament sag throughout life.

In a preferred method of assembly of the lamp, the support member 10 is interwound with the filament while the coil is still supported by the coiling mandrel such as is ordinarily used in the coiling of a tungsten filament. Thus the coil is not directly subjected to the physical strain of the attachment of the support member thereto. After the filament has been attached to its end foliated portions and lead wires to the ends thereof, the filament may be inserted into the open tube of the lamp, as is conventional, with the support member 10 attached thereto. The support being attached to the filament is, in effect, self-centering so that when the pinching members for the seals come down, forming the seals, the support member is centered and firmly embedded into the seals.

Thus it will be seen that there is provided a lamp which has a fuse element relieved of mechanical stress by a new and novel support member and a filament with a shortened unsupported length.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. An electric incandescent lamp comprising an elongated envelope of vitreous material having pinch seals at its ends, a helically coiled tungsten wire filament extending longitudinally of said envelope, lead-in conductors hermetically sealed in respective said pinch seals and extending exteriorly thereof and electrically connected to respective ends of said filament, at least one of said lead-in conductors terminating within its associated pinch seal, the end of the filament associated with said one lead-in conductor terminating in an integral straight wire fuse leg portion which extends from the interior of the envelope directly into the associated pinch seal and is connected to said one lead-in conductor within said pinch seal, and a wire support member having one end em-

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bedded in the last-mentioned pinch seal in spaced insulated relation to the said one lead-in conductor and having its other end firmly engaging the coiled portion of said filament immediately adjacent to said straight wire fuse leg portion whereby to relieve said straight wire fuse leg portion of mechanical stress.

2. An electric incandescent lamp comprising an elongated envelope of vitreous material having pinch seals at its ends, a helically coiled tungsten wire filament extending longitudinally of said envelope, lead-in conductors hermetically sealed in respective said pinch seals and extending exteriorly thereof and electrically connected to respective ends of said filament, at least one of said lead-in conductors terminating within its associated pinch seal, the end of the filament associated with said one lead-in conductor terminating in an integral straight wire fuse leg portion which extends from the interior of the envelope directly into the associated pinch seal and is connected to said one lead-in conductor within said pinch seal, and a wire support member having one end embedded in the last-mentioned pinch seal in spaced insulated relation to the said one lead-in conductor and having its other end helically coiled and in firm screwed on engagement with the coiled portion of said filament immediately adjacent to said straight wire fuse leg portion whereby to relieve said straight wire fuse leg portion of mechanical stress.

3. An electric incandescent lamp comprising an elongated envelope of vitreous material having pinch seals at

its ends, a helically coiled-coil tungsten wire filament extending longitudinally of said envelope, lead-in conductors hermetically sealed in respective said pinch seals and extending exteriorly thereof and electrically connected to respective ends of said filament, at least one of said lead-in conductors terminating within its associated pinch seal, the end of the filament associated with said one lead-in conductor terminating in a helical single coil leg portion followed by an integral straight wire fuse leg portion which extends from the interior of the envelope directly into the associated pinch seal and is connected to said one lead-in conductor within said pinch seal, and a wire support member having one end embedded in the last-mentioned pinch seal in spaced insulated relation to the said one lead-in conductor and having its other end helically coiled and in firm screwed on engagement with the portion of said single coil leg immediately adjacent to said straight wire fuse leg portion whereby to relieve said straight wire fuse leg portion of mechanical stress.

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