May 6, 1969 R. W. FREESE, JR 3,443,144

INFRARED INCANDESCENT LAMP

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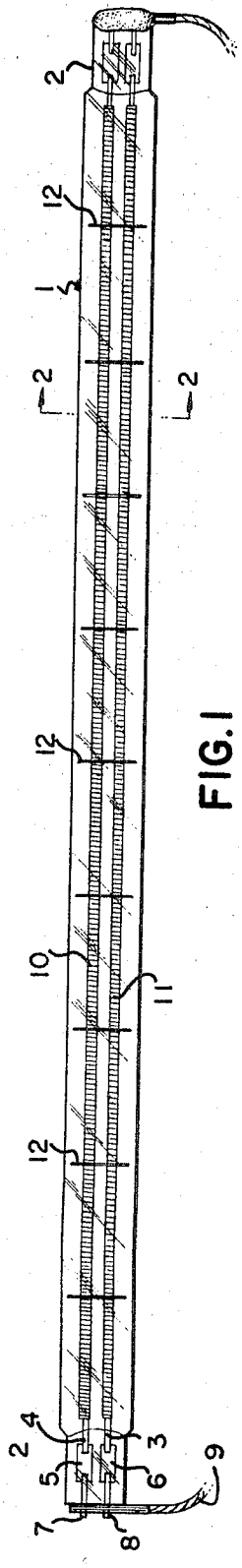


FIG. 1

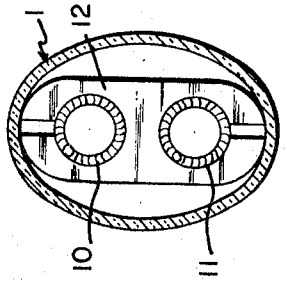


FIG. 2

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INFRARED INCANDESCENT LAMP

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5 Claims

ABSTRACT OF THE DISCLOSURE

This invention concerns infrared incandescent electric lamps having an oval-shaped quartz envelope, with two parallel tungsten filaments, extending the length of the lamp, and are mounted within said envelope.

This invention relates to incandescent lamps and particularly to those having tubular quartz envelopes in which filaments are disposed along the length of the envelope.

In the past, tubular quartz-type incandescent lamps have been made with a generally cylindrical envelope and the filament has been disposed axially, extending throughout the entire length. Such lamps have operated well for infrared heating purposes, however, I have now discovered a modification of such lamps to improve the amount of irradiated heat.

According to my invention I have discovered that if the envelope is modified to a generally oval shape with two filaments disposed and electrically connected in parallel, that materially higher operating wattages can be used. The seals in which the ends of the filaments are disposed are similar to those which are conventional in the art. Advantageously, through the use of the parallel filaments, higher heat density per unit area of envelope wall can be obtained. Moreover, a longer lamp life at higher wattage density per unit watt of current can be realized. Both of these advantages can be realized without modifying the structure of the fixture in which these lamps are installed and hence my new lamps are completely compatible and interchangeable with prior art lamps in existing installations.

In the prior art, techniques utilized to obtain higher wattages in the lamp were to use a very large diameter filament or to intertwist two or more filaments together on the same axis. The current that could be carried in lamps having axially disposed filament(s) was limited to 75 to 80% of the wall loading which is obtainable with the design of my invention. Moreover, the prior art designs utilized only one filament support through the seal at each end of the envelope for the filament. According to my invention, I mount each of the two filaments upon separate supports, thereby increasing the current carrying characteristics of the seal. The current to the filaments is distributed over a fairly large area and thereby provides excellent heat dissipation so that the seal will not break.

The many other objects, features and advantages of my invention will become manifest to those conversant with the art upon reading the following specification when taken in conjunction with the accompanying drawings wherein preferred embodiments of my incandescent lamp are shown and described by way of illustrative examples.

Of these drawings:

FIGURE 1 is a plan view of the dual filament, oval

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saped, quartz-type incandescent lamp of my invention and FIGURE 2 is a cross-sectional view taken along the lines 2—2 of FIGURE 1 showing particularly the disposition of the filaments and the cross-sectional shape of the envelope.

Referring now to FIGURE 1, the envelope 1 has a pair of conventional press seals 2 disposed at either end thereof. A pair of filament supports 3 and 4 extend into the press seal and are attached to molybdenum foil sections 5 and 6. These foil sections are very thin, generally less than about 8×10^{-4} inches, and go into tension when the quartz cools about them. Extending from the other side of the molybdenum foil sections are a pair of lead-in wires 7 and 8, the distal ends of which are disposed outside of the seal. A current conveying line 9 is attached to each of the lead-in wires 7 and 8 and is used to connect the lamps to a source of electricity. If desired, the two separate molybdenum foil sections shown can be joined together into one wide section and also a single lead-in line having about twice the diameter of one of the lead-in wires 7 or 8 can be substituted. Preferably, however, two foil sections are used with two separate lead-in wires. Frequently it is desirable to shield the outside of the press seal and the lead-in wires with a metal tip to prevent accidental damage of the exposed weld and the seal. Similar electrical connections are disposed in the press seal at the other end of the lamp.

A pair of filaments 10 and 11 extend along the length of the lamp and are fitted upon filament supports 3 and 4 and similar filament supports at the other end. A series of spacers 12 are disposed along the length of the filament to prevent them from sagging against the quartz envelope.

As shown in FIGURE 2, the filaments 10 and 11 are disposed inside of the quartz envelope 1. A spacer 12 is fitted about the filaments 10 and 11 and supports them inside of the lamp. Preferably, these filaments are each mounted upon the axis of the half circle forming one portion of the oval. In this manner even heat distribution is obtained along the length of the envelope 1.

In the lamps of the prior art, a typical T–3 quartz envelope had a diameter of about ⅜ inch. With the envelope according to my invention I have found that the ratio of the height to the width should be between about 1.25 to 1.7:1 for maximum efficiency. Preferably the width of the oval is about ⅜ inch and the height is about ½ inch. The filament is sometimes of a coiled coil shape.

When using the heater of my invention, the life of the lamp can be extended materially even when operating at excessively high wattages. For example, when testing a lamp having a round cross-section, and operating at 8,000 watts, the average life was 15 minutes. When testing lamps having oval cross-sections, such as described herein, the average life was 75 minutes at 8,000 watts. The life of the lamps was measured from a point when the power was turned on to when the quartz deformed from the overload conditions. With the oval shape quartz lamps having two filaments in parallel, a 20 to 25% gain in wattage per linear inch can be realized before the softening point of the quartz is reached. Because the lamps have the same width as the round type, the same number of lamps can be placed in a grouping area even though they irradiate more heat. Therefore, the above described gain in wattage per linear inch can be realized in a lamp grouping per unit area.

It is apparent that changes and modifications may be made within the spirit and scope of the instant invention, but it is my intention, however, only to be limited by the spirit and scope of the appended claims.

As my invention I claim:

1. An incandescent lamp comprising: a tubular quartz envelope, said envelope having an oval-shaped cross section; two filaments disposed in said envelope, spaced from each other and extending parallelly along the length of said envelope; press seals disposed at either end of said envelope; means to support said filaments disposed in said press seals; means to convey current to said filaments in parallel.

2. The incandescent lamp according to claim 2 wherein the ratio of the height to the width of the envelope is between about 1.25 to 1.75:1.

3. The incandescent lamp according to claim 2 wherein there are molybdenum foil sections disposed in the press seals at either end of the envelope, the means to support the filaments being electrically connected ot said molybdenum foil sections.

4. The incandescent lamp according to claim 3 wherein there are two molybdenum foil sections in each press seal, each of them being attached to one of the means to support the filaments.

5. The incandescent lamp according to claim 4 wherein there are a series of spacers disposed about each of the filaments, separating them from each other and from the envelope.

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