# United States Patent [19]

**Rich**

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[54] **SEAL FOR A HIGH PRESSURE, SHORT ARC GAS LAMP**


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[51] **Int. Cl.**..... **H01j 5/34,** H01j 61/36

[58] **Field of Search**..... 174/17.05, 17.08, 174/50.57, 50.58, 50.61, 50.63, 152 GM; 313/182, 183, 184, 217, 218, 220, 221, 284, 285, 287, 290, 317, 318, 331, 332; 287/189.365; 314/34



[56] **References Cited**

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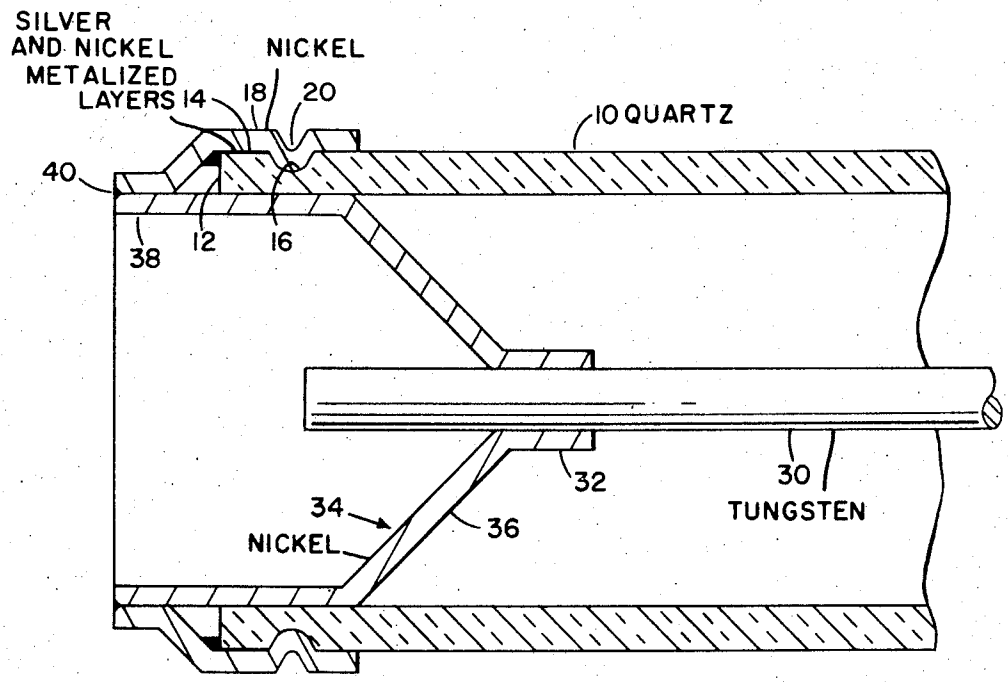
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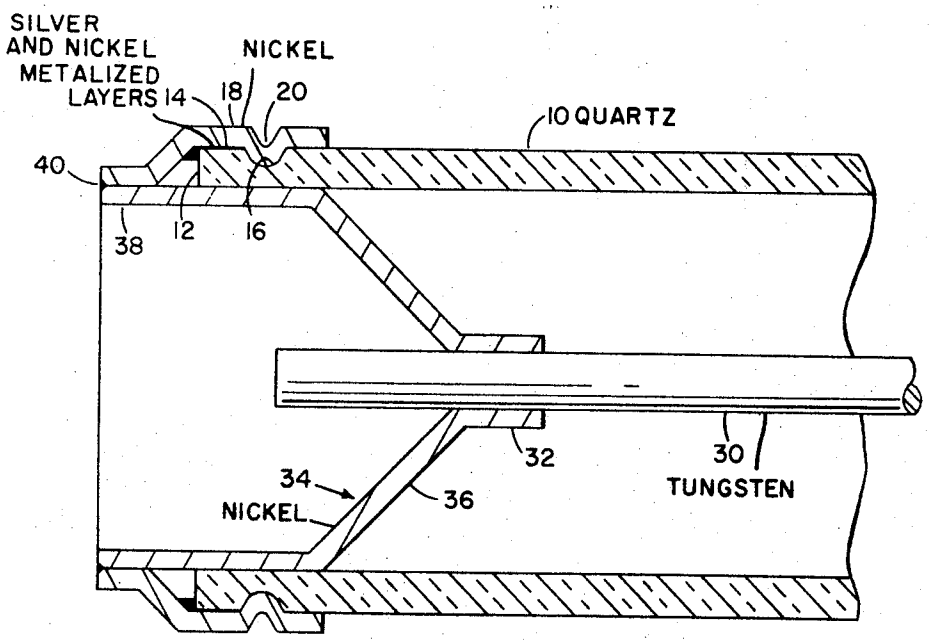


[57] **ABSTRACT**

The invention concerns a reliable quartz-to-metal seal for use in a high pressure, short arc gas lamp, suh as for example, that disclosed in Keller et al. U.S. Pat. No. 3,256,459. The seal involves a nickel ferrule to provide a long path nickel-to-quartz and nickel-to-tungsten seal.


**1 Claim, 1 Drawing Figure**




SILVER
AND NICKEL
METALIZED
LAYERS
14
NICKEL
18
20
10 QUARTZ
40
38
12
16
32
30
TUNGSTEN
34
NICKEL
36

# SEAL FOR A HIGH PRESSURE, SHORT ARC GAS LAMP

## BACKGROUND OF THE INVENTION

In previous lamps of this type, the fusing of the quartz envelope to the tungsten electrodes caused phase changes in the tungsten due to the high temperatures required. Also flexure of the tungsten electrodes occurred because of the relatively insecure mounting which was a result of using ribbons or pigtails to carry current thereto.

In accordance with the need, it is an object of this invention to provide a lamp having a nickel ferrule interfaced between the tungsten electrode and the quartz envelope.

Another object of the invention is to provide a substantially rigid support for the tungsten electrodes.

A further object of the invention is to prevent phase changes in the tungsten electrodes by providing a seal structure which requires less heat for assembly.

## BRIEF DESCRIPTION OF THE DRAWING

The single FIGURE of the drawing is a section illustrating the seal of the invention as applied to one end of a lamp of the type described.

## DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawing, **10** indicates a quartz tube which constitutes the outer envelope of the lamp in question. The outer half of the end surface **12** and the outer surface **14** of the tube **10** are metalized by successive thin layers of nickel and silver in a manner well known in the art for a distance of approximately 0.025 inch.

The tube **10** is provided with a groove **16** adjacent its end. A pure nickel ferrule **18** is positioned on the end of the tube **10** for proper overall length and concentricity and deformed into the groove **16** as indicated at **20**.

Before positioning, the inner surface of the ferrule **18** is plated with silver and subsequent to the positioning of the ferrule, the ferrule **18** is joined to the tube **10** by soldering with pure tin or five percent indium lead solder. This process produces a seal which will withstand pressures of better than 400 psi and is vacuum tight.

A tungsten lead **30** is bonded into the opening of a central boss of a nickel insert generally indicated **34**. The insert comprises the boss **32**, a conical portion **36** and a cylindrical skirt **38**. The outer diameter of the skirt **38** is such that the insert will slide into the tube **10**.

The insert **34** is positioned within the end of the tube **10** so that the tungsten lead is properly located and the skirt **38** is then welded to the ferrule **18** in the area indicated generally **40** by a shielded arc process (Heliarc).

The end of the quartz tube is thus completely sealed through a combination of a nickel-to-quartz seal and a nickel-to-tungsten seal. Neither of these seals requires a particularly high heat process so that any phase changes of the tungsten due to excessive heat is eliminated. Further, the conical nickel insert provides a rigid strong support of the tungsten lead **30**.

I claim:

**1.** A seal for a short arc high pressure lamp structure comprising a quartz tube,

the outer surface of the end portions of said tube being metalized by successive layers of nickel and silver,

an annular groove formed in the outer surface of said tube adjacent the metalized portion,

a nickel ferrule positioned surrounding one end of said tube,

said ferrule being deformed into said groove and soldered to said metalized area,

a frusto conical nickel insert positioned within said one end of said tube with the wide end thereof welded to said ferrule, and

a tungsten electrode protruding through the narrow end of said insert and sealed thereto.

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