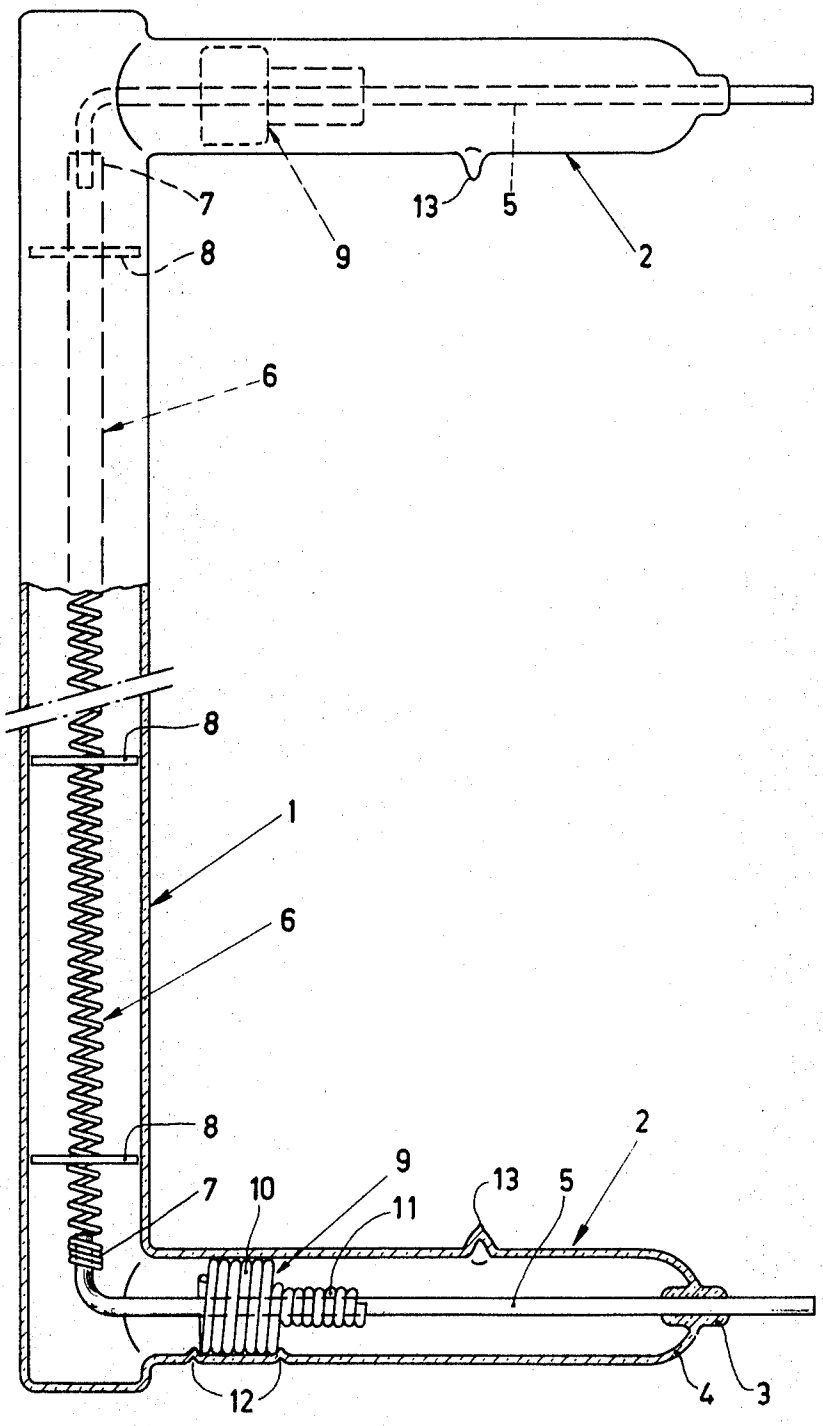
Oct. 20, 1970 V. R. NOTELTEIRS ET AL 3,535,577

TUBULAR ELECTRIC INCANDESCENT LAMP WITH FILAMENT AND CURRENT SUPPLY WIRES SPACED FROM TUBE WALLS

Filed Nov. 14, 1967



INVENTORS
VICTOR R. NOTELTEIRS
FRANCISCUS L. WIJNEN
BY
Frank R. Trifari
AGENT

United States Patent Office

3,535,577

Patented Oct. 20, 1970

3,535,577

TUBULAR ELECTRIC INCANDESCENT LAMP WITH FILAMENT AND CURRENT SUPPLY WIRES SPACED FROM TUBE WALLS

Victor Rosallie Notelteirs and Franciscus Ludovicus Wijnen, Emmasingel, Eindhoven, Netherlands, assignors, by mesne assignments, to U.S. Philips Corporation, New York, N.Y., a corporation of Delaware

Filed Nov. 14, 1967, Ser. No. 682,792

Claims priority, application Netherlands, Nov. 30, 1966, 6616833

Int. Cl. H01j *1/94, 19/48*

U.S. Cl. 313—279 7 Claims

ABSTRACT OF THE DISCLOSURE

An electric incandescent lamp formed as a U-shaped tubular bulb defining a base and two legs, has terminal wires disposed in the legs and a filament disposed in the base. The remote end of each terminal wire extends through a seal at a free end of a leg and the junction end of each wire is supported by a resilient element and maintained spaced from the tube walls.

The invention relates to an electric incandescent lamp having a tubular approximately U-shaped bulb, in which a filament is stretched in the bulb part interconnecting the limbs of the U between two terminal wires which are each disposed mainly in one of the limbs of the U and are passed out of the bulb through a seal at the free end of each of the limbs.

Lamps of this kind have the advantage that, if they are arranged in a row one beside the other, the so-called dead space between the ends of their filaments need be only small. This is of special importance for lamps having a high absorption power, since the terminal wires of these lamps must be comparatively long so that the temperature at the terminal seals can be kept sufficiently low.

In the lamps of this kind, the limbs of the U may also be passed through a wall of a lighting fitting in which the relevant lamp is arranged, so that these seals are even more satisfactorily protected from heat and from the resulting oxidation of the terminal wire ends.

In a known incandescent lamp of this kind, the terminal seals have the form of pinches, and moreover a further pinch is provided at each of the two angular points constituting the transitions between the bulb part comprising the filament and the limbs of the U. These further pinches constitute the second support of each of the two terminal wires, which support mainly absorbs the mechanical load exerted by the filament on the terminal wires in the operative and in the inoperative condition of the lamp. Moreover, these further pinches play a part in the manufacture of the lamp; after the four pinches have been provided, this known lamp is shaped into the form of a U by bending the originally rectilinear bulb at these further pinches heated for this purpose together with the parts of the terminal wires lying in the pinches.

This known lamp construction has the disadvantage that special expansion curvatures must be provided in the parts of the terminal wires disposed in the limbs of the U in order to prevent breaking of the glass at one or more of the four pinches of the lamp in the manufacture of the lamp during cooling after the bending process described above. This known construction is moreover not particularly suitable for lamps having a high absorption power, for example, of 10 to 20 kw. With a view to the high current intensities produced in such large lamps, the parts of the terminal wires to be disposed in the terminal pinches and flattened to foils must have such a large

cross-section that great difficulties would be involved in sealing these foils in a gas-tight manner. Moreover, a large development of heat during operation of such a large lamp and the influence of this heat on the lamp parts lying in the proximity of the filament, such as the supports of the terminal wires at the angular points, must be taken into account. Especially the mechanical load on these supports resulting from differences in expansion between the filament and the terminal wires on the one hand and the lamp bulb on the other hand plays an important part. For these and other reasons, in heavy tubular lamps, so-called bead seals are often used for the terminal wires. The said known construction of tubular U-shaped lamps does not provide a usable solution in this respect.

The invention has for an object to obviate these disadvantages and relates to an electric incandescent lamp of the kind mentioned in the preamble which, according to the present invention, is characterized in that the terminal wires are free of the inner side of the bulb also at the angular points or bends of the U and are each supported at a point lying between the angular points and the seals by a resilient member on the inner side of the bulb.

Thus, the advantage is obtained that the ends of the terminal wires mechanically laterally loaded by the filament can be freely deformed inside the bulb walls so that at least this load does not give rise to breaking of the bulb at its angular points. The terminal wires are nevertheless supported by the resilient members so that the end seals of the terminal wires (which may be bead seals) need absorb this load only to a very small extent so that also in this case the risk of breaking of the bulb is strongly reduced. Finally, the terminal wires can be deformed freely in their longitudinal direction so that auxiliary means, such as expansion curvatures, are superfluous.

A favourable embodiment of the electric incandescent lamp according to the invention is characterized in that a resilient member comprises a substantially helically wound wire having one or more turns tightly surrounding a terminal wire and one or more adjoining turns of larger diameter which fit into the tubular bulb with a small amount of clearance.

By this solution, an effective comparatively simple and robust construction of the resilient support of a terminal wire in a lamp according to the invention can be obtained.

The invention will now be described with reference to the drawing, which shows only one embodiment of the incandescent lamp according to the invention. For the sake of clarity, this embodiment is shown very diagrammatically and partly in longitudinal sectional elevation.

The U-shaped lamp shown has a tubular bulb or central part **1** interconnecting the two—likewise tubular—limbs or legs **2** of the U. In each leg is disposed a terminal wire **5** having a body part between a junction end and a remote end. The filament **6** of the lamp is secured by its ends **7** to the junction ends of the terminal wires **5** and is further supported at a few points by disc-shaped or helical supporting members **8** on the inner side of the bulb part **1**.

The terminal wires **5** are secured at their remote ends by so-called bead seals in the free ends **4** of the bulb limbs **2**. The beads **3** fused to the wires **5** may be made of a kind of glass having a coefficient of expansion lying between the coefficients of expansion of the material of the terminal wires **5** and of the glass of which the bulb parts **1** and **2** are mainly made. This is of special importance if the latter coefficients are relatively strongly different. The tube ends **4** may also be built up of rings made of various kinds of glass so that the coefficient of

expansion of a glass ring each time lies between the coefficients of expansion of the adjacent parts of the lamp.

The junction ends of the terminal wires 5 located at the angular points of the U-shaped lamp bulb are free of the inner side of the bulb i.e. each wire is spaced from the inner walls of the tube. In the proximity of these angular points, the terminal wires 5 are supported by the resilient members 9 on the inner side of the bulb. In the embodiment shown, a member 9 comprises a substantially helically wound wire having a few turns 11 tightly surrounding a terminal wire 5 and a few adjoining turns 10 of larger diameter which fit into the tubular bulb with a small amount of clearance. The members 9 are locked against displacement by small local depressions 12 in the bulb.

The lamp shown further includes the seals 13 of the exhaust tubes used in the manufacture for exhausting the lamp and/or filling it with gas.

What is claimed is:

1. A double-ended electric incandescent lamp comprising:

(a) a generally U-shaped tube formed of a central part and two legs defining a bend of the tube at the intersection of the central part and each leg, and a free end of each leg,

(b) a seal at each free end,

(c) a terminal wire disposed within each leg, each wire having a junction end in the proximity of a bend, a body part along the length of the leg, and a remote part extending through the seal, with the body part and junction end of the wire spaced from the inner walls of the leg and the bend,

(d) a filament disposed within the central part and having opposite ends connected to said junction ends of the terminal wires, and

(e) a resilient element disposed in each leg axially spaced from the seal, this element engaging and resiliently supporting the wire and maintaining the body part and junction end of the wire spaced from contact with the tube walls.

2. An electric incandescent lamp as claimed in claim 1 wherein said resilient member is a substantially helically

wound wire having at least one turn tightly grasping a portion of said terminal wire, and at least one adjoining turn of larger diameter which engages the inner wall of said leg of the U-shaped bulb.

3. An electric incandescent lamp as claimed in claim 2 wherein the inner wall of said leg engaged by said adjoining turn is provided with spaced depressions in said bulb acting as abutment means for said adjoining turn.

4. A lamp as defined in claim 1 wherein each of said elements is located between the bend and the seal.

5. A lamp as defined in claim 1 wherein each of said elements is located near the bend.

6. A lamp as defined in claim 1 wherein each leg has diameter at its junction end substantially the same as along its body part.

7. A lamp as defined in claim 1 wherein the junction end of each terminal wire is movable both laterally and longitudinally with respect to its axis in reaction to heat from operation of the lamp and its contact.

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JOHN W. HUCKERT, Primary Examiner

A. J. JAMES, Assistant Examiner

U.S. Cl. X.R.

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