# United States Patent [19]

**Op de Beeck et al.**

[11] **3,774,065**

[45] **Nov. 20, 1973**


[54] **HOLOGEN FILAMENT LAMP**


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[21] Appl. No.: **241,663**

[30] **Foreign Application Priority Data**

Apr. 17, 1971 Netherlands ..... 7105200

[52] **U.S. Cl.** ..... **313/344,** 313/273, 313/278, 313/279

[51] **Int. Cl.** ..... **H01j 1/16,** H01j 1/92, H01j 19/48

[58] **Field of Search** ..... 313/271, 273, 274, 313/278, 279, 344



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,416,024 | 12/1968 | Young | 313/273 |
| 2,134,574 | 10/1938 | Pinkle | 313/271 X |
| 2,950,413 | 8/1960 | Jayne et al. | 313/271 |



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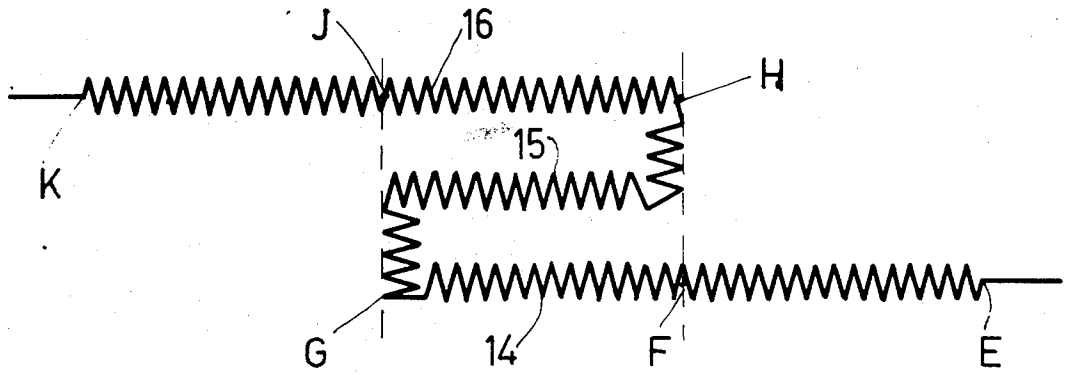
[57] **ABSTRACT**

A halogen filament lamp for copying purposes in which the filament is constructed from filament segments which are connected together by intermediate members; each intermediate member is formed from a helically wound wire which forms one assembly with the adjacent filament segments, a short-circuiting wire being wound across the winding of said intermediate member.


**1 Claim, 3 Drawing Figures**



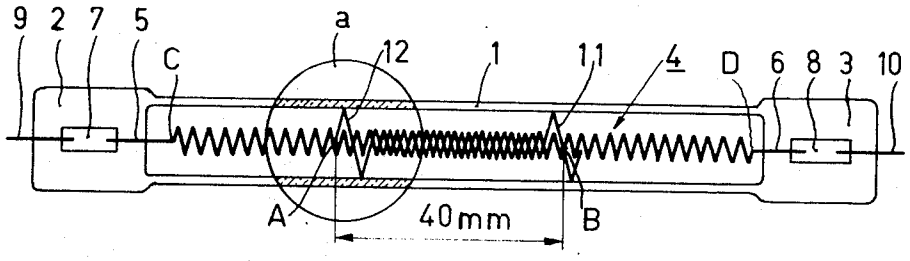



Fig.1

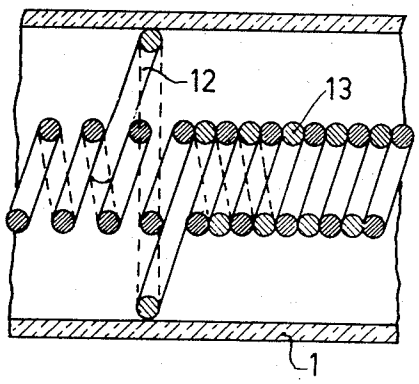



Fig.1a

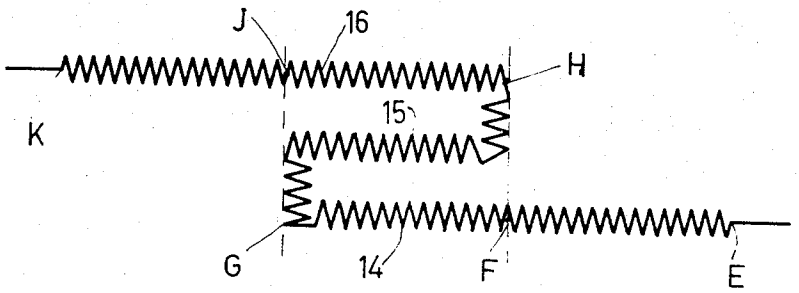



Fig.2

# HOLOGEN FILAMENT LAMP

The invention relates to a halogen filament lamp particularly suitable as a copying lamp, which lamp comprises a tubular lamp envelope which is closed by pinched seals between which a filament formed from a helically wound wire is stretched which filament comprises at least over part of its longitudinal dimension a number of short circuited turns to form at least one non-light-emissive part between two light-emissive other parts. Such a halogen filament lamp, the filament of which is supported in a few places by wire supports and with which it can be achieved that a surface present opposite to the filament lamp is uniformly exposed, is known inter alia from the published Dutch Pat. application 6915668.

In the known halogen filament lamp of this type, the relevant turns of the filament are short-circuited by a short-circuiting rod present inside said turns. Said short-circuiting rod can be provided by winding the wire across a long rod which is then removed by etching in those places where the turns must not be short-circuited. This means a rather expensive method of manufacturing. This drawback has been mitigated in a likewise known halogen filament lamp in which the desirable light distribution is achieved in that each segment of the filament the light emission of which is to be suppressed consists of an intermediate member which is formed by a straight piece of wire which forms one assembly with the adjacent helically wound filament segments. The operation is based on the fact that the straight intermediate members per unit of lamp length comprise less filament wire than the helically wound filament segments and as a result of this radiate less light per unit of lamp length than the filament segments.

However, this filament lamp suffers from the drawback that the pretension of the filament, which pretension is provided in the manufacture of the lamp during pinching, is substantially entirely gone after switching on and off the lamp for some 500 to 600 times. The no longer stretched filament will consequently no longer extend centrally in the tubular lamp envelope and be locally strongly deformed as a result of which fracture occurs.

The decrease of the pretension in the filament when using the lamp may be explained as follows: The helically wound filament segments and the intermediate members will expand by heating when the lamp is switched on. In a lamp which has not yet been used frequently, the pretension will for the time being be so large that the filament remains extending centrally in the lamp envelope. After switching off the lamp, the intermediate members cool more rapidly than the filament segments as a result of their shape. Consequently, the intermediate members will also re-assume their previous position more rapidly than said segments, that is to say they shrink. The adjacent filament segments will be expanded. Since said expansion occurs at a high temperature, the result will be a small permanent deformation of the filament segments. Although the permanent elongation is small, it has been found that the pretension has substantially entirely gone after switching on and off the lamp some 500 to 600 times.

It is the object of the invention to provide a halogen filament lamp which does not exhibit the said drawbacks.



For that purpose, the halogen filament lamp according to the invention is characterized in that the turns in question are short-circuited by a helically wound piece of wire the winding axis of which coincides with the axis of the filament. As a result of this, the resistance across the turns in question is lower so that the temperature will also be lower and the light emission will be less than in the light-emissive parts. Since the filament is formed from a continuous, helically wound wire, the short-circuited turns will not cool more rapidly than the light-emissive parts because the thermal energy is retained longer by the piece of wire.

Furthermore, the pretension conferred on the filament causes a larger expansion in a helically wound intermediate member than in a straight intermediate member. The expansion of the helically wound intermediate member by heating is absorbed in said intermediate member itself and does not cause deformation of the adjacent light emissive parts or causes said deformation only to a slight extent.

An embodiment of the halogen filament lamp according to the invention is characterized in that the turns of the piece of wire are present between the turns of the filament. As a result of this, one type of wire support may be used in the filament lamp for supporting the various parts of the filament. The turns of the piece of wire and the turns of the filament preferably contact each other laterally.

A further embodiment of the halogen filament lamp according to the invention is characterized in that the piece of wire forms part of the wire of the filament which shows a first series of turns wound opposite to the direction of winding of the light-emissive parts of the filament and a second series of turns wound across the first series of turns and again in the said direction of winding, the second series of turns changing into the turns of the adjoining light-emissive part of the filament. It is very advantageous for the whole filament to be wound from one wire. It is known per se to provide a second and third winding on the filament in a filament lamp, see inter alia Dutch Patent No. 91906. In this case, the double winding, however, serves to reinforce the ends of the filament.

A favourable embodiment of the halogen filament lamp according to the invention is characterized in that at least one end of the piece of wire is formed as a wire support engaging the inner wall of the lamp envelope. This wire support may be constructed as a curl which is formed during winding the piece of wire. As a result of this an extra operation, namely the provision of a separate support, becomes superfluous.

The invention will be described in greater detail with reference to the drawings, in which:

FIGS. **1** and **1***a* shows a first embodiment of the lamp according to the invention,

FIG. **2** shows diagrammatically a winding of a second embodiment of the lamp according to the invention comprising two filament segments and an intermediate member constructed from three windings.

The halogen filament lamp shown in FIG. **1** comprises a tubular lamp envelope **1** which is closed at its ends by the pinch seals **2** and **3**. Between the pinches **2** and **3** the helically wound filament **4** is stretched which is secured with its ends **5** and **6** to foils **7** and **8** which are incorporated in the pinch seals **2** and **3**, respectively. To the foils **7** and **8** are furthermore connected the lead-in wires **9** and **10**, respectively, which

emerge from the lamp. The filament 4 is supported in the lamp envelope by the wire supports 11 and 12. Said wire supports are formed as curled supports forming one assembly with the piece of wire 13 (see FIG. 1*a*) which extend between the points A and B and is present between the turns of the filament. The part of the filament present between the points A and B will emit less light than the adjacent parts which are present between the points AC and BD. So in this embodiment a separate piece of wire is used the turns of which contact the turns of the filament laterally. The distance between the points AB is in this case 40 mm.

In the second embodiment of the lamp according to the invention shown in FIG. 2, one single wire is used which is formed to a filament having two light-emissive parts and one non-light-emissive part by using a suitable winding method by winding to and fro. FIG. 2 shows diagrammatically th wound filament. In this case the part 14 of the filament extends from point E to point G. The part 15 present between the points G and H is wound across part 14. The part 16 is wound across part 15 between the points H and J. The parts present between the points EF and JK constitute the light-emissive parts, while the part present between the points FJ constitutes the non-light-emissive part.

Of course, the lamp may be constructed with more than two light-emissive parts which are connected by more than one non-light-emissive part.

What is claimed is:

1. A halogen filament lamp particularly suitable as a copying lamp comprising:

a tubular lamp envelope closed by pinch seals at either end;

a filament formed of helically wound wire stretched between the seals, said filament having an intermediate portion which is non-light emissive between two light emissive portions, said intermediate portion formed as a first series of turns wound opposite to the main axial direction of the winding of one of the light-emissive parts and interengaging a portion of the filament wound in said main axial direction and a second series of turns wound across and interengaging the first series of turns and in the main axial direction, the second series of turns leading into the helical turns of the other light-emissive part of the filament.

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# UNITED STATES PATENT OFFICE
# CERTIFICATE OF CORRECTION

Patent No. 3,774,065 Dated November 20, 1973

Inventor(s) HERBERT K.M. OP DE BEECK ET AL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

[54] "HOLOGEN" should be --HALOGEN--

Insert after [21] Filed: Apr. 6, 1972, --Assignee: U.S. Philips Corporation, New York, N.Y.--

Column 1, line 1, "HOLOGEN" should be --HALOGEN--

Column 3, line 18, "th" should be --the--

Signed and sealed this 9th day of April 1974.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents