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(54) **Kisülőlámpa, különösen kisnyomású kisülőlámpa**

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Kisülőlámpa, különösen kisnyomású kisülőlámpa

Description

Discharge lamp, in particular a low-pressure discharge lamp

Technical subject area

The invention relates to a discharge lamp, in particular a low-pressure discharge lamp, with a discharge vessel and two electrodes arranged at least partially in the discharge vessel and with a first coating arranged at least in certain regions on an outer side of the discharge vessel, which is designed at least as a spectral filter for the light generated in the discharge vessel.

Prior art

Discharge lamps, in particular fluorescent lamps, with coatings on their outer side are known. For discharge lamps subject to relatively low loads, that is, lamps with a discharge current of less than approximately 200mA it is known to form external coatings made of plastic. These can be formed for example from polycarbonate or polyolefin or polyester, which also enable the functionality of a spectral filter, in particular of UV (ultraviolet) protection and other colour effects. For these discharge lamps subject to relatively low loads the said plastic coating also enables the functionality of adequate shatterproofing, whereby the shattering of the discharge lamp and in particular of the discharge vessel, for example in the case of a lamp explosion, can in general be prevented. However, these single-layer coatings can only guarantee their functionality for these relatively low loaded discharge lamps.

In addition, it is known to apply single-layer coatings comprising high-temperature-resistant plastics to the outer side of relatively highly loaded discharge lamps which have discharge currents greater than 300mA. These cannot, however, be used to provide a sufficient pigmentation or colouring with regard to a spectral filter function, so that the highly loaded types of lamp cannot yet be equipped with reliable shatter protection and simultaneous UV protection or colour effects.

GB-645335 discloses a low-pressure gas discharge lamp, wherein a fluorescent layer is applied to the outside of the lamp vessel.

Description of the invention

It is the object of the present invention therefore to create a discharge lamp, in particular a highly loaded discharge lamp in terms of its discharge current, the outer coating of which satisfies multi-functional requirements.

This object is achieved by a discharge lamp having the features according to Claim 1.

A discharge lamp according to the invention is designed in particular as a low-pressure discharge lamp. The discharge lamp comprises a discharge vessel and two electrodes which are arranged at least partially in the discharge vessel. On an outer side of the discharge vessel, at least in certain areas, a first coating is arranged which is designed at least as a spectral filter for the light generated in the discharge vessel. In addition, a second coating is formed on this first coating at least in certain areas, which second coating is designed at least as an oxidation protection layer for the first coating. It is this layer system which enables multi-functional requirements of the discharge lamp to be satisfied. In particular, the second coating can prevent the oxidation of the first coating and substantially increase the thermal resistance of the first coating.

It is preferable that the second coating is formed directly on the first coating. It can also be provided that at least one additional layer is formed between the two coatings, at least in certain areas. It can also be provided that both the first coating and/or the second coating are each designed as a multi-layer system.

The discharge lamp is advantageously designed for discharge currents greater than 200mA. It is particularly preferable that the discharge lamp is designed as a highly loaded discharge lamp, which is designed specifically for discharge currents greater than 300mA. On such highly loaded discharge lamps in particular a coating system can therefore be formed on the outer side, which at least satisfies both requirements for high thermal resistance and adequate spectral filtering functionality. This means that the outer coating of such discharge lamps can also therefore be coloured or pigmented as desired and nevertheless resist high thermal loads. In particular it means that the thermal resistance of the first coating can be considerably increased. A temperature resistance or a thermal resistance of a material is understood to mean, among other

things, that the materials substantially maintain their elastic properties under the influence of relatively high temperatures and that the materials are not depolymerized, and do not oxidize nor become brittle.

It is preferable if the first coating is essentially completely covered by the second coating. This whole-surface coverage can completely protect the first coating against oxidation.

It can however also be provided that the second coating is only formed on the outer side of the discharge vessel on the first coating in the areas around the first and the second electrode. This arrangement means that an at least two-layer system is arranged in particular on the areas of the discharge lamp, and in particular of the discharge vessel, which become hottest. These are precisely the areas where the thermal resistance of the first coating can be increased substantially by the second coating. In order to increase this thermal resistance of the first coating, the second coating can be formed from a suitable material.

The first and/or the second coating is preferably designed as a shatterproof coating for the discharge lamp. This allows the layer system to be designed with multi-functionality, which, alongside the spectral filtering by means of at least the first coating and the oxidation protection, which is realized by the second coating, also guarantees the shatterproofing function.

The first coating is preferably formed from plastic, in particular at least partially from polycarbonate, polyester, poly(methyl methacrylate) or polyolefin. These materials enable pigmentation to be provided relatively simply, and thereby a relatively simple and low-cost means to provide the spectral filter functions of this coating. Spectral filter functions can also be designed in relation to the production of saturated light colours, for example, red, green, blue, and yellow, in the discharge lamp. In particular, an adequate UV filtering function is provided by this first coating.

The second coating can also be used to contribute to the spectral filter functionality of the layer system.

Particularly advantageously, the second coating is formed at least partially, in particular entirely, from a plastic layer with low oxygen permeability. In particular, the second coating is at least partially formed from FEP (perfluoro (ethylene-propylene) plastic). This

material facilitates a particularly effective oxidation protection of the first coating arranged underneath it, and also enables a highly reliable shatterproofing, in particular in the case of a discharge lamp which is highly loaded in terms of its discharge current.

The first coating preferably extends at least over the entire length of the outer side of the discharge vessel.

The second coating has a layer thickness of preferably less than 10 mm, in particular of less than 6 mm, in particular a layer thickness between 0.1 mm and 5 mm.

The discharge lamp preferably comprises a tubular discharge vessel, at each end region of which an electrode is arranged. The second coating is preferably formed with a layer thickness which is substantially radially constant around the circumference, and which substantially has this radial thickness in the longitudinal direction of the discharge vessel also.

The discharge vessel preferably has an outer diameter of less than 30mm, in particular less than 25mm.

Brief description of the drawing(s)

Hereafter an exemplary embodiment of the invention is described in greater detail on the basis of a schematic drawing. The single figure shows a schematic cross-sectional view of a discharge lamp according to the invention.

Preferred embodiment of the invention

Figure 1 shows schematic sectional view through a low-pressure discharge lamp designed as a fluorescent lamp 1. The fluorescent lamp 1 comprises a tubular discharge vessel 2, which can be a glass bulb, for example. At each opposite end region 21 and 22 of the discharge vessel 2 an electrode 3 or 4 is arranged and attached to an associated socket 5 and 6 respectively. From the sockets 5 and 6, two electrical contact pins 7a and 7b, and 8a and 8b extend to the outside. On an outer side 23 of the discharge vessel 2, a first coating 9 is formed. In the exemplary embodiment this first coating 9 is a plastic layer formed from polycarbonate, polyester, poly(methyl methacrylate) or polyolefin. This first coating 9 has at least a spectral filter functionality for the light generated in the discharge vessel 2. In particular, the first coating 9 is designed as a UV protective layer.

The first coating 9 extends over the entire length L, which includes the length of the discharge vessel 2 together with the adjacent sockets 5 and 6.

It can also be provided that this first coating 9, at least in certain areas, extends on the reverse sides and thus on the sides of the sockets 5 and 6 facing contact pins 7a and 7b or 8a and 8b.

The first coating 9 is arranged completely continuously in the radial direction of the tubular discharge vessel 2 and thus is fully covering the outer side 23. In the exemplary embodiment this first coating 9 is formed directly on this outer side 23 and on the edges of the sockets 5 and 6.

In addition, the layer thickness d1 of this first coating 9 is formed with an almost constant radial extent. In addition, the layer thickness d1 is also designed to be substantially equal to this layer thickness d1 over the entire length L.

A second coating 10 is formed directly on top of this first coating 9. The second coating 10 is provided as an oxidation protection layer for the first coating 9. In the exemplary embodiment the first coating 9 is covered by the second coating 10 over its entire area. In addition to its function as an oxidation protection layer the second coating 10 is also provided at least as a shatterproofing layer. The second coating 10 is designed as an FEP layer with low oxygen permeability and high shatterproofing effect. This second coating 10 has a relatively high thermal resistance, which is higher than the basic thermal resistance of the first coating 9.

In addition to the arrangement shown in the figure, it can also be provided that the second coating 10 only covers the first coating 9 in certain areas. In particular it can be provided that the second coating 10 is formed only in local areas A and B of the discharge lamp and in particular of the discharge vessel 2. In these regions of the discharge vessel 2, the highest surface temperatures occur in comparison to other areas of the discharge vessel 2. It is these areas A and B most of all where it is essential to increase the thermal resistance of the first coating 9 by means of the second coating 10. The sizes of the areas A and B in the longitudinal direction are only examples and can also be larger or smaller. In this arrangement the second coating 10 thus constitutes two separate ring-like coatings, which are formed so that they extend radially around the first coating 9.

In this embodiment then, in the region between the areas A and B no second coating 10 is formed on the first coating 9.

In the exemplary embodiment the layer thickness d2 of the second coating 10 is formed both with a substantially constant radius around the circumference, and also with this layer thickness d2 in the longitudinal direction over the entire length L.

It can also be provided that the layer thicknesses d1 and d2 vary in the direction of the longitudinal extension of the discharge lamp 1. For example it can be provided that the layer thickness d2 is thicker in an area close to the electrodes 3 and 4, for example in the areas A and B, than in an area between these electrodes 3 and 4. This can also be provided with the layer thickness d1 of the first coating 9.

The fluorescent lamp 1 is designed for operation with discharge currents greater than 200mA.

Szabadalmi igénypontok

1. Kisülőlámpa, különösen kisnyomású kisülőlámpa egy kisülőedénnyel (2) és két, legalább részben a kisülőedényben (2) elrendezett elektródával (3, 4) valamint a kisülőedény (2) külső oldalán (23) legalább szakaszonként elrendezett első bevonattal (9), amely legalább spektrális szűrőként van kialakítva a kisülőedényben (2) előállított fény számára, azzal jellemezve, hogy
az első bevonaton (9) legalább szakaszonként egy második bevonat (10) van kialakítva, ahol a második bevonat (10) az első bevonat (9) oxidációs védőbevonataként van kialakítva.

2. Az 1. igénypont szerinti kisülőlámpa, azzal jellemezve, hogy a második bevonat (10) közvetlenül az első bevonaton (9) van kialakítva.

3. Az 1. vagy 2. igénypont szerinti kisülőlámpa, azzal jellemezve, hogy az első bevonatot (9) a második bevonat (10) lényegében teljesen lefedi.

4. Az 1. vagy 2. igénypont szerinti kisülőlámpa, azzal jellemezve, hogy a második bevonat (10) csak az első és második elektróda (3, 4) területén (A, B) van a kisülőedény (2) külső oldalán (23), az első bevonaton (9) kialakítva.

5. Az 1. igénypont szerinti kisülőlámpa, azzal jellemezve, hogy az első bevonat (9) közvetlenül a külső oldalon (23) van kialakítva.

6. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy a második bevonat (10) úgy van kialakítva, hogy növeli az első bevonat (9) termikus ellenállóképességét.

7. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy az első (9) és/vagy második bevonat (10) a kisülőlámpa (1) szilánkvédő bevonataként van kialakítva.

8. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy az első bevonat (9) műanyagból, különösen legalább részben polikarbonátból, poliészterből, poli(metil-metakrilát)-ból vagy poliolefinből van kialakítva.

9. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy a

második bevonat (10) legalább részben FEP-ből van kialakítva.

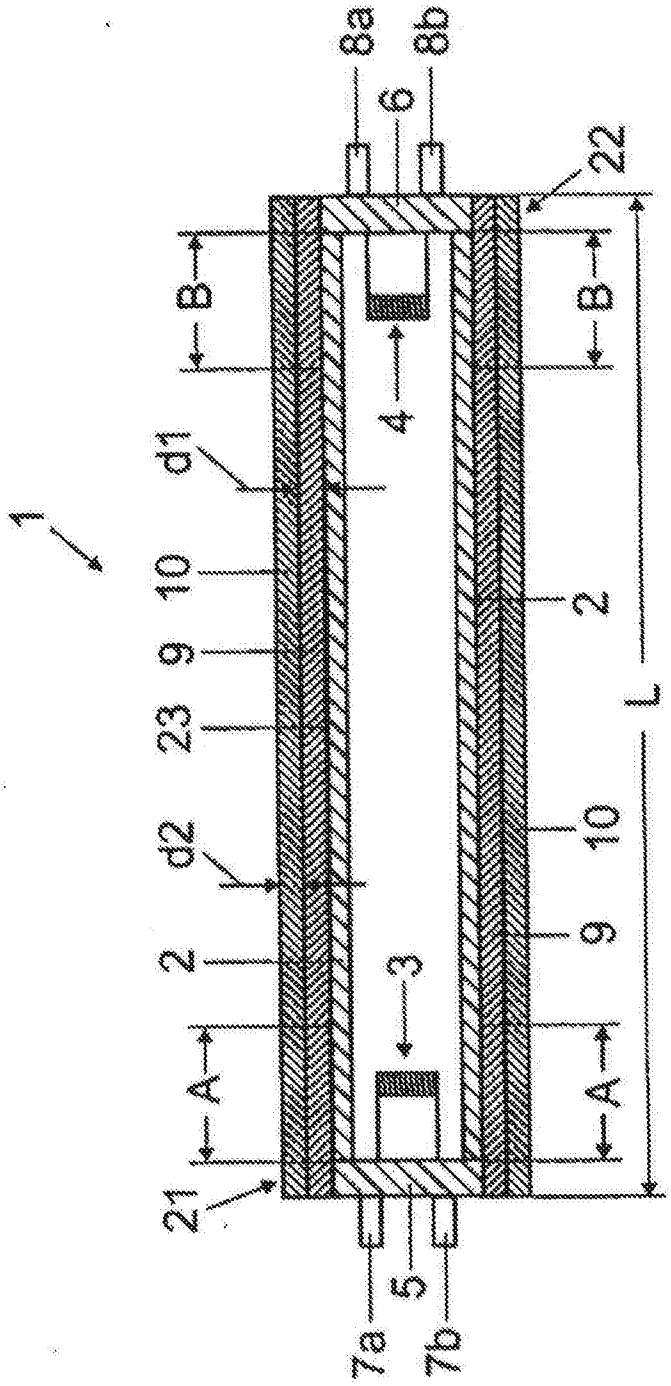
10. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy az első bevonat (9) a kisülőedény (2) külső oldalának (23) teljes hosszára kiterjed.

11. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy a legalább az első bevonat (9) legalább UV-álló.

12. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy a második bevonat (10) rétegvastagsága (d2) kisebb mint 10 mm, előnyösen kisebb mint 6 mm, és még előnyösebben a rétegvastagság (d2) 0,1 mm és 5 mm között van.

13. Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy 200 mA-nál nagyobb, előnyösen 300 mA-nál nagyobb kisülési áramokra van kialakítva.

14.
Az előző igénypontok egyike szerinti kisülőlámpa, azzal jellemezve, hogy a kisülőedény (2) külső átmérője kisebb mint 30 mm, előnyösen kisebb mint 25 mm.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