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(54) **METHOD FOR SECURING THE BASE OF AN ELECTRIC LAMP AND ELECTRIC LAMP WITH
A BASE SECURED BY THIS METHOD**

(57) A method for securing the base of an electric lamp and an electric lamp with a base secured by this method relate to light sources intended to be connected to low-power electrical circuits. The method comprises first forming relief-type depressions in the surface of the

body of the lamp and then compressing points of the skirt of the base to form projections on the inner surface thereof which are arranged in one of said relief-type depressions.

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Description

[0001] The invention relates to light sources intended to be connected to low-power electrical circuits and may be used when manufacturing electric lamps, in particular, incandescent lamps, light-emitting-diode lamps and compact fluorescent lamps.

[0002] The most conventional means for connecting the electric lamp to the electrical circuit using the lampholder is a base. There are known Edison screw bases, bayonet bases, prefocus bases and other types of bases which are usually manufactured from metal and are secured to the one of the parts of the lamp assembly and may be connected with its live elements.

[0003] There is known a metal base which ensures galvanic coupling between internal elements of the lamp and its connection to an electrical circuit. The base is secured to the lamp using cements of hot- or cold curing, the curing behaviours depend on the cement composition («Electronics», encyclopedic dictionary under the editorship of V. G. Kolesnikov, published in Moscow by the Soviet Encyclopedia Publishing House, 1991, p.609).

[0004] The use of these cements, however, has several drawbacks in the process of manufacturing: there must be prepared compounds which have short shelf lives; there must be performed a preliminary operation for cleaning the base surface; a cement must be applied as the whole processing procedure; time requirements to cement curing must be observed. On the other hand, under the influence of elevated temperatures when using the lamp for a long time the cement strength properties are significantly reduced, which often results in the fracture of the base attachment with the lamp.

[0005] There is known a method whereby a male screw base the threads of which are formed by a conductor is placed in grooves on the surface of the plastic part of the base, and the ends of the conductor are protruded into the cavity of the base and secured to the live elements of the lamp. Transversal flanged projections on the plastic part of the base have holes through which it is secured to the lamp housing (U.S. patent No. 4198112, IPC H01R 11/02, issued on April 15, 1980).

[0006] The attachment between a base and a lamp in the known analog definitely appears to be highly reliable. However, the design and processing complexity makes the known solution unsuitable for use in the large-scale computer-aided manufacturing.

[0007] There is known a method whereby a metal base is mechanically secured to the cylindrical part of a plastic neck of the housing of the compact fluorescent lamp. This is made by spot crimping along the perimeter of the cylindrical part of the base toward the surface of the female part of a neck of the lamp housing (U.S. patent No. 6081067, IPC H01J5/48, issued on June 27, 2000).

[0008] The advantage of the known solution is the possibility of using it under the conditions of large-scale lamp manufacturing. A local depression on the far cylindrical surface of the base (a base shell) resulted from spot

crimping meets the resistance of the housing plastic, and in the contact area between the base and the female part of a plastic neck friction forces are created, thus preventing the base torsion with respect to the lamp.

[0009] In the known solution the more high the crimping force is, the more reliable the fixation is. However, mechanical properties of the plastic part set limits on the intensity of this force. Thus, the crimping force intensity shall be taken within a limited range which is not regular but depends on physical and chemical properties of the supplied batch workpieces. It is quite apparent that there may be a danger of discrepancy between the actual physical and chemical properties of attached parts and crimping processing conditions during computer-aided manufacturing. In addition, friction forces in the contact area are reduced as a result of repeated thermal stresses and natural aging of plastics, thus increasing the probability of the base torsion.

[0010] The solutions described in applications WO 2006/056111 and EP 0044195 have also been taken into consideration when framing the specification.

[0011] The technical result of the invention is a simplification of the technology for securing the base, an increase in the reliability of unreleasable attachment and a decrease in force stresses when securing the lamp base.

[0012] The method for securing the base of an electric lamp is characterized by the following essential features:

[0013] The method for securing the base of an electric lamp including the fabrication of the lamp housing part having a surface matching an internal surface of the base shell; base securing to said housing surface by spot crimping of the base shell with a concomitant formation of projections on the inner surface thereof, characterized in that at least one relief-type depression is formed on said housing surface and spot crimping of the base shell is made so that said projection can be arranged in said relief-type depression.

[0014] The following features shall be pointed out as optimizing and ampliative ones:

- relief-type depressions are evenly formed over the whole matching surface, which allows the base to be reliably secured without considering overstated requirements to relative positioning of attached parts;
- conical relief-type depressions are formed (for example, in the form of a circular cone or equilateral pyramid);
- longitudinal relief-type depressions positioned along the housing axis are formed on the surface intended for matching that of the base shell.

[0015] An electric lamp manufactured using the said method is characterized by the following essential features:

[0016] An electric lamp comprising a housing and a base secured to the housing corresponding surface and

having fixing projections matching said housing surface characterized in that said cylindrical housing surface has relief-type depressions the envelope of which bottoms forms a surface matching the enveloping surface of projection bottoms each of which is received by one of said depressions.

[0017] The following features shall be pointed out as optimizing ones:

- a part of the housing comprising a surface for securing the base is made as a separate component fabricated so that it can be attached to the housing;
- the number of depressions on the securing surface is equal to the number of projections;
- relief-type depressions are conical (in particular, in the form of a circular cone or equilateral pyramid);
- relief-type depressions are positioned at regular intervals over the whole securing surface;
- a part of the housing comprising a surface for the base placement and the base itself have a helical surface, relief-type depressions are longitudinal and are positioned along the housing axis;
- a surface for securing the base has at least one depression, and the base has a helical surface.

[0018] The feature describing the mutual position of enveloping surfaces of depression and projection bottoms characterizes the mutual position of depressions and projections when providing the most reliable attachment of said elements.

[0019] The invention is illustrated by the following drawings:

Fig. 1 is a highly schematic view of the procedure for crimping the base shell on the housing relief surface.

Fig. 2 is a tri-dimensional view of a base and the housing parts with relief surface for securing the base.

[0020] A base 1 on the housing surface 2 with a depression 3 is secured using a tool 4 the crimping force vector of which is directed along the axis of the depression 3 so that a projection 5 extruded from the surface of the base 1 can be arranged in the depression 3. The operation of securing the base 1 to the housing is considered as performed when the envelope 6 of depression 3 bottoms forms a surface matching the envelope 7 of projection 5 bottoms on the base 1.

[0021] In Fig. 2 the surface for securing the base 1 to a part of the housing 8 has longitudinal indentations 3 arranged over the perimeter of the securing surface and positioned along the axis of the housing 8. A male screw base 1 placed on the helical surface 9 of the housing 8 may be easily secured to any portion of the shell 10 of the base 1 by making a projection 5.

[0022] The embodiment of the invention does not involve any difficulties in practice for the technicians in the

field of electric lamp manufacturing. The housing part with depressions can be easily manufactured. The tools required for crimping procedure are easily adaptable to any specific form of depressions.

Claims

1. The method for securing the base of an electric lamp including the fabrication of the lamp housing part having a surface matching an internal surface of the base shell; base securing to said housing surface by spot crimping of the base shell with a concomitant formation of projections on the inner surface thereof, **characterized in that** at least one relief-type depression is formed on said housing surface, and spot crimping of the base shell is made so that said projection can be arranged in said relief-type depression.
2. The method as claimed in claim 1 **characterized in that** relief-type depressions are evenly formed over the whole surface matching a base.
3. The method as claimed in claim 1 **characterized in that** conical relief-type depressions are formed (for example, in the form of a circular cone or equilateral pyramid).
4. The method as claimed in claim 1 **characterized in that** longitudinal relief-type depressions positioned along the housing axis are formed on the surface intended for matching that of the base shell.
5. The method as claimed in claim 1 **characterized in that** said part of the housing has a helical surface suitable for a male screw base arrangement, and longitudinal relief-type depressions positioned along the housing axis are formed.
6. The method as claimed in claim 1 **characterized in that** said part of the housing is made as a separate component fabricated so that it can be attached to the housing.
7. An electric lamp comprising a light emission source, a housing and a base secured to the housing corresponding surface and having fixing projections contacting to said housing surface **characterized in that** said cylindrical housing surface has relief-type indentations arranged over the perimeter of the securing surface and positioned along the axis of the housing.
8. An electric lamp as claimed in claim 6 **characterized in that** a part of the housing comprising a surface for securing the base is made as a separate component fabricated so that it can be attached to the hous-

ing.

9. An electric lamp as claimed in claim 6, **characterized in that** the deepening of the relief made conical, in particular, in the form of a circular cone or a pyramid of equilateral. 5
10. An electric lamp as claimed in claim 6, **characterized in that** the deepening of the relief available on a regular basis across the surface of the fixing. 10
11. An electric lamp as claimed in claim 6, **characterized in that** part of the housing, containing a surface location and the cap fitted with a screw cap surface, and the deepening of the relief made by longitudinal and oriented along the axis of the housing; 15
12. An electric lamp as claimed in claim 6, **characterized in that** the surface for securing the cap has at least one recess, and the base is equipped with a helical surface. 20

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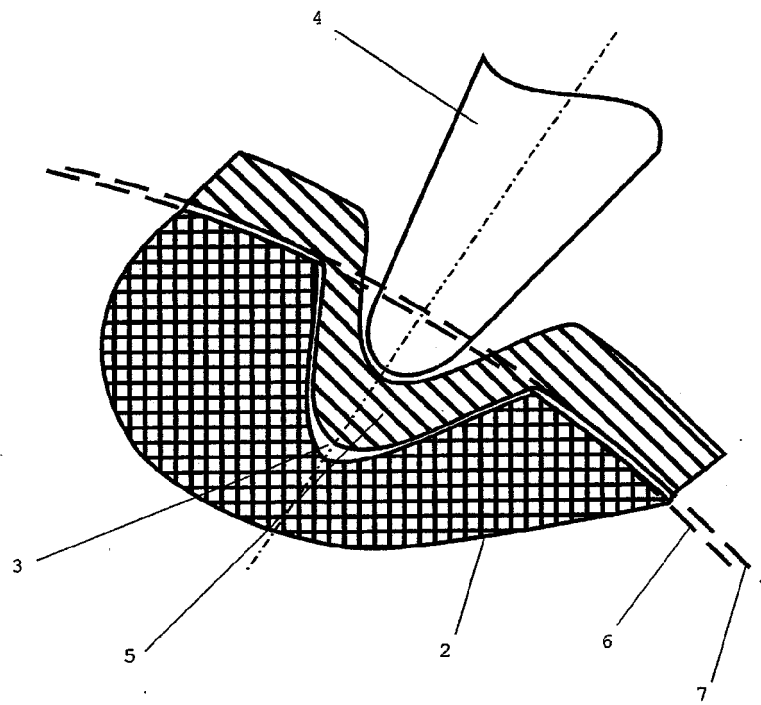


FIG. 1

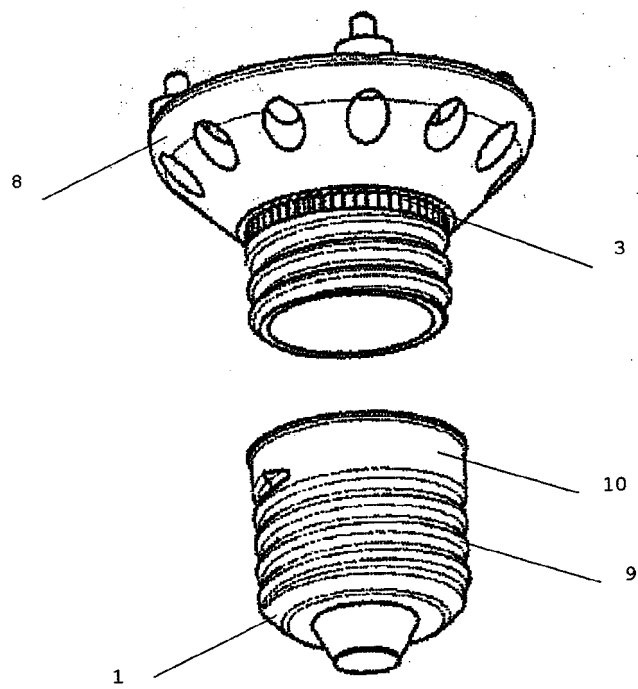


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/RU 2010/000046

A. CLASSIFICATION OF SUBJECT MATTER		H01J 5/48 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols)		
H01R 33/94, H01J 5/48, 5/50, 5/54, 5/56, 9/00, 9/24, 9/34, H01K 1/42, 1/46		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 201191596 Y (JIGANG QUAN et al.) 04.02.2009, figure 1, the abstract	6, 8-12
Y		7
Y	EP 1833069 A1 (ZHOU NANQING) 12.09.2007, figures 1-4	7
A	US 6081067 A (GENERAL ELECTRIC COMPANY) 27.06.2000	1-12
A	RU 2076380 C1 (VSEROSIISKII NAUCHNO-ISSLEDOVATELSKY INSTITUT EKSPERIMENTALNOY FIZIKI) 27.03.1997	1-12
A	SU 317130 A (A.P. PAPSHIN et al.) 02.12.1971	1-12
☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search		Date of mailing of the international search report
21 October 2010 (21.10.2010)		28 October 2010 (28.10.2010)
Name and mailing address of the ISA/		Authorized officer
Facsimile No.		Telephone No.

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US 6081067 A [0007]
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