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NL-5656 AA Eindhoven (NL)(54) **Method of placing a single-capped electric lamp in a lampholder, single-capped electric lamp designed for this purpose, and luminary provided with the single-capped electric lamp.**

(57) In the process for mounting a single-capped electric lamp (1) in a lampholder (20) of a luminaire (22) use is made of a cap (3) having an end zone (9) in its shell (4) which in a mounted lamp is outside the lampholder. The end zone (9) is provided with relief (15) enabling a mounting tool (30) to seize the cap (3) with a little force and nevertheless to have a firm grip onto the lamp. The position of the relief (15) may be related to the position of coupling means (10) present at the cap (3) for cooperation with means of the lampholder, enabling the tool (30) to approach the holder (20) with the cap (3) in a predetermined position. By the process it is counteracted that a lamp (1) having a cap (3) which is suited to be used in the process and a luminaire (22) having the holder (20), becomes damaged during

assembling.

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The invention relates to a method of placing a single-capped electric lamp in a lampholder of a luminaire,

whereby the electric lamp provided with:
a lamp cap having a metal shell with an axis, a first end which is closed by an electric insulator, and an open second end with an adjoining end zone, the metal shell having coupling means outside the end zone for fixing the lamp cap in a lampholder;
a light-transmitting lamp vessel with an electric element inside which is connected to contacts of the lamp cap by means of conductors, which lamp vessel is fastened in the open second end of the shell,

is gripped by a tool,

is inserted with its lamp cap into the lampholder which has means for cooperating with the coupling means of the lamp cap, and

is fixed in the lampholder by rotation, the end zone remaining outside the lampholder thereby.

The invention also relates to an electric lamp suitable for use with the method and to a luminaire which is provided with the single-capped electric lamp.

Such a method is generally known. Wherever a large number of lamps is to be placed in holders, as in or for the motorcar industry, automated tools such as robots are used for this purpose. The lampholders may form part of, for example, lighting units which are to be placed at the rear of a car and which comprise lamps for the stop/rear light, reversing light, indicator light, fog rear light.

The tool grips the electric lamp by the lamp vessel or by the end zone of the metal shell.

The coupling means of the lamp cap may consist of screwthread, as is the case with Edison lamp caps. Alternatively, they may consist of projections, as is the case in the lamp according to US 4 396 860, which has symmetrically arranged projections, or of asymmetrically arranged projections, for example, positioned at different heights. It is also possible that more than two projections are present as the coupling means, for example, at equal height but asymmetrically arranged according to Addition 50 610 to FR 853 358, or asymmetrically and at unequal heights according to JP 2-90483. Asymmetrical coupling means serve not only for coupling the lamp to the lampholder, but also as a key for rendering possible the coupling in one position only.

A disadvantage of the known method is that rejects frequently occur: lamp vessels break, for example, because they are gripped with excessive force or because the lamp is screwed home with excessive force; detaching of the lamp vessel from the lamp cap can also occur, during which electrical connections may also be broken; lamp caps

are damaged, for example, because the surface of the end zone is scraped off or deformed. Damage of the lamp cap may result in a loss of corrosion resistance. A major disadvantage is that the lamp may suffer damage which is not immediately observable, but which nevertheless leads to early failure of the lamp.

It is an object of the invention to provide a method of the kind mentioned in the opening paragraph by which damage to the lamp is counteracted, and to provide a lamp suitable for use with the method and a luminaire which is provided with the single-capped electric lamp.

According to the invention, this object is achieved in that the lamp cap has a relief in the end zone of the shell, with which relief the tool engages.

The relief may comprise an indentation in the end zone. This achieves that the tool has a better grip on the lamp, while the lamp need be clamped in with lesser force. In addition, lamps of one kind may all have the relief in the same rotational position relative to the coupling means of the metal shell, for example, relative to the entrance of a screwthread. This renders it simpler to insert the lamp, brought into the correct rotational position, into the lampholder and fix it therein by rotation. It is favourable if the end zone has at least a second relief. A very good grip on the lamp is then possible with little clamping force.

In a favourable embodiment, the electric lamp suitable for use with the method has a relief in the form of a projection. A projection can be universally used; both in lamps; the lamp vessel of which has in the lamp cap circumferentially only a small distance to the shell, and in lamps, as the lamp according to the cited US 4 396 860, where only a flat seal of the lamp vessel enters the lamp cap and where there are accordingly portions with a greater distance between lamp vessel and shell than elsewhere around said seal. A projection is also favourable because of the smaller proneness to wear of tools having recesses. With tools having, for example, a thin projection which is to cooperate with an indentation in the end zone, wear of this projection may reduced the operating life of the tool.

Reliefs in the end zone of the shell of the lamp cap, in particular a projection, more in particular two projections, are of special interest for bayonet lamp caps such as BA9 and BA15 lamp caps. Bayonet lamp caps in fact generally have at most two discrete rotational positions in which they can be inserted into a lampholder. For some types of bayonet lamp caps there is only one rotational position, as is the case with, for example, BAY lamp caps. The coupling means in these cases consist of projections, for example pins, at the

metal shell which are present at unequal heights at the shell, which are of unequal lengths, or which enclose unequal angles with one another.

A relief in the end zone now renders it possible to provide the tool with information about the rotational position which the coupling means occupy relative to the tool. This renders it possible for the tool to make the lamp approach the lampholder in the correct position. A risk of damage to the lamp or lampholder is avoided by this.

A favourable embodiment of the electric lamp is one which has a projection as the relief which lies in one line with a coupling means in the longitudinal direction of the shell. The tool can then be readily aligned relative to the lampholder. It is also favourable if a second projection, for example, rotated through less than 180° relative to the first projection, or, for example, having a dissimilar length or shape, is present as a relief. In the case of an asymmetrical lamp cap, the tool can then be given information about this asymmetry by the asymmetry of the relief. A projection may consist of a pin connected to the shell, but advantageous is a protuberance provided in the shell itself.

The method and the lamp suitable therefor are especially important if the lamp has a rated operational voltage of up to several tens of V. This is because the lamp cap need not be recessed in a lampholder in that case. Indeed, the IEC standards prescribe a portion projecting from the lampholder for bayonet lamp caps, for example, of at least 4.2 mm in IEC 7004-14-7 for BA9 and at least 2.6 mm in IEC 7004-11A-7 for BA15.

The electric element in the lamp vessel may be a pair of electrodes in an ionizable gas or an incandescent body, possibly in a gas containing a halogen, or alternatively two or more of such elements. The lamp cap may have one or several contacts at the electric insulator, but may in addition have a contact at the shell.

An embodiment of the method according to the invention, of the lamp suitable for use in the method, and of the luminaire comprising this lamp are shown in the drawing, in which:

Fig. 1 shows a step in the method of placing a single-capped electric lamp suitable for use in the method in a lampholder of a luminaire; and

Fig. 2 shows a modification of the lamp cap of Fig. 1.

In Fig. 1, the electric lamp 1 is provided with a lamp cap 3 which has a metal shell 4 with an axis 5, a first end 6 which is closed by an electric insulator 7, and an open second end 8 with an adjoining end zone 9, the metal shell having coupling means 10 outside the end zone for fixing the lamp cap 3 in a lampholder 20. The coupling means in the Figure consist of two projections which have been pressed out from the shell so as

to form a bayonet cap.

The lamp also has a light-transmitting lamp vessel 11 with an electric element 12 inside, an incandescent body in the Figure, which is connected to contacts 14 of the lamp cap 3 by means of conductors 13, which lamp vessel 11 is fastened in the open second end 8 of the shell 4 of the lamp cap 3.

The lamp is gripped by tool 30 and inserted with its lamp cap 3 into a lampholder 20 of a luminaire 22, the lampholder comprising means 21 for cooperating with the coupling means 10 of the lamp cap 3. These means 21 in the Figure consist of substantially L-shaped slots for forming a bayonet lampholder.

The lamp is fixed in the lampholder 20 by rotation, the end zone 9 remaining outside the lampholder 20. In contrast to known lamps, for example, that of the cited JP 2-90483, where the profile of the lamp cap is inside the holder, here the relief present in the end zone will not be inside the lampholder.

The lamp cap 3 has a relief 15 engaging with the tool 30 in the end zone 9 of the shell 4. The relief in the embodiment drawn consists of two projections, protuberances in the Figure, i.e. pressed-out portions of the shell. The tool 30 comprises a head 31 which has movable arms 32 comprising profiled jaws 33 which fit the relief 15 of the lamp cap 3.

The Figure shows the phase in the method in which the tool 30, for example a robot, has gripped the lamp 1 at the relief 15 in the end zone 9 of the shell 4 of the lamp cap 3. The tool 30 then performs a rotation a for aligning the lamp cap 3 relative to the lampholder 20, upon which a translation b is performed for inserting the lamp 1 with its lamp cap 3 into the lampholder, upon which a rotation c is performed for turning the lamp 1 home in the lampholder 20. In the case of a lampholder and a lamp cap of the bayonet type, as shown, the invention offers the possibility for the tool, after the movements a, b and c have been performed, to perform a translation d opposed to the translation b, if so desired, to make sure that the lamp cap has been locked in the bayonet of the lampholder. Lampholders in fact may be designed with such a fit that the elasticity of a contact in the base of the lampholder is not capable of immediately forcing the translation d on the lamp, the moment the tool has released the lamp. If so desired, the lamp may be burned before the tool releases the lamp.

The lampholder forms part of a luminaire 22 which may or may not be provided with a cover plate, which in its turn may or may not be coloured, refracting, scattering or transparent.

Since the tool has profiled jaws which match and cooperate with the relief in the end zone of the

lamp cap shell, the tool has a grip on the lamp cap and the tool can securely hold the lamp cap with little clamping force. The lamp vessel and the connections with the lamp cap are not loaded at all during this. Since the relief in the embodiment drawn is oriented relative to the coupling means, *i.e.* in the Figure in the axial direction of the lamp cap in line with these coupling means, it is also possible for the tool to make the lamp cap approach the lampholder in the aligned state, after a rotation α in the case of the lamp drawn.

In the luminaire resulting in Fig. 1, the end zone 9 with the relief is outside the lampholder. The end zone 9 extends between the second end 8 and the dash-dot line drawn parallel thereto.

In Fig. 2, portions of the lamp cap 43 corresponding to portions in Fig. 1 have reference numerals which are 40 higher than in Fig. 1. The lamp cap is of the BAY type and has two contacts 54 at its base. The coupling means 50a, b are at unequal heights, diametrically opposed to one another and spaced away from one another in the direction of the axis 45. The lamp cap can be placed in a holder designed for it in one discrete manner only. Information about the location of the projection 50a and the projection 50b is provided to the mounting tool in that the relief in the end zone 49, the projections 55a and 55b, is also asymmetrical. The projections enclose an angle of less than 180° with one another. The projection 55a lies in one line with the projection 50a in the direction of the axis 45. To an observer O, the coupling means 50b lies closer than does 50a, and the projection 55b of the relief 55a, b lies between the coupling means 50a and 50b. The observer O, who knows the configuration of the coupling means 50a, b and of the relief 55a, b, can deduce from the position of the relief where the projection 50a is located and where the projection 50b is located.

Claims

1. A method of placing a single-capped electric lamp (1) in a lampholder (20) of a luminaire (22),
whereby the electric lamp provided with:
a lamp cap (3) having a metal shell (4) with an axis (5), a first end (6) which is closed by an electric insulator (7), and an open second end (8) with an adjoining end zone (9), the metal shell having coupling means (10) outside the end zone for fixing the lamp cap (3) in a lampholder (20);
a light-transmitting lamp vessel (11) with an electric element (12) inside which is connected to contacts (14) of the lamp cap (3) by means of conductors (13), which lamp vessel (11) is fastened in the open second end (8) of the

shell (4),

is gripped by a tool (30),

is inserted with its lamp cap (3) into the lampholder (20) which has means (21) for co-operating with the coupling means (10) of the lamp cap (3), and

is fixed in the lampholder (20) by rotation, the end zone (9) of the shell (4) remaining outside the lampholder (20) thereby,

characterized in that the lamp cap (3) has a relief (15) in the end zone (9) of the shell (4), with which relief the tool (30) engages.

2. A single-capped electric lamp suitable for use with the method as claimed in Claim 1, which lamp is provided with:

a lamp cap (3) having a metal shell (4) with an axis (5), a first end (6) which is closed by an electric insulator (7), and an open second end (8) with an adjoining end zone (9), the metal shell having coupling means (10) outside the end zone for fixing the lamp cap (3) in a lampholder;

a light-transmitting lamp vessel (11) with an electric element (12) inside which is connected to contacts (14) of the lamp cap (3) by means of conductors (13), which lamp vessel (11) is fastened in the open second end (8) of the shell (4),

characterized in that the lamp cap (3) has a relief comprising a projection (15) in the end zone (9) of the shell (4).

3. A single-capped electric lamp as claimed in Claim 2, characterized in that the relief comprises at least two projections (15).

4. A single-capped electric lamp as claimed in Claim 2, characterized in that the relief (15) lies in one line with the coupling means (10) seen in the direction of the axis (5).

5. A single-capped electric lamp as claimed in Claim 3, characterized in that the relief (15) is asymmetrical.

6. A single-capped electric lamp as claimed in Claim 2, 3, 4 or 5, characterized in that the lamp cap (3) is a bayonet cap.

7. A luminaire manufactured by the method as claimed in Claim 1 and provided with a single-capped electric lamp.

8. A luminaire (22) provided with a lampholder (20) in which a single-capped electric lamp (1) is accommodated,
which electric lamp (1) is provided with:

a lamp cap (3) having a metal shell (4) with an axis (5), a first end (6) which is closed by an electric insulator (7), and an open second end (8) with an adjoining end zone (9), the metal shell having coupling means (10) outside the end zone for fixing the lamp cap (3) in a lampholder (20); 5

a light-transmitting lamp vessel (11) with an electric element (12) inside which is connected to contacts (14) of the lamp cap (3) by means of conductors (13), which lamp vessel (11) is fastened in the open second end (8) of the shell (4) of the lamp cap (3), 10

the lampholder (20) comprising means (21) for cooperating with the coupling means (10) of the lamp cap (3), and 15

the lamp cap (3) being fixed in the lampholder (20) by rotation, whereby the end zone (9) of the shell (4) remains outside the lampholder (20), 20

characterized in that the lamp cap (3) has projections (15) in the end zone (9) of the shell (4).

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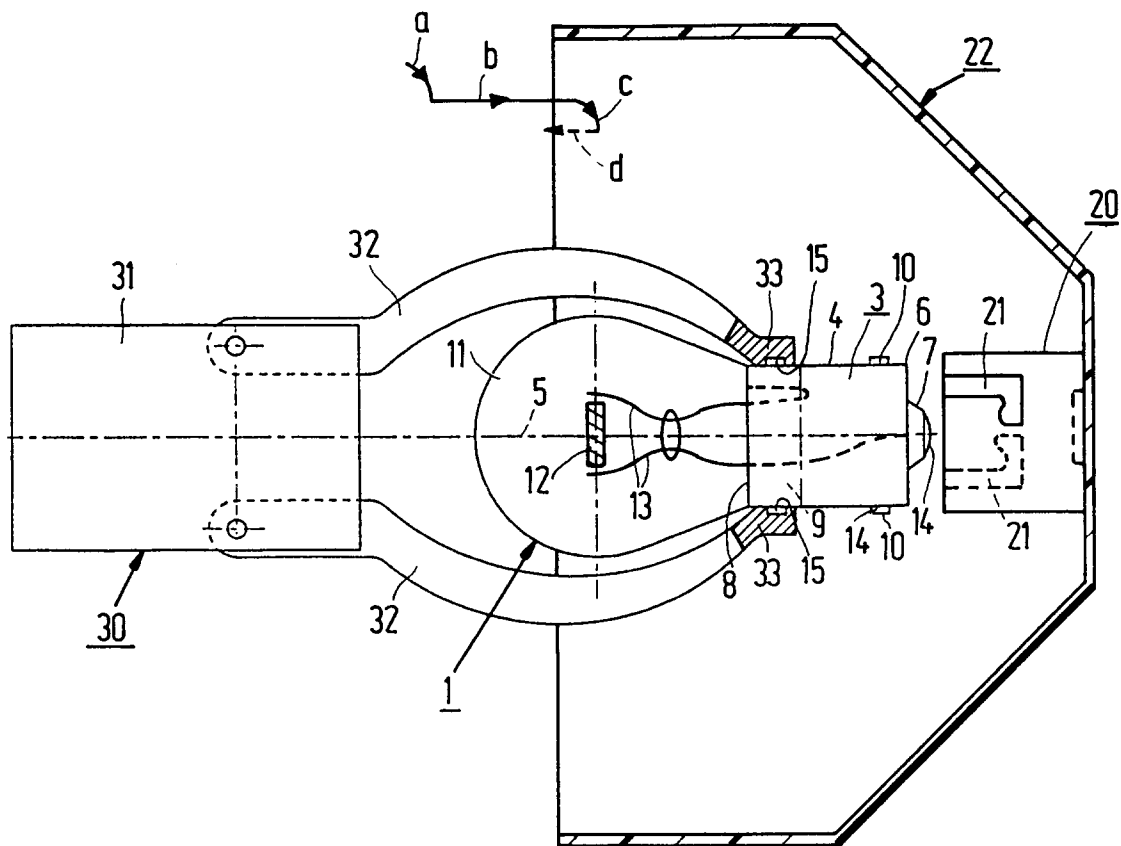


FIG.1

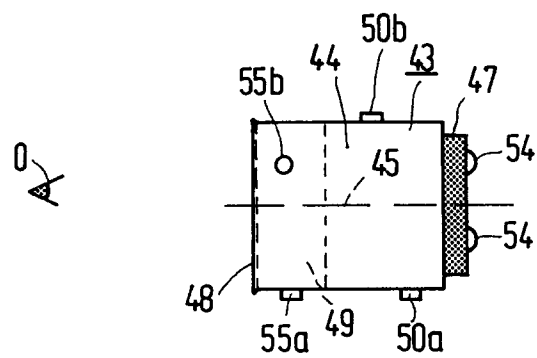


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number

EP 93 20 1682

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	DE-C-680 263 (PHILIPS PATENTVERWALTUNG GMBH.) * page 4, line 104 - page 5, line 62; figure 1 * ---	1,8	H01R43/26 H01J9/00 H01K3/32
A	FR-E-50 610 (LAMPE YVEL SA.) * page 2, line 65 - line 79; figure 5 * ---	1	
A	FR-A-561 564 (JUNG) * page 1, line 22 - line 33; figures 1,4,5 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H01R H01J H01K
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 30 SEPTEMBER 1993	Examiner HORAK A.L.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons & : member of the same patent family, corresponding document			