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**Datasheet for the decision  
of 15 July 2021**

**Case Number:** T 2554/17 - 3.4.03

**Application Number:** 07102375.8

**Publication Number:** 1959505

**IPC:** H01L33/58, H01L33/48,  
H01L25/075

**Language of the proceedings:** EN

**Title of invention:**  
Mounting lenses for LED modules

**Patent Proprietor:**  
Tridonic GmbH & Co. KG

**Opponent:**  
OSRAM GmbH

**Headword:**

**Relevant legal provisions:**

EPC 1973 Art. 56, 54(2)

EPC Art. 123(2)

RPBA Art. 12(4)

RPBA 2020 Art. 13(2)

**Keyword:**

Inventive step - Main Request and Auxiliary Requests (no) -  
common general knowledge

Late-filed request - submitted during oral proceedings - prima  
facie not compliant with the EPC - admitted (no)

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**

**Boards of Appeal**

**Chambres de recours**

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**Case Number: T 2554/17 - 3.4.03**

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.03**  
**of 15 July 2021**

**Appellant:** Tridonic GmbH & Co. KG  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
19 October 2017 concerning maintenance of the  
European Patent No. 1959505 in amended form.**

**Composition of the Board:**

**Chairman** G. Eliasson  
**Members:** A. Böhm-Pélissier  
T. Bokor

## Summary of Facts and Submissions

- I. The appeal is against the decision of the Opposition Division to maintain in amended form European patent No. 1 959 505. The opposition was based on the grounds of opposition under Articles 100 (a)-(c) EPC, in particular lack of novelty, lack of inventive step, insufficient disclosure and added subject-matter.
- II. The patent was maintained based on Auxiliary Request 2 (current Auxiliary Request 4). Both Patent Proprietor (herein "Proprietor") and Opponent have appealed the decision. In response to a communication of the Board, both parties filed further comments.
- III. Reference is made to the following documents:
- (a) filed with the notice of opposition:
    - D1 = EP 1 566 847 A
    - D5 = JP 2006 080251 A
    - D9 = EP 1 691 425 A1
    - D10 = US 4 941 072 A
    - D11 = "LW F65G for Flashlight Applications in Mobile Phones - Application Note", OSRAM Opto Semiconductors, 1 December 2005
  - (b) introduced by the Opponent with the statement of the grounds of appeal:
    - D12 = DE 38 84 293 T2.
- IV. At the end of the oral proceedings held before the Board of Appeal the Proprietor requested the decision of the Opposition Division be set aside and the patent be maintained as granted, as Main Request. As an

auxiliary measure it was requested to maintain the patent based on Auxiliary Requests 1 to 12, where Auxiliary Requests 1 to 4 and 7 to 12 were filed with the grounds of appeal dated 13 February 2018 and Auxiliary Requests 5, 6 and 13 were filed during the oral proceedings.

Furthermore, it was requested not to admit D12.

- V. The Opponent requested to revoke the patent in its entity and not to admit Auxiliary Requests 5 to 12.
- VI. Underlining, **bold** and ~~strike-through~~ in cited passages and labelling of the features were added by the Board.
- VII. **Claim 1** according to the **Main Request** reads:  
(A) A light emitting **diode** (LED) module (1), comprising:  
(B) an LED chip (3) or an LED package (3b)  
(C) mounted on a substrate (5),  
(D) a lens (2), and  
(E) a mechanical metal holder (4) being soldered on the substrate (5),  
(F) wherein the holder (4) comprises spring arms (8) for elastically engaging the lens (2) characterised in that  
(G) the mechanical metal holder (4) is designed to act as a spacer defining an air gap (6) between the light exit surface of the LED chip and the bottom face (7) of the lens (2).
- VIII. **Claim 13** according to the Main Request reads:  
(A') A **method** for mounting a lens (2) over a light emitting diode (LED) package (3b), comprising the steps of:

(a) mechanically holding the lens (2) in a metal holder (4) forming one holder/lens unit, wherein the holder (4) comprises spring arms (8), and the holder elastically engages the lens (2) by means of said spring arms (8),  
(b) placing the LED package (3b) on a substrate (5), and  
(c) soldering the LED package (3b) together with the pre-assembled holder/lens unit onto the substrate (5) in one soldering process step.

IX. Claim 1 of Auxiliary Request 1:

[Features (A) to (G) of the Main Request];  
(H) wherein the metal holder (4) comprises a connection part (10) for connecting the spring arms (8),  
(I) the connection part being at least partially provided between the bottom face of the lens (2) and the substrate (5).

Claim 12 of Auxiliary Request 1 = Claim 13 of the Main Request

X. Claim 1 of Auxiliary Request 2

[Features (A) to (I) of Auxiliary Request 1],  
(J) and wherein the lens (2) is made from glass.

Claim 11 of Auxiliary Request 2 = Claim 13 of the Main Request

XI. Claim 1 of Auxiliary Request 3

[Features (A) to (J) of Auxiliary Request 2]  
(K) and wherein the air gap is in the order of 0.1 to 0.3 mm.

Claim 10 of Auxiliary Request 3 = Claim 13 of the Main Request

XII. Auxiliary Request 4 (patent as maintained)  
claim 1 = Method claim 13 of the Main Request

XIII. Claim 1 of Auxiliary Request 5 (based on the Main Request)  
[Feature (A)];  
(B5) ~~an LED chip (3) or~~ an LED package (3b) {amended during Oral Proceedings}  
[Feature (C)],  
(C5) the LED package (3b) being composed of a LED chip (3) in a coated housing, [Features (D)-(G)].

Claim 13 of Auxiliary Request 5 = Claim 13 of the Main Request with feature C5 added

XIV. Auxiliary Request 6 (based on the Main Request)  
  
[Features (A), (B5) as amended during Oral Proceedings, (C), (C5)],  
(C6) the LED package (3b) including a transparent coating containing a color-conversion substance, [Features (D)-(G)].

Claim 13 corresponds to claim 13 of the Main Request with feature C6 added.

XV. Auxiliary Request 7 (previous Auxiliary Request 3 filed before the opposition division)  
[Features (A)-(G), (K) {...wherein in that...}].

Claim 12 of Auxiliary Request 7 corresponds to claim 13 of the Main Request with Features (G) and (K) added.

XVI. Auxiliary Request 8 (previous Auxiliary Request 5 filed before the opposition division)  
[Features (A) to (I) of Auxiliary Request 1];

(L) the metal holder (4) engaging a portion of the bottom surface of the lens (2),  
(M) the bottom surface being directed towards the LED chip (3) or LED package (3b).

Claim 11 of Auxiliary Request 8 corresponds to claim 13 of the Main request with features (H), (I), (L), (M) added.

XVII. Auxiliary Request 9 (previous Auxiliary Request 6 filed before the opposition division)  
[Feature (A)];  
(B9) an LED chip (3) ~~or an LED package (3b)~~  
[Features (C)-(G)].

Claim 12 of Auxiliary Request 9 = claim 13 of the Main Request

XVIII. Auxiliary Request 10 (previous Auxiliary Request 7 filed before the opposition division)  
[Features (A), (B)],  
(C10) mounted on top of a substrate (5),  
[Features (D)-(G)].

Claim 13 of Auxiliary Request 10 has feature (C10) added to claim 13 of the Main Request.

XIX. Auxiliary Request 11 (previous Auxiliary Request 8 filed before the opposition division)  
[Features (A) to (G) of Main Request],  
(N) wherein the spring arms (8) engage a peripheral groove (9) provided in the lens (2).

Claim 13 of Auxiliary Request 11 has feature (N) added to claim 13 of the Main Request.



XX. Auxiliary Request 12 (previous Auxiliary Request 9 filed before the opposition division)  
[Features (A)-(C) of Main Request];  
(D12) a lens (2) having an essentially cylindrical base body (18) on top of which a hemispherical portion (13) is provided, and [Features (E)-(G)].

Claim 13 of Auxiliary Request 12 has feature (D12) added to claim 13 of the Main Request.

XXI. Auxiliary Request 13 (filed during Oral Proceedings)  
[Auxiliary Request 2], but without claim 11 (= claim 13 as granted).

XXII. The parties argued essentially as follows:

- (a) The Opponent argued that Auxiliary Requests 7 to 12 were not admitted into the first instance proceedings and did not fulfill the requirement of convergence; they should therefore not be admitted;
- (b) all requests were - with respect to D9 - not novel or not inventive in combination with the common general knowledge;
- (c) the skilled person, when reproducing the device described in D9, would design the "claw" as spring arms engaging the lens;
- (d) the additional features of the auxiliary requests were either disclosed or suggested by D9;
- (e) the new requests filed during Oral Proceedings made no attempt to overcome the inventive step objections and were filed late, they furthermore gave reason to new objections under Article 123(2) EPC; no exceptional circumstances could be identified justifying why they should be admitted into the proceedings. These requests should therefore not be admitted into the proceedings.

- (f) The Proprietor argued that the further prior art document D12 should not be admitted into the proceedings since it was filed late and not more relevant than the documents on file with regard to the assessment of inventive step;
- (g) requests similar to auxiliary requests 4 to 12 had already been filed in the first instance proceedings; new auxiliary requests 5, 6 and 13 were a reaction to developments during the oral proceedings before the Board. The auxiliary requests should therefore be admitted into the proceedings;
- (h) D9 did in particular not disclose or teach spring arms for elastically engaging the lens in the lens holder and pre-assembly of the lens with the holder before reflow soldering.

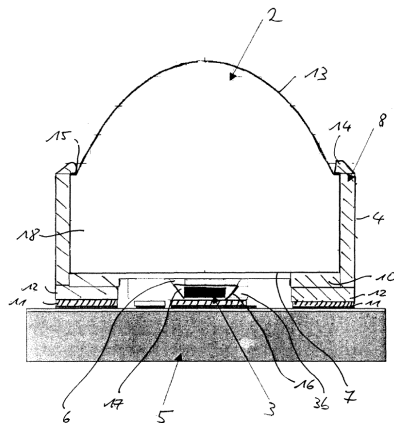


Figure 3 Fig. 3 of the impugned patent

FIG. 6

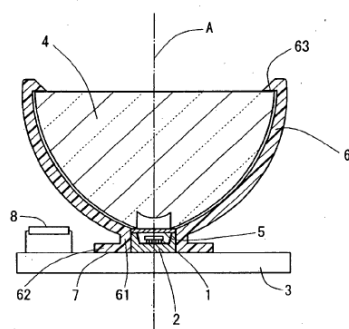
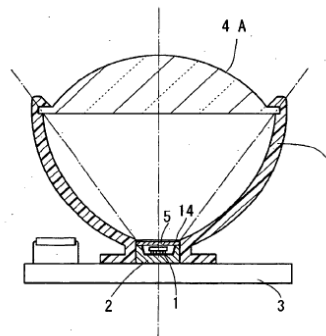


FIG. 7



Figs. 6 and 7 of D9

XXIII. As to inventive step the parties argued as follows:

- (a) The Proprietor argued that D9 disclosed a single claw and the skilled person would not be directed at implementing multiple claws. D9 systematically distinguished between the use of plural and singular. The skilled person would not re-design the holders shown in D9. D9 did not explicitly disclose a snapping action in the context of claw 63. The multiple point contacts also lead away from a spring arm pressing sideways on the lens. D1 taught that a closed metal ring can work as lens holder. Insertion of the lens was realised by heating up the metal ring.
  
- (b) The Opponent argued that the skilled person would arrive at the claimed subject-matter by simply reproducing the teaching of D9. They would see the problems of manufacture, tolerance and mounting. They would understand that the cup-shaped structure can be made even more elastic by splitting the cup. The skilled person was even more led to this by the claws on the bottom. D10 and D12 taught spring arms with gaps between the arms for providing both enough flexibility and rigidity and therefore provided evidence of the common general knowledge. As discussed above, D9 itself clearly taught a snap action for the bottom part of the holder. D9 disclosed in paragraph [0045] ("point contacts" for providing "air gap") to reduce the contact between holder and lens. Splitting up the lens holder 6 would provide less contact between lens and holder.

### **Reasons for the Decision**

1. The appeals are admissible.

## **2. Admission of D12**

2.1.1 D12 had been filed in reaction to the discussions and decisions in the first instance proceedings, and the Board does not see reasons why it could and should have been filed already in the first instance proceedings (cf. Article 12 (4) RPBA 2007). The Board is of the opinion that D12 has a short and uncomplicated disclosure and is filed with the aim of reinforcing arguments already introduced in the first instance proceedings. Its teachings are quickly and easily understandable from the figures.

2.1.2 In addition, in the summons to the oral proceedings the Opposition Division was of the opinion that the independent claims as granted were not novel over D9. Therefore, it was not apparent that further documents were necessary for supporting any reasoning under Article 56 EPC 1973.

2.1.3 D12 was filed as evidence that the holder in D9 has to be composed by spring arms, i.e. has to comprise gaps in the holder between the arms holding the lens. D12 furthermore addresses the problem of thermal expansion of the lens. D12 appears to be relevant for the assessment of inventive step.

2.1.4 The Board therefore considers that there is no reason for not admitting D12 into the procedure in application of Article 12 (4) RPBA 2007.

## **2.2 Admission of Auxiliary Requests 1 to 12**

2.2.1 The Proprietor argued that Auxiliary Requests 1 to 3 were first filed with the statement of grounds of appeal, but addressed the objections of the Opponent

and were convergent. Auxiliary Request 4 corresponded to the request based on which the patent was maintained in amended form. Auxiliary Requests 5 to 12 corresponded to Auxiliary Requests 1 to 3 and 5 to 9 of the proceedings before the Opposition Division. Auxiliary Requests 5 and 6 were based on Auxiliary Requests 1 and 2 of the first instance proceedings and had already been admitted into the opposition proceedings.

2.2.2 The Opponent argued that Auxiliary Requests 7 to 12 were not admitted into the first instance proceedings and did not fulfill the requirement of convergence.

2.2.3 The Board is of the opinion that Article 12 (4) RPBA 2007 addresses the admission of requests which could have been presented or were not admitted in the first instance proceedings. The latter does not apply and Auxiliary Requests 4 to 12 have been already presented in the first instance proceeding. The question of admission did not arise because a higher ranking request was found allowable. Auxiliary Requests 1 to 3 address objections of the Opponent and are convergent. Therefore, the Board does not see a reason, why these requests should not be admitted under Article 12(4) RPBA 2007.

### 3. **The invention as claimed**

3.1 The present invention is related to mounting lenses of an LED module to a substrate, such as a printed circuit board (PCB). It is an object that the lens is in a defined position vis-a-vis an LED chip of the LED module. The lenses are generally used to achieve a defined radiation pattern and/or smaller viewing angle.

- 3.2 If there is an air gap between the LED chip and the lens, the lens is called "a secondary optics lens". It is the object of the present invention to facilitate the mounting of a secondary optics lens.
- 3.3 It is proposed to mount the lens using a reflow solder process. Reflow soldering is known in the art and is a means to attach a surface mounted component (Surface Mount Technology, SMT) to a PCB. It typically consists of applying powder particles and/or solder paste, positioning the devices and reflowing the solder in an oven. During the reflow process the powder particles and the solder paste melt, with the surfaces being joined together and solidifying the solder to create a strong metallurgical bond.

4. **Main Request**

D9 is considered as **closest prior art**, because it has most similarities with the impugned invention. It discloses reflow soldering and an elastic claw for holding the lens.

4.1 **Novelty over D9**

- 4.1.1 The Opponent argued that D9 disclosed
- (A) a light emitting diode (LED) module, comprising:
  - (B) an LED package (chip 1 and mounting substrate 2 defined the "LED package"),
  - (C) mounted on a substrate (wire board 3 comprised a substrate),
  - (D) a lens (4A), and
  - (E) a mechanical metal holder (Paragraph [0045]: "*The lens holder 6 is made of a metal such as aluminum, copper or the like*", in the sixth/eleventh embodiment only the shape of the lens holder 6 was different, the

material was the same) being soldered on the substrate of a wire board (3),

(F) wherein the holder (6) comprises ~~spring arms~~ an elastic claw (63) for elastically engaging the lens (4),

(G) wherein the mechanical metal holder (6) is designed to act as a spacer for defining an air gap between the light exit surface of the LED chip and the bottom face of the lens (4).

4.1.2 The disputed feature was only the spring arms. Fig. 10 of D9 showed symmetric claws 64, functioning in the same way as the upper claw of the lens holder 6. The opponent referred to paragraphs [0050], [0052] and [0045] of D9. These passages demonstrated that the lens holder 6 had spring arms as claimed and inevitably multiple arms. This was supported by the three evenly spaced guide portions 61 fixing the lens holder and by the aim to reduce the contact between lens and holder to point contacts at plural locations. This structure had to apply to all figures of D9 with a lens holder. The claim only required spring arms without defining any additional details of its functioning. The term "spring arm for elastically engaging" was therefore a broad functional definition. The spring arms shown in Fig. 3 of the impugned patent were similar to the holder 6 in D9 and did not appear to be very elastic. The use of the term "claw" in singular was not decisive, because the corresponding Japanese term might not have been translated correctly. A claw had to be composed of a plurality of fingers. This was contrary to the interpretation that the holder 6 is formed as closed ring or cup. Contacting the lens of Figs. 6 and 7 of D9 in horizontal or vertical direction was also an elastic engagement, otherwise the lens would be loose. Fig. 1 (recess 6a) also supported the snapping action

of the claws. Paragraph [0045] disclosed that the holder had contact with the lens at multiple locations and therefore exercised a retaining force onto the lens. The drawings were only schematic. The air gap between the lens and the holder in Figs. 6 and 16 did not reflect the facts described in paragraph [0045].

- 4.1.3 The Proprietor argued that claw 64 was not the same as the disclosed single lens holding claw 63. D9 showed no elastic spring arms. D9 disclosed rather a form-fit fastening than a force-fit. A force-fit as required by the claim necessitated a constant force applied by a spring arm. Claw 63 was always mentioned in singular in contrary to other components being mentioned in plural, e.g. the portions 61. The air gap between lens and holder showed the lack of pressing force. In contrast to Figs. 6, 8, 10 and 16 of D9 Fig. 3 of the impugned patent had no air gap. D9 did not comprise any hint at an elastic action.
- 4.1.4 The Board is of the opinion that D9 discloses a lens holder elastically engaging the lens (cf. paragraph [0047]: "*In this sixth embodiment, the lens 4 is fixed to the lens holder 6 by inserting the lens 4 into the lens holding portion of the lens holder 6 and bending the claw 63 at the top of the lens holder 6*"). Figs. 6 and 16 illustrate elastically engaging the lens at least in vertical direction. In Figs. 7 and 17 the lens would be loose, if it was not elastically engaged by the holder in horizontal direction. The figures are only schematic. Therefore, the contact points in the air gap between the lens and the holder as described in paragraph [0045] are not shown.
- 4.1.5 However, D9 does not directly and unambiguously disclose a holder comprising (a plurality of) spring



arms. D9 discloses that the lens is inserted into body 6 by bending the holder together with claw 63 during insertion. According to the figures claw 63 restores elastically the original position after insertion of the lens. For this purpose claw 63 requires either a very extensible material for holder 6 or at least a gap/slot in order to allow - during insertion - the larger diameter of the claw. D9 is silent about heating the holder for inserting the lens. It is therefore likely that holder 6 is formed by a plurality of arms. However, for this assumption no unambiguous and direct disclosure is provided by D9.

4.1.6 Therefore, the subject-matter of claim 1 as granted is novel over D9, Article 54(2) EPC 1973. D9 discloses Features (A)-(G) except that the claw comprises spring arms.

#### 4.2 **Effect, Problem**

4.2.1 The effect of this difference in view of the disclosure of the impugned patent is that different temperature coefficients (CTE) of the holder and the lens do not affect the reliability of the attachment of the lens (paragraph [0043] of the impugned patent). Paragraph [0013] of the impugned patent addresses the problem that the secondary lens is sensible to variation in temperature, i.e. that soldering / welding of the holder is only possible, if the lens can be protected against the increased temperature linked to this mounting step. The patent furthermore mentions that the elastic spring arms allow an integral fastening of the holder / lens unit by clamping the lens in the holder by hand, therefore facilitating the production (paragraphs [0037]-[0039]).

4.2.2 The Opponent argued in the written submissions that the problem could be defined as providing a reliable attachment of the lens to the holder, which is not affected by the different CTEs of the lens and the holder and which still provides quick and easy mounting of the secondary lens to the holder therefore facilitating the production process.

4.2.3 The Proprietor limited the problem to be solved to facilitating the production process.

4.2.4 The Board however is of the opinion that the problem can be defined as "reproducing the device disclosed in D9". D9 is the starting point of the problem and solution approach. The first step of working out an alleged invention however is to reproduce the device disclosed in the closest prior art.

#### 4.3 **Obviousness over D9**

4.3.1 The Board is of the opinion that the term "claw" in general is used to describe a finger-like pointed object and therefore teaches the skilled person to design a finger-like claw. Also the "point contacts at multiple locations" and the multiple parts at the bottom of the holder hint to a plurality of claws. The skilled person furthermore is aware that slots in the holder would improve the elasticity of holder 6. The Board therefore agrees with the Opponent that the skilled person would see the problems of manufacture, tolerance and mounting. They would understand that the cup-shaped structure can be made even more elastic by splitting the cup. D10 and D12 teach spring arms with gaps between the arms for providing both enough flexibility and rigidity. D9 itself clearly teaches a snap action for the bottom part of the holder.

4.3.2 Therefore, - when reproducing the ambiguous disclosure of D9 - there is a clear indication for a person skilled in the art that they can solve the objective problem of working the embodiments of D9 by designing gaps into the holder and forming a plurality of claws.

4.3.3 Consequently, the subject-matter of claim 1 of the Main Request does not involve an inventive step in view of D9 and common general knowledge.

#### 4.4 **Claim 13 (method claim)**

4.4.1 The Board agrees with the Proprietor that claim 13 in **addition** to the device claim comprises the features that first the lens is mounted to the holder and then the pre-assembled holder-lens unit as a whole is soldered to the substrate by means of reflow soldering. These features are not explicitly disclosed in D9. These differences result in an improved production process.

4.4.2 The problem therefore can be formulated as the provision of an improved production process for the device disclosed in D9.

#### 4.5 **Obviousness**

4.5.1 The Proprietor argued that D9 did not disclose or teach a pre-assembly and the soldering in a single step. The soldering without lens was advantageous, as the lens might deform under heat. There was no hint in D9 to assemble first and to solder thereafter. Paragraph [0061] suggested that the lens was mounted in a last step after soldering.

- 4.5.2 The Opponent argued that assembling a lens and the holder before or after soldering was a pure economic, not a technical problem. Resin or silicon lenses could be made to withstand solder temperatures as was shown in D11, page 3, end of left column. The impugned patent attributed no particular advantage to a pre-assembled lens and holder. D9 was silent on the order of assembly or the material of the lens. Pre-assembly with an adhesive was taught in D9 and the skilled person would replace the adhesive with the soldering. Paragraphs [0044] and [0061] suggested that the lens was already in place during the soldering. A lens/holder unit could be mounted easier in the same manner and at the same time as other electronic components (SMT with "pick and place" machines). This hinted the skilled person to this option.
- 4.5.3 The Board is of the opinion that the soldering process in D9 is the same reflow soldering process as in the impugned patent. Reflow soldering implies that all elements soldered must withstand the heat involved in the soldering process. The skilled person knows that lenses can be made such that they withstand the heating process. D11, page 3, last paragraph of the left column directly teaches that the lens can be soldered together with the holder by means of a reflow soldering process. Glass as lens material is a well-known option.
- 4.5.4 Lenses are *a priori* made of glass (e.g. D10, column 1, line 26). With respect to epoxy resin lenses glass lenses do not have the disadvantage of limited light stability and yellow-degradation, which is a particular issue for blue and white LEDs (see impugned patent, paragraph [0006]). Glass is robust, has high transparency, low yellow degradation, withstands a reflow process and in addition, does not degrade with

blue, white or even ultraviolet light (paragraph [0039] of the impugned patent).

4.5.5 D9 does not unambiguously disclose a specific order of assembly, i.e. whether the lens is mounted before or after the reflow soldering process. When reproducing the device disclosed in D9 the skilled person would therefore choose the most suitable order of assembly steps and then choose the lens material accordingly. In the present case glass is a very suitable option. The skilled person would optimize the mounting process. If pre-assembling the lens and the holder before soldering would facilitate "pick and place" and SMT, the skilled person would choose this option.

4.5.6 Therefore, the subject-matter of method claim 13 as granted does not involve an inventive step in view of D9 and the common general knowledge of the skilled person.

## 5. **Auxiliary Requests**

5.1 **Auxiliary Requests 1 to 4** do all comprise the method claim as granted and therefore are not allowable under Article 56 EPC 1973 for the same reasons as discussed above.

## 5.2 **Admission of new Auxiliary Requests 5 and 6 under Article 13(2) RPBA 2020**

5.2.1 The Opponent argued that feature (C5) in these requests only referred to the option "LED package" and not to the option "LED chip" in feature (B). Feature (C5) was therefore not limiting. In view of this fact new Auxiliary Requests **5** and **6** were filed during oral proceedings. The option "LED chip" was deleted:

*(B5) ~~an LED chip (3) or an LED package (3b) ... (C5)~~  
the LED package being composed of an LED chip in a  
coated housing.*

5.2.2 The Opponent argued for and requested non-admission, the request being late and raising issues which cannot be expected to be treated. The requirement for cogent reasons and exceptional circumstances under the RPBA were not fulfilled. The amendment (feature C(6)) was based on the description for reference sign 17 ("*17 : Transparent coating, e.g. containing color-conversion substance*") and 3b (page 13, lines 9 and 25, of the application as originally filed) in combination with Fig. 3. However, the expression "is composed of" was equivalent to "consists of" (different to "comprises") and meant that there was no other component than the chip and the coated housing. The package however appeared to comprise other components, e.g. reflector 16. Reference sign 17 only appeared in combination with reflector 16 in the description as originally filed (page 11, line 32ff). Therefore, the requirements of Article 123(2) EPC were not fulfilled. Furthermore, D9 described in paragraphs [0072] and [0074] different exemplary embodiments where the LED chip could be encapsulated with a resin material (sealing resin, reference number 16 in FIGS. 22 and 23) surrounding the LED chip. The encapsulation material thus formed a coated housing around the LED chip. Feature (C5) therefore was obvious to the skilled person, if it was desired to additionally protect the LED chip. Feature (C6) of Auxiliary Request 6 was suggested by D5, reference signs 50 and 60.

5.2.3 The Proprietor argued that an obvious error was corrected in the claims. The amendment was clear and supported by the description. The new requests were a

reaction to developments during the oral proceedings before the board. The auxiliary requests should therefore be admitted into the proceedings. The skilled person understood that the reflector 16 was optional. Page 11, line 32ff, and page 13, lines 9 and 25, provided a sufficient basis. Paragraphs [0072] and [0074] of D9 did not relate to the embodiments shown in Figs. 6, 7, 16 and 17.

5.2.4 The Board has doubts that the requests fulfil the requirements of Article 123(2) EPC and 56 EPC 1973 for the reasons brought forward by the Opponent. The error consists not in defining wrong facts, but in that the limitation does not correspond to the intention of the Proprietor. Therefore, Auxiliary Requests 5 and 6 filed in the oral proceedings are not admitted into the appeal proceedings pursuant to Article 13 (2) RPBA 2020.

### 5.3 **Auxiliary Request 7**

5.3.1 The Proprietor argued that Claim 1 in addition comprised that the air gap is in the order of 0.1 to 0.3 mm. This feature was not disclosed in D9. The effect of the air gap could be seen that the refractive index in the light path from the LED chip to the lens was changed (impugned patent, paragraphs [0004] and [0054]). Fig. 6 of D9 showed that the air gap was significantly larger.

5.3.2 The Opponent argued that no technical effect can be associated with the chosen values, which appeared purely arbitrary. The skilled person would arrive at this value, depending on the desired optical characteristics of the system. The problem therefore could be formulated as optimizing the optical path of

the light emitted from the LED by adapting the thickness of the air gap between the LED package and the lens.

5.3.3 The Board agrees with the reasoning of the Opponent that the skilled person obviously would adapt the thickness of the air gap to the desired optical path and chose a range of 0.1 to 0.3 mm, if this fits best to the dimensions and requirements of the LED package. D1 suggests an air gap of 0,05 mm or greater in paragraph [0025]. Therefore the subject-matter of claim 1 of the Auxiliary Request 7 does not involve an inventive step in view of D9 in combination with the common general knowledge or D1.

#### 5.4 **Auxiliary Request 8**

5.4.1 The Proprietor argued that D9 did not disclose any connecting part and its connection to the multiple spring arms. Fig. 7 did not show a plurality of spring arms.

5.4.2 The Opponent argued that Fig. 7 of D9 disclosed a connecting part separate from the spring arms, which also engaged the bottom of the lens.

5.4.3 The Board is also of the opinion that D9 discloses in Figs. 16 and 17 that the metal holder 6 engages a portion of the bottom surface of the lens, the bottom surface being directed towards the LED package. It is obvious that the metal holder comprises at the bottom a connection part for connecting the spring arms. Without such a connection the spring arms would not have enough stability.



5.4.4 The subject-matter of claim 1 of the Auxiliary Request 8 therefore does not involve an inventive step in view of D9.

5.5 **Auxiliary Requests 9 to 12.**

5.5.1 As to Auxiliary Request **9**, The Board is of the opinion that, as the Opponent pointed out, the reasoning of section 3 relating to the Main Request applies for both alternatives - LED chip and LED package. Therefore, the subject-matter of independent claims 1 and 12 does not involve an inventive step for the same reasons as the Main Request.

5.5.2 As to Auxiliary Request **10**, The Proprietor argued that the added feature of top mounting was not shown in D9.

5.5.3 The Board however is of the same opinion as the Opponent that the claim does not require direct mounting of the LED chip on the top of the substrate. Furthermore, the *LED package 2* of D9 is directly mounted on the substrate.

5.5.4 As to Auxiliary Request **11**, The Proprietor argued that the feature of the groove in the lens was not shown in D9. In contrast, D9, Fig. 7, only taught a nose for a lens engaging a groove in the holder.

5.5.5 The Opponent argued that D9 taught essentially equivalent features and changing a nose to a groove was not inventive. D9 disclosed in Fig. 7 that the elastic claw 63 engaged a groove in the holder 6 with a corresponding peripheral nose of the lens. It was an obvious alternative solution to use instead of a nose a peripheral groove, wherein the elastic claw engaged a groove provided in the lens.

5.5.6 The Board is also of the opinion that nose and groove are complementary engaging means. The skilled person is aware of both options and would chose the most suitable solution. They would therefore provide the groove not in the holder 6 of D9, but in the lens, the claws engaging the groove of the lens.

5.5.7 As to Auxiliary Request **12** It was undisputed that D9 discloses the additional features of Auxiliary Request 12 relating to the shape of the lens.

5.6 **Admission of Auxiliary Request 13 under Article 13(2) RPBA 2020**

5.6.1 The Proprietor argued that Auxiliary Request 13 is based on Auxiliary Request 2, where method claim 11 (equivalent to claim 13 of the Main Request) was deleted. Therefore the objection mentioned in section 5.1 did not apply. Glass lenses were disclosed in D9 only for the primary lens 15 (paragraph [0015]).

5.6.2 The Opponent argued that claim 1 of this request comprised essentially the connecting portion, which was disclosed in D9, and the feature that the lens was made from glass. The skilled person would choose any suitable material for the lens. As discussed previously glass had many advantages.

5.6.3 The Board is of the opinion that both features have already been discussed. The first in the context of Auxiliary Request 8, the second in the context of method claim 13 (see section 4.5.3 and 4.5.4, above). This request therefore does not overcome the objections under Article 56 EPC 1973, because both features are obvious as discussed earlier. The Board cannot identify

any cogent reason or exceptional circumstances as required under Article 13 (2) RPBA 2020 for admitting this request.

6. In Summary, the subject-matter of the Main Request and Auxiliary Requests **1 to 4** and **7 to 12** does not involve an inventive step in view of D9 within the meaning of Article 56 EPC 1973. The Board does not admit Auxiliary Requests **5, 6** and **13** under Article 13 (2) RPBA 2020, as they *prima facie* do not comply with the requirements of the EPC. Since all requests admitted in the procedure do not comply with the requirements of Article 52(1) EPC in combination with Article 56 EPC 1973, the patent has to be revoked (Article 101(3) (b) EPC and Article 111(1) EPC 1973).

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



S. Sánchez Chiquero

G. Eliasson

Decision electronically authenticated