



## **PATENT AT ISSUE:**

European Patent 2 643 717 entitled 'Colour-mixing collecting optics'

**SUBJECT-MATTER:** Action for revocation

## **JUDGES SEATED:**

This decision was issued by the presiding judge, Prof. Dr Maximilian Haedicke, the legally qualified judge and judge-rapporteur, Dr Tatyana Zhilova, and the technically qualified judge, Dr Uwe Schwengelbeck.

## **SUMMARY OF THE FACTS**

### **I. The patent at issue**

1. The patent at issue (EP '717) is based on the international patent application EP 04 018 805.4, which was filed on 17 November 2011, claiming the priority of an Austrian preliminary application dated 23 November 2010 (AT 19512010). The publication of the grant of the patent is dated 26 January 2022 (specification of the contested patent EP 2 643 717 B1).
2. The defendant is the registered proprietor of the patent at issue.
3. The patent relates to a colour- and light-mixing optical assembly, in particular as a full-colour-capable pixel for outdoor imaging display panels, spotlights or signalling, and comprises 15 patent claims.
4. In the granted version of the patent at issue, independent claim 1 reads as follows:

*A colour- and light-mixing collecting optical system, in particular as a full-colour-capable pixel for outdoor imaging display panels, spotlights or signalling, comprising an LED light source, a light-guiding rod arranged in front thereof, and a collecting lens, wherein the LED light source (1) comprises a plurality of LED crystals (R, G, B), the light-entry surface (3) of the light-guiding rod (2) is ordered in front of the light-exit surface of the LED light source (1) and captures light from each LED crystal, wherein the light-guiding rod (2) extends perpendicular to the entry surface (3) and wherein its cross-section is constant or gradually increases, characterised in that the light exit (4) of the light-guiding rod (2) is situated in the region of the focus (F) of the converging lens (5), that this the from the focus (F) is focused in a direction parallel to the axis, and that the light emerging from a point (P) on the light exit (4) to the side of the centre (F) (4) emerges, is focused in a corresponding direction (p) in a parallel beam, that the outer surface of the light-guiding rod (2) is formed from optically highly polished planes which adjoin one another with sharp edges, and thus each cross-section has the shape of a polygon, that the material of the light-guiding rod (2) is free from light-scattering components, and that the light exit (4) of the light guide rod (2) already largely corresponds in its outline to the required light distribution when inverted, and the light passing through is emitted by the upstream converging lens (5) in the form of the upright outline in accordance with the optical law of projection.*

- According to dependent claim 2, the light-guiding rod has a length that is a multiple of the diameter of the entrance surface.
- According to dependent claim 3, the LED crystals emit different colours.
- According to dependent claim 4, the light source (1) is a full-colour or multi-LED comprising a number of crystals and/or colours in a single housing.
- According to dependent claim 5, the light source (1) is a FullColor or Multi-LED comprising three crystals in the primary colours red, green and blue.
- According to dependent claim 6, the light source (1) consists of several LEDs with individual crystals and the same direction of emission, arranged in a dense order.
- According to dependent claim 7, the light source (1) is constructed from several crystals on a common printed circuit board using chip-on-board technology.
- According to dependent claim 8, the LED crystals are powered by electrically isolated power sources; if one circuit fails, the other or adjacent LED crystal continues to emit light, thereby achieving fail-safe operation or a colour change in the emitted light.
- According to dependent claim 9, by using conversion material, the light source (1) has a light-emitting surface with a seamless order of LED crystals, which possess locally varying colour and brightness properties.
- According to dependent claim 10, the light guide cross-section is an equilateral triangle, a regular hexagon, a square or a rectangle.
- According to dependent claim 11, the light guide cross-section has the shape of an arrow, a cross or a similar symbol.
- According to dependent claim 12, optical structures are arranged behind the converging lens, by means of which the light distribution is altered or scattered.
- According to dependent claim 13, the optical structures (7) are superimposed on the outer surface (6) of the converging lens (5).
- According to dependent claim 14, the light exit (4) of the light-guiding rod (2) exists only virtually, and the light-guiding rod (2) merges directly into the converging lens (5).
- According to dependent claim 15, optically active surfaces (8, 8a) or surface structures (7) adjoin the light guide (2) in its extension, which focus, deflect or scatter the emerging light by refraction or total internal reflection.

5. On 25 February 2026, the defendant filed a request for limitation with the European Patent Office. It requested that the word 'in particular' be deleted from

the first line of claim 1. By decision of 6 March 2026, the request for limitation was granted. The limited version of the patent at issue was published in the European Patent Bulletin on 8 April 2026 (European Patent Bulletin 15/2026).

## II. The parties' applications

6. The claimant requests that
  - 1) that the contested patent be declared invalid in its entirety;
  - 2) to order the defendant to pay the costs of the proceedings;
  - 3) order the defendant to provide security for the costs;
  - 4) to order a provisional and immediately enforceable reimbursement of the claimant's costs in the amount of EUR 26,000.00.
7. The claimant submits that the patent in suit should be revoked pursuant to Article 65(2) of the UPC Agreement and Article 138(1)(a) of the EPC, as the subject-matter of the patent in suit is not patentable under Articles 52 to 57 of the EPC. In particular, the subject-matter of the patent in suit is not new in view of the prior art (Articles 54 and 52(1) of the EPC) and does not involve an inventive step (Articles 56 and 52(1) of the EPC).
8. Furthermore, the patent in suit should be declared invalid on the grounds of impermissible extension pursuant to Article 65(2) of the UPC Agreement, Article 138(1)(c) of the EPC, and the alleged invention is also not disclosed with sufficient clarity and completeness to enable a person skilled in the art to carry it out (Article 65(2) EPC, Art. 138(1)(b) EPC) (see statement of claim, p. 6).
9. The intervener requests
  - 1) that the contested patent be declared invalid in its entirety;
  - 2) that a provisional and immediately enforceable order be made for the reimbursement of the intervener's costs in the lump sum of EUR 26,000.00.
10. The defendant has lodged a preliminary objection concerning the jurisdiction of the Paris Central Chamber pursuant to Rule 19.1(b) of the RoP in conjunction with Article 33(4), second sentence, of the UPC Agreement (App\_28233/2025). By order of the judge-rapporteur dated 28 July 2025, following a hearing of the parties, an order was made that the preliminary objection be dealt with in the main proceedings. The preliminary objection was withdrawn by the defendant during the oral hearing.
11. In its statement of defence, the defendant requests that
  - 1) that the action for revocation be dismissed;
  - 2) in the alternative, that the patent be maintained with amended claims in accordance with one of the alternative claims 1 to 12;
  - 3) to order the claimant to pay the costs of the proceedings.
12. In its document of 29 October 2025 (rejoinder), the defendant submitted 42 new subsidiary claims in response to the new arguments put forward in the intervention statement. The first twelve subsidiary claims were included in these 42 subsidiary claims, and a list of correspondences with the numbering was submitted.
13. Following the limitation of the patent at issue by the European Patent Office, the defendant applied for the patent to be maintained in its limited form.

14. Following the Court's order of 26 March 2026 pursuant to Rule 105 of the RoP, the defendant, by a document dated 28 April 2026, reduced the total number of alternative claims to six and, in the alternative, sought combinations of two or more of the aforementioned alternative claims. In doing so, auxiliary claims 1, 2 and 3 were cited in order to overcome the alleged departure from the original disclosure. Claims 8, 9 and 10 were cited to overcome alleged deficiencies regarding novelty and/or inventive step. Furthermore, claims 1, 2, 3, 8, 9 and 10 were amended in accordance with the limitation such that the word 'in particular' was deleted from their wording.
15. The limitation of the patent by the European Patent Office in the course of the court proceedings was regarded as inadmissible by the claimant and the intervener. The claimant requests that the court rule on the patent in its originally granted form and declare the amended auxiliary claims to be inadmissible.

## **GROUNDINGS FOR THE DECISION**

### **A. Procedural issues**

#### **I. Limitation of the patent at issue by the European Patent Office in the course of the court proceedings**

16. In the view of the claimant and the intervener, the limitation of the patent should be disregarded (document of 7 April 2026). They base their arguments on Article 105a(2) EPC, which they contend is applicable by analogy. This provision stipulates that an application for revocation or limitation cannot be filed whilst opposition proceedings relating to the European patent to be limited are pending. In accordance with the spirit and purpose of this provision, the same must apply to invalidity proceedings pending before the Unified Patent Court. Consequently, the request for limitation is inadmissible and the Court must exclude the limitation from consideration in accordance with Rule 334 of the RoP.
17. The defendant takes the view that nullity proceedings before a national court or the Unified Patent Court do not constitute a procedural obstacle to a limitation by the European Patent Office. Upon publication of the decision on the limitation in the European Patent Bulletin, the patent in suit is deemed to have been limited from the outset and with effect for all Contracting States to the EPC for which it was granted (Article 105b(3) EPC, Article 68 EPC). Consequently, the Court must take the limitation into account.
18. The Court agrees with the defendant.
19. Article 105b(3) EPC stipulates that the decision on limitation or revocation applies to the European patent with effect for all Contracting States for which it has been granted. It takes effect on the date on which the mention of the decision is published in the European Patent Bulletin.
20. Pursuant to Article 68 EPC, the effects provided for in Articles 64 and 67

of the European patent application and the European patent granted thereon shall, to the extent that the patent has been revoked or limited in the course of preliminary objection proceedings, limitation proceedings or revocation proceedings, be deemed not to have occurred from the outset.

21. Taking into account the provisions cited above, the limited version of the patent at issue applies retroactively and is the only legally valid version of the patent at issue at the time of the conclusion of the court proceedings. Consequently, the limitation must be observed.
22. Article 105a(2) EPC merely stipulates that a request for limitation cannot be filed whilst opposition proceedings relating to the European patent are pending.
23. Neither the EPC nor the UPC Agreement contains a provision extending this prohibition to court proceedings for the revocation of a patent. On the contrary: the provision in Article 33(10) of the UPC Agreement permits parallel proceedings before the European Patent Office and the UPC, not only in the case of a preliminary objection but also in the case of a limitation of a patent or an action for revocation. It provides for the court proceedings to be stayed if a swift decision by the Patent Office is to be expected.
24. Consequently, the claimant's and the intervener's assertion regarding an unintended legal loophole is not convincing. An analogous application of Article 105a(2) of the EPC is therefore inadmissible.
25. The Patent Office's decision on the limitation of the patent constitutes an independent administrative act which is not subject to indirect judicial review. The Court therefore disregards the claimant's arguments regarding the inadmissibility of the request for limitation before the Patent Office as irrelevant to the present proceedings.
26. On the basis of the arguments put forward, the court assesses the validity of the patent in its limited form.

## **II. Admissibility of the new amended versions of the alternative claims**

27. In the corrected versions of auxiliary claims 1, 2, 3, 8, 9 and 10, which were filed by document dated 28 April 2026, the wording corresponds to that of the limited version of the patent at issue.
28. The Court considers the editorial corrections in the new auxiliary claims, which do not involve any other substantive changes, to be admissible (UPC (Paris Regional Centre), decision of 18 March 2026, UPC\_CFI\_417/2025; UPC (Paris Regional Centre), decision of 22 April 2026, UPC\_CFI\_461/2025).

### **B. Substantive issues**

#### **I. Legal framework**

29. Pursuant to Article 65(1) and (2) of the UPC Agreement, the Court shall rule on the validity of a patent in the context of invalidity proceedings on the basis of the grounds set out in Articles 138(1) and 139(2) of the EPC.

30. The relevant date for the interpretation of a patent claim for the

assess its validity is the filing date (or priority date) of the application that led to the patent.

31. The patent claim must be interpreted and all alleged grounds for invalidity must be assessed from the perspective of a person skilled in the art with their general technical knowledge as at the filing date or priority date of the patent.
32. The burden of proof regarding the facts giving rise to the invalidity of the patent, as well as regarding other circumstances pointing to invalidity or revocation, lies with the claimant.
33. Pursuant to Article 76(2) of the UPC Agreement, the court shall base its decision on the merits solely on the grounds, facts and evidence submitted by the parties, in respect of which the opposing party has had the opportunity to comment.

## **II. Person skilled in the art and general technical knowledge**

34. The person skilled in the art relevant here is a signals engineer or physicist with a bachelor's degree who has several years' experience in the field of optical signalling systems and knowledge of the related geometric optics (see UPC (LD Vienna), decision of 15 January 2025, UPC\_CFI\_33/2024).

## **III. Technical field and state of the art**

35. The patent at issue relates to a colour- and light-mixing collecting optical system for outdoor display boards and variable traffic signs, whereby freely programmable graphics, text or even images can be displayed (patent at issue specification, paras. [0001], [0007]).
36. The introduction to the description in the specification of the contested patent states that US 2007/0024971 discloses a colour- and light-mixing collecting optical system in which the mixing is achieved by the special design of the cross-section of the light guide rod, featuring ridges and concave indentations. In certain embodiments, TIR collimators are also provided as converging lenses with a specific order in front of the light guide rod. A disadvantage here is the high cost associated with the complex light guide rod and the relatively large longitudinal extent of the optical system (patent specification, para. [0002]).
37. In the case of large LED screens, it is very labour-intensive to install individual monochromatic LEDs with lens domes in such a way that they are all precisely aligned with one another (contested patent specification, para. [0011]). In principle, light transmission by means of a light guide, into one end of which a light source shines and from the other end of which the emitted light is distributed by an optical system, has long been known. However, such a basic system can be modified by an enormous number of parameters, resulting in an immense variety of properties and design options (contested patent specification, para. [0020]).
38. In US 2009/0052189 A1, a reflector is primarily used, as the conically tapering optical fibre rod emits light into a hemisphere, which is easier to focus using a reflector. In a second collection system presented in US 2009/0052189 A1, the light is pre-mixed by means of dichroic mirrors. These fundamental

differences stem from the objective of US 2009/0052189 A1 to achieve maximum focusing, whereas the present invention is intended to achieve a specific light distribution (specification of the contested patent, para. [0026]).

39. WO 2006/054199 A1 discloses a light source comprising a light-generating device with at least one LED or at least one laser light-emitting element for generating and coupling light into at least one optical fibre, which comprises at least one coupling-out element for coupling the light out (patent specification in dispute, para. [0027]).

**IV. The objective technical problem**

40. According to paragraphs [0028] and [0032] of the specification of the contested patent, the objective of the invention is to construct an optical system which completely mixes the light from different LED crystals of a full-colour or multi-LED arrangement in such a way that its intensity and direction are maintained within a small space and can subsequently be focused in a known manner, without producing colour differences, colour fringes or colour spots, whilst the order had to be cost-effective and compact. The task set out in the specification of the contested patent is also to be regarded in the present case as the objective technical problem underlying the invention.

**V. The invention**

41. The invention is defined by independent claim 1.

42. Claim 1, in the version validly limited pursuant to Article 105a EPC, can be structured as follows:

<b>M1</b>	Colour- and light-mixing optical assembly, <del>in particular</del> as a full-colour-capable pixel for outdoor imaging display panels, for spotlights or signalling, comprising
<b>M2</b>	an LED light source, and
<b>M3</b>	a light-guiding rod arranged in front of it, and
<b>M4</b>	a converging lens,
<b>M5</b>	wherein the LED light source (1) comprises a plurality of LED crystals (R, G, B),
<b>M6</b>	the light-entry surface (3) of the light-guiding rod (2) is situated in front of the light-exit surface of the LED light source (1), and
<b>M7</b>	captures light from each LED crystal,
<b>M8</b>	wherein the light-guiding rod (2) extends perpendicular to the entrance surface (3) and
<b>M9</b>	whereby its cross-section is constant or gradually increases, characterised in that,
<b>M10</b>	in that the light exit (4) of the light-guiding rod (2) is situated in the region of the focus (5) of the converging lens (5),

<b>M11</b>	that the lens focuses the light emerging from the focal point (F) in a direction parallel to the optical axis, and that the light emerging from a point (P) on the light exit (4), is focused in a corresponding directions <sup>1</sup> (p) parallel,
<b>M12</b>	that the outer surface of the light-guiding rod (2) is formed from optically highly polished planes which are sharply and thus each cross-section has the shape of a polygon ,
<b>M13</b>	that the material of the optical fibre rod (2) is free from light-scattering components, and
<b>M14</b>	that the light exit (4) of the light-guiding rod (2) already largely corresponds in its outline to the required light distribution when inverted, and that the light passing through is emitted by the upstream converging lens (5) in accordance with the optical law of projection in the form of the upright outline in accordance with the optical law of projection.

## VI. Interpretation of independent patent claim 1

43. The Court of Appeal has established the following legal framework for the interpretation of patent claims (UPC (Court of Appeal), Order of 26 February 2024, UPC\_CoA\_335/2023; UPC (Court of Appeal), Order of 13 May 2024, UPC\_CoA\_1/2024; UPC (Court of Appeal), decision of 25 November 2025, UPC\_CoA\_464/2024).

44. Pursuant to Article 69 EPC and the Protocol on its interpretation, a patent claim is not merely the starting point but the decisive basis for determining the scope of protection of a European patent. The interpretation of a patent claim does not depend solely on the strict, literal meaning of the wording used. Rather, the description and the drawings must always be used as aids to the interpretation of the patent claim, and not merely to resolve any ambiguities in the patent claim. However, this does not mean that the patent claim serves merely as a guideline and that its subject-matter also extends to what, after examination of the description and the drawings, appears to be the subject-matter for which the patent proprietor seeks protection (see UPC (Court of Appeal), Order of 26 February 2024, UPC\_CoA\_335/2023).

45. A feature in a patent claim must always be interpreted in the light of the patent as a whole (see UPC (Court of Appeal), Order of 13 May 2024, UPC\_CoA\_1/2024). The technical function that these features actually perform, both individually and as a whole, must be deduced from the function of the individual features in the context of the patent claim as a whole. The description and the drawings may show,

<sup>1</sup> “directions” is the wording used in the patent specification.

that the patent specification defines terms independently and, in this respect, constitutes a patent-specific lexicon. Even if the terms used in the patent deviate from general linguistic usage, it may therefore be the case that, ultimately, the meaning of the terms as derived from the patent specification is decisive. In applying these principles, the aim is to combine appropriate protection for the patent proprietor with sufficient legal certainty for third parties.

46. Claim 1 relates to a colour- and light-mixing optical assembly for spotlights or for signalling purposes (see feature M1), whereby, as stated in the introduction to the description of the patent at issue, such an optical assembly mixes colours and light and generates directional light. Such optics are used, for example, in display boards (e.g. outdoor display boards) or spotlights (e.g. stage spotlights) ([0001], [0007], [0060] and [0062]).

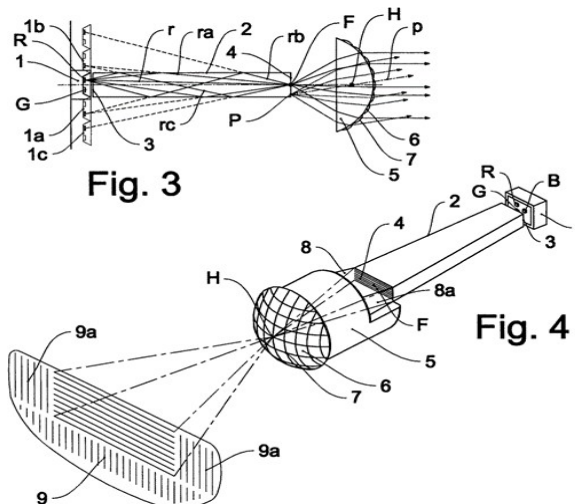
47. The claimed collecting optical system consists (exhaustive list) of only three components:

- i. an LED light source, i.e. a light source based on light-emitting diodes (cf. reference numerals 1 and 3 in the two embodiments shown in Fig. 3 and Fig. 4 / feature M2); the light source may also already comprise a conversion material or a conversion layer, whereby blue light is converted into white/mixed light, whilst further mixing of the light takes place within the light guide rod (see the specification of the contested patent, paragraph [0061] and sub-claim 9),
- ii. a light-guiding rod arranged in front of the display as viewed from the direction of a viewer (see reference number 2 in Figs. 3 and 4, feature M3) and
- iii. a converging lens (see reference number 5 in Fig. 4 / feature M4).

48. The following features require further explanation.

*'Light-guiding rod'*

49. By the light-guiding rod listed in feature M3, a person skilled in the art understands an elongated/rod-shaped object through which light is guided to its end as a result of multiple total internal reflections within the rod.



50. According to an embodiment shown in Figure 4 and the accompanying text (contested patent specification, para. [0055]), a light-guiding rod may also consist of two sections; see, in Figure 4, the sub-section or light-guiding rod designated by reference number 2, which also defines a light-exit surface in accordance with feature M10, as well as reference numbers 8, 8a and 8b for a part adjoining the lens.

*“Region of the focus (F) of the converging lens (5)”*

51. The person skilled in the art does not necessarily and restrictively interpret a converging lens (5), as referred to in features M4 and M10, as merely a spherical lens. The person skilled in the art does indeed understand a converging lens to mean a (simple) spherical lens with an entrance or exit surface in the form of a spherical segment and a corresponding radius of curvature, as well as a focal region in which light paths or light rays converge. However, the person skilled in the art is also aware that spherical lenses suffer from imaging errors or aberrations, which can be avoided by using aspherically shaped lenses.
52. A converging lens must be capable of focusing or collecting light within a focal region of the lens. For this function, it is not strictly necessary for the lens to be spherical in shape. The person skilled in the art therefore understands the term ‘converging lens’ – which is not further explained in the patent at issue – to refer not only restrictively to a spherical lens, but also to an aspherical lens.
53. Due to the aforementioned optical aberrations, real converging lenses do not produce a perfect focus in the sense of a (theoretically) infinitely small point. Consistent with this, the patent at issue, as formulated in feature M10, refers to a ‘region of the focus (F) of the converging lens (5)’.

*“LED light source (1) with multiple LED crystals (R, G, B)”*

54. In addition to the converging lens (5), the converging optical system comprises an LED light source (1) with several LED crystals (R, G, B) — that is, LEDs for the additive primary colours red, green and blue, which together produce white light, whereby the light-entry surface (3) of the light-guiding rod (2) is ordered in front of the light-exit surface of the LED light source (1) and captures light from each LED crystal (see the specification of the contested patent, Figs. 3 and 4, para. [0038] et seq. / features M5 and M6). The light-guiding rod (2), with a constant (see Fig. 3) or gradually increasing cross-section, extends perpendicular to the light-entry surface (3) of the light emitted by the LED light source (see Fig. 4 / features M7 to M9).

*“Feature M8”*

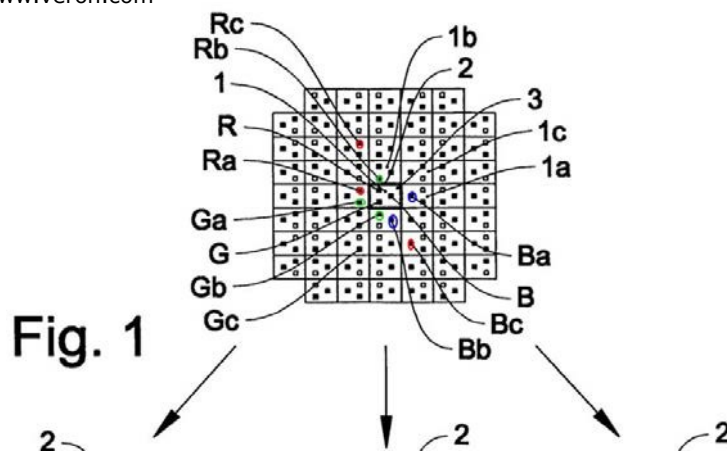
55. Feature M8 does not necessarily mean that a (notional) central axis of the light-guiding rod – which is aligned, for example, with the rod’s sloping side surfaces – must also be exactly perpendicular to the entry surface.

*‘Feature M11’*

56. The centre point (F) listed in feature M11 is the centre of the light exit (4) from the light-guiding rod (2). The light exit (4), in turn, is located, in accordance with feature M10, in the region of the focus (F) of the converging lens (5) and is therefore not necessarily situated exactly at a single (ideal, infinitely small) focus/focal point of the converging lens (cf. patent specification, para. [0048] / features M10 and M11).
57. Consequently, feature M11 can only be understood by a person skilled in the art to mean that the light emerging from the centre of the light exit (4) of the light-guiding rod (2) is collimated in a direction parallel to the optical axis, and that the light emerging from a point (P) on the light exit (4) to the side of the centre (F) of the light exit (4) is bundled in a corresponding direction (p) (not '*directions*', as stated in the wording of the claim) (specification of the contested patent, para. [0048], and Fig. 3, reference mark p).

*'The outer surface of the light-guiding rod (2)'*

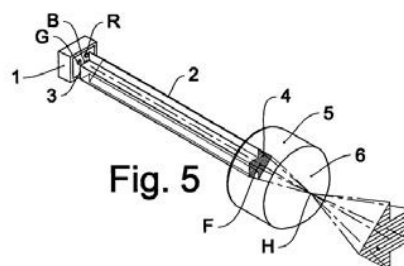
58. The outer surface of the light-guiding rod (2) is formed, in accordance with features M12 and M13, from optically highly polished planes, the material of which is free from light-scattering or rough components. This is consistent with the understanding of a person skilled in the art, who assumes that the effect of a light guide or light guide rod is based on the so-called 'total internal reflection' of light at its inner surface.
59. With regard to the highly polished surfaces of the optical fibre rod (2), the person skilled in the art does not assume that these have in fact been highly polished in the literal sense during the manufacturing process. Rather, the person skilled in the art knows that a polishing process is not the only way to achieve a sheath surface (and thus also a correspondingly reflective inner surface of the sheath) that is optically polished in a functional sense, or sufficiently smooth and therefore highly reflective. The point of feature M12 is that the outer surface is functionally so smooth that the light is completely (= totally) reflected as it passes through the light-guiding rod, and is not scattered as a result of a rough surface (cf. the specification of the contested patent, para. [0040]: on smooth Plexiglas surfaces, total internal reflection occurs at an incident angle of approximately 42°).
60. The fact that the optically high-gloss polished surfaces, in accordance with feature M12, adjoin one another with sharp edges is understood by a person skilled in the art, within the context of the description, to mean that this does not impair the display of mirror images of the light source (cf. Fig. 1 and the kaleidoscope-like mirror images Ra, Rb, Rc, Ga [...] of the coloured LEDs) within the framework of geometric optics, as would be the case with larger edge radii (cf. the specification of the contested patent, Fig. 1 (showing several colour-coded mirror images of coloured LEDs) and the specification of the contested patent, para. [0039], penultimate and last sentences: '[...] If the light-guiding rod 2 has sharp edges, all mirror images can be viewed unobstructed. In the case of larger edge radii, some mirror images would be obscured by the radius, or reflections would occur at the radii themselves, thereby impairing the display').



61. The optically highly polished surfaces (without scattering components) ensure that the light from the LED light source (1) is guided through multiple lossless total internal reflection at the walls of the light-guiding rod (2) to its light exit (4) (contested patent specification, para. [0034]). Such 'guidance' (without light exit) of the light in the sense of a light guide would no longer be possible if there were scattering components in the outer surface and its planes. Thus, the highly polished surfaces referred to in feature M12 define both the optical fibre rod and the light exit (4) listed in features M10 and M14, namely at the point where the high-gloss polish ends.

*'Feature M14'*

62. According to the description of the patent at issue, which must form the basis for the interpretation of the claim features, scattering structures, within the context of a possible configuration of the exit surface of the converging lens, are to be understood as an optically effective structure on the converging lens (5) (see the specification of the patent at issue, para. [0054] as well as [0053] and Fig. 4 / feature M13). Feature M14 thereby describes the geometric optics with reference to the light exit (4) of the light-guiding rod (2) and the converging lens (5).
63. The outline of the light exit (4) of the light-guiding rod (2) largely corresponds to the required light distribution, but is inverted (see patent specification, Figs. 4 and 5, as well as the ray path shown there with inversion of an image / feature M14). The light passing through the light exit (4) is emitted by the upstream converging lens (5) in accordance with the law of optical projection in the form of the upright outline, which is, however, inverted. As described in the contested patent specification with reference to a point P at the light exit (4) (patent specification, para. [0048], also Fig. 5), the light exit (4) is projected to infinity in accordance with the laws of optics, whereby each point P at the light exit (4) is mapped onto a direction p determined by the laws of optics. The resultant light distribution of the optical order is therefore a uniformly bright, uniform in colour and inverted area in the shape of the light exit.



## VII. Insufficient disclosure / lack of workability

64. Pursuant to Article 83 EPC, an invention must be disclosed in the European patent application in such a clear and complete manner that a person skilled in the art is able to carry it out.
65. The requirement for sufficient disclosure is only met if the person skilled in the art can carry out the teaching set out in the claims across the entire claimed scope, using their general technical knowledge, without undue effort.
66. The claimant and the intervener argue that the teaching of the patent at issue does not enable a person skilled in the art to carry out the entire subject-matter defined in claim 1 without undue effort. They contend that the requirement under Article 83 EPC is not met, in particular in the combination of features M10 and M11. According to feature M10, it should be sufficient for the light exit of the light-guiding rod to be '*in the region of the focus*' of the converging lens. On the contrary, paragraph [0048] expressly confirms the common understanding of those skilled in the art that, in order to achieve the characteristics of feature M11, a converging lens must be positioned such that the light exit is '*exactly at its focus*'. Furthermore, feature M10 – according to which the light exit of the light-guiding rod is to be situated in the region of the focus of the converging lens – encompasses, as evidenced by the information in paragraphs [0053] to [0055], at least two further variants, namely that of an actual and a purely virtual light exit. Accordingly, it is clear that the location of the light exit cannot be arbitrary.
67. These arguments are not convincing.
68. The light exit of the light-guiding rod is located where, as a result of a light-scattering structure, total internal reflection no longer occurs across the entire outer surface of the light-guiding rod (see Fig. 3, as well as the specification of the contested patent, paragraph [0054] and the above interpretation). As previously explained in the context of the interpretation of the claims, the highly polished outer surface referred to in feature M12 – without any scattering components or structures – defines one end of the light-guiding rod as well as the light exit (4) listed in features M10 and M14. The point at which scattering structures terminate the total internal reflection of light at the outer surface of the light-guiding rod (2) functionally defines the light exit. The patent at issue explains in this regard that, in the embodiment shown in Figure 4, the light exit (4) exists only virtually, as the material, in the case of an overall one-piece body, extends as far as the exit dome (6) of the collecting lens (2), the focus of which lies at the virtual light exit (patent at issue specification, para. [0055] and para. [0053]).
69. Due to aberrations, real converging lenses generally do not have a perfect focus/focal point in the sense of an infinitely small point on the lens. In line with this, the patent at issue and the wording of feature M10 refer to a '*region of the focus (F) of the converging lens (5)*', in which light converges—i.e. is focused—as a result of the laws of optics.
70. On the basis of the teaching of the patent at issue, the person skilled in the art is therefore readily

able to define a virtual light exit and position it within the focal region of a converging lens in such a way that nothing stands in the way of the feasibility of features M11 and M10 in conjunction with feature M12 and feature M14. Given the order of the components of the converging optical system described in the patent at issue, it is immediately clear to a person skilled in the art, on the basis of the laws of optics, that the light emerging from the centre (F) can thus be collimated in a direction parallel to the axis in accordance with feature M11, and that the light emerging from a point (P) of the light exit (4) to the side of the centre (F) (4) can be focused in parallel in another associated direction (p).

71. The person skilled in the art thus finds sufficient guidance in the specification of the contested patent with regard to workability, which is therefore established. There is no insufficient disclosure pursuant to Article 138(1)(b) EPC, as alleged by the claimant in connection with features M10 and M11.

### VIII. Inadmissible extension

72. An inadmissible extension exists where the granted claim contains a subject-matter which goes beyond the content of the filed application. In order to determine this, the court must first ascertain what information the person skilled in the art would derive directly and unambiguously from the entire filed application, drawing on their general technical knowledge. In doing so, account must also be taken of the implicitly disclosed subject-matter, i.e. the subject-matter that is a clear and unambiguous consequence of what is expressly mentioned (see UPC (Court of Appeal), Order of 14 February 2025, UPC\_CoA\_382/2024, Abbott v Sibio, para. 52).
73. Direct disclosure requires that the subject-matter was originally disclosed as a specific, clearly defined and recognisable individual embodiment, whether explicitly or implicitly, without the need for deductive reasoning. An unambiguous disclosure requires that it be beyond doubt – and not merely probable – that the subject-matter claimed in an amended claim was disclosed as such in the application as originally filed. (see UPC (LD Düsseldorf), decision of 28 January 2025, UPC\_CFI\_355/2023, FUJIFILM v Kodak).
74. The claimant and the intervener argue that the requirement for a direct and unambiguous disclosure in the content of the original application WO 2012/068603 A1 (Annex BB-A3) is not met, in particular with regard to the combination of features M10 and M11. A basis for feature M10 is found only on page 12, lines 9 and 10 of the application: *'If, downstream of the light-guiding rod 2, a converging lens 5 is positioned such that the light exit 4 is located precisely at its focus F, [...]*' (emphasis added by the claimant). However, feature M10 is formulated more broadly and also encompasses embodiments in which the light exit of the light-guiding rod is merely 'in the vicinity of the focus' of the converging lens and therefore not necessarily at that focus.
75. Furthermore, the requirement for a direct and unambiguous disclosure is not, in itself, met for feature M11 either. Thus, with regard to the lateral points, feature M11 merely requires that the light emerging from a point (P) of the light exit to the side of the centre point (F) of the light exit is bundled in a corresponding direction (p) in parallel

- . The basis for feature M11 is found on page 12, lines 9 and 10 of the application; it is apparent from this that every point P of light emission is mapped onto a direction p determined in accordance with the laws of optics, irrespective of the direction of the individual light rays emerging from that point.
76. Furthermore, there is also no direct and unambiguous disclosure in claim 13 of the original application for feature M12, which forms the basis for this feature: '[...] the light-guiding rod is optically smooth and highly polished on **all** its surfaces [...]' (emphasis added by the claimant). Consequently, feature M12 lacks, on the one hand, the instruction that all surfaces of the light-guiding rod must be highly polished, and, on the other hand, the instruction that these must be 'smoothly' highly polished.
77. The claimant's arguments regarding a lack of disclosure in the original application of patent claim 1 with feature M10, as well as features M11 and M12, cannot be accepted.
78. The application as originally filed (see Annex BB-A3, page 6, line 20 et seq.) it is disclosed that the light is concentrated 'in a known manner' by means of a converging lens, the focus of which lies 'in the region' of the light-emitting end of the optical fibre, whereby 'from a technical point of view' the focus and the light-emitting surface should, as far as possible, coincide, or at the very least the light-emitting surface should be situated in a region immediately surrounding the focus – area. Thus, feature M10, according to which the light exit is to be ordered 'in the vicinity of the focus (F) of the converging lens (5)' – in conjunction with feature M11 concerning light focusing by a converging lens – is originally disclosed directly and unambiguously to the person skilled in the art. The fact that the original application also mentions positioning the light-emitting end of the light-guiding rod 'exactly at the focus (F)' of the converging lens does not preclude this.
79. The original application discloses (see Annex BB-A3, WO 2012/068603 A1, page 6, line 20 et seq. and the above remarks) that, in the solution according to the invention, the light emerging from the light-guiding rod is concentrated 'in a known manner' by a converging lens. This focusing of the light emerging from the light exit is also explained in the original application (see Annex BB-A3, WO 2012/068603 A1, page 12, line 9 et seq.). The person skilled in the art will therefore readily understand that light emerging from any point (P) at the light exit (4) is collimated in a direction (p) associated with that point (P). Feature M11 in patent claim 1, as restricted pursuant to Article 105a EPC, thus describes, in the understanding of a person skilled in the art, a parallel bundling or collimation of the light emerging from the light-emitting end of the light guide, exactly as described in the original disclosure.
80. The original application further discloses that the optical fibre rod provided in the optics of the invention guides the light emitted by the LED light source 'by means of multiple lossless total internal reflection at the walls of the optical fibre rod up to its light exit' (see Annex BB-A3, WO 2012/068603 A1, page 7, line 35, to page 8, line 2). In the process, the light is mixed within the light-guiding rod (see page 8, lines 26 ff). A person skilled in the art knows that 'multiple lossless total internal reflection at the walls of the light-guiding rod' requires the surface of the 'walls' is optically smooth. By these 'walls', the

a person skilled in the art, on the basis of their general technical knowledge, refers only to the surfaces at which the light is totally reflected until it exits the optical fibre. The fact that claim 13 of the originally filed application (see Annex BB-A3, publication WO 2012/068603 A1) claims an embodiment which expressly provides “that the light-guiding rod (2) is optically smooth and highly polished on all its surfaces” does not mean that the person skilled in the art would understand the claimed collecting optics differently from as set out above with regard to the specification of the contested patent. Consequently, feature M12 is also to be regarded as originally disclosed.

81. There is therefore no inadmissible extension or amendment going beyond the content of the original disclosure.

## IX. Novelty

82. The action for revocation and the intervention statement were based on a lack of novelty in relation to the content of several publications representing the state of the art: US 2009/0073710 A1 (**D1**); US 7,607,804 B2 (**D2**); US 2008/0285984 A1 (**D1'**); US 2010/0284201 A1 (**D2'**); US 2007/0024971 A1 (**D3'**) and WO 2006/119723 A1 (**D4'**).

83. Following the interim hearing and during the oral hearing, the claimant focused on the following publications: US 2009/0073710 A1 (D1) and US 7,607,804 B2 (D2). The intervener focused on publication US 2008/0285984 A1 (D1'). The remaining publications, which were also introduced by the intervener, differ significantly from the contested invention. They are therefore considered only briefly.

### *In comparison with US 2009/0073710 A1 (D1)*

84. Publication D1 describes a lighting system comprising red, green and blue (RGB) light-emitting diodes (LEDs), a light collimator and a light mixer, in which the light distribution of the light emitted by the lighting system is rendered asymmetrical by the order of a prismatic protrusion on a light-guiding rod. Vehicle headlamps are cited as an application, which do not dazzle oncoming drivers (see paragraphs [0001], [0003], [0022], [0048] and [0052]). In addition to so-called wall washers and floodlights, other applications mentioned include large-area light-emitting panels, such as those used in signage, contour lighting and advertising hoardings (see paragraphs [0003]).

85. The light-collecting optical system known from D1 comprises the following parts (see Figs. 1A, 1C and paragraphs [0040], [0041] and [0048]):

- i. the aforementioned LED light source with LED crystals for the colours red, green and blue (RGB), which are ordered on a printed circuit board (PCB 2) of the LED light source (feature M2), as well as light-collimating sections (12, 12'), which are attached to the LEDs and may still be regarded as part of the LED light source,
- ii. a light-mixing section (3) based on total internal reflection (TIR) arranged in front of them, which the person skilled in the art recognises, on the basis of total internal reflection (TIR), as a light-guiding rod with a highly polished (and

therefore fully reflective) outer surface that is free from light-scattering components (see paragraphs [0041] to [0043] and Claim 1 / features M3; see also features M12 and M13), as well as

- iii. a positive lens (positive lens 20), which, due to its positive refractive power, is nothing other than a converging lens (see paragraphs [0048] and Fig. 1C / feature M4).

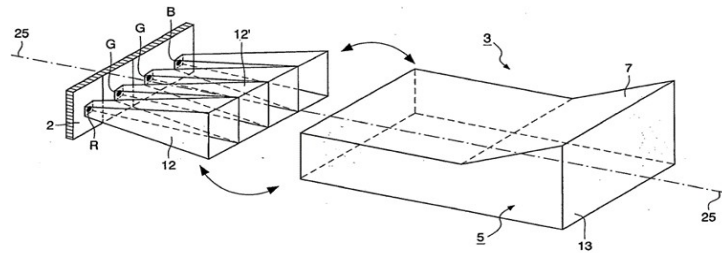


FIG. 1A

86. The light exit window (see Fig. 1B and para. [0045], light exit window 13) of the light-guiding rod, in the form of a light-mixing section (3) based on total internal reflection, is arranged in front of the light-emitting surface of the LED light source and its LED crystals (RGB) and the light-collimating sections (12, 12') ordered (see Fig. 1A / feature M6). In this arrangement, the light-entry surface of the light-guiding rod, which extends perpendicular to the entry surface (see Fig. 1A, left-hand part of the light-mixing section 3), captures the light from each of the coloured LED crystals (RGB) (features M7 and M8).

87. Similar to the embodiment shown in Figure 4 of the specification of the contested patent, the optical fibre rod known from D1 comprises two optical fibre sections (cf. reference numeral 3 in Fig. 1A and Fig. 1C of D1). The light guide shown in Figures 1A and 1C comprises, firstly, a part or section with a constant cross-section, and a part whose cross-section gradually increases (feature M9).

88. Features M10 and M11 are not disclosed in publication D1. The fact that the light exit of the light-guiding rod is located in the region of the focus of the positive lens/converging lens (see Fig. 1C, positive lens 20) is not described in D1. Accordingly, it is also not apparent from D1 that the converging lens focuses the light emerging from the centre of the light-emitting end of the light-guiding rod in a direction parallel to the optical axis, and that it focuses the light emerging from a point on the light-emitting end (light exit window 13) to the side of the centre of the light-emitting end in a corresponding parallel direction.

89. This also applies to feature M14, which is likewise not described in D1.

90. Contrary to the view put forward by the claimant, the subject-matter of the patent claim, as limited under Article 105a EPC, is therefore to be regarded as novel in relation to D1 on the basis of features M10, M11 and M14.

*In relation to US 7,607,804 B2 (D2)*

91. Publication D2 (see, inter alia, the abstract) describes a lighting device comprising a light source

and a primary optical element in the form of a light guide with a light inlet and a light outlet.

92. The collecting optics described in D2 consist of

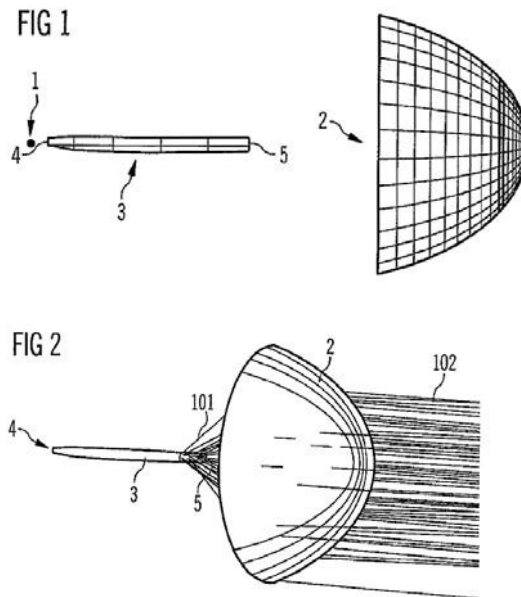
- i. an LED light source (an LED or an array of a plurality of LEDs [...] used as the light source 1),
- ii. a light-mixing section arranged in front of it in the form of primary optics (primary optics 3), which, by virtue of total internal reflection, constitutes a light-conducting [...] waveguide with a totally reflective outer surface that is free from light-scattering components (see column 4, lines 31–47, as well as Fig. 1 and column 7, lines 20 ff.: By virtue of its light-conducting functions, the primary optics element 3a can be used as an optical waveguide / feature M3; see also features M12 and M13),
- iii. an optical element in the form of a (collimator) lens (optical apparatus 2 / freeform lens in the form of a projection lens), which collimates light rays (Rays 101 are collimated by the optical apparatus 2) and is also nothing other than a converging lens (see Fig. 2 and column 7, lines 31 et seq. / feature M4).

93. This is an illumination system with a converging optical system that performs a light-mixing function (see column 4, line 15 et seq.: ‘light is advantageously mixed’). Light-emitting diodes (LEDs or an array of a plurality of LEDs) are specified as the light source (light source 1), which produce white light. The white light consists of radiation with different wavelengths, i.e. coloured light (see column 3, lines 41–50). However, colour mixing already takes place within the LED light source itself by means of a fluorescent layer on the LED chip (fluorescent layer / fluorescent surface on the semiconductor chip), as a result of which the LED light source already emits white light (see col. 7, lines 50–59).

94. It is evident from D2 that the light exit of the light-guiding rod is located in the focal region of the converging lens in the form of a condenser/free-form lens (optical apparatus 2 / freeform lens) (see Fig. 2 and column 7, lines 31 ff.: Rays 101 are collimated by the optical apparatus 2 / feature M10). It is therefore immediately apparent to a person skilled in the art that the converging lens collimates the light emerging from the centre of the light-emitting end of the light-guiding rod in a direction parallel to the optical axis, and collimates the light emerging from a point on the light-emitting end to the side of the centre of the light-emitting end in a corresponding direction (feature M11). This also applies when applying the laws of optics with regard to feature M14.

95. With regard to feature M12, D2 does not describe that the outer surface of the primary optics (primary optics 3), which forms a light-conducting rod (total internal reflection [...] light-conducting [...] waveguide), is formed from planes that adjoin one another with sharp edges, each cross-section having the shape of a polygon. Rather, in connection with a polygon-like cross-sectional area as an embodiment, D2 merely teaches that at least one rounded corner or at least one rounded angle is also formed there (see column 5, lines 8–24: ‘[...] the primary optical element has a cross-section in the form of a polygon which has at least one rounded corner on the light

outlet side. In other words, the cross-section is essentially in the form of a polygon, preferably in the form of a rectangle or pentagon, but with at least one or all of the corners of this polygon not being angled, but being rounded. This allows the profile of the light/dark transition to be softened, and thus adjusted.”). Thus, whilst the light guide does indeed have surfaces that are sharp-edged, not every cross-section or every part of the cross-section has the shape of a polygon, as required by feature M12.

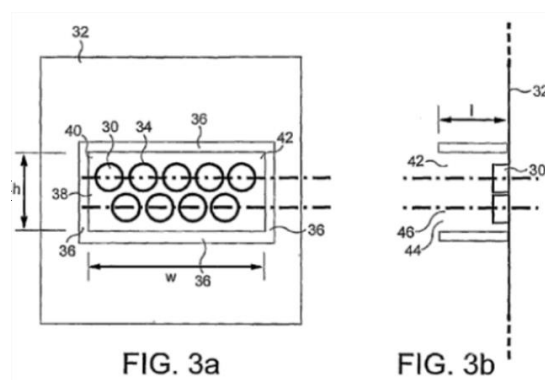


96. Consequently, the subject-matter of patent claim 1 is also considered novel in relation to the teaching of D2 on the basis of feature M12 (see also the comments on feature M1).

*In relation to US 2008/0285984 A1 (D1')*

97. Publication D1' (Annex BB-C7), which was introduced into the proceedings by the intervener, deals with the homogenisation of radiation from discrete light sources and the bundling of radiation from LEDs or lasers in an optical transmission device or a so-called transmitter (see paragraphs [0001] and [0002]). The aim is therefore to distribute light from multiple light sources, such as LEDs, evenly. D1' makes no mention of colours or a colour mixture corresponding to feature M1.

98. The transmitter cited above comprises a plurality of discrete light sources 30, for example in the form of LEDs, which are ordered in an array (Fig. 3a). The light from the LEDs (light sources 30 / fast LEDs) is directed into a box referred to in D1' as a mirror box 38, which is bounded by walls (walls 36) (Figs. 3a, 3b together with the text in paragraphs [0092] and [0074] respectively).



99. However, the box/mirror chamber (box 38, mirror box) described in D1'— which is relatively short in relation to the extent of the light source (LEDs)— is not to be regarded as a light-guiding rod corresponding to features M3 and M6, which is ordered in front of the light-emitting surface of the LEDs. Rather, the LEDs are already located inside the box/mirror chamber (see Fig. 4).
100. With regard to a light-guide rod (cf. feature M3 in conjunction with M6 and M8 to M14), D1' – in contrast to a box or mirror cavity – mentions an embodiment in which the light from a light source is first guided through a suitable light guide (lightguide / fibre light guide / light pipe) to a mirror cavity (see para. [0101]). However, such an embodiment does not pre-empt the subject-matter of claim 1 either, since the claim merely requires a light guide rod arranged in front of an LED light source (see the concluding list of features M1 to M4: [...] comprising an LED light source, as well as a light guide rod arranged in front of it and a converging lens). Furthermore, according to feature M12, the light guide rod must also be formed from reflective planes, which cannot be inferred from paragraph [0101] of D1' either.
101. Consequently, the optical system known from D1' lacks, on its own, features M3 and M10 of claim 1 of the patent at issue.
102. The subject-matter of patent claim 1 is therefore also to be regarded as novel in relation to the teaching of D1'.

*In relation to the other publications*

103. publication D2' (US 2010/0284201), this document relates to an optical illumination system comprising a colour- and light-mixing condenser lens assembly which mixes the additive RGB primary colours (red, green, blue) and is used in projectors in connection with the collimation of light (see paragraph [0001] and feature M1). This collecting optical system differs from the collecting optical system of claim 1 of the patent at issue in that the optical system does not consist solely of three components corresponding to the exhaustive list set out in features M1, M2, M3 and M4. Rather, the collecting optical system known from D2' comprises additional components such as a diffuser (diffuser 206), which, in contrast to the teaching of the patent at issue, is still ordered between a light guide and the lens system (see Fig. 2 and paragraphs [0046]–[0052]). Contrary to feature M10, the light exit of the light pipe (lightpipe 204) is also located in the region of the diffuser (diffuser 206). Accordingly, feature M14 is also not present, which relates to light emission in connection with the inverted upright outline of the light-emitting end of the light-guide rod. Consequently, publication D2' does not preclude the subject-matter of claim 1 on the grounds of lack of novelty either.
104. Nor does D3' (US 2007/0024971 A1) anticipate the subject-matter of claim 1 in a manner that would render it lacking in novelty. D3' describes numerous different embodiments of light-mixing lighting/projection devices, emphasising that the use of light-guiding rods with ribbed reflective surfaces is advantageous (see, inter alia, the abstract and paragraphs [0003] and [0006]). Consequently, D3' excludes both

feature M12, relating to a highly polished surface, and feature M13, which requires that the material of the light guide rod be free of light-scattering components. Furthermore, the illumination device shown in Fig. 30A is designed as a zoom system in which, although various distances between the light guide rod and a projection lens (projection lens 420) can be adjusted to produce a 'spot' mode or a 'flood' mode, However, a specific focus position corresponding to feature M10 is not thereby directly and unambiguously specified or disclosed.

105. Nor does publication D4' (WO 2006/119723 A1), which relates to a projector or projection device comprising a light modulator, detract from novelty. It is true that light of different colours from a light source can be coupled into an optical element, where it is mixed to produce white light (see pages 12 to 13, second paragraph / features M1 and M2). However, this publication does not teach that the light emerging from a light-guiding rod, as shown in the embodiments of Figures 17, 32C, 37 and 38, lies within the focal region of a converging lens. The description merely states that the light path of the light guide is imaged, for example, by means of a projection lens, as the light guide has undergone extensive light mixing through the light guide at this point (see p. 45, last paragraph). However, the fact that the light path is imaged does not mean that the light exit of the optical fibre rod lies in the region of a lens's focal point, as required by feature M10. Similarly, Figure 33C of D4' contains no indication of the positioning of a converging lens or of the light exit of the light guide rod in relation to the focus of a lens. This applies equally to features M11 and M14, which are linked to feature M10 in accordance with geometric optics, in the context of the parallelised emission of mixed light.

## **X. Inventive step**

### *Assessment of inventive step*

106. The approach of the Unified Patent Court to the assessment of inventive step, which is already apparent from the order of the Court of Appeal in the case of *Nanostring v 10X Genomics* (UPC (Court of Appeal), order of 26 February 2024, UPC\_CoA\_335/2023) and in the case of *Meril v Edwards* (UPC (Court of Appeal), decision of 25 November 2025, UPC\_CoA\_464/2024), is as follows:
107. Firstly, the objective technical problem, i.e. the subject-matter of the invention, must be identified. This must be done by comparing the claim as a whole in the context of the description and the drawings. In doing so, account must also be taken of the inventive concept underlying the invention (the technical teaching), which must be based on the technical effect which the person skilled in the art, on the basis of the application, understands to have been achieved by the claimed invention.
108. The objective problem should not contain any references to the claimed solution, in order to avoid a retrospective assessment.
109. The claimed solution is obvious if, at the relevant date, the person skilled in the art, starting from a realistic starting point

in the state of the art of the relevant technical field and with the aim of solving the objective problem, would have arrived at the claimed solution (and not merely 'could have arrived at it').

110. A starting point is realistic if its teaching would have been of interest to a person skilled in the art who, on the filing date, wished to solve the objective problem. This may be the case, for example, where the relevant prior art already discloses several features similar to those of the claimed invention and/or addresses the same or a similar underlying problem as the claimed invention.

111. There may be more than one realistic starting point, and the claimed invention must be inventive in relation to each of these points.

*Alleged realistic starting points*

112. As is apparent from the Court of Appeal's approach, outlined above, to determining a lack of inventive step, there may be more than one realistic starting point. However, this approach also means that several steps must be taken to demonstrate a lack of inventive step (see UPC (LD), decision of 27 May 2026, UPC\_CFI\_807/2024 and UPC\_CFI\_334/2025).

113. The action for revocation is based on the lack of patentability of claim 1 due to a lack of inventive step in relation to the following documents:

D1: US 2009/0073710 A1

D2: US 7,607,804 B2

D3: US 2006/0061870 A1

D4: Chen et al.: Freeform surface design for a light-emitting diode-based collimating lens

D5: Tukker: Beam-shaping lenses in illumination optics

D6: DE 101 42 582 B4

D7: DE 100 05 653 A1

D8: DE 200 19 735 U1

D9: AT 505572 A1

D10: EP 0 860 805 A1

D11: EP 1 227 458 A2

D12: WO 02/17628 A2.

114. The claimant has argued that there is a lack of inventive step, based on five prior art references: D1: US 2009/0073710 A1; D2: US 7,607,804 B2; D8: DE 200 19 735 U1; D9: AT 505572 A1 and D10: EP 0 860 805 A1, either on its own and/or in 13 combinations with common technical knowledge and other publications. Following the interim hearing, the claimant focused on the following publications (document of 7 April 2026): D1 or D2 in combination with common technical knowledge; D8 or D10 in combination with D1 or D12; and D9 in combination with D12 and common technical knowledge.

115. With regard to inventive step, the intervener cites the following prior art documents (marked with ' by the court):

D1': US 2008/0285984 A1

D2': US 2010/0284201 A1

D3': US 2007/0024971 A1

D4': WO 2006/119723 A1

D5': Publication "Recent Advances in Mixing Rods" D6':  
US 2004/0062044 A1

D7': WO 02/52190 A1 (including Espacenet translation)

D8': JP H 09265807 (including Espacenet translation)

D9': US 2007/0177011 A1

116. The intervener has argued that there is a lack of inventive step, based on four starting points: D3', D6', D4' and D5', either alone and/or in 13 combinations with general technical knowledge and other publications. Following the interim hearing, the intervener focused on publications (document of 7 April 2026) D3' or D4' in combination with D6'.

117. In its submissions on inventive step, the claimant relies on several starting points and cites a large number of documents relating to possible combinations. Some of these combinations are not explained in detail, but are merely mentioned in passing in the pleadings.

118. For this reason, the court will discuss in detail only those starting points and combinations on which the claimant's side focused following the interim hearing. The remainder will be considered only briefly.

*Based on US 2009/0073710 A1 (D1)*

119. The lighting system described in publication D1 is based on a collecting optical system which, due to red, green and blue LEDs in accordance with feature M1, has both a colour-mixing and a light-mixing function (mixed colours or white light) (see para. 4 as well as paras. 40, 41 and 48: light-mixing section). Owing to the LEDs of the LED light source in the (additive) primary colours red, green and blue (RGB), the collecting optics are also used as a full-colour-capable pixel for the aforementioned application in light-emitting panels. Therefore, publication D1 represents a realistic starting point for a person skilled in the art.

120. According to the claimant, publication D1 must be considered in the light of general technical knowledge.

121. However, the features M10, M11 and M14 relating to the focal region, which are not described in D1, do not, in themselves, follow from publication D1 alone for the person skilled in the art.

122. The person skilled in the art does indeed understand D1 to mean that an inversion takes place through the positive lens (positive lens 20): Light rays passing through a prismatic protrusion portion (7) are deflected upwards before passing through the positive lens and are then inverted by the positive lens and deflected downwards (see Fig. 1B, Fig. 1C and para. [0048]). A light ray passing through the prismatic protrusion is not reflected there due to the absence of an interface; see the dotted line in Fig. 1B). Instead, in accordance with the laws of geometric optics, such a light beam is directed upwards (see Fig. 1B, upper beam on the right) and then directed downwards by the positive lens (see Fig. 1C).

123. In the case of a vehicle headlamp, this results in the road being illuminated more brightly, whilst an area above it is dimmed (see the hatched area 22 / shaded part in Fig. 1C). Consequently, an oncoming driver is not dazzled by the headlamp. However, this does not yet mean that the light is also focused in a parallel beam through the positive lens (20) in accordance with the teaching of the patent at issue and in accordance with feature M11 in conjunction with feature M10 in connection with the light exit window (13) mentioned therein (see also points p and P together with the associated ray paths in Fig. 3 of the specification of the contested patent), which would be the case if the light exit of the light guide were located at the focus or in the vicinity of the focus (see the discussion on the interpretation of the claims). D1 makes no mention of the parallel convergence of light rays behind the lens (positive lens 20) – that is, in the region between the lens and an imaginary projection surface (imaginary projection surface 22'). D1 is concerned solely with achieving a shaded part – for this, it is not necessary to order the light exit in the region of the lens's focal point. Had this been the intention of D1, a corresponding reference would certainly also have been included in the detailed description of publication D1.

124. However, based on the teaching of publication D1, general technical knowledge cannot lead the person skilled in the art in an obvious manner to the subject-matter of independent patent claim 1. Without a retrospective analysis, the person skilled in the art could not arrive at the contested invention.

125. Consequently, based on the content of D1, there is an inventive step.

*Based on US 7,607,804 B2 (D2)*

126. D2 states that the condensing lens is suitable for a wide range of applications (a large number of applications [...] in particular [...] headlights) (see column 3, lines 8–17, and column 4, lines 65 et seq. / see feature M1). D2 points out that the focusing optical system can produce a non-uniform light distribution and a brightest area (the luminance distribution has a brightest area, a hotspot, in the centre of the cross-section of the light beam) – this implies, to the person skilled in the art, that the focusing optical system is at least suitable for a spotlight.

127. However, based solely on the prior art document D2, the person skilled in the art has no reason to mix the already white light from the (white) LEDs within the light guide rod. Consequently, the person skilled in the art regards the focusing optics of D2 as a light-mixing system overall, but no longer as a colour-mixing system. Suitability for colour mixing would be present here if LEDs of different colours were used, but this is not the case here.

128. Nor does the person skilled in the art have any reason to change the rounded edge of the light guide (at least one rounded corner) to a sharp edge, since it is precisely the rounded edge according to D2 that leads to the desired light distribution specified there (see the above comments on D2 and features M1 and M12).

129. Consequently, there is also no reason for a person skilled in the art to replace the light guide rod in the collecting optics known from D2 with a differently shaped light guide rod.

130. Consequently, inventive step is also present on the basis of the content of D2.

*On the basis of DE 200 19 735 U1 (D8)*

131. According to the claimant, publication D8 must be considered in the light of D1 and D12.

132. Publication D8 relates to an LED signalling device for road traffic signals. D8 discloses, for example, a plurality of LEDs and a condenser in the form of a Fresnel lens arranged in front of them along the optical axis.

133. Publication D8 teaches that, for road traffic, it is necessary to focus the light such that it is emitted to infinity, so that the signal remains clearly visible even from a great distance (see page 1, lines 9 to 17, and page 2, lines 4 to 14). According to the explicit teaching of D8, the Fresnel lens should preferably be positioned such that the LEDs lie outside its focal plane.

134. Deliberate defocusing is to be achieved by means of additional diffusing elements (see page 4, lines 33 to page 5, line 7). The teaching of D8 therefore moves away from collimated emission of the light emitted by the LEDs.

135. Starting from a device as known from D8, the person skilled in the art would not simply combine the device described therein with a light guide according to D1, but would be required to adapt it in such a way as to achieve the loss-free, complete light mixing and homogeneous light distribution required by the task. Without their own inventive contribution, the person skilled in the art would not be able to convert the LED signalling device according to D8 into the collecting optics of the patent at issue, owing to the design differences compared with the lighting system according to D1.

136. D12 describes a design for improving the contrast and visibility of so-called video walls by reducing phantom light. To this end, an order is proposed in which individual mono-LEDs – one red, one blue and one green LED – are each assigned to a light guide rod (see Fig. 1 and Fig. 3, together with the accompanying text). If the person skilled in the art were to position the optical system known from D8 in front of the light guides of the device known from D12, they would not thereby achieve any difference in the beam pattern compared with D8. This would merely result in an increase in the installation space.

137. Consequently, inventive step is also present on the basis of the content of D8.

*Based on EP 0 860 805 A1 (D10)*

138. According to the claimant, publication D10 must also be considered in relation to D1 and D12.

139. Like D8, D10 relates to a signal-transmitting optical system for traffic signal installations ('traffic lights', see column 1, line 13). The signal optics consist of a two-part lens system comprising a condenser and a diffusing lens, as well as a light source, whereby the light source is composed of at least three individual, mostly similar lighting elements (i.e. monochrome LEDs, as opposed to full-colour LEDs used as the light source in the patent at issue). The light emitted by the majority of the light sources is captured and focused by a condenser. It is then homogenised by the upstream diffusing lens or other diffusing structures and directed into the desired directions specified by applicable standards. The diffusing lens also enables the light emitted by different-coloured LEDs to be mixed.

140. D10 contains no indication as to where the focus of the condenser lies. It can merely be inferred from D10 that sharp images of the light-emitting elements are to be avoided (see column 6, lines 4–13).

141. Nor would a person skilled in the art have had any obvious reason to apply the lens system known from D10—which does not require a light-guiding rod—and the measures for light diffusion taught in D10 to a device such as that known from D1, or to combine the teaching of D10 with that of D1 (see the citations mentioned earlier in relation to D1 and D10).

142. Nor would the person skilled in the art have had any reason to combine, in terms of design, a lens system without a light guide rod, as known from D10, with the video panel known from D12, in which no colour or light mixing is achieved by means of a light guide rod in accordance with the patent at issue (see, inter alia, Figs. 1 to 3 and the accompanying text in D12).

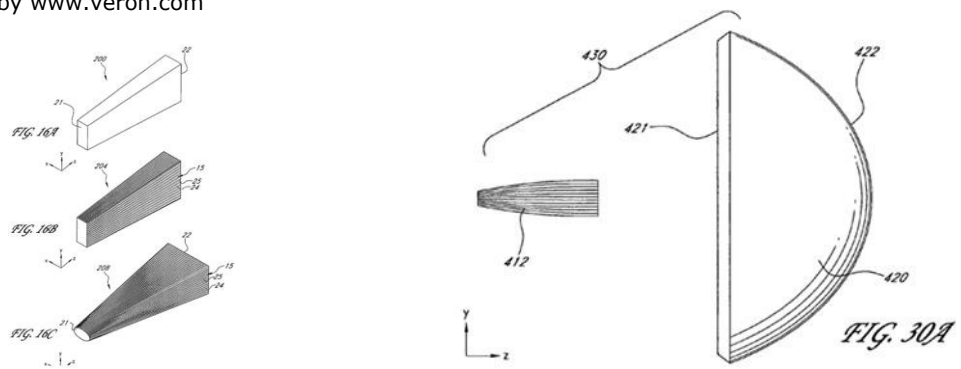
143. Consequently, inventive step is also present on the basis of the content of D10.

*On the basis of US 2007/0024971 A1 (D3')*

144. According to the claimant, publication D3' must be considered in relation to D6'.

145. Publication D3' relates to torches and discloses a variety of different embodiments which are not interrelated.

146. Figure 16A of D3' shows an embodiment of a lighting device with a light mixer having flat/smooth side walls (see paragraph [0228]).



147. There is no indication for the person skilled in the art to use a light mixer of a different geometric shape – and, above all, a non-ribbed one – in the lighting device shown in Figure 30A, particularly as such light mixers are described in D3' as being disadvantageous in relation to light mixing compared to ribbed light mixers, which diverges from the patent at issue (see, inter alia, the abstract and paragraphs [0006], [0227] and [0228]).

148. In order to fulfil the objective task of the patent at issue, the person skilled in the art would, contrary to the teaching of D3', have to use a light guide rod with smooth walls, which is described in D3' as disadvantageous because it does not achieve suitable light mixing. In addition, the person skilled in the art would have to position the lens in a specific position (not taught by D3').

149. Publication D6' relates to a different technical field from that of the subject-matter of the patent in suit and also of D3', namely an illumination device for image projectors: '[0003] The present invention relates to a portable illumination apparatus which has high brightness and realises uniform illumination, and an image projection apparatus using the illumination apparatus.' The objective of D6' is the uniform illumination of an area. D6' therefore deals with the spatial distribution of light and does not concern colour mixing. In such projectors, a discharge lamp (bulb) is generally used as the light source in combination with a parabolic reflector or an ellipsoidal reflector (see paragraph [0005] of D6').

150. The person skilled in the art would therefore not have considered D6' as a means of solving the objective problem underlying the claimed patent. Since D6' belongs to a different technical field and achieves a completely different technical effect, it would not have been promising, from the perspective of the person skilled in the art, to combine the known optics from D3 with image projectors such as those described in D5'.

151. Consequently, inventive step is also present on the basis of the content of D3'.

*On the basis of WO 2006/119723 (D4')*

152. According to the claimant, publication D4' must also be considered in relation to D6'

153. Publication D4', like D6', relates to a different technical field from that of the subject-matter of the patent in suit, namely optics for use in projectors. The objective of D4' is to ensure as uniform and intense illumination as possible of an image to be projected (page 1, paragraphs [0001] and [0003] of D4').

154. Consequently, publication D4' does not constitute a realistic starting point for determining inventive step.

*Based on the remaining publications*

155. D9 does not specify where the focus of a convex lens/converging lens lies, which is ordered behind a light guide with an exit surface shaped as a field lens. Furthermore, the light guide is not designed with sharp edges, but is rounded. The arguments set out above regarding D2 apply equally to D9.

156. Publication D6', like D4', relates to a different technical field from that of the subject-matter of the patent in suit, namely optics for use in projectors, and does not constitute a realistic starting point for determining a lack of inventive step.

157. With regard to publication D5', the intervener asserts a lack of inventive step only in relation to feature M10. However, features M11, M12, M13 and M14 are not disclosed in publication D5'. Furthermore, the intervener has not substantiated or demonstrated a lack of inventive step within the meaning of Article 56 EPC.

## **XI. Conclusion**

158. The limitation of the patent at issue in the course of the court proceedings has no bearing on the assessment of its novelty. The subject-matter of claim 1 of the patent at issue, both in the version limited pursuant to Article 105a EPC and in the granted version, is patentable in relation to all the cited documents.

159. There is no inadmissible extension in the version of the patent at issue limited in accordance with Article 105a EPC. The subject-matter is also capable of being carried out.

160. The subject-matter of patent claim 1 of the patent at issue, as limited in accordance with Article 105a EPC, is novel and involves an inventive step. This applies equally to the subject-matter of the dependent claims of the patent at issue. The validity of independent claim 1, both in the granted version and in the version limited in accordance with Article 105a EPC, establishes the validity of dependent claims 2 to 15.

161. The action for revocation is dismissed. The patent, as limited in accordance with Article 105a EPC, is to be maintained. Consequently, the auxiliary claims are no longer relevant.

### **C. Costs**

162. During the interim proceedings, the value in dispute was set at EUR 1,000,000.00 for the purposes of applying the ceilings on recoverable costs.

163. Pursuant to Article 69(1) of the UPC Agreement, the costs of the proceedings and other costs incurred by the successful party, in so far as they are reasonable and proportionate, shall be borne by the unsuccessful party up to a ceiling laid down in the Rules of Procedure, provided that no grounds of equity preclude this.

164. In view of the outcome of the proceedings, the defendant is the successful party. There are no grounds of equity precluding the defendant. Consequently, the costs of the court and the defendant are to be borne jointly by the claimant and the intervener.

165. All other applications are dismissed.

**DECISION**

On the basis of the foregoing, the Paris Central Chamber of the Unified Patent Court decides as follows:



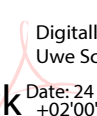
1. The [REDACTED] is dismissed.
2. European Patent 2 643 717 is upheld in the limited version pursuant to Article 105a of the EPC.
3. The claimant and the intervener shall bear the costs of the proceedings.
4. Once the time limit for appeal has expired, the Registry shall forward a copy of this decision to the European Patent Office and to the national patent offices of all Contracting States concerned.

**INFORMATION ON APPEALS**

Any party whose applications have been rejected in whole or in part may lodge an appeal against this decision with the Court of Appeal within two months of service of the decision (Article 73(1) of the UPC Agreement, R. 220.1(a), 224.1(a) of the RoP.

Issued in Paris, on 25 June 2026 NAMES

**AND SIGNATURES**

<p>Prof. Dr Maximilian Haedicke Presiding Judge</p>	<p>Maximilian Wilhelm Haedicke</p>  <p>Digitally signed by Maximilian Wilhelm Haedicke DN: cn=Maximilian Wilhelm Haedicke, c=DE Date: 24 June 2026 15:57:39 +02'00'</p>
<p>Dr Tatyana Zhilova legally qualified judge and judge-rapporteur</p>	<p>Tatyana Borisova Zhilova</p>  <p>Digital signature by Tatyana Borisova Zhilova Date: 24 June 2026 19:15:36 +02'00'</p>
<p>Dr Uwe Schwengelbeck, technically qualified judge</p>	<p>Uwe Schwengelbeck</p>  <p>Digitally signed by Uwe Schwengelbeck Date: 24 June 2026 16:25:39 +02'00'</p>

<p>Margaux Grondein on behalf of the Deputy-Registrar</p>	 <p>Digital signature of MARGAUX MARIE- ANGE GRONDEIN</p>