

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43*bis*.1)

Date of mailing
(day/month/year) see form PCT/ISA210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2011/068240

International filing date (day/month/year)
19.10.2011

Priority date (day/month/year)
19.10.2010

International Patent Classification (IPC) or both national classification and IPC
INV. F21K99/00 F21V7/00 ADD. F21Y101/02 F21Y113/00

Applicant
UNIVERSITY COLLEGE CORK - NATIONAL UNIVERSITY...

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA220.

Name and mailing address of the ISA:



European Patent Office
P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk - Pays Bas
Tel. +31 70 340 - 2040
Fax: +31 70 340 - 3016

Date of completion of
this opinion

see form
PCT/ISA210

Authorized Officer

Cosnard, Denis

Telephone No. +31 70 340-3913



Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed
 - a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:
 - a. (means)
 - on paper
 - in electronic form
 - b. (time)
 - in the international application as filed
 - together with the international application in electronic form
 - subsequently to this Authority for the purposes of search
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-15</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-15</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-15</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 Reference is made to the following documents:

- D1 WO 2009/016604 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; LANKHORST MARTIJN H R [NL]; WANG) 5 February 2009
- D2 EP 2 149 807 A2 (SAMSUNG ELECTRONICS CO LTD [KR]) 3 February 2010
- D3 US 2006/072314 A1 (RAINS JACK C [US]) 6 April 2006
- D4 WO 2007/130536 A2 (LED LIGHTING FIXTURES INC [US]; VAN DE VEN ANTONY PAUL [CN] CREE LED L) 15 November 2007
- D5 US 2005/134527 A1 (OUDERKIRK ANDREW J [US] ET AL) 23 June 2005
- D6 US 2003/223248 A1 (CRONIN PAUL J [US] ET AL) 4 December 2003

2 The application does not meet the requirements of Article 6 PCT, because claims 1 and 14 lack clarity.

2.1 The term "at a height higher than" used in claims 1 and 14 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, because no reference point nor direction is given to define the height, thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.

2.2 The term "are closer to said aperture/reflector" used in claims 1 and 14 is vague and unclear and leaves the reader in doubt as to the meaning of the technical feature to which it refers, because the comparative sentence does not define to which group the lower efficiency LEDs are compared (i.e. the term "than..." is missing), thereby rendering the definition of the subject-matter of said claim unclear, Article 6 PCT.

3

3.1 Document D1 is regarded as being the prior art closest to the subject-matter of claim 1, and insofar as this claim can be understood, this document shows the following features thereof:

A wide spectrum light source (see figure 6) comprising:

- a housing with an aperture (see cone-shaped reflector ref. 600 and 601), said aperture adapted to emit light (surface through which the light exits the housing);

- a plurality of light emitting diode (LED) sources (see ref. 602-606) mounted in said housing (see figure 6), said LED sources are arranged at different heights (see figure 6) in said housing adapted to provide wide spectrum operation of said light source,

- wherein said housing (600, 601) comprises a stepped base portion (601) (with respect to portion 600);

- wherein (green ref. 606, respectively blue ref. 602) LED is mounted on said stepped base portion at a height (considered with respect to the surface supporting red LED ref. 604, see clarity objection in paragraph 2.1 of the present written opinion) higher than (blue ref. 605, respectively green ref. 603) LED.

3.2 The subject-matter of claim 1 therefore differs from this known wide spectrum light source in that:

a) LEDs of high efficiencies and LEDs of low efficiencies are in plurality.

b) Lower efficiency LEDs are mounted on said stepped base portion at a height higher than higher efficiency LEDs, such that said lower efficiency LEDs are positioned closer to said aperture.

3.3 The problem to be solved by feature (a) of the present invention may therefore be regarded as increasing the light intensity of the emitted light.

3.4 These features (a) have already been employed for the same purpose in a similar wide spectrum light source (see document 1, figures 9 or 10). It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a wide spectrum light source according to document D1, figure 6, thereby arriving at a wide spectrum light source according to claim 1.

- 3.5 The problem to be solved by feature (b) of the present invention may therefore be regarded as increasing the efficiency of the wide spectrum light source, by optimising the efficiency differences of the LEDs.

In document D1 at least two different types of LEDs are used, each type having a wavelength (green and blue) different from the other.

Blue LEDs are generally known not to exceed 30 lm/W, whereas green LEDs are known not to exceed 100 lm/W.

When designing the device in figure 6 the skilled person could choose:

In the range 0-30 lm/W for the choice of both LEDs of different colours:

- Blue LED having a lower efficiency than the green LED. Then, the high efficiency LED ref. 603 and low efficiency LED ref. 602 would disclose the subject-matter of claim 1.
- Green LED having a lower efficiency than the blue LED. Then, high efficiency LED ref. 605 and the low efficiency LED ref. 606 would disclose the subject-matter of claim 1.

In the range above 30 lm/W for the choice of green LEDs:

Then, the high efficiency LED ref. 603 and low efficiency LED ref. 602 would disclose the subject-matter of claim 1.

However, document D1 does not suggest that those particular choices would be exclusively made by the skilled-person in order to solve the problem. He could also consider other technical solutions. Therefore, these combinations are not obvious to him.

Consequently, the subject-matter of claim 1, as far as claim 1 can be understood (see clarity objections in Re Item V, paragraph 2.) seems to be inventive.

- 4 Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter of claim 14 does not involve an inventive step in the sense of Article 33 (3) PCT, and the criteria of Article 33(1) PCT are therefore not met.

- 4.1 Document D1 is regarded as being the prior art closest to the subject-matter of claim 14, and discloses:

- 4.2 A wide spectrum light source (see figure 6) comprising:
- a housing with an aperture (see cone-shaped reflector ref. 600 and 601), said aperture adapted to emit light (surface through which the light exists the

housing);

- a plurality of light emitting diode (LED) sources (see ref. 602-606) mounted in said housing (see figure 6), said LED sources are arranged at different heights (see figure 6) in said housing adapted to provide wide spectrum operation of said light source
- wherein said housing comprises a reflector (607) and a stepped portion (601) (with respect to portion 600),
- wherein (green ref. 606, respectively blue ref. 602) LED is mounted on said stepped portion at a height (considered with respect to the surface supporting red LED 604, see clarity objection in paragraph 2.1 of the present written opinion) higher than (blue ref. 605, respectively green ref. 603) LED.

4.3 The subject-matter of claim 1 therefore differs from this known wide spectrum light source in that:

- a) LEDs of high efficiencies and LEDs of low efficiencies are in plurality.
- b) Lower efficiency LEDs are mounted on said stepped portion at a height higher than higher efficiency LEDs, such that said lower efficiency LEDs are positioned closer to said reflector.

4.4 The problem to be solved by feature (a) of the present invention may therefore be regarded as increasing the light intensity of the emitted light.

4.5 These features (a) have already been employed for the same purpose in a similar wide spectrum light source (see document 1, figures 9 or 10). It would be obvious to the person skilled in the art, namely when the same result is to be achieved, to apply these features with corresponding effect to a wide spectrum light source according to document D1, figure 6, thereby arriving at a wide spectrum light source according to claim 1.

4.6 The problem to be solved by feature (b) of the present invention may therefore be regarded as increasing the efficiency of the wide spectrum light source, by optimising the efficiency differences of the LEDs.

In document D1 at least two different types of LEDs are used, each type having a wavelength (green and blue) different from the other. Independently from the choice of the efficiencies within the colored LEDs the skilled person could make for optimising the light emission, nothing is suggested in document D1 about the location of the LEDs with respect to a reflector, such

that the lower efficient LEDs would be positioned closer to it. Moreover, that location is also not an obvious modification of the device known from document D1 the skilled person would make.

Therefore, the subject-matter of claim 14, as far as it can be understood (see Re Item V, paragraph 2.), seems to be inventive.

- 4.7 Claims 2-13, respectively claim 15, are(is) dependent on claim 1, respectively claim 14, and as such also meet(s) the requirements of the PCT with respect to novelty and inventive step.

Re Item VII

Certain defects in the international application

The features of the claims 1-15 are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

Re Item VIII

Certain observations on the international application

Claims 1 and 14 lack clarity (see Re Item V, paragraph 2).

Possible steps after receipt of the international search report (ISR) and written opinion of the International Searching Authority (WO-ISA)

General information	For all international applications filed on or after 01/01/2004 the competent ISA will establish an ISR. It is accompanied by the WO-ISA. Unlike the former written opinion of the IPEA (Rule 66.2 PCT), the WO-ISA is not meant to be responded to, but to be taken into consideration for further procedural steps. This document explains about the possibilities.
Amending claims under Art. 19 PCT	Within 2 months after the date of mailing of the ISR and the WO-ISA the applicant may file amended claims under Art. 19 PCT directly with the International Bureau of WIPO. The PCT reform of 2004 did not change this procedure. For further information please see Rule 46 PCT as well as form PCT/ISA/220 and the corresponding Notes to form PCT/ISA/220.
Filing a demand for international preliminary examination	<p>In principle, the WO-ISA will be considered as the written opinion of the IPEA. This should, in many cases, make it unnecessary to file a demand for international preliminary examination. If the applicant nevertheless wishes to file a demand this must be done before expiry of 3 months after the date of mailing of the ISR/ WO-ISA or 22 months after priority date, whichever expires later (Rule 54bis PCT). Amendments under Art. 34 PCT can be filed with the IPEA as before, normally at the same time as filing the demand (Rule 66.1 (b) PCT).</p> <p>If a demand for international preliminary examination is filed and no comments/amendments have been received the WO-ISA will be transformed by the IPEA into an IPRP (International Preliminary Report on Patentability) which would merely reflect the content of the WO-ISA. The demand can still be withdrawn (Art. 37 PCT).</p>
Filing informal comments	After receipt of the ISR/WO-ISA the applicant may file informal comments on the WO-ISA directly with the International Bureau of WIPO. These will be communicated to the designated Offices together with the IPRP (International Preliminary Report on Patentability) at 30 months from the priority date. Please also refer to the next box.
End of the international phase	At the end of the international phase the International Bureau of WIPO will transform the WO-ISA or, if a demand was filed, the written opinion of the IPEA into the IPRP, which will then be transmitted together with possible informal comments to the designated Offices. The IPRP replaces the former IPER (international preliminary examination report).
Relevant PCT Rules and more information	Rule 43 PCT, Rule 43bis PCT, Rule 44 PCT, Rule 44bis PCT, PCT Newsletter 12/2003, OJ 11/2003, OJ 12/2003
