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Declarations under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

Published:

— with international search report (Art. 21(3))

— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

[Continued on next page]

(54) Title: ILLUMINATION DEVICE WITH LED AND A TRANSMISSIVE SUPPORT COMPRISING A LUMINESCENT MATERIAL

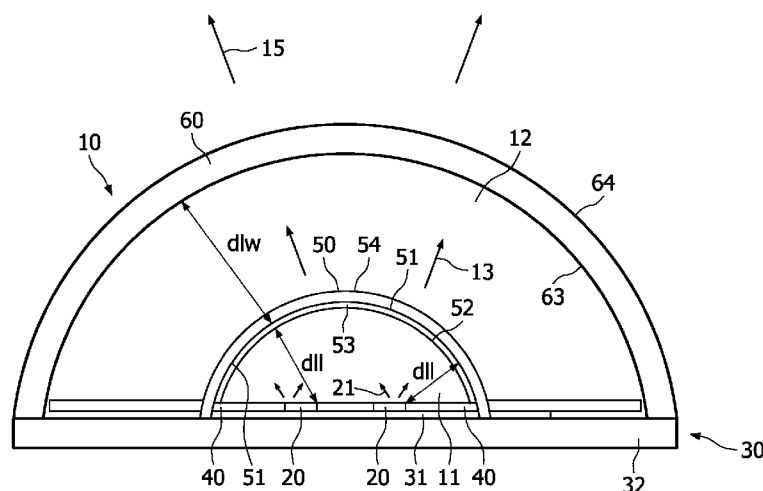


FIG. 1e

(57) Abstract: The invention provides an illumination device (10) with a light emitting diode (20), a transmissive support (50) comprising a luminescent material (51), and a translucent exit window (60). The luminescent material (51) LED (20) distance dLL is larger than 0 mm, and the luminescent material (51) exit window (60) distance dLW is also larger than 0 mm. With the proposed illumination device (10) the lamp may especially look white when it is in the off- state and illuminated with white light. Other advantages are that an intrinsically efficient system may be provided and that a warm white option may be provided.





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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
INV. F21K7/00 H01L33/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H01L F21H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2006 156187 A (MITSUBISHI ELECTRIC CORP; MITSUBISHI ELEC LIGHTING CORP) 15 June 2006 (2006-06-15) the whole document -----	1-5, 7-14,16, 17
X	WO 2007/073496 A (LED LIGHTING FIXTURES INC [US]; NEGLEY GERALD H [US]) 28 June 2007 (2007-06-28) page 7, line 12 - page 8, line 14 page 10, line 8 - page 16, line 30 figures 1,2 -----	1-5,7,8, 11,15-17
X	EP 1 418 628 A (MATSUSHITA ELECTRIC WORKS LTD [JP]) 12 May 2004 (2004-05-12) column 9, line 39 - column 20, line 16 figures 1-31 ----- -/--	1-5,10, 13-16

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G* document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 691 425 A (MATSUSHITA ELECTRIC WORKS LTD [JP]) 16 August 2006 (2006-08-16) column 10, line 7 - column 20, line 40 figures 1,6-23,25 -----	1-5,10, 13,15-17
X	EP 1 081 771 A (HEWLETT PACKARD CO [US]) 7 March 2001 (2001-03-07) column 5, line 20 - column 9, line 10 figures 2,5 -----	1,3-5,9, 10,14-17
A	WO 2007/102098 A (KONINKL PHILIPS ELECTRONICS NV [NL]; WEIJERS ALDEGONDA L [NL]; LANKHOR) 13 September 2007 (2007-09-13) the whole document -----	1-5,7-17

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2009/050177

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers allsearchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search reportcovers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-5, 7-17

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-5,7-17

An illumination device comprising a light emitting diode LED arranged to emit LED emission, a transmissive support comprising a luminescent material, wherein the luminescent material is arranged to absorb at least part of the LED emission and emit luminescent material emission, wherein the LED and the luminescent material are arranged to generate light of a predetermined colour, wherein the illumination device further comprises a translucent exit window arranged to transmit at least part of the light, wherein, relative to the LED, the transmissive support is downstream from the LED, thereby providing a luminescent material LED distance dLL larger than 0 mm, and the translucent exit window is downstream from the transmissive support, thereby providing a luminescent material exit window distance dLW equal to or larger than 0 mm, wherein the materials and/or the geometry of the arrangement are further specified.

2. claims: 1+6,18(part)

An illumination device comprising a light emitting diode LED arranged to emit LED emission, a transmissive support comprising a luminescent material, wherein the luminescent material is arranged to absorb at least part of the LED emission and emit luminescent material emission, wherein the LED and the luminescent material are arranged to generate light of a predetermined colour, wherein the illumination device further comprises a translucent exit window arranged to transmit at least part of the light, wherein, relative to the LED, the transmissive support is downstream from the LED, thereby providing a luminescent material LED distance dLL larger than 0 mm, and the translucent exit window is downstream from the transmissive support, thereby providing a luminescent material exit window distance dLW equal to or larger than 0 mm, wherein the luminescent material LED distance dLL is adjustable; and a method for tuning the colour point of the light of such an illumination device wherein, during operation of the light emitting diode LED, the luminescent material LED distance dLL is adjusted until a predetermined colour point is sensed by a sensor arranged to sense the light generated by the LED and the luminescent material.

3. claim: 19(part)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A method for tuning the colour point of the light of an illumination device according to claim 1, wherein the transmissive support comprises a non-uniform distribution of the luminescent material, wherein the transmissive support is movable, and wherein, during operation of the light emitting diode LED, the position of the transmissive support relative to the LED is adjusted until a predetermined colour point is sensed by a sensor arranged to sense the light generated by the LED and the luminescent material.

4. claims: 18(part),19(part)

A method for tuning the colour point of the light of an illumination device according to claim 1 in the absence of the translucent exit window.

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2009/050177

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