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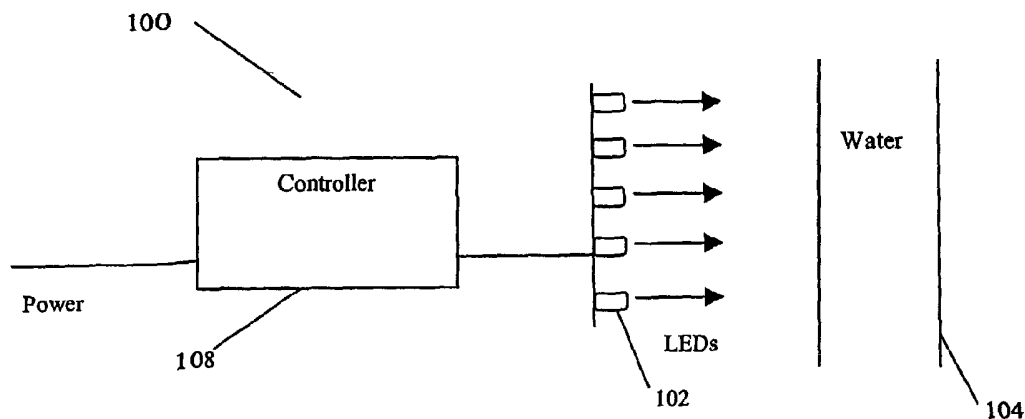
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- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: ULTRAVIOLET LIGHT EMITTING DIODE SYSTEMS AND METHODS



(57) Abstract: Ultraviolet producing light emitting diode devices. An embodiment of the present invention is a purification device. The purification device may comprise a purification chamber, and at least one LED that produces ultraviolet light wherein the at least one LED is arranged to irradiate the inside of the chamber. Other LED based devices are also disclosed.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/41569

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C02F1/32 A61L2/10

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)

IPC 7 A61L

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)

EP0-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 780 103 A (HERAEUS KULZER GMBH) 25 June 1997 (1997-06-25) column 3, line 57 -column 4, line 14; claims 1,2; figure 1 ---	
X	EP 0 263 185 A (HOSHIN KAGAKU SANGYOSHO KK) 13 April 1988 (1988-04-13) the whole document ---	1-5,18, 19,23,25
X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 14, 31 December 1998 (1998-12-31) -& JP 10 233532 A (HOUSHIN KAGAKU SANGIYOUSHIYO:KK), 2 September 1998 (1998-09-02) abstract; figures --- -/--	1-5,18, 19,23,25

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

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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"E" earlier document but published on or after the international filing date

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"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.

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 01/41569

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 05, 30 May 1997 (1997-05-30) -& JP 09 000941 A (TOYODA GOSEI CO LTD), 7 January 1997 (1997-01-07) abstract; figures ---	1-5,18, 19,23,25
X	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 05, 30 May 1997 (1997-05-30) -& JP 09 000940 A (TOYODA GOSEI CO LTD), 7 January 1997 (1997-01-07) abstract ---	1-5,18, 19,23,25
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 11, 30 September 1999 (1999-09-30) & JP 11 155932 A (SANYO ELECTRIC CO LTD), 15 June 1999 (1999-06-15) abstract ---	1-3,23
A	US 5 919 422 A (TAMAKI MAKOTO ET AL) 6 July 1999 (1999-07-06) the whole document -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/41569

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 II Observations where unity of invention is lacking (Continuation of item 2 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 all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers 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, 18, 19, 23, 25

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ 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: 1-5,18,19,23,25

Method and chamber for treating vapor and liquids

2. Claims: 6-9,26-29

Method and device for radiation of items with a handheld device

3. Claims: 20-22

Insect light

4. Claims: 10-17,24,30-37,43-48

Method of impacting the growth of plants and device with at least one LED emitting ultraviolet light and one LED emitting visible light

5. Claims: 38-42

Method of irradiating a display

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 01/41569

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