UL Certification Categories (CCNs)

Other Categories with LED Luminaires

- FTBR, FWBO – Exit Signs
- IFDH – Low Voltage Landscape Lighting Systems
- IFDQ – Low Voltage RV Luminaires
- IFDR – Low Voltage Lighting Systems
- IFFR – Track Lighting
- UYMR – Sign Accessories

What's Next (part 1)

- UL 8750 Comment resolution (done)
- UL 8750 Recirculation (9/11 – 10/26)
- UL 8750 Standard Issued
- Transition Plan Analysis
- Certifications Updated / Upgraded

What's Next (part 2)?

- STP Meeting?
- Further refinement of UL 8750
- Temperature test exempt criteria?
- Substitution criteria based on standardized inputs / outputs:
  - Alternate drivers
  - Alternate LED modules
  - Alternate LEDs in modules

Questions / Contact Info

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,957	08/26/2013	6465961	C1160.10003US04	6150

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Maschoff Brennan
1389 Center Drive, Suite 300
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EXAMINER	
KIELIN, ERIK J	
ART UNIT	**PAPER NUMBER**
3992	
MAIL DATE	**DELIVERY MODE**
01/23/2014	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,957*.

PATENT NO. *6465961*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

Office Action in Ex Parte Reexamination	Control No. 90/012,957	Patent Under Reexamination 6465961	
	Examiner ERIK KIELIN	Art Unit 3992	AIA (First Inventor to File) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

a. ☒ Responsive to the communication(s) filed on *8/26/2013* .
☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

b. ☐ This action is made FINAL.

c. ☒ A statement under 37 CFR 1.530 has not been received from the patent owner.

A shortened statutory period for response to this action is set to expire *2* month(s) from the mailing date of this letter. Failure to respond within the period for response will result in termination of the proceeding and issuance of an *ex parte* reexamination certificate in accordance with this action. 37 CFR 1.550(d). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).** If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. ☒ Notice of References Cited by Examiner, PTO-892.
2. ☐ Information Disclosure Statement, PTO/SB/08.
3. ☐ Interview Summary, PTO-474.
4. ☐ _____.

Part II SUMMARY OF ACTION

1a. ☒ Claims *8 and 9* are subject to reexamination.
1b. ☒ Claims *1-7 and 10-20* are not subject to reexamination.
2. ☐ Claims _____ have been canceled in the present reexamination proceeding.
3. ☐ Claims _____ are patentable and/or confirmed.
4. ☒ Claims *8 and 9* are rejected.
5. ☐ Claims _____ are objected to.
6. ☐ The drawings, filed on _____ are acceptable.
7. ☐ The proposed drawing correction, filed on _____ has been (7a) ☐ approved (7b) ☐ disapproved.
8. ☐ Acknowledgment is made of the priority claim under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the certified copies have
   1 ☐ been received.
   2 ☐ not been received.
   3 ☐ been filed in Application No. _____ .
   4 ☐ been filed in reexamination Control No. _____.
   5 ☐ been received by the International Bureau in PCT application No. _____.
   * See the attached detailed Office action for a list of the certified copies not received.
9. ☐ Since the proceeding appears to be in condition for issuance of an *ex parte* reexamination certificate except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte* Quayle, 1935 C.D. 11, 453 O.G. 213.
10. ☐ Other: _____

cc: Requester (if third party requester)

DETAILED ACTION

This action is on the claims for which a substantial new question of patentability has been requested and determined to exist; that is claims 8 and 9 of US Patent No. 6,465,961 (the '961 patent, hereafter).

The present application is being examined under the pre-AIA first to invent provisions.

Table of Contents

I. The References

(1) WO 00/17569 published 30 March 2000 (Begemann)

(2) US 6,220,722 issued 24 April 2001 (Begemann-722)

(3) US 6,015,979 issued 18 January 2000 (Sugiura)

(4) US PG Publication 2002/0159490 filed 29 March 2001 (Karwacki)

(5) US 5,777,350 issued 7 July 1998 (Nakamura)

(6) US 5,535,230 issued 9 July 1996 (Abe)

(7) CA 2 260 389 published 30 July 1999 (Waitl)

(8) Bogner et al., "White LED" in *Proceedings of the SPIE*, pp. 143-150, 28 January 1999 (Bogner)

(9) EP 0 977 278 A2 published 2 February 2000 (Matsubara)

(10) US 5,998,925 issued 7 December 1999 (Shimizu)

(11) US 6,160,833 filed 6 May 1998 (Floyd)

(12) RP Photonics Encyclopedia, "Bragg Mirrors," reprinted from http://www.rp-photonics.com/bragg_mirrors.html, last visited August 24, 2013 (RP Photonics Encyclopedia)

(13) US 4,766,470 issued 23 August 1988 (Scholl)

The application that matured to the '961 patent was filed 24 August 2001.

Each of the above US, CA, WO, and EP publications (except for Begemann-772, Karwacki, Floyd, and RP Photonics Encyclopedia) issued or published more than one year before the filing of the application that matured to the '961 patent; therefore, each of Begemann, Sugiura, Nakamura, Abe, Waitl, Bogner, Matsubara, Shimuzu, and Scholl qualifies as prior art under 35 USC 102(b).

Each of Begemann-772, Karwacki, and Floyd was filed in the USA before the filing of the '961 patent; therefore, each qualifies as prior art under 35 USC 102(e).

RP Photonics Encyclopedia is used only for evidence and need not qualify as prior art.

II. Statute

The following is a quotation of **35 U.S.C. 103(a)** which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

III. Rejections

A. Begemann and Sugiura

1. Claim 8 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Begemann in view of Sugiura, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as evidenced by Scholl.

Claim 8 depends from claim 7 which depends, in turn from claim 1. Accordingly, the features of claims 1 and 7 will be addressed as well.

Claim 1 reads,

> *[1] 1. A semiconductor light source for emitting light to illuminate a space used by humans, the semiconductor light source comprising:*
>
> *[2] an enclosure, said enclosure being fabricated from a material substantially transparent to white light, an interior volume within said enclosure,*
>
> *[3a] a heat sink located in said interior volume,*
>
> *[3b] said heat sink being capable of drawing heat from one or more semiconductors devices,*
>
> *[3c] said heat sink having a plurality of panels on it suitable for mounting semiconductor devices thereon,*
>
> *[3d] said panels on said heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,*
>
> *[4a] at least one semiconductor chip capable of emitting light mounted on one of said panels,*

[4b] said semiconductor chip being capable of emitting monochromatic light,

[4c] said semiconductor chip being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, LED modules, laser modules, and VCSEL chips, and

[5] a coating for converting monochromatic light emitted by said chip to white light.

With regard to the preamble [1]:

[1] *1. A semiconductor light source for emitting light to illuminate a space used by humans, the semiconductor light source comprising:*

Begemann states,

> The invention relates to a **LED [light emitting diode] lamp**...
>
> (Begemann, abstract; emphasis added)

> The invented lamp enables continuous, uniform, high-intensity **lighting** to be achieved.
>
> (Begemann, p. 2, lines 1-2; emphasis added)

> FIG. 4 diagrammatically shows an application of a LED lamp, which requires an asymmetric light distribution. **The LED lamp (20) is used as outdoor lighting** and is situated on a holder (21) which is secured to the wall (22) of a building.
>
> (Begemann, p. 6, lines 22-24; emphasis added)

The light-emitting diode, or LED, is a semiconductor light source.

With regard to features [2], Begemann's Figs. 1 and 2, show LED lamps, including

[2] *an enclosure **5**, said enclosure being fabricated from a material substantially transparent to white light, an interior volume within said enclosure,*

Begemann's Fig. 1 (reproduced below) shows one embodiment of the LED lamp. The figure has been annotated with larger numbers and a legend.

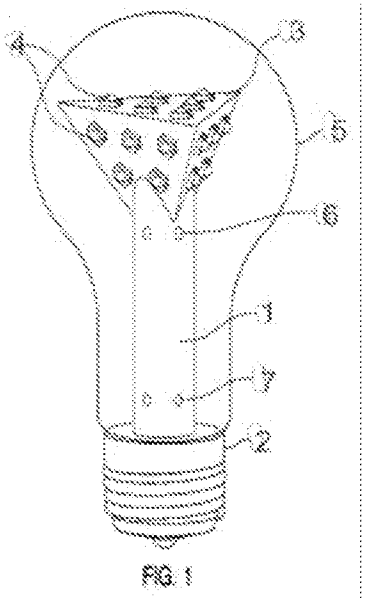


FIG. 1

The "envelope (5)" can be made from "glass" or "synthetic resin" and reads on the claimed *enclosure* (Begemann, p. 1, lines 22-23). The "envelope (5)" can be made from "glass" or "synthetic resin" and reads on the claimed *enclosure having an interior volume* (Begemann, p. 1, lines 22-23). At least glass is *transparent to white light*.

Regarding the heat sink, features [3a]-[3d], Begemann's Figs. 1 and 2 show

> *[3a] a heat sink **1, 3** located in said interior volume,*
>
> *[3b] said heat sink **1, 3** being capable of drawing heat from one or more semiconductors devices **4**,*
>
> *[3c] said heat sink **1, 3** having a plurality of panels on it suitable for mounting semiconductor devices **4** thereon,*
>
> *[3d] said panels on said heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,*

With regard to the heat sink **1, 3**, Begemann states,

> In the example described herein, the **substrate (3)** has the shape of a regular pyramid with four flat faces and is connected to the **gear column (1)** via a vertex of the pyramid. **The outer surface of the substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the column (1)**. In the present case, said **outer surface of the substrate is made of a copper alloy**. Each of the faces of the pyramid is provided with a number (five or six) LEDs (4),

> which are secured to the faces by means of a **heat-conducting adhesive**.
> ...
> **The outer surface of the gear column (1) of the LED lamp is made of a metal or a metal alloy**. This enables a **good heat conduction from the substrate (3) to the (metal) lamp cap (2)** to be attained. In the present example, a copper alloy is used for the column. The use of the above-mentioned heat-dissipating means enables the LEDs with the relatively high luminous flux to be used without heat problems in a LED lamp of the above-described type.

(Begemann, p. 4, line 26 to p. 5, line 5; emphasis added)

The "faces" of the polyhedron substrate **3** read on the claimed *panels*. Fig. 1, above, shows a plurality of LEDs **4** mounted on each of the panels of the polygonal substrate **3**.

Because the panels of the polyhedron substrate **3** face different directions, they necessarily are *oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source*. Further in this regard, Begemann states,

> The use of a substrate which is composed of a **regular polyhedron** of at least four faces enables the **intended uniform lighting** to be achieved. The regular polyhedron is connected to the gear column, preferably, via a vertex. However, the polyhedron may in principle also be connected to the gear column in the center of one of the faces. The greatest uniformity in lighting is obtained if each one of the faces is provided with the same number of LEDs of the same type.
>
> In experiments leading to the present invention, it has been found that favorable results can be achieved with polyhedrons in the form of an octahedron (regular polyhedron of eight faces) and dodecahedron (regular polyhedron of twelve faces). Better results, however, are achieved with substrates in the form of a hexahedron (polyhedron of six faces, cube). In practice it has been found that a **good uniformity in light distribution** can already be obtained using substrates in the form of a tetrahedron (regular polyhedron of four faces, pyramid). In an alternative embodiment the substrate comprises a three-dimensional body like a sphere or an ellipsoid, or a pat [sic] of a sphere or an ellipsoid.

(Begemann, p. 2, lines 8-21; emphasis added)

Regarding the light-emitting semiconductor chips, features [4a]-[4c],

> *[4a] at least one semiconductor chip **4, 11** capable of emitting light mounted on one of said panels,*
>
> *[4b] said semiconductor chip **4, 11** being capable of emitting monochromatic light.*

> *[4c] said semiconductor chip **4, 11** being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, LED modules, laser modules, and VCSEL chips,*

Begemann's Fig. 1 shows the LED modules **4**, or "light emitting diodes" (LEDs) mounted on the panel. Fig. 3A (reproduced below) shows the LED modules include a semiconductor chip **11**:

> **Fig. 3-A shows a LED** which comprises **single-chip LEDs**, which each have only one light point (11) per **LED**. This light point (11) is placed on a so-called **MC-PCB (12)**, **which is responsible for a good heat transfer**. … A heat-conducting adhesive between **MC-PCB (12) and substrate (3)** is responsible for a **good heat dissipation from the LED to the substrate**.

(Begemann, p. 6, lines 4-11; emphasis added)

The semiconductor chips **11** emit monochromatic light, e.g. red, blue, green, or yellow:

> A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with an array of LEDs, which preferably comprises at least one **green**, at least one **red** and at least one **blue** LED or at least one **green**, at least one **red**, at least one **yellow** and at least one **blue** LED **or** at least one **white** LED.

(Begemann, p. 3, lines 6-9; emphasis added)

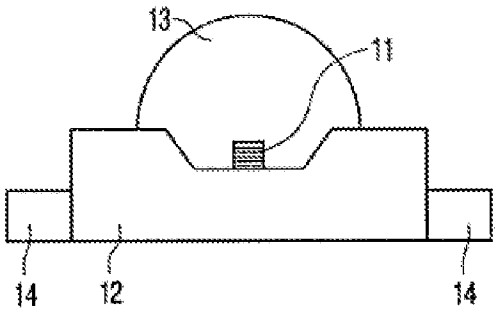


FIG. 3A

(Begemann, Fig. 3A)

Regarding the conversion coating, feature [5],

> *[5] a coating for converting monochromatic light emitted by said chip to white light.*

Although Begemann discloses using white LEDs (*id.*), it does not give details of the white LED. As such, Begemann fails to disclose the claimed conversion coating of

feature [5]. It is clear from the passage, however, that Begemann, in general, desires producing white light output from the LED lamps shown in Figs. 1 and 2.

It is noted that the claim, as currently drafted, does not limit the location of the conversion coating, so it may be placed anywhere that it is in receiving relationship to the monochromatic light emitted by a single LED or multiple LEDs, to thereby allow conversion of said LED light to white light.

Each of Abe, Waitl, Bogner, Matsubara, and Shimizu teaches *a coating for converting monochromatic light emitted by said chip [i.e. a light-emitting semiconductor chip] to white light*. These references are representative of two different locations for the conversion coating: (1) directly on the semiconductor chip, and (2) on the interior surface of an enclosure, spaced away from the semiconductor chip.

With regard to option (1), each of Bogner, Matsubara, and Shimizu locates the coating directly on the chip. Bogner is representative.

Bogner teaches a white LED comprising a GaN-based semiconductor LED emitting monochromatic blue light having a conversion coating deposited directly on the LED. In this regard, Bogner states,

> For **white LED** high brightness blue light emitting diodes based on gallium nitride (**GaN**) or indium gallium nitride (**InGaN**) are used. This light source works as an efficient pump exciting the luminescent material to higher energy levels. The lifetime of these levels is only a few nanoseconds. The luminescent molecules come back to their ground state by radiation of surplus energy as green, yellow or red light.

(Bogner, p. 144, ¶ 2; emphasis added)

> For the production of a **white LED** with **luminescence converte**r different methods can be used. One possibility is to **coat the blue chip with a thin high concentrate mixture of resin and converter**. A [sic] adequate layer can also be brought up like a window on the top surface of the plastic. In this way converter concentration and thickness of the layer have to be very exact to get the wished hue. A further method used also for the production of the Siemens **Single Chip White LED** is to mix the phosphor in the whole plastic volume. Patents for this method are taken out. **Fig. 8** shows a cross section of **white TOPLED®**. The chip is mounted on a premolded leadframe and embedded in the resin including the fluorescent.

(Bogner, paragraph bridging pp. 146-147; emphasis added)

Bogner's Fig. 8 is shown below.

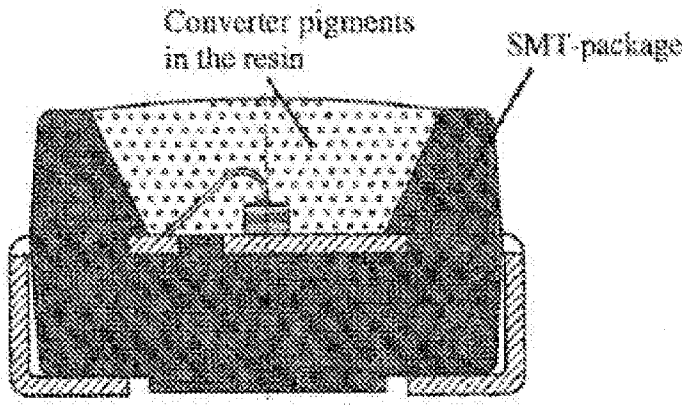


Fig.8: Cross section of white TOPLED®

(Bogner, Fig. 8, p. 147)

Because Begemann desires white light, it would have been obvious to one of ordinary skill in the art, at the time of the invention to use Bogner's white LEDs including the GaN-based LEDs having the phosphor-containing conversion coating, as Begemann's "white LED" (Begemann, p. 3, lines 6-9), in order to produce white light. So modified, Begemann in view of Bogner teaches feature [5], *a coating for converting monochromatic light emitted by said chip to white light*.

The rationale for combining the references meets at least rationale B in MPEP 2143: simple substitution of one known element for another to obtain predictable results.

The details of how **Matsubara** and **Shimizu** apply to the conversion coating are incorporated by reference from the Request at pp. 20-25.

With regard to option (2) each of Abe and Waitl locates the conversion coating on the interior surface of an enclosure, specifically a bulb, in which is located a plurality of semiconductor LED or laser diode (LD) chips.

Waitl, like Begemann, teaches a semiconductor light source intended to replace incandescent lamps that are used for general illumination purposes. Even though statements of intended use fail to have patentable weight, Waitl's semiconductor light source, like Begemann's is *for emitting light to illuminate a space used by humans*. In this regard, Waitl states,

> The present invention relates to opto-electronic **semiconductor** elements, particularly suitable for **general illumination**, and especially adapted to be used with luminescence or light wavelengths conversion phosphors, in which the respective components of the semiconductor element, when integrated to form a light source, are so constructed that thermal coefficients of expansion of the respective elements are similar, and to a **method of manufacturing** such elements. The light emitting elements are, for example, light emitting

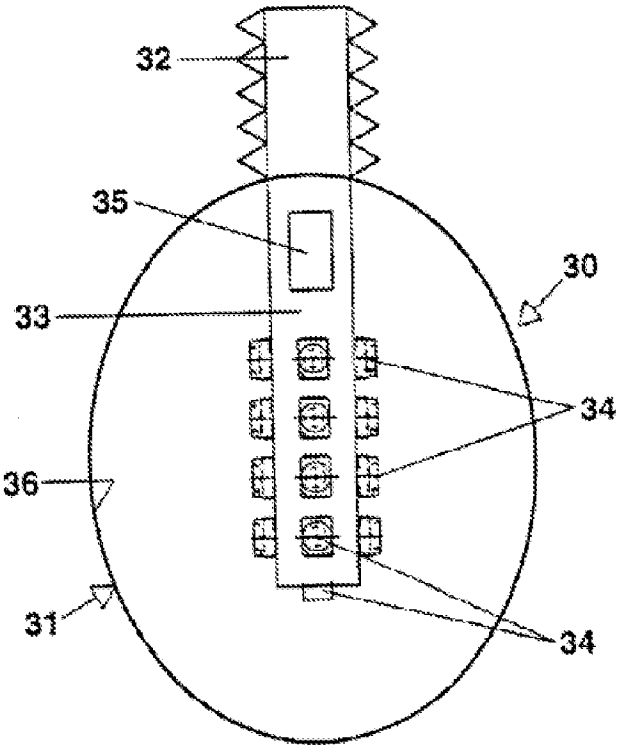
> diodes (LEDs), which emit light in the region of between about 320 to 1600 nm. **Preferably, the LEDs emit ultraviolet (UV) light, and are used in combination with luminescence conversion materials to emit white or other visible light**. These elements can then be used for **general illumination** purposes.

(Waitl, p. 2, lines 2-15; emphasis added)

> The concept in accordance with the present invention is especially suitable for elements intended as **replacements for incandescent lamps**, utilizing LEDs.

(Waitl, p. 8, lines 3-5; emphasis added)

Waitl's Fig. 4, (reproduced below) shows one embodiment of the LED lamp. The figure has been annotated with a legend.



30: compact lamp
31: outer bulb
32: screw base
33: round rod
34: LEDs (emitting e.g. blue or UV light)
35: electronics
36: luminescence conversion layer (e.g. phosphor)

(Waitl: p. 11, line 30 to p. 12, line11)

FIG. 4

The luminescence conversion layer **36** reads on the claimed *coating for converting monochromatic light emitted by said chip to white light* and is coated on the inside of the enclosure **31**:

> The **outer bulb 31** is covered at its **inner surface with a luminescence conversion layer 36**. The **LEDs 34 may emit, for example, UV, or blue**

> **light**. The general principle is **well known** and reference is made, for example, to the referenced article in OLE of Oct. 1997 by Philip Hill.

(Waitl, p. 12, lines 5-9; emphasis added)

Thus, Waitl's GaN-based LEDs emit monochromatic light, i.e. UV or blue, that is converted by the luminescence conversion layer **36** to white light.

Because Begemann desires white light, it would have been obvious to one of ordinary skill in the art, at the time of the invention to use Waitl's GaN-based LEDs as Begemann's LEDs **4** and to apply Waitl's phosphor layer coating **36** on the interior surface of Begemann's envelope **5**, in order to produce white light. So modified, Begemann in view of Waitl teaches feature [5], *a coating for converting monochromatic light emitted by said chip to white light*.

The rationale for combining the references meets at least rationale B in MPEP 2143: simple substitution of one known element for another to obtain predictable results.

Begemann produces white light either by using white LEDs or mixing light from separate LEDs emitting light of each of the primary colors. Waitl produces white light by converting blue or UV light from the LEDs to white light using the "luminescence conversion materials" **36** on the inner surface of the bulb **31**, as discussed above. As such, the results of making the substitution would be predictable, i.e. white light would still be produced.

The details of how **Abe** applies to the claimed conversion coating are incorporated by reference from the Request at pp. 20-22.

This is all of the features of claim 1.

Claims 7 and 8 read,

> *7. A device as recited in claim 1 wherein said chip includes*
>
> *a substrate on which epitaxial layers are grown,*
>
> *a buffer layer located on said substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,*
>
> *a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer,*
>
> *an active layer, said active layer emitting light when electrons jump to a valance state,*
>
> *a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and*

> *a contact layer on which an electron [sic] may be mounted for powering said chip.*
>
> *8. A device as recited in claim 7 further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.*

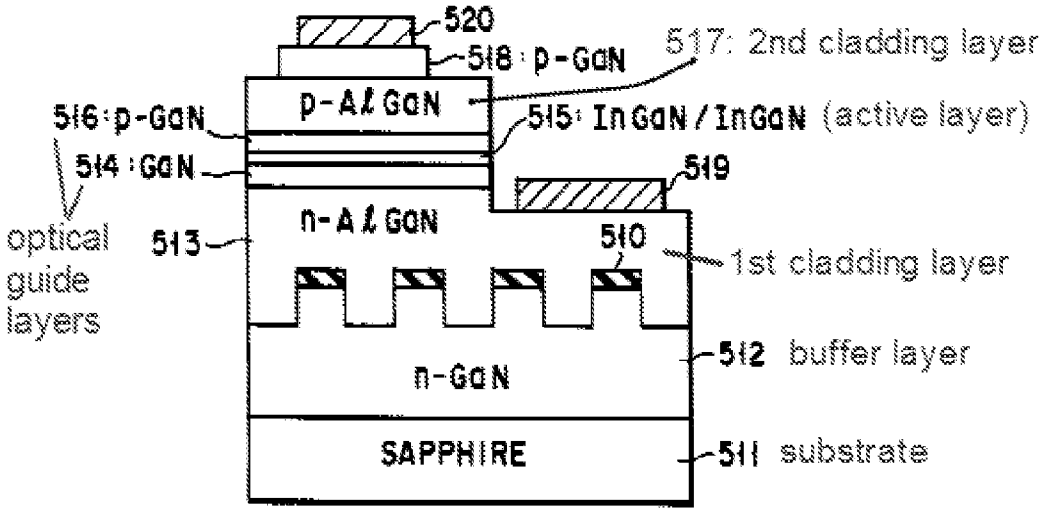
At the outset, an "electron" is an atomic particle and cannot be "mounted". It is assumed that the claim, instead, means "electrode".

In general, claims 7 and 8 are directed to the layers included in a semiconductor light-emitting diode.

Begemann does not discuss the composition of the LEDs, nor do Bogner and Waitl teach the specific composition of the GaN-based LEDs.

Sugiura, like each of Bogner and Waitl, teaches GaN-based LEDs. ("The present invention relates to a **nitride-based** semiconductor element such as a **semiconductor laser, a light-emitting diode**, an electronic device, or the like and a method for manufacturing the same." Sugiura, col. 1, lines 5-9; emphasis added.)

Sugiura's Fig. 15 (reproduced below) teaches each of the features of claims 7, 8, and 18.



F I G.15

With regard to Fig. 15, Sugiura states,

> Referring to FIG. 15, numeral **511** denotes a sapphire substrate, and, on the **sapphire substrate 511**, an n-type **GaN buffer layer 512** is formed. On the GaN buffer layer **512**, an SiO_2 mask **510** is provided in the form of stripes. By the use of this mask **510**, the buffer layer **512** is etched down to a predetermined depth. **On the GaN buffer layer 512** and the SiO_2 mask 510, an n-type AlGaN **clad layer 513 is formed flat by utilizing the lateral growth**, and, **on the clad layer 513**, an undoped GaN **optical guide layer 514**, **a quantum well layer 515 consisting of an InGaN/InGaN**, a p-type GaN **optical guide layer 516**, and a p-type AlGaN **clad layer 517** are formed.
>
> Further, a portion of the above-mentioned laminate or stack structure is removed from the surface side thereof down to the clad layer **513**, and, on the clad layer **513** thus exposed, an n-side electrode **519** is formed. **On the** p-type AlGaN **clad layer 517**, a **p-side electrode 520 is formed through** a low-resistance p-type GaN **contact layer 518**. These electrodes **519** and **520** are each narrowed to a width of 3 μm.
>
> Here, it is pointed out that, **for the growth of the respective layers, the MOCVD method is used**.

(Sugiura, col. 23, line 62 to col. 24, line 16; emphasis added)

Thus, Sugiura teaches the features of claim 7 as follows:

> *7. A device as recited in claim 1 wherein said chip includes*
>
> *a substrate **511** on which epitaxial layers are grown,*

"…semiconductor layers are formed by the **MOCVD** method. However, the hydride **VPE** [vapor phase **epitaxy**] method or the molecular beam **epitaxy** (**MBE**) method may be used instead." (Sugiura, col. 12, lines 16-19; emphasis added) MOCVD is also a method of epitaxy because crystalline semiconductor is grown using lateral growth.

Claim 7 continues,

> *a buffer layer **512** located on said substrate **511**, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,*

Because the substrate material is sapphire (single crystal Al_2O_3) and the cladding layer is AlGaN, the buffer layer of GaN inherently *mitigates differences in material properties between said substrate and other epitaxial layers*.

Claim 7 continues,

> *a first cladding layer **513** serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer **512**,*

Electron confinement in the chip by the AlGaN cladding layer **513** is inherent because AlGaN has a wider bandgap energy than the InGaN in the active layer **515**. In addition, the '961 patent admits AlGaN cladding layers confine electrons:

> Then a **cladding layer 1204**, such as **n-AlGaN**, is provided. **Cladding layers serve to confine the electrons** as they jump from a conduction band to valance and give up energy that converts to light. An **active layer 1205 p-InGaN** is then provided where electrons jump from a conduction band to valance and emit energy which converts to light.

(the '961 patent, col. 4, lines 50-55; emphasis added)

Thus it is held, absent evidence to the contrary, that Sugiura's cladding layer **513** confines electron movement in the LED chip. See *In re Best*, 195 USPQ 428 (CCPA 1977) and *In re Fitzgerald*, 205 USPQ 594 (CCPA 1980) and MPEP 2112.

Claim 7 ends,

> *an active layer **515**, said active layer emitting light when electrons jump to a valance state,*
>
> *a second cladding layer **517**, said second cladding layer positioned so that said active layer **515** lies between cladding layers **513, 517**, and*
>
> *a contact layer **518** on which an electron [electrode **520**] may be mounted for powering said chip.*

With regard to **claim 8**, the optical guide layers **514, 516**, located on opposite sides of the active layer **515**, are inherently reflective. Evidence that the optical guide layers are inherently reflective comes from their reliance on reflection to guide the light emitted by the active layer to emit at the edge.

Further evidence that the optical guide layers are inherently reflective comes from Scholl:

> In conventional edge-emitting LED's, the active layer is typically surrounded by two confining layers which in turn are surrounded by two **optical guide layers** and light is emitted from the LED after multiple internal **reflections** at **the interface between a confining layer and an optical guide layer**.

(Scholl, col. 1, lines 42-47; emphasis added)

In addition, Sugiura discloses a surface emitting laser (Sugiura, col. 15, lines 50-52) in Fig. 9 (reproduced below).

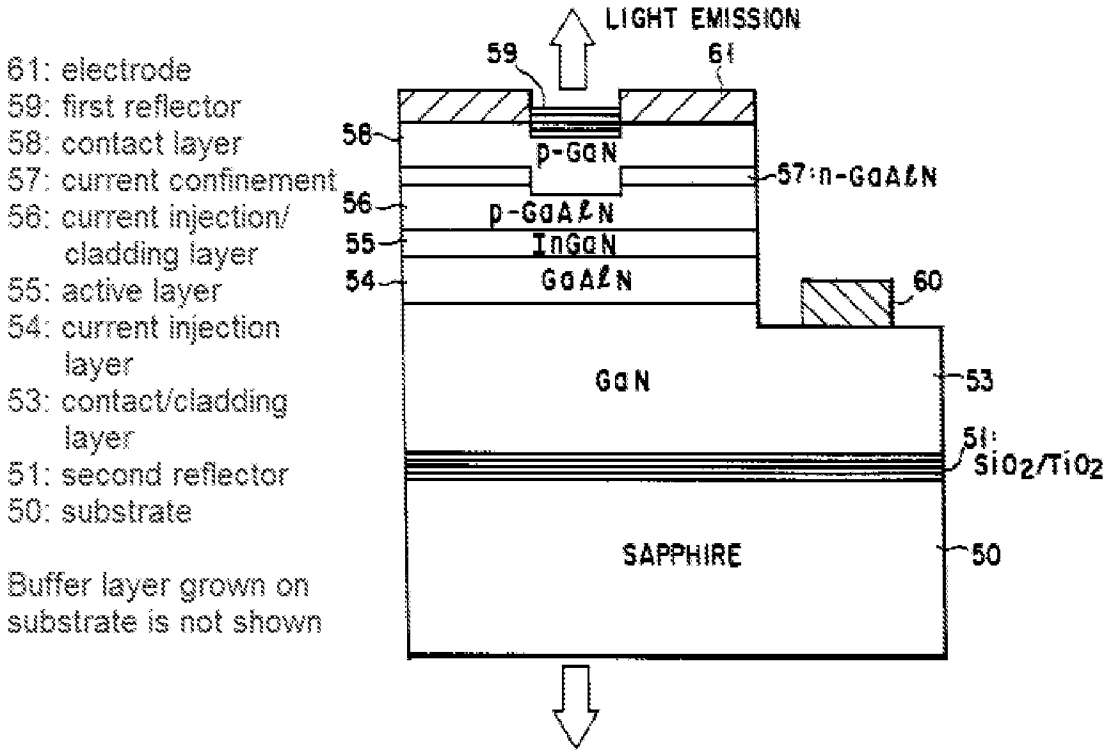


FIG.9

In regard to the layers making up the laser, Sugiura states,

> On the **sapphire substrate 50** on which the mask **51** has been formed, a **GaN buffer layer** (not shown) is grown for two minutes. Grown on the thus grown GaN buffer layer is an **n-type GaN contact layer 53** (with a thickness of 2 μm) into which silicon has been doped. …
>
> Subsequently grown is an $In_{0.1}Ga_{0.9}N$ **active layer 55** which has a thickness of 0.1 μm, and, on the thus grown active layer **55**, a **p-type $Ga_{0.8}Al_{0.2}N$ current injection layer 56** into the upper portion of which Mg has been doped and an n-type $Ga_{0.8}Al_{0.2}N$ current narrowing layer **57** are successively grown in such a manner that the current injection film **56** and the current narrow layer **57** each have a thickness of 0.25 μm. …
>
> Next, the wafer is put into the MOCVD apparatus again, and, on the current narrowing layer **57**, there is grown a p-type GaN **contact layer 58** into which Mg has been doped. After the growth of the p-type GaN contact layer **58**, the wafer is removed from within the MOCVD apparatus. Further, over approximately the whole surface of the p-type GaN contact layer **58**, a multi-layer film comprising SiO_2 and TiO_2 is laminated by vapor deposition. Subsequently, by the use of the photolithography technique, the multi-layer film is processed into a predetermined shape, whereby a **first reflector 59** is formed. On the other hand, the multi-layer film (mask) **51**--comprising SiO_2 and TiO_2 --formed on the sapphire substrate **50** is rendered into a **second reflector**.

> …On the other hand, on the p-type GaN **contact layer 58**, also a p-type **electrode 61** is formed, forming a chip-shaped laser element separated as shown in FIG. 9.

(Sugiura, col. 15, line 50 to col. 16, line 39; emphasis added)

Thus, Sugiura teaches the features of claim 7 as follows:

> *7. A device as recited in claim 1 wherein said chip includes*
>
> *a substrate **50** on which epitaxial layers are grown,*
>
> *a buffer layer ["**GaN buffer layer** (not shown)" (id.)] located on said substrate **50**, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,*

Because the substrate material is sapphire (single crystal Al_2O_3) and the cladding layer is AlGaN, the buffer layer of GaN inherently *mitigates differences in material properties between said substrate and other epitaxial layers*.

> *a first cladding layer **53** serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer **512**,*

As noted above, Sugiura states "Grown on the thus grown GaN buffer layer is an n-type GaN contact layer **53**" (*id.*). The contact layer **53** is also a cladding layer.

Evidence of the dual function of the cladding/contact layer **53** comes from the '961 patent's Fig. 3b. Fig. 3b labels layer **1203** of the LED as an "n-GaN cladding layer". The associated description in the specification indicates that layer **1203** is also a contact layer:

> Then a **conductive layer 1203 is provided, such as n-GaN**. This layer acts as a connector for a negative electrode. Then a cladding layer **1204**, such as n-AlGaN, is provided. **Cladding layers serve to confine the electrons** as they jump from a conduction band to valance and give up energy that converts to light. An **active layer 1205 p-InGaN** is then provided where electrons jump from a conduction band to valance and emit energy which converts to light.

(the '961 patent, col. 4, lines 50-55; emphasis added)

Thus, it is held, absent evidence to the contrary, that Sugiura's n-GaN contact layer **53** inherently functions as both a cladding layer and contact layer. (See *Best Fitzgerald* and MPEP 2112, *supra*.)

This is also consistent with the '961 patent's Fig. 3f, which shows layer **1223** functioning as both a cladding layer and contact layer, and this is corroborated in the description in the specification (the '961 patent, col. 5, line 35: "a cladding layer and contact layer **1223** such as n-GaN").

Claim 7 continues,

> *an active layer **55**, said active layer emitting light when electrons jump to a valance state,*
>
> *a second cladding layer **56**, said second cladding layer positioned so that said active layer **55** lies between cladding layers **53, 56**, and*

The p-type $Ga_{0.8}Al_{0.2}N$ current injection layer **56** inherently functions as a second cladding layer, as evidenced by the '961 patent. In each of the '961 patent's Figs. 3b, 3d, 3f, and 3h, p-AlGaN functions as a second cladding layer that confines electrons. As to Fig. 3b, the '961 patent states,

> On the active layer **1205**, another **cladding layer 1206**, such as **p-AlGaN** is provided that also **serves to confine electrons**.
>
> (the '916 patent, col. 4, lines 55-57; emphasis added)

As to Fig. 3d, the '961 patent states,

> On the active layer **1215**, another **cladding layer 1216**, such as **p-AlGaN** is provided.
>
> (the '916 patent, col. 5, lines 19-20; emphasis added)

As to Fig. 3f, the '961 patent states,

> The active layer **1227** is followed by **another cladding layer p-AlGaN 1228** which is followed by a second reflective layer **1229** AlN/AlGaN MQW. … The second reflective layer **1229** is followed by a **cladding layer p AlGaN 1230** and a contact layer p+-GaN **1231**.
>
> (the '916 patent, col. 5, lines 42-49; emphasis added)

As to Fig. 3h, the '961 patent states,

> The active layer **1247** is followed by **another cladding layer p-AlGaN 1248** which is followed by a second reflective layer **1429** AlN/AlGaN MQW. The second reflective layer **1249** is followed by a **cladding layer p AlGaN 1250** and a contact layer p+-GaN **1251**.
>
> (the '916 patent, col. 6, lines 5-10; emphasis added)

Thus, it is held, absent evidence to the contrary, that Sugiura's p-type $Ga_{0.8}Al_{0.2}N$ current injection layer **56** inherently functions as both a cladding layer. (See *Best Fitzgerald* and MPEP 2112, *supra*.)

Claim 7 ends,

> *a contact layer **58** on which an electron [electrode **61**] may be mounted for powering said chip.*

With regard to **claim 8**, the first and second reflectors **59, 51**, are located on opposite sides of the active layer **55**, as shown in Sugiura's Fig. 9.

It would have been obvious to one of ordinary skill in the art, at the time of the invention to use Sugiura's layer order of the GaN-based LED in the GaN-based LEDs of either of Bogner and Waitl that is used in Begemann, or to use Sugiura's GaN-based LED as the GaN-based LED of either of Bogner and Waitl that is used in Begemann, because each of Begemann, Bogner, and Waitl are silent to the structure of the LED, such that one of ordinary skill would use a known LED that serves the same purpose of emitting a primary monochromatic light for conversion.

This reason satisfies at least rationale B in MPEP 2143: simple substitution of one known element for another to obtain predictable results. This is simple substitution of Sugiura's GaN-based LED for either of Bogner's and Waitl's GaN-based LEDs because Bogner and Waitl do not provide the details of the GaN-based LED. The results are predictable because both GaN-based LEDs produce shorter wavelength light in the same region of the spectrum.

More generally, it would have been obvious to one of ordinary skill in the art, at the time of the invention to produce a white LED lamp, as taught by Begemann, using an appropriate combination of LEDs and conversion coatings appropriate for the monochromatic LED light, as taught by each of Bogner, Waitl, Abe, Matsubara, and Shimizu, wherein the order of layers in the LED can be as in Sugiura.

This is all of the features of claims 7 and 8.

2. Claim 9 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Begemann in view of Sugiura, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as applied to claim 8, above, and further in view of Karwacki.

Claim 9 reads,

> *9. A device as recited in claim 8 wherein said reflective layers include multiple quantum wells.*

The prior art of Begemann in view of Sugiura, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as explained above, discloses each of the features of claim 8.

None of the references, Sugiura in particular, teaches the reflective layers are multiple quantum well layers.

Karwacki teaches a light-emitting device having a reflective layer composed of multiple quantum wells, called a "Quantum Well Mirror" or QWM used to replace at least one of the DBRs. In this regard, Karwacki states,

> The present invention relates to semiconductor lasers that emit light at visible wavelengths, and more particularly, to Vertical-Cavity Surface Emitting Lasers (VCSELs) that produce N-frequencies of visible light in a single cavity by altering the optical length of the cavity through the use of a **Quantum Well Mirror (QWM) replacing one of the Distributed Bragg Reflectors (DBRs)** typically found in a VCSEL.

(Karwacki, ¶ [0002]; emphasis added)

> It is a further object of the present invention to provide for a VCSEL device that may be fabricated of different semiconductor materials that provide a desired bandgap for fundamental light frequencies of interest.

(Karwacki, ¶ [0009]; emphasis added)

> With reference to the drawing, FIG. 1 illustrates a schematic diagram of a tunable multi-frequency VCSEL device **10** of the present invention. **The VCSEL device 10 is tunable to N visible frequencies and comprises a QWM that replaces at least one of the DBRs commonly found in the prior art VCSEL devices.** As will be further described hereinafter, the QWM element in the VCSEL is tunable so as to develop one of the visible light frequencies, by applying a specific voltage to its electrode, making up the multiple visible light spectrum developed by the this device **10**.

(Karwacki, ¶ [0016]; emphasis added)

See also ¶¶ [0018]-[0020].

> With reference to FIG. 1, it is seen that a single **QWM device 18 is used to replace one of the DBR** of a typical VCSEL device, such as those disclosed in U.S. Pat. Nos. 5,557,627 and 5,719,892. The fundamental frequency within the cavity can be set by applying a DC voltage, having a possible value between 0 to 10 volts, across the electrodes **26** and **28** of the QWM device **18**. This will set a particular cavity length for the VCSEL device **10**. If modulation is required, an additional time varying signal can be applied across the electrodes **26** and **28**, in a manner to be described hereinafter with reference to FIG. 3.

(Karwacki, ¶ [0022]; emphasis added)

As stated in the Request in the page 29, it would have been obvious to one of ordinary skill in the art, at the time of the invention to replace reflective layers **51** and/or **59** or the optical guide layers **514** and/or **516** of Sugiura with the QWM described by Karwacki to fine tune a laser within a semiconductor light source to the optimum absorption wavelength of the phosphor coating that is used to make white light or, alternatively, to rapidly modulate the output wavelength of the laser in order to generate a broader spectrum white light, as taught by Karwacki.

B. Begemann and Nakamura

1. Claim 8 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Begemann in view of Nakamura, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu.

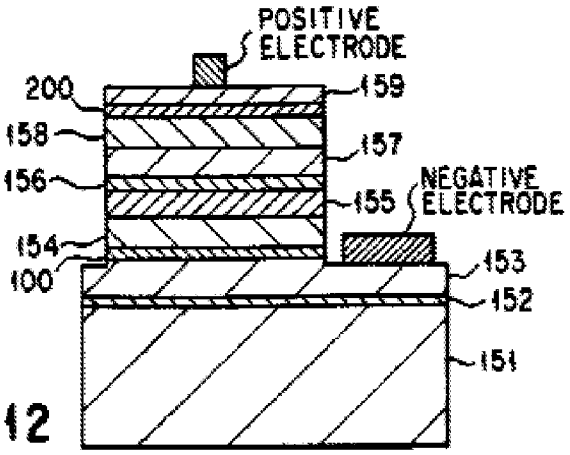
Claims 7 and 8 read,

> *7. A device as recited in claim 1 wherein said chip includes*
>
> *a substrate on which epitaxial layers are grown,*
>
> *a buffer layer located on said substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,*
>
> *a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer,*
>
> *an active layer, said active layer emitting light when electrons jump to a valance state,*
>
> *a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and*
>
> *a contact layer on which an electron [sic] may be mounted for powering said chip.*
>
> *8. A device as recited in claim 7 further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.*

The prior art of Begemann in view of any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as explained in the previous rejection, discloses each of the features of claim 1.

Again, Begemann does not provide the details of the white LED and therefore does not teach the features of claims 7 and 8.

Nakamura teaches the features of claims 7 and 8. Nakamura's Fig. 12 (reproduced below) shows a GaN-based LED having all of the features of claims 7 and 8, as set forth below.



F I G. 12

159: p-GaN contact layer
200: light-reflecting film
158: p-AlGaN cladding layer
157: p-InGaN cladding layer
156: active layer
155: n-GaN cladding layer
154: n-AlGaN cladding layer
100: light-reflecting film
153: n contact/cladding layer
152: buffer layer
151: substrate

Nakamura teaches the features of the light-emitting semiconductor chip of claims 7 and 8 as follows:

> *7. A device as recited in claim 1 wherein said chip includes*
>
> *a substrate **151** on which epitaxial layers **151-200** are grown,*

Epitaxy is a method and therefore fails to have patentable weight beyond the implied structure (MPEP 2113). Because epitaxy is a method of growing crystal layers, the structure implied by the method is crystal layers. Nakamura teaches that the layers of the light-emitting devices are crystalline:

> The n-type contact layer **12** may be formed of a n-type nitride semiconductor. If it is formed of a binary or ternary mixed **crystal** such as GaN or AlGaN, a contact layer of excellent **crystallinity** can be obtained.

(Nakamura, col. 6, lines 64-67; emphasis added)

> The n-type clad layer **13** may be formed of a p-type nitride semiconductor. If it is formed of a binary or ternary mixed **crystal** such as GaN, AlGaN or InGaN, a clad layer of excellent **crystallinity** can be obtained.

(Nakamura, col. 7, lines 8-11; emphasis added)

See also, Nakamura, col. 8, lines 4-6, 63-65; col. 9, lines 23-25; col. 20, lines 19-22; col. 22, lines 46-56. Therefore, Nakamura discloses that the layers grown on the substrate are crystal layers, which is all that is required by the claim.

Nakamura's Fig. 12 shows

> *a buffer layer **152** located on said substrate **151**, said buffer layer **152** serving to mitigate differences in material properties between said substrate and other epitaxial layers,*

In this regard, Nakamura states,

> The light-emitting device shown in FIG. 11 comprises a substrate 151 on which a **buffer layer 152** for **alleviating a lattice mismatching** between the **substrate 151** and the nitride semiconductor …
>
> (Nakamura, col. 19, lines 45-48; emphasis added)

Nakamura Fig. 12 shows

> *a first cladding layer **153** serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer **152**,*

Nakamura's Figs. 11 and 12 show an n-GaN contact layer **153** which, serves as both a cladding layer and a contact layer. Evidence of the dual function of the cladding/contact layer **153** comes from the '961 patent's Fig. 3b. Fig. 3b labels layer **1203** of the LED as an "n-GaN cladding layer". The associated description in the specification indicates that layer **1203** is also a contact layer:

> Then a **conductive layer 1203 is provided, such as n-GaN**. This layer acts as a connector for a negative electrode. Then a cladding layer **1204**, such as n-AlGaN, is provided. **Cladding layers serve to confine the electrons** as they jump from a conduction band to valance and give up energy that converts to light. An **active layer 1205 p-InGaN** is then provided where electrons jump from a conduction band to valance and emit energy which converts to light.
>
> (the '961 patent, col. 4, lines 50-55; emphasis added)

Thus, it is held, absent evidence to the contrary, that Nakamura's n-GaN cladding layer **1203** inherently functions as both a cladding layer and contact layer. (See *Best Fitzgerald* and MPEP 2112, *supra*.)

This is also consistent with the '961 patent's Fig. 3f, which shows layer **1223** functioning as both a cladding layer and contact layer, and this is corroborated in the description in the specification (the '961 patent, col. 5, line 35: "a cladding layer and contact layer **1223** such as n-GaN").

In addition, the excerpt from the '961 patent, above, admits that the function of cladding layers is to confine electrons.

Nakamura's Figs. 11 and 12 show an n-GaN contact layer **153** which, by comparison to layer **1203** of the '961 patent's Fig. 3b, simultaneously serves as both a cladding layer and a contact layer. Therefore, it is held, absent evidence to the contrary that Nakamura's n-GaN layer **153** is a cladding layer *serving to confine electron movement within the chip*. As shown in Nakamura's Figs. 11 and 12, the cladding layer **153** is also *adjacent said buffer layer* **152**.

Nakamura's Fig. 12 shows

> *an active layer **156**, said active layer **156** emitting light when electrons jump to a valance state,*
>
> *a second cladding layer **157**, said second cladding layer positioned so that said active layer **156** lies between cladding layers **153**, **157**, and*
>
> *a contact layer **159** on which an electron [sic; electrode] may be mounted for powering said chip.*

In this regard, Nakamura states,

> FIG. 11 shows a cross-sectional view schematically illustrating a structure of a light-emitting device according to the **seventh embodiment** of the present invention. The light-emitting device shown in FIG. 11 comprises a **substrate 151** on which a **buffer layer 152** for alleviating a lattice mismatching between the substrate **151** and the nitride semiconductor, an **n-type contact layer 153** for forming a negative electrode is thereon, a second **n-type clad layer 154**, a **first n-type clad layer 155**, an **active layer 156**, a **second p-type clad layer 158** and a **p-type contact layer 159** for forming a positive electrode thereon are superimposed in the mentioned order.

(Nakamura, col. 19, lines 43-54; emphasis added)

Nakamura's Fig. 12 shows a "POSITIVE ELECTRODE" formed on the contact layer **159**.

Fig. 12 also shows reflective layers **100** and **200** on opposite sides of the active layer **156**, as required by claim 8:

> *8. A device as recited in claim 7 further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.*

In this regard, Nakamura states,

> According to the seventh embodiment of the present invention, it is also possible to dispose as a **light-reflecting film a first multi-layered film 100** consisting of at least two kinds of nitride semiconductor layers, each differing in composition on the outer side of the first n-type clad layer **155**, **and**/or **a second multi-layered film 200** consisting of at least two kinds of nitride semiconductor layers, each differing in composition on the outer side of the second p-type clad layer **158**.
>
> **FIG. 12** schematically illustrates a sectional view of a light-emitting device provided with such **a light-reflecting film**, and FIG. 13 shows a perspective view of the light-emitting device shown in FIG. 12. These Figures illustrate a structure of a **laser device** wherein the reference numeral **100** represents a first multi-layered film, and **200**, a second multi-layered film. The first multi-

> layered film **100** and the second multi-layered film **200** are each formed of nitride semiconductors differing in composition and in refractive index which are **alternately superimposed under the condition, for example, of λ/4 n (λ: wavelength; n: refractive index)** thereby forming a two or more-ply structure so as to **reflect** the emission wavelength of the active layer **156**.

(Nakamura, col. 21, lines 47 to col. 22, line 1; emphasis added)

It would have been obvious to one of ordinary skill in the art, at the time of the invention to use Nakamura's layer order of the GaN-based LED in the GaN-based LEDs of either of Bogner and Waitl that is used in Begemann, or to use Nakamura's GaN-based LED as the GaN-based LED of either of Bogner and Waitl that is used in Begemann, because each of Begemann, Bogner, and Waitl are silent to the structure of the LED, such that one of ordinary skill would use a known LED that serves the same purpose of emitting a primary monochromatic light for conversion.

This reason satisfies at least rationale B in MPEP 2143: simple substitution of one known element for another to obtain predictable results. This is simple substitution of Nakamura's GaN-based LED for either of Bogner's and Waitl's GaN-based LEDs because Bogner and Waitl do not provide the details of the GaN-based LED. The results are predictable because both GaN-based LEDs produce shorter wavelength light in the same region of the spectrum.

More generally, it would have been obvious to one of ordinary skill in the art, at the time of the invention to produce a white LED lamp, as taught by Begemann, using an appropriate combination of LEDs and conversion coatings appropriate for the monochromatic LED light, as taught by each of Bogner, Waitl, Abe, Matsubara, and Shimizu, wherein the order of layers in the LED can be as in Nakamura.

This is all of the features of claims 7 and 8.

2. Claim 9 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Begemann in view of Nakamura, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as applied to claim 8, above, and further in view of Karwacki, as evidenced by RP Photonics Encyclopedia.

Claim 9 reads,

> *9. A device as recited in claim 8 wherein said reflective layers include multiple quantum wells.*

The prior art of Begemann in view of Nakamura, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as explained above, discloses each of the features of claim 8.

None of the references, Nakamura in particular, teaches the reflective layers are multiple quantum well layers. However, the mirrors described in Nakamura, although not names, are descriptive of a distributed Bragg reflector (DBR), as evidenced by RP Photonics Encyclopedia. In this regard, RP Photonics Encyclopedia explains what a DBR is:

> A Bragg mirror (also called **distributed Bragg reflector**) is a mirror structure which consists of an **alternating sequence of layers of two different optical materials**. The most frequently used design is that of a **quarter-wave mirror**, where **each optical layer thickness corresponding to one quarter of the wavelength** for which the mirror is designed. The latter condition holds for normal incidence; if the mirror is designed for larger angles of incidence, accordingly thicker layers are needed.

(RP Photonics Encyclopedia, 1st page, 1st ¶; emphasis added)

As just noted above in addressing claim 8, Nakamura similarly describes the reflector layers **100** and **200** as quarter-wave mirrors, i.e. "each optical layer thickness corresponding to one quarter of the wavelength for which the mirror is designed" (*id.*):

> The first multi-layered film **100** and the second multi-layered film **200** are each formed of nitride semiconductors differing in composition and in refractive index which are **alternately superimposed under the condition, for example, of λ/4 n (λ: wavelength; n: refractive index)** thereby forming a two or more-ply structure so as to **reflect** the emission wavelength of the active layer **156**.

(Nakamura, col. 21, line 62 to col. 22, line 1; emphasis added)

Thus, while Nakamura discloses the reflective layers **100** and **200** are DBRs, it does not indicate that they are multiple quantum well layers.

Karwacki teaches a light-emitting device having a reflective layer composed of multiple quantum wells, called a "Quantum Well Mirror" or QWM used to replace at least one of the DBRs. In this regard, Karwacki states,

> The present invention relates to semiconductor lasers that emit light at visible wavelengths, and more particularly, to Vertical-Cavity Surface Emitting Lasers (VCSELs) that produce N-frequencies of visible light in a single cavity by altering the optical length of the cavity through the use of a **Quantum Well Mirror (QWM) replacing one of the Distributed Bragg Reflectors (DBRs)** typically found in a VCSEL.

(Karwacki, ¶ [0002]; emphasis added)

> It is a further object of the present invention to provide for a VCSEL device that may be fabricated of different semiconductor materials that provide a desired bandgap for fundamental light frequencies of interest.

(Karwacki, ¶ [0009]; emphasis added)

> With reference to the drawing, FIG. 1 illustrates a schematic diagram of a tunable multi-frequency VCSEL device **10** of the present invention. **The VCSEL device 10 is tunable to N visible frequencies and comprises a QWM that replaces at least one of the DBRs commonly found in the prior art VCSEL devices.** As will be further described hereinafter, the QWM element in the VCSEL is tunable so as to develop one of the visible light frequencies, by applying a specific voltage to its electrode, making up the multiple visible light spectrum developed by the this device **10**.

(Karwacki, ¶ [0016]; emphasis added)

See also ¶¶ [0018]-[0020].

> With reference to FIG. 1, it is seen that a single **QWM device 18 is used to replace one of the DBR** of a typical VCSEL device, such as those disclosed in U.S. Pat. Nos. 5,557,627 and 5,719,892. The fundamental frequency within the cavity can be set by applying a DC voltage, having a possible value between 0 to 10 volts, across the electrodes **26** and **28** of the QWM device **18**. This will set a particular cavity length for the VCSEL device **10**. If modulation is required, an additional time varying signal can be applied across the electrodes **26** and **28**, in a manner to be described hereinafter with reference to FIG. 3.

(Karwacki, ¶ [0022]; emphasis added)

As stated in the Request in the paragraph bridging pages 50-51, it would have been obvious to one of ordinary skill in the art, at the time of the invention to replace the reflective layers **100** and **200** of Nakamura with the QWM described by Karwacki to fine tune a laser within a semiconductor light source to the optimum absorption wavelength of the phosphor coating that is used to make white light or, alternatively, to rapidly modulate the output wavelength of the laser in order to generate a broader spectrum white light, as taught by Karwacki.

C. Begemann and Floyd

1. Claim 8 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Begemann in view of Floyd, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu.

The prior art of Begemann in view of any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as explained in the previous rejection, discloses each of the features of claim 1.

Again, Begemann does not provide the details of the white LED and therefore does not teach the features of claims 7 and 8.

Floyd teaches the features of claims 7 and 8. Floyd's Fig. 2, (reproduced below) shows a GaN-based blue VCSEL having all of the features of claims 7 and 8, as set forth below (Floyd, abstract).

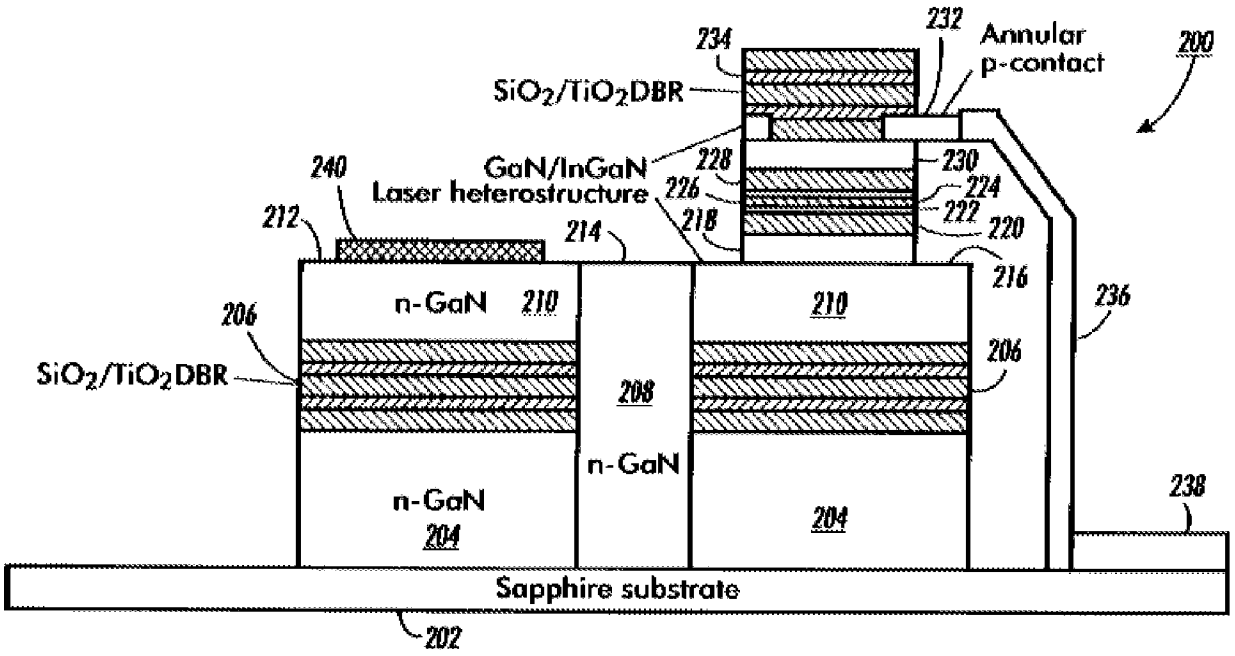


FIG. 2

Floyd teaches the features of claims 7 and 8 as follows:

> *7. A device as recited in claim 1 wherein said chip **200** includes*
>
> *a substrate **202** on which epitaxial layers are grown,*

The layers of the laser are epitaxially grown (Floyd, abstract: "The gallium nitride-based laser structure is grown by selective area epitaxy and lateral mask overgrowth.

Claim 7 continues,

> *a buffer layer **204, 206, 208, 210** located on said substrate **202**, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,*

Floyd indicates that Fig. 1 (reproduced below) shows the "substrate and buffer layer" of the LED:

> FIG. 1 is a cross-sectional side view of the semiconductor layers of the **substrate and buffer layer** of the semiconductor structure of the present invention.

(Floyd, col. 2, lines 12-14; emphasis added)

Because the "substrate" is element **102**, the remaining layers **104, 106, 108,** and **110** are taken to be the "buffer layer". Thus, the buffer layer in the associated Fig. 2 includes layer **210**.

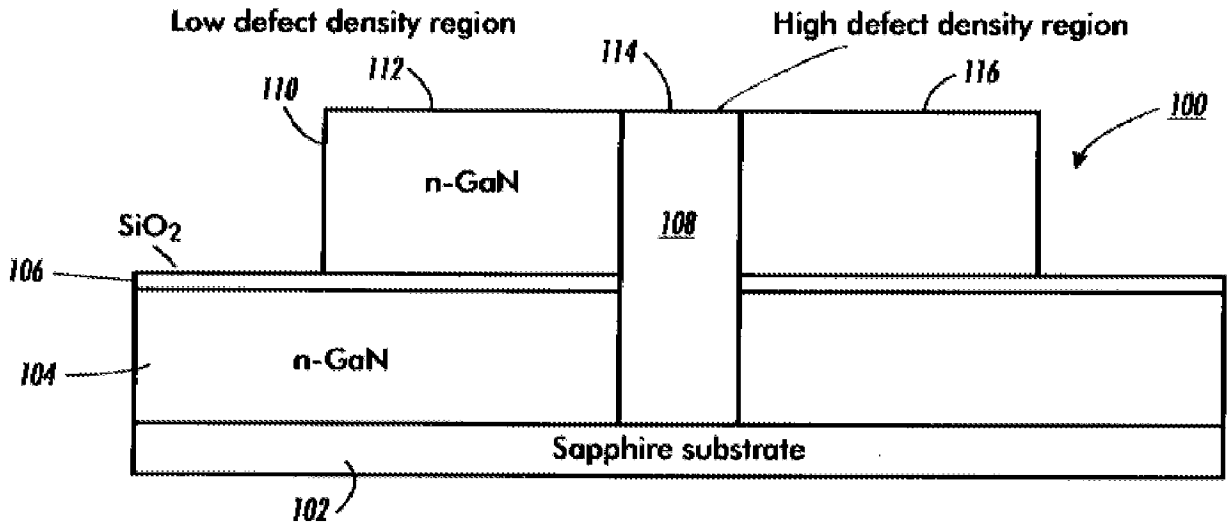


FIG. 1

The buffer layer *mitigates differences in material properties between said substrate and other epitaxial layers*. In this regard, Floyd states,

> As the layer **110** gets thicker, the layer starts to laterally overgrow the SiO_2 layer **106**. Since this laterally overgrown material is attached to the lower GaN layer **104** only on one side, it will **grow without strain** and, therefore, **without dislocations**.

(Floyd, col. 2, lines 53-57; emphasis added)

Because layer **110** grows without strain and without dislocations, it is shown to *mitigates differences in material properties between said substrate **102** and other epitaxial layers*.

Claim 7 continues,

> *a first cladding **218** layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer [portion labeled **210**],*

With regard to the cladding layer **218**, Floyd states,

> Using Organometallic Vapor Phase Epitaxy ("OMPVE"), a lower **n-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 218** is deposited on the GaN layer **210**.

(Floyd, col. 3, lines 61-63; emphasis added)

Again, the '961 patent admits n-AlGaN cladding layers confine electrons:

> Then a **cladding layer 1204**, such as **n-AlGaN**, is provided. **Cladding layers serve to confine the electrons** as they jump from a conduction band to valance and give up energy that converts to light. An **active layer 1205 p-InGaN** is then provided where electrons jump from a conduction band to valance and emit energy which converts to light.

(the '961 patent, col. 4, lines 50-55; emphasis added)

Therefore, Floyd's n-AlGaN layer inherently confines electron movement within the chip.

The cladding layer **218** is shown adjacent to the portion of the buffer layer labeled **210**.

Claim 7 continues,

> *an active layer **222**, said active layer emitting light when electrons jump to a valance state,*

Floyd states,

> An $In_{0.15}$ $Ga_{0.85}N$/GaN multiple quantum well **active layer 222** is deposited on the confinement layer **220**.

(Floyd, col. 4, lines 3-4; emphasis added)

Claim 7 continues,

> *a second cladding layer **226**, said second cladding layer positioned so that said active layer lies between cladding layers, and*

Floyd states,

> An upper p-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride **cladding layer 226** is deposited on the confinement layer 224.

(Floyd, col. 4, lines 10-12; emphasis added)

Claim 7 ends,

> *a contact layer **228** on which an electron [sic] may be mounted for powering said chip.*

Floyd states,

> A third p-GaN **contact layer 228** is deposited on the upper cladding layer **226**.
>
> (Floyd, col. 4, lines 15-16; emphasis added)

Floyd's Fig. 2 also shows the first and second reflector layers of claim 8:

> *8. A device as recited in claim 7 further comprising a first **206** and a second **234** reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer **222**, said reflective layers serving to reflect light emitted by said active layer.*

In this regard, Floyd states,

> A narrow bandwidth **distributed Bragg reflector ("DBR") 206** of approximately 8 to 12 alternating layers of dielectric film materials such as n-SiO_2 and n-TiO_2 is then deposited on the GaN base layer **204** by plasma-enhanced chemical vapor deposition ("PECVD") or by electron beam evaporation.
>
> (Floyd, col. 3, lines 23-28; emphasis added)
>
> Within the annular contact **232**, the **upper p-DBR 234** is formed on the surface of the contact layer **228**.
>
> (Floyd, col. 4, lines 46-47; emphasis added)

It would have been obvious to one of ordinary skill in the art, at the time of the invention to use Floyd's layer order of the GaN-based LED in the GaN-based LEDs of either of Bogner and Waitl that is used in Begemann, or to use Floyd's GaN-based LED as the GaN-based LED of either of Bogner and Waitl that is used in Begemann, because each of Begemann, Bogner, and Waitl are silent to the structure of the LED, such that one of ordinary skill would use a known LED that serves the same purpose of emitting a primary monochromatic light for conversion.

This reason satisfies at least rationale B in MPEP 2143: simple substitution of one known element for another to obtain predictable results. This is simple substitution of Floyd's GaN-based LED for either of Bogner's and Waitl's GaN-based LEDs because Bogner and Waitl do not provide the details of the GaN-based LED. The results are predictable because both GaN-based LEDs produce shorter wavelength light in the same region of the spectrum.

More generally, it would have been obvious to one of ordinary skill in the art, at the time of the invention to produce a white LED lamp, as taught by Begemann, using an appropriate combination of LEDs and conversion coatings appropriate for the

monochromatic LED light, as taught by each of Bogner, Waitl, Abe, Matsubara, and Shimizu, wherein the order of layers in the LED can be as in Floyd.

This is all of the features of claims 7 and 8.

2. Claim 9 is rejected under pre-AIA 35 U.S.C. 103(a) as being unpatentable over Begemann in view of Floyd, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as applied to claim 8, above, and further in view of Karwacki, as evidenced by RP Photonics Encyclopedia.

Claim 9 reads,

> *9. A device as recited in claim 8 wherein said reflective layers include multiple quantum wells.*

The prior art of Begemann in view of Floyd, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, as explained above, discloses each of the features of claim 8.

None of the references, Floyd in particular, teaches the reflective layers are multiple quantum well layers. While Floyd discloses the reflective layers **206** and **234** are DBRs, it does not indicate that they are multiple quantum well layers.

Karwacki teaches a light-emitting device having a reflective layer composed of multiple quantum wells, called a "Quantum Well Mirror" or QWM used to replace at least one of the DBRs. In this regard, Karwacki states,

> The present invention relates to semiconductor lasers that emit light at visible wavelengths, and more particularly, to Vertical-Cavity Surface Emitting Lasers (VCSELs) that produce N-frequencies of visible light in a single cavity by altering the optical length of the cavity through the use of a **Quantum Well Mirror (QWM) replacing one of the Distributed Bragg Reflectors (DBRs)** typically found in a VCSEL.

(Karwacki, ¶ [0002]; emphasis added)

> It is a further object of the present invention to provide for a VCSEL device that may be fabricated of different semiconductor materials that provide a desired bandgap for fundamental light frequencies of interest.

(Karwacki, ¶ [0009]; emphasis added)

> With reference to the drawing, FIG. 1 illustrates a schematic diagram of a tunable multi-frequency VCSEL device **10** of the present invention. **The VCSEL device 10 is tunable to N visible frequencies and comprises a QWM that replaces at least one of the DBRs commonly found in the prior art VCSEL devices.** As will be further described hereinafter, the QWM element in the VCSEL is tunable so as to develop one of the visible light

> frequencies, by applying a specific voltage to its electrode, making up the multiple visible light spectrum developed by the this device **10**.
>
> (Karwacki, ¶ [0016]; emphasis added)

See also ¶¶ [0018]-[0020].

> With reference to FIG. 1, it is seen that a single **QWM device 18 is used to replace one of the DBR** of a typical VCSEL device, such as those disclosed in U.S. Pat. Nos. 5,557,627 and 5,719,892. The fundamental frequency within the cavity can be set by applying a DC voltage, having a possible value between 0 to 10 volts, across the electrodes **26** and **28** of the QWM device **18**. This will set a particular cavity length for the VCSEL device **10**. If modulation is required, an additional time varying signal can be applied across the electrodes **26** and **28**, in a manner to be described hereinafter with reference to FIG. 3.
>
> (Karwacki, ¶ [0022]; emphasis added)

As stated in the Request in the page 70, it would have been obvious to one of ordinary skill in the art, at the time of the invention to replace the reflective layers **206** and **234** of Floyd with the QWM described by Karwacki to fine tune a laser within a semiconductor light source to the optimum absorption wavelength of the phosphor coating that is used to make white light or, alternatively, to rapidly modulate the output wavelength of the laser in order to generate a broader spectrum white light, as taught by Karwacki.

Conclusion

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in reexamination proceedings are provided for in 37 CFR 1.550(c).

In order to ensure full consideration of any amendments, affidavits or declarations, or other documents as evidence of patentability, such documents must be submitted in response to this Office action. Submissions after the next Office action, which is intended to be a final action, will be governed by the requirements of 37 CFR 1.116, which will be strictly enforced.

Patent owner is notified that any proposed amendment to the specification and/or claims in this reexamination proceeding must comply with 37 CFR 1.530(d)-(j).

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner of the third party requester must be served on the other party (or parties where two or more third-party-requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

By **U.S. Postal Service Mail** to:

Mail Stop *Ex Partes* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand to: Customer Service Window
Randolph Building
401 Dulany St.
Alexandria, VA 22314

By EFS-Web:

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at

https://efs.uspto.gov/efile/myportal/efs-registered

EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication should be directed to Erik Kielin at telephone number 571-272-1693.

Signed:

/Erik Kielin/
Primary Patent Examiner
Art Unit 3992

Conferees:

/Albert J Gagliardi/
Primary Examiner, Art Unit 3992

/JENNIFER MCNEIL/
Supervisory Patent Examiner, Art Unit 3992

Notice of References Cited	Application/Control No. 90/012,957	Applicant(s)/Patent Under Reexamination 6465961	
	Examiner ERIK KIELIN	Art Unit 3992	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-4,766,470	08-1988	Scholl et al.	257/94
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90012957	6465961
	Examiner	Art Unit
	ERIK KIELIN	3992

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	11/27/2013								
	1	N								
	2	N								
	3	N								
	4	N								
	5	N								
	6	N								
	7	N								
	8	✓								
	9	✓								
	10	N								
	11	N								
	12	N								
	13	N								
	14	N								
	15	N								
	16	N								
	17	N								
	18	N								
	19	N								
	20	N								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S12	235	quantum adj2 (mirror reflector reflective reflecting reflection)	US-PGPUB; USPAT	OR	ON	2013/11/26 16:29
S13	1368	quantum near3 (mirror reflector reflective reflecting reflection)	US-PGPUB; USPAT	OR	ON	2013/11/26 16:29
S14	1446	quantum near3 (mirror reflector reflective reflecting reflection)	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 16:30
S15	434	S14 and (LED light adj emitting adj diode)	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 16:32
S16	97	S15 and @ad<"20010824"	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 16:32
S17	54	S15 and @rlad<"20010824"	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 16:32
S18	126	S16 S17	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 16:32
S19	1446	quantum near3 (mirror reflector reflective reflecting reflection)	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 18:23
S20	3	S19 and karwacki.in.	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 18:23
S21	17	quantum adj well adj mirror	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 18:24
S22	24	multiple adj quantum adj well adj (reflecting reflection reflective reflector mirror)	US-PGPUB; USPAT; FPRS; EPO; JPO	OR	ON	2013/11/26 18:34

11/27/2013 1:21:28 PM
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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90012957	6465961
	Examiner	Art Unit
	ERIK KIELIN	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Reviewed prosecution history of US application 09/939,340 and co-pending reexamination proceedings 95/000,680 and 95/002,324	11/5/2013	/EK/
EAST search for multiple quantum well mirrors or reflectors (details attached)	11/26/2013	/EK/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inter Partes Reexaminations and *Ex Parte* Reexamination of:	U.S. Patent No. 6,465,961	
Control Nos.:	95/000,680, 95/002,324, and 90/012,957	Art Unit 3992
Inventor:	Cao, Densen	
Filed:	September 13, 2012, September 14, 2012, and August 26, 2013	
For:	SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS	
Examiner:	Kielin, Erik J	
Customer No.:	109488	
Confirmation Nos.:	7901, 7846, and 6150	
Docket Nos.:	C1160.10003US02, C1160.10003US03, and C1160.10003US04	

PATENT OWNER'S PETITION TO *NOT* MERGE *EX PARTE* REEXAMINATION CONTROL NO. 90/012,957 WITH *INTER PARTES* REEXAMINATION CONTROL NO. 95/002,324 UNDER MPEP 2686.01(VI)

Attn: Office of Patent Legal Administration
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Patent Owner hereby petitions to not merge *ex parte* reexamination control number 90/012,957 with *inter partes* reexamination control number 95/002,324 under MPEP

2686.01(VI).[1] *Ex parte* reexamination control number 90/012,957 and *inter partes* reexamination control number 95/002,324 are pending for the same patent, namely U.S. Patent No. 6,465,961. However, any *sua sponte* merger of *ex parte* reexamination control number 90/012,957 with *inter partes* reexamination control number 95/002,324 under 37 C.F.R. § 1.989(a) by the Office of Patent Legal Administration would be improper because such a merger would allow the Third Party Requester, Osram Sylvania Inc. ("Osram"), to introduce claims into an *inter partes* reexamination after these claims have ***twice*** been denied *inter partes* consideration by the Office. This would effectively circumvent the prohibition in 35 U.S.C. § 317(a). Any such *sua sponte* merger would reward Osram's procedural gamesmanship, and should not be permitted.

I. STATEMENT OF MATERIAL FACTS

1. Osram requested reexamination of, among other claims, claims 8 and 9 of the '961 patent in *inter partes* reexamination control number 95/002,324 on September 14, 2012.

2. Osram was denied reexamination of claims 8 and 9 of the '961 patent in *inter partes* reexamination control number 95/002,324 on December 7, 2012.

3. Osram filed a petition requesting reinstatement of, among other claims, claims 8 and 9 with the Office of Patent Legal Administration ("the OPLA") on January 11, 2013.

4. Osram's petition was denied by the OPLA as untimely filed on June 25, 2013.

5. Osram requested reexamination of, among other claims, claims 8 and 9 of the '961 patent in *ex parte* reexamination control number 90/012,957 on August 26, 2013.

---

[1] Since MPEP 2686.01(VI) grants a third party requestor or a patent owner the right to file a "petition to merge" multiple reexamination proceedings on the same patent, MPEP 2686.01(VI) also inherently grants a patent owner the right to file an opposition to a "petition to merge," which is effectively a "petition to not merge," file by a third party requestor. The present "Petition to Not Merge" is filed under the same authority in opposition to the ability of the Office of Patent Legal Administration's ability to *sua sponte* merge multiple reexamination proceedings on the same patent under 37 C.F.R. § 1.989(a).

6. Osram was granted reexamination of claims 8 and 9 of the '961 patent in *ex parte* reexamination control number 90/012,957 on November 8, 2013.

7. *Inter partes* reexamination control number 95/002,324 and *ex parte* reexamination control number 90/012,957 are both currently pending.

II. APPLICABLE RULES

35 U.S.C. 317 - Inter Partes Reexamination Prohibited
(a) ORDER FOR REEXAMINATION— Notwithstanding any provision of this chapter, once an order for inter partes reexamination of a patent has been issued under section 313, neither the third-party requester nor its privies may file a subsequent request for inter partes reexamination of the patent until an inter partes reexamination certificate is issued and published under section 316, unless authorized by the Director.

1.989 - Merger of Concurrent Reexamination Proceedings
(a) If any reexamination is ordered while a prior inter partes reexamination proceeding is pending for the same patent and prosecution in the prior inter partes reexamination proceeding has not been terminated, a decision may be made to merge the two proceedings or to suspend one of the two proceedings. Where merger is ordered, the merged examination will normally result in the issuance and publication of a single reexamination certificate under § 1.997.

MPEP 2686.01(VI) - Petition to Merge Multiple Copending Reexamination Proceedings
The patent owner can file a petition to merge the proceedings at any time after the order to reexamine the second request. A requester of any of the multiple reexamination proceedings may also petition to merge the proceedings at any time after the order to reexamine the second request. A petition to merge the multiple proceedings which is filed by a party other than the patent owner or one of the third party requesters of the reexaminations will not be considered but will be returned to that party by the OPLA. Note that the acceptance of a petition to merge the multiple proceedings at any time after the order to reexamine the second request is contrary to 37 CFR 1.939 since such acceptance can be prior to the issuance of the first Office action. Accordingly, the requirement of 37 CFR 1.939 is hereby waived to the extent that a petition for merger of a reexamination proceeding with a reexamination proceeding or with a reissue (see MPEP § 2686.03) can be submitted after the order to reexamine has been issued in all the reexamination proceedings to be merged. This waiver is made to assure merger at the earliest possible stage.

All decisions on the merits of petitions to merge multiple reexamination proceedings, where at least one of the proceedings is an inter partes reexamination, will be made by the OPLA.

III. BACKGROUND

Both reexaminations filed by Osram on U.S. Patent No. 6,465,961 ("the '961 patent"), namely *inter partes* reexamination control no. 95/002,324) (which will be referred to herein as "Osram's INTPR") and *ex parte* reexamination control no. 90/012,957) (which will be referred to herein as "Osram's EXPR"), are currently pending. After Osram twice failed to achieve *inter partes* reexamination of claims 8 and 9 of the '961 patent, Osram was successful in placing claims 8 and 9 of the '961 patent in *ex parte* reexamination. At present, Osram's INTPR and Osram's EXPR are pending as separate proceedings before the USPTO. Although Osram has not filed a petition to merge Osram's EXPR with Osram's INTPR, Patent Owner is filing the present petition to avoid the OPLA from *sua sponte* merging Osram's EXPR with Osram's INTPR under 37 C.F.R. § 1.989(a).

IV. DISCUSSION

A. Osram's EXPR Should Not Be Merged With the Two INTPRs Because Merger Would Allow TPR to Circumvent the Prohibition in 35 U.S.C. § 317(a)

The Office should refrain from a *sua sponte* merger of Osram's EXPR with Osram's INTPR under 37 C.F.R. § 1.989(a) because any such merger would circumvent the prohibition in 35 U.S.C. § 317(a). In particular, 35 U.S.C. § 317(a) requires that "once an order for inter partes reexamination of a patent has been issued under section 313, ***neither the third-party requester nor its privies*** may file a subsequent request for inter partes reexamination of the patent until an inter partes reexamination certificate is issued and published under section 316, unless authorized by the Director." (Emphasis added).

In this case, since an order for *inter partes* reexamination of the '961 patent has issued in Osram's INTPR, 35 § U.S.C. 317(a) prohibits Osram (or its privies) from filing a subsequent

request for *inter partes* reexamination of the '961 patent until ***after*** an *inter partes* reexamination certificate is issued and published in Osram's INTPR. Although Osram has not filed a subsequent request for an *inter partes* reexamination of the '961 patent, Osram did file a subsequent request for an *ex parte* reexamination of the '961 patent (Osram's EXPR), and any merger of the two proceedings would effectively convert Osram's EXPR into an *inter partes* reexamination proceeding, thereby circumventing the prohibition of 35 U.S.C. § 317(a).

In a case on point, the Office denied a third party requestor's petition to merge two reexaminations because merging the reexaminations as requested by the third party requestor would circumvent the prohibition of 35 U.S.C. § 317(a). *See* Inter Partes Reexamination Control No. 95/000,093 (the "'093 Reexamination"). Similar to the present circumstances, the third party requester in the '093 Reexamination, Sony, first filed a prior *inter partes* reexamination request, then filed a subsequent *ex parte* reexamination request on some claims involved, and on some claims not involved, in the prior *inter partes* reexamination request. Upon denying a petition to merge, the two proceedings, the OPLA stated:

> In the present instance, a merger of the [subsequent] ex parte reexamination proceeding with the [prior] inter partes reexamination proceeding would inappropriately provide Sony, as the third party requester of the inter partes reexamination, with inter partes participation rights as to the entirety of [subsequent] ex parte reexamination proceeding, in which Sony's rights of participation are currently limited by the ex parte reexamination statute. ... Sony's desire to have the Office consider in the inter partes reexamination context all the issues that Sony has raised in the ex parte reexaminations would improperly circumvent 35 U.S.C. § 317(a), which prohibits a third party requester from raising issues in a second inter partes reexamination when the third party has already triggered a pending inter partes reexamination. That prohibition, in view of the facts of the present case, also militates against granting Sony's petition to merge the two sets of proceedings. In other words, a third party should not be able circumvent § 317(a)'s prohibition by (i) triggering an inter partes reexamination limited to certain issues, (ii) raising new issues in an ex parte proceeding, and then (iii) automatically expecting the ex parte proceeding to be merged with the pending inter partes proceeding...

(*See* '093 Reexamination, 2006-07-03 Petition Decision, pages 9-10, attached hereto as Exhibit A.) Although the '093 Reexamination Petition Decision also involved how the merger would circumvent a suspension of the prior *inter partes* reexamination issues of suspension (*see id.* at pages 6-9), the cited language from this Petition Decision is directly on point and weighs against any future merger of Osram's EXPR and Osram's INTPR. For similar reasons as noted in the '093 Reexamination Petition Decision cited above, Patent Owner respectfully submits that the Office should ***not*** entertain any potential merger of Osram's EXPR with Osram's INTPR because any such merger would circumvent the prohibition in 35 U.S.C. § 317(a).

V. CONCLUSION

In conclusion, Patent Owner respectfully requests that Osram's INTPR and Osram's EXPR be prosecuted separately "with special dispatch."

The Commissioner is hereby authorized to charge payment of any fees that may be applicable to this communication, or credit any overpayment, to Deposit Account No. 50-5394.

Dated this 23rd day of January, 2014.

Respectfully submitted,

/John T. Gadd, Reg. No. 52,928/

JOHN T. GADD
Registration No. 52,928
Attorney for Patentee
Customer No. 109488
Telephone No. (435) 252-1360

CERTIFICATION OF SERVICE

Pursuant to 37 C.F.R. 1.903 and 37 C.F.R. 1.248(a)(4), the undersigned, on behalf of the Patentee, hereby certifies that a copy of the foregoing PATENT OWNER'S PETITION TO *NOT* MERGE *EX PARTE* REEXAMINATION CONTROL NO. 90/012,957 WITH *INTER PARTES* REEXAMINATION CONTROL NO. 95/002,324 UNDER MPEP 2686.01(VI) were served on the Third Party Requesters by First Class Mail or where First-Class Mail is not available due to weight limitations, by Priority Mail, on the date indicated below. Service was performed by mailing a copy of the same to the law firms representing the Third Party Requesters at the following addresses by First-Class Mail or where First-Class Mail is not available due to weight limitations, by Priority Mail, postage prepaid:

David L. Terrell
Sutton McAughan Deaver PLLC
Three Riverway, Suite 900
Houston, TX 77056

W. Karl Renner
Fish & Richardson P.C.
60 South Sixth Street
Suite 3200
Minneapolis, MN 55402

Thomas A. Rozylowicz
Fish & Richardson P.C.
60 South Sixth Street
Suite 3200
Minneapolis, MN 55402

Dated this 23rd day of January, 2014.

Respectfully submitted,

/John T. Gadd, Reg. No. 52,928/

JOHN T. GADD
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Exhibit A

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(For Patent Owner)

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CENTRAL REEXAMINATION UNIT

Marcus J. Millet
LERNER, DAVID, LITTENBERG, KRUMHOLZ
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600 South Avenue West
Westfield, New Jersey 07090

(For Requester)

In re Mark R. Tremblay et al.
Reexamination Proceeding
Control No.: 95/000,093
Filed: May 17, 2005
For: U.S. Patent No.: 6,424,333

In re Mark R. Tremblay et al.
Reexamination Proceeding
Control No.: 95/000,094
Filed: May 19, 2005
For: U.S. Patent No.: 6,275,213

DECISION
DENYING
PETITIONS

In re Mark R. Tremblay et al.
Reexamination Proceeding
Control No.: 90/007,844
Filed: December 13, 2005
For: U.S. Patent No.: 6,424,333

In re Mark R. Tremblay et al.
Reexamination Proceeding
Control No.: 90/007,843
Filed: December 13, 2005
For: U.S. Patent No.: 6,275,213

This is a decision on the April 11, 2006 requester (hereinafter "requester" or "Sony") petitions filed (a) under 37 CFR 1.183 for waiver of the rules to permit entry of the petitions, and (b) under 37 CFR 1.182 for merger of:

1. Reexamination Control No.: 90/007,844 with Reexamination Control No.: 95/000,093, and

2. Reexamination Control No.: 90/007,843 with Reexamination Control No.: 95/000,094.[1]

On May 3, 2006, the patent owner (hereinafter "patent owner" or "Immersion") filed oppositions to Sony's petitions.

The petition fee of $400 set forth in 37 CFR 1.17(f) for each of the present petitions under 37 CFR §§ 1.182 and 1.183 has been charged to Sony's Deposit Account No. 12-1095, in accordance with petitioner's authorization at the last sentence of page 2 of the April 11, 2005 petitions. A total of $800 will be charged for the two petitions directed to the two sets of proceedings

The petitions and oppositions are before the Office of the Patent Legal Administration of the United States Patent and Trademark Office ("USPTO" or "Office").

For reasons set forth below, Sony's petitions are:

Granted as to the request under 37 CFR 1.183 for waiver of the rules to permit entry and consideration of the petitions; and

Denied as to the request under 37 CFR 1.183 for merger, i.e., as to the underlying relief requested.

BACKGROUND

1. U.S. Patent No. 6,424,333 (hereinafter, the '333 patent) issued on July 23, 2002, including claims 1-18.

2. U.S. Patent No. 6,275,213 (hereinafter, the '213 patent) issued on August 14, 2001, including claims 1-60.

3. The patent owner, Immersion, obtained a jury verdict (Civil Action No. 02-0710 CW) in the

[1] See the penultimate paragraph of the second page of the petitions which identifies the petitions as being filed under 37 CFR §§ 1.182 and 1.183.

United States District Court for the Northern District of California, finding that Sony (the real party in interest for the instant requests for reexamination) infringed claims 14-18 the '333 patent, and claims 7, 41-46, 49, 50, 53, and 54 of the '213 patent. The jury also found that claims 14-18 of the '333 patent and claims 7, 41-46, 49, 50, 53, and 54 of the '213 patent were not invalid.[2]

4. Judgment was entered in Civil Action No. 02-0710 CW on March 24, 2005, in favor of Immersion against Sony on Immersion's claims of infringement of the '333 and '213 patents.[3] Judgment was also entered in Immersion's favor as to Sony's counter-claims for declaratory judgment of non-infringement. In a separate order, the court also issued a permanent injunction against Sony, stayed pending appeal to the Federal Circuit, and imposed a compulsory license fee for the duration of the stay.[4]

5. On May 17, 2005, Sony filed a request for *inter partes* reexamination of claims 1 and 14-18 of the '333 patent, assigned control No. 95/000,093 (the '093 proceeding). Of the claims for which reexamination was requested, the validity of only claim 1 of the '333 patent was not litigated in the district court proceeding.

6. On May 19, 2005, Sony filed a request for *inter partes* reexamination of claims 1, 7, 41-46, 49, 50, 53, and 54 of the '213 patent, assigned control No. 95/000,094 (the '094 proceeding). Of the claims for which reexamination was requested, the validity of only claim 1 of the '213 patent was not litigated in the district court proceeding.

7. On June 16, 2005, Sony appealed the district court decision to the U.S. Court of Appeals for the Federal Circuit (Appeal Nos. 05-1227, 1358 and 1441). The appeal is still pending.

8. On July 6, 2005, Immersion filed petitions to dismiss or suspend the instant *inter partes* reexamination proceedings pursuant to 37 CFR §§ 1.181, 1.182, 1.183, 1.987, and 35 U.S.C. § 314(c).

9. On July 29, 2005, Sony filed petitions and oppositions under 37 CFR 1.183 in response to Immersion's petitions.

10. On August 5, 2005, Immersion filed a reply to Sony's oppositions.[5]

11. On August 17, 2005, the Office issued orders granting the requests for *inter partes* reexamination in both the '093 and '094 reexamination proceedings, finding that the requests raised a substantial new question of patentability regarding (a) claims 1 and 14-18 of the '333 patent and (b) claims 1, 7, 41-46, 50, 53, and 54 of the '213 patent.

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[2] 2005 U.S. Dist. LEXIS 4784.
[3] 2005 U.S. Dist. LEXIS 4781.
[4] 2005 U.S. Dist. LEXIS 4784.
[5] MPEP § 2646 prohibits petitioner filing of such a reply, and the patent owner's reply was accordingly not considered.

12. On August 23, 2005, the Director of the Office of Patent Legal Administration issued a decision denying the petitions to dismiss or suspend the '093 and '094 *inter partes* reexamination proceedings (in the decision, it was noted that claim 1 in each reexamination was not part of the concurrent pending litigation).

13. On September 9, 2005, Immersion filed (a) renewed petitions to suspend the '093 and '094 *inter partes* reexamination proceedings, and (b) a statutory disclaimer of claim 1 in each of the '333 and '213 patents.

14. On September 12, 2005, Immersion filed a petition in the two *inter partes* reexamination proceedings requesting that the Office of Patent Legal Administration retain jurisdiction over the two proceedings, pending resolution of the matter petitioned in the September 9, 2005 petitions. Jurisdiction over the two proceedings was, in fact, retained by the Office of Patent Legal Administration.

15. On September 26, 2005, Sony filed an opposition to the petitions to suspend the *inter partes* reexamination proceedings.

16. On October 21, 2005, Sony filed its principal brief in the Federal Circuit appeal. On March 15, 2006, Immersion filed its corrected substitute brief.

17. On November 17, 2005, the Director of the Office of Patent Legal Administration issued a decision granting Immersion's petitions, finding "good cause" to suspend the '093 and '094 *inter partes* reexamination proceedings until the U.S. Court of Appeals for the Federal Circuit issues a decision in the concurrently pending appeal, in view of the statutory disclaimer of claim 1 of both the '213 and '333 patents.

18. On December 13, 2005, Sony filed requests for *ex parte* reexamination of claims 2, 3, 5, 6, 7, 15, 16, 17, 20, 21, 25, 41, 42, 43, 44, 45, 46, 49, 50, 53 and 54 of the '213 patent and claims 2, 3, 4, 5, 6, 7, 8, 9, 12, 13, 14, 15, 16, 17 and 18 of the '333 patent, the requests being assigned control Numbers 90/007,843 (for reexamination of the '213 patent) and 90/007,844 (for reexamination of the '333 patent).

19. On December 15, 2005, Sony filed petitions under 37 CFR 1.907(a) and 35 U.S.C. § 317(a), requesting that the USPTO Director authorize Sony to file additional requests for *inter partes* reexamination of the '333 and '213 patents, in order to permit Sony to request *inter partes* reexamination of certain claims of the '213 and '333 patents that it failed to request in its initial set of *inter partes* reexamination requests, dated May 17 and 19, 2005.

20. On January 23, 2006, Immersion filed oppositions to Sony's petitions under 37 CFR 1.907(a) and 35 U.S.C. § 317(a).

21. On March 9, 2006, a substantial new question of patentability (SNQ) was found for claims 2, 3, 5, 6, 15, 16, 17, 20, 21 and 25 of the '213 patent and for claims 2, 3, 4, 5, 6, 7, 8, 9, 12 and

13 of the '333 patent, and *ex parte* reexamination proceedings 90/007,843 and 90/007,844 (hereinafter, the '843 and '844 proceedings) were ordered.

22. On March 22, 2006, the Senior Legal Advisor of the Office of Patent Legal Administration issued a decision dismissing Sony's December 15, 2005 petitions under 37 CFR 1.907(a) and 35 U.S.C. § 317(a).

23. On April 11, 2005, Sony filed the instant petitions. The instant petitions are filed under 37 CFR 1.183 for waiver of the rules to permit entry of the petitions, and under 37 CFR 1.182 for merger of the '844 and '093 proceedings, and merger of the '843 and '094 proceedings.

24. On May 3, 2006, Immersion filed oppositions to Sony's merger petitions.

25. On December 13, 2005, Sony brought action in the United States District Court, Eastern District of Virginia, pursuant to the Administrative Procedure Act (APA), 5 U.S.C. §§ 701-706, to obtain judicial review of the Office's November 17, 2005 petition decision suspending the '093 and '094 *inter partes* reexamination proceedings. Specifically, Sony sought review of the Office's November 17, 2005 decision which found that "good cause" existed under 35 U.S.C. § 314(c) to suspend the just-commenced '093 and '094 *inter partes* reexamination proceedings with respect to certain claims in the '213 and '333 patents on the ground that the validity of those claims were already the subject of an ongoing appeal in the U.S. Court of Appeals for the Federal Circuit. Sony argued that the Office abused its discretion in suspending the proceedings, contending the Office had a legal obligation to reexamine all claims in the patents (except the two disclaimed claims), including the claims Sony failed to request for reexamination.

26. On May 22, 2006, the U.S. District Court, Eastern District of Virginia, *Sony Computer Entertainment America Inc., et al. v. Jon W. Dudas*, Civil Action No. 1:05CV1447 (E.D.Va. May 22, 2006), Slip Copy, 2006 WL 1472462, issued a decision in favor of the Office. The decision upheld the Office's finding of "good cause" to suspend the '093 and '094 *inter partes* reexamination proceedings and also upheld the Office's discretion to not reexamine claims of the '213 and '333 patents for which *inter partes* reexamination was not requested.

27. A patent owner's statement under 37 CFR 1.530 has not been received in the '843 and '844 *ex parte* reexamination proceedings, and the time for filing such statement has expired.

DECISION WAIVNG RULES, TO PERMIT CONSIDERATION OF MERGER PETITIONS

37 CFR 1.535 provides as to third party requesters:

> "A reply to the patent owner's statement under § 1.530 may be filed by the *ex parte* reexamination requester within two months from the date of service of the patent owner's statement. Any reply by the *ex parte* requester must be served upon the patent owner in accordance with § 1.248. If the patent owner does not file a statement under § 1.530, no reply or other submission from the *ex parte* reexamination requester will be considered."

37 CFR 1.550 provides as to third parties in general:

> "(g) ...no submissions on behalf of any third parties will be acknowledged or considered unless such submissions are:
> (1) in accordance with § 1.510 or § 1.535; or
> (2) entered in the patent file prior to the date of the order for *ex parte* reexamination pursuant to § 1.525.
> "(h) Submissions by third parties, filed after the date of the order for *ex parte* reexamination pursuant to § 1.525, must meet the requirements of and will be treated in accordance with § 1.501(a)."

The present petitions do not have an entry right under the rules. *See* 37 CFR 1.510, 1.535, and 1.550. The appropriate provisions of the rules are, however, waived to permit consideration of the instant Sony merger petitions, based upon the specific facts and unique circumstances of the present situation, as well as statements made in the Office's March 22, 2006 decision dismissing Sony's petitions to file additional requests for *inter partes* reexamination. Likewise, the appropriate provisions of the rules are *sua sponte* waived to permit consideration of Immersion's oppositions to the merger petitions.

DECISION ON MERGER PETITIONS

37 CFR 1.989(a) provides:

> If any reexamination is ordered while a prior *inter partes* reexamination proceeding is pending for the same patent and prosecution in the prior *inter partes* reexamination proceeding has not been terminated, a decision **may** be made to merge the two proceedings or to suspend one of the two proceedings. Where merger is ordered, the merged examination will normally result in the issuance of a single reexamination certificate under § 1.997. [Emphasis added].

In addition, MPEP 2686.01(I) provides:

> "If a second request for reexamination is filed where a certificate will issue for a first reexamination later than 3 months from the filing of the second request, the proceedings **normally** will be merged once reexamination has been ordered in both proceedings. In this situation the second request is decided based on the original patent claims and if reexamination is ordered in the second proceeding, the reexamination proceedings **normally** would be merged."

Reexamination of the '333 patent has been ordered in the '844 *ex parte* proceeding and '093 *inter partes* proceeding, and reexamination of the '213 patent has been ordered in the '843 *ex parte* proceeding and '094 *inter partes* proceeding. In addition, a patent owner's statement under 37 CFR 1.530 has not been received in the '844 and '843 proceedings, and the time for filing such has expired. [6] [7] Accordingly, a decision under 1.989(a) on the Sony petitions for merger is timely.

The issue to be decided is whether the *ex parte* reexaminations should be merged with the respective *inter partes* reexaminations. The present petitions raise a novel question regarding merger practice, because, pursuant to 35 U.S.C. § 314(c), the present '093 and'094 *inter partes* reexaminations are currently suspended.

At page 3 of the petitions, Sony argues that:

> "there is every reason to merge the two proceedings, and no proper reason to refrain from such merger. As set forth in M.P.E.P. § 2686.01, '[i]f a second request for reexamination is filed where a certificate will issue for a first reexamination later than three months from the filing of the second request, the proceedings normally will be merged once reexamination has been ordered in both proceedings.' Here, all of the proceedings are at a relatively early stage; reexamination has been ordered in all of the proceedings, but no first Official Action has been issued in any of the proceedings. As the Office has already held that 'it is not in the Office's interest to conduct a piecemeal reexamination of a patent' because a reexamination of any claim 'will already require the Examiner to review the written description, the drawings, other claims in the patent and the prior art,' and accordingly, there is relatively little additional effort to reexamine all claims instead of just some' in a given reexamination proceeding. (Decision Denying Petitions dated August 23, 2005 in the '093 and '094 *Inter Partes* Reexaminations at 13.) There is no reason for the Office to consider the same issues twice, rather than once."

As an initial matter, there is no legal requirement for the Office to merge two pending reexamination proceedings. Rather, as with the Office's decisions to reexamine claims beyond those requested and to suspend an *inter partes* reexamination for "good cause," the Office's

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[6] Pursuant to MPEP 2283(III), "[I]f Request 2 is granted, the order in the second proceeding should be mailed immediately. The two requests should be held in storage until the patent owner's statement and any reply by the requester have been received in Request 2, or until the time for filing same expires."

[7] As to the suspended '093 and '094 proceedings, there is no provision for filing a patent owner's statement in an *inter partes* reexamination proceeding.

decision to merge two reexaminations is a purely discretionary act. *See Sony Computer Entertainment America Inc., et al. v. Jon W. Dudas,* 2006 WL 1472462 (E.D.Va. May 22, 2006).

First, the statute does not require the Office to merge or consolidate multiple reexamination proceedings. In fact, the statute is silent as to this procedural issue. Second, the relevant regulation makes it clear that the Office has discretion when deciding whether to merge an *ex parte* reexamination proceeding with an *inter partes* reexamination proceeding. See 37 CFR 1.989(a) ("If any reexamination is ordered while a prior *inter partes* reexamination proceeding is pending for the same patent and prosecution in the prior *inter partes* reexamination proceeding has not been terminated, a decision **may** be made to merge the two proceedings or to suspend one of the two proceedings." (Emphasis added)). Furthermore, while the MPEP states that the Office will "normally" merge two reexaminations, that general policy does not address the unique circumstances here, in which one set of proceedings has been suspended. Indeed, the Office has never had to address the question of dissolving a suspension order for the sake of merging proceedings.

Pursuant to 35 U.S.C. 314(c), the USPTO Director may suspend an *inter partes* reexamination proceeding "for good cause." In the present instance, the Office's November 17, 2005 petition decision suspended the '093 and '094 *inter partes* reexamination proceedings because the Federal Circuit appeal on the same patent claims was far advanced in comparison to the *inter partes* reexamination proceedings, which had only recently been commenced. Thus, there was ample "good cause" to suspend the *inter partes* reexamination proceedings pending completion of the Federal Circuit appeal, in view of the statutory estoppel that would operate upon a final decision on the claims by the Federal Circuit. *See* 35 U.S.C. § 317(b).

Further, the U.S. District Court for Eastern District of Virginia upheld the Office decision to suspend the '093 and '094 *inter partes* reexamination proceedings, stating that "the PTO did not abuse its discretion in concluding that there was good cause to suspend reexamination of the litigated claims in light of the more advanced Federal Circuit appeal focusing on the same claims...." [8] The District Court found that "the PTO's decision to suspend *inter partes* review of the patent claims in issue here was clearly supported by good cause and therefore well within the bounds of the PTO's discretion." [9] Thus, Sony has already appealed the merits of the suspension order, but the court rejected that challenge.

Based on the above, the requested merger of the '844 *ex parte* reexamination proceeding with the '093 *inter partes* reexamination proceeding would consolidate a suspended *inter partes* proceeding with an *ex parte* proceeding which must go forward with special dispatch. *See Ethicon v. Quigg*, 849 F.2d 1422, 7 USPQ2d 1152 (Fed. Cir. 1988). The same would be true for the requested merger of the '843 *ex parte* reexamination proceeding with the '094 *inter partes* reexamination proceeding. In each instance, the requested merged proceeding would be required to proceed with special dispatch, based on the presence of the *ex parte* reexamination

[8] *Sony Computer Entertainment America Inc., et al. v. Jon W. Dudas,* 2006 WL 1472462, Slip Copy at 11.
[9] *Id.* ,at 7.

proceeding. Thus, the merger of the two sets of proceedings would necessarily require dissolving the Office's decision to suspend the *inter partes* reexamination proceedings.

While Sony is correct that the Office usually prefers to avoid piecemeal reexamination, merging the two sets of proceedings in the present instance would clearly circumvent the Office's suspension decision of the *inter partes* reexamination proceedings, which was approved by the District Court based upon the reasoning advanced by the Office. Indeed, merging the proceedings here would render the Office's discretion to suspend meaningless, and would defeat the whole purpose behind the suspension decision, *i.e.*, to await the final outcome on the litigated claims. Furthermore, such a result would undermine the legislative intent underlying 35 U.S.C. 314(c) (expressly providing the Office with discretion to find "good cause" to suspend). In view of the foregoing, the more appropriate course is to preserve the suspension decision (and all the reasoning given therein) and deny the merger petition, rather than permit Sony to collaterally attack the suspension order (which has already been affirmed by the District Court). In other words, the Office does not find that its concern over piecemeal reexamination overrides, in this instance, the reasoning for why the Office suspended the *inter partes* reexamination proceedings. Moreover, there will not be any piecemeal reexamination if the Federal Circuit affirms the District Court's decision as to validity, because the *inter partes* reexaminations will be terminated under 35 U.S.C. 317(b) and 37 CFR 1.907(b).[10]

Accordingly, the request for merger is denied.

It is also noted that pursuant to 37 CFR 1.989(b):

> "An *inter partes* reexamination proceeding filed under § 1.913 which is merged with an *ex parte* reexamination proceeding filed under § 1.510 will result in the merged proceeding being governed by §§ 1.902 through 1.997, except that the rights of any third party requester of the *ex parte* reexamination shall be governed by §§ 1.510 through 1.560."

In the present instance, a merger of the '844 *ex parte* reexamination proceeding with the '093 *inter partes* reexamination proceeding would inappropriately provide Sony, as the third party requester of the *inter partes* reexamination, with *inter partes* participation rights as to the entirety of '844 *ex parte* reexamination proceeding, in which Sony's rights of participation are currently limited by the *ex parte* reexamination statute. Again, the same would be true for a merger of the '843 *ex parte* reexamination proceeding with the '094 *inter partes* reexamination proceeding. Sony's desire to have the Office consider in the *inter partes* reexamination context all the issues that Sony has raised in the *ex parte* reexaminations would improperly circumvent 35 U.S.C. § 317(a), which prohibits a third party requester from raising issues in a second *inter partes* reexamination when the third party has already triggered a pending *inter partes* reexamination. That prohibition, in view of the facts of the present case, also militates against granting Sony's petition to merge the two sets of proceedings. In other words, a third party should not be able circumvent § 317(a)'s prohibition by (i) triggering an *inter partes* reexamination limited to certain issues, (ii) raising new issues in an *ex parte* proceeding, and then (iii) automatically

[10] Should the Federal Circuit remand or vacate the lower court's validity findings, the Office at that time can consider reviewing the suspension decision as well as the question of merging the proceedings.

expecting the *ex parte* proceeding to be merged with the pending *inter partes* proceeding, let alone an *inter partes* proceeding that has been suspended for "good cause," which has already been affirmed by a district court.

CONCLUSION

1) The Sony (i.e., third party requester) petitions are

   Granted as to the request under 37 CFR 1.183 for waiver of the rules to permit entry and consideration of the petitions, and

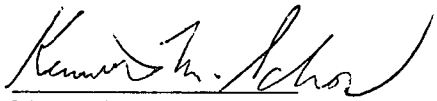
   Denied as to the request under 37 CFR 1.183 for merger, i.e., as to the underlying relief requested.

2) The above-captioned '093 and '094 *inter partes* reexamination proceedings remain suspended until the U.S. Court of Appeals for the Federal Circuit issues a decision in the concurrently pending appeal identified above.

3) The above-captioned '843 and '844 *ex parte* reexamination proceedings are ready for action, and jurisdiction over the '843 and '844 proceedings is transferred to the examiner for that purpose.

4) The parties to the'093 and '094 *inter partes* reexamination proceedings should keep the Office apprised of the progress of the appeal in the concurrent litigation and notify the Office when that appeal has been resolved.

5) Telephone inquiries with regard to this decision should be directed to the undersigned at 571-272-7710.



Kenneth M. Schor
Senior Legal Advisor
Office of Patent Legal Administration

7-3-06
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Electronic Acknowledgement Receipt

EFS ID:	18010305
Application Number:	90012957
International Application Number:	
Confirmation Number:	6150
Title of Invention:	SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS
First Named Inventor/Applicant Name:	6465961
Customer Number:	109488
Filer:	John Thomas Gadd
Filer Authorized By:	
Attorney Docket Number:	C1160.10003US04
Receipt Date:	23-JAN-2014
Filing Date:	26-AUG-2013
Time Stamp:	19:15:20
Application Type:	Reexam (Patent Owner)

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Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		C1160-10003US04-Petition-to-Not-Merge-Reexams.pdf	790069 0c385675793ea794593ce25908473336200 6703b	yes	18

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Receipt of Petition in a Reexam	1	6
	Reexam Certificate of Service	7	7
	Reexam Miscellaneous Incoming Letter	8	18
Warnings:			
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,957	08/26/2013	6465961	C1160.10003US04	6150

109488 7590 11/08/2013

Maschoff Brennan
1389 Center Drive, Suite 300
Park City, UT 84098

EXAMINER	
KIELIN, ERIK J	
ART UNIT	**PAPER NUMBER**
3992	
MAIL DATE	**DELIVERY MODE**
11/08/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. *90/012,957*.

PATENT NO. *6465961*.

ART UNIT *3992*.

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified *ex parte* reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the *ex parte* reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

PTOL-465 (Rev.07-04)

DECISION ON REQUEST FOR REEXAMINATION

A substantial new question of patentability affecting claims 8 and 9 of US 6,465,961 B1 to Densen Cao (the '961 patent, hereafter) is raised by the request for *ex parte* reexamination.

No substantial new question of patentability is raised as to claims 1 and 7.

Since requester did not request reexamination of claims 2-6 and 10-20 and did not assert the existence of a substantial new question of patentability (SNQ) for such claims, these claims will not be reexamined. See *Sony Computer Entertainment America, Inc. v. Dudas*, 85 USPQ2d 1594, 1601-02 (E.D. Va. 2006) ("[T]he scope of the PTO's investigation extends only to those claims (i) for which reexamination has been requested; and (ii) for which the PTO has determined there exists a substantial question of validity.") (discussing *inter partes*, but equally applicable to *ex parte*). See also MPEP 2243.

Table of Contents

I. The References

(1) WO 00/17569 published 30 March 2000 (Begemann)

(2) US 6,220,722 issued 24 April 2001 (Begemann-722)

(3) US 6,015,979 issued 18 January 2000 (Sugiura)

(4) US PG Publication 2002/0159490 filed 29 March 2001 (Karwacki)

(5) US 5,777,350 issued 7 July 1998 (Nakamura)

(6) US 5,535,230 issued 9 July 1996 (Abe)

(7) CA 2 260 389 published 30 July 1999 (Waitl)

(8) Bogner et al., "White LED" in *Proceedings of the SPIE*, pp. 143-150, 28 January 1999 (Bogner)

(9) EP 0 977 278 A2 published 2 February 2000 (Matsubara)

(10) US 5,998,925 issued 7 December 1999 (Shimizu)

(11) US 6,160,833 filed 6 May 1998 (Floyd)

(12) RP Photonics Encyclopedia, "Bragg Mirrors," reprinted from http://www.rp-photonics.com/bragg_mirrors.html, last visited August 24, 2013 (RP Photonics Encyclopedia)

The application that matured to the '961 patent was filed 24 August 2001.

Each of the above US, CA, WO, and EP publications (except for Begemann-772, Karwacki, Floyd, and RP Photonics Encyclopedia) issued or published more than one year before the filing of the application that matured to the '961 patent; therefore, each of Begemann, Sugiura, Nakamura, Abe, Waitl, Bogner, Matsubara, and Shimizu qualifies as prior art under 35 USC 102(b).

Each of Begemann-772, Karwacki, and Floyd was filed in the USA before the filing of the '961 patent; therefore, each qualifies as prior art under 35 USC 102(e).

RP Photonics Encyclopedia is used only for evidence and need not qualify as prior art.

II. Prosecution History

A. 09/939,340

During the examination of the application, 09/939,340, that became the '961 patent, the examiner said nothing negative to the patentability, allowing all claims in the first action. The examiner of the '340 application provided the following reasons for allowing the claims:

> The following is an examiner's statement of reasons for allowance: The limitation which distinguishes the claims of this application over the prior art is **the limitation concerning the heat sink having a plurality of panels and being located inside a transparent enclosure**.
>
> The prior art does not disclose proper motivation for combining references which disclose this limitation with the references which disclose the other limitations recited in the claims of this application.

(the '340 application, Notice of Allowance dated 7/30/2002; emphasis added)

Thus, a reference teaching a heat sink having a plurality of panels and being located inside a transparent enclosure may raise a substantial new question of patentability, , so long as the same question of patentability is not being addressed in the co-pending *inter partes* reexamination proceedings, which will be addressed below.

B. 95/000,680 and 95/002,324

The *inter partes* reexaminations having control numbers 95/000,680 and 95/002,324 are currently pending as to claims 1-7 and 10-20. It was determined the neither of the '680 and '2324 Requests established a reasonable likelihood of prevailing as to claims 8 and 9; thus, claims 8 and 9 are currently not subject to reexamination. Many of the same references cited in the instant Request, above, were cited against claims 1 and 7-9 in the co-pending reexaminations. The proposed combinations of references relied on in the requests are cited below.

1. The '680 Request:

a. Begemann in view of Schweber (Claim 1)

b. Begemann in view of Schweber and further in view of any of Matsubara, Sugiura, Abe, and Watabe (Claims 7 and 8)

c. Begemann in view of Schweber and further in view of any of Matsubara, Sugiura, Abe, and Watabe, and still further in view of Kano (Claim 9)

d. Begemann in view of Schweber and either of Matsubara and Shimizu (Claim 1)

e. Begemann in view of Schweber and either of Matsubara and Shimizu, and further in view of any of Matsubara, Sugiura, Abe, and Watabe (Claims 7 and 8)

f. Begemann in view of Schweber and either of Matsubara and Shimizu, and further in view of any of Matsubara, Sugiura, Abe, and Watabe, and still further in view of Kano (Claim 9)

2. The '2324 Request:

a. Begemann in view of Schweber (Claim 1)

b. Begemann in view of Waitl (Claim 1)

c. Begemann in view of Waitl and Shimizu (Claims 7 and 8)

d. Begemann in view of Waitl and Matsubara (Claim 7)

e. Begemann in view of Waitl and Watabe (Claims 7-9)

f. Begemann in view of Waitl and Sugiura (Claims 7-9)

g. Begemann in view of Abe (Claim 1)

h. Begemann in view of Abe and Ramdani (Claims 7-9)

i. Begemann in view of Abe and Larkins (Claims 7 and 8)

j. Begemann in view of Abe, Larkins, and Karwacki (Claim 9)

In the order granting each *inter partes* reexamination, it was determined that the Requests failed to show how the features of claims 8 and 9 were met by the references. How the above-identified proposed rejections affect whether or not the proposed rejections in the instant Request raise substantial new questions of patentability as to claims 1, 7, 8, and 9 will be discussed below, as necessary.

III. Substantial New Question of Patentability

MPEP 2242 states in pertinent part,

> For "a substantial new question of patentability" to be present, it is only necessary that: (A) the prior art patents and/or printed publications raise a substantial question of patentability regarding at least one claim, i.e., the teaching of the (prior art) patents and printed publications is such that a reasonable examiner would consider the teaching to be important in deciding whether or not the claim is patentable; and (B) the same question of

> patentability as to the claim has not been decided by the Office in a previous examination or pending reexamination of the patent or in a final holding of invalidity by the Federal Courts in a decision on the merits involving the claim.

As to what constitutes a "substantial new question of patentability" affecting a claim of a patent for which reexamination is requested, MPEP 2216 indicates that the applied prior art patents and/or printed publications must include "a new, non-cumulative technological teaching that was not previously considered and discussed on the record during the prosecution of the application that resulted in the patent for which reexamination is requested, and during the prosecution of any other prior proceeding involving the patent for which reexamination is requested".

The above-cited references, alone or in the following proposed combinations, are relied on in the Request for showing that the claims are unpatentable and are relied on, here, for showing whether or not a substantial new question of patentability exists as to the indicated claims.

In addition, when there is a copending reexamination proceeding, as it the case here (see 95/000,680 and 95/002,324), MPEP 2240(II) states

> If a second or subsequent request for *ex parte* reexamination is filed (by any party) while a first *ex parte* reexamination is pending, the presence of a substantial new question of patentability depends on the prior art (patents and printed publications) cited by the second or subsequent requester. If the requester includes in the second or subsequent request prior art which raised a substantial new question in the pending reexamination, reexamination should be ordered only if the prior art cited raises a substantial new question of patentability which is **different from that raised in the pending reexamination proceeding**. If the prior art cited raises the same substantial new question of patentability as that raised in the pending reexamination proceedings, the second or subsequent request should be denied.

(Emphasis added.)

Thus any substantial new question of patentability raised in the instant Request must be different that any raised in the '680 and '2324 Requests.

The above-cited references, alone or in the following proposed combinations, are relied on in the Request for showing that the claims are unpatentable and are relied on, here, for showing whether or not a substantial new question of patentability exists as to the indicated claims.

A. The Request indicates that Requester believes claims 1 and 7-9 are unpatentable over Begemann in view of Sugiura, Karwacki, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu

(See Request, pp. 1, 5 [Issue No. 1], and 12-30.)

Of the above references, only Bogner is new art; the rest are old art because they are currently being considered in the '680 and '2324 reexamination proceedings, as noted above. Nonetheless, because Abe, Waitl, Bogner, Matsubara, and Shimizu are applied in the alternative, there are effectively four proposed rejections based solely on old art.

On November 2, 2002, Public Law 107-273 was enacted. Title III, Subtitle A, Section 13105, part (a) of the Act revised the reexamination statute by adding the following new last sentence to 35 U.S.C. 303(a) and 312(a):

> The existence of a substantial new question of patentability is not precluded by the fact that a patent or printed publication was previously cited by or to the Office or considered by the Office.

For any reexamination ordered on or after November 2, 2002, the effective date of the statutory revision, reliance on previously cited/considered art, i.e., "old art," does not necessarily preclude the existence of a substantial new question of patentability (SNQ) that is based exclusively on that old art. Rather, determinations on whether a SNQ exists in such an instance shall be based upon a fact-specific inquiry done on a case-by-case basis. A discussion of the specifics now follows.

1. Claim 1

Claim 1 reads,

> *1. A semiconductor light source for emitting light to illuminate a space used by humans, the semiconductor light source comprising:*
>
> *an enclosure, said enclosure being fabricated from a material substantially transparent to white light, an interior volume within said enclosure,*
>
> *a heat sink located in said interior volume,*
>
> > *said heat sink being capable of drawing heat from one or more semiconductors devices,*
> >
> > *said heat sink having a plurality of panels on it suitable for mounting semiconductor devices thereon,*
> >
> > *said panels on said heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,*
>
> *at least one semiconductor chip capable of emitting light mounted on one of said panels,*

said semiconductor chip being capable of emitting monochromatic light,

said semiconductor chip being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, LED modules, laser modules, and VCSEL chips, and

a coating for converting monochromatic light emitted by said chip to white light.

Begemann's Figs. 1 and 2 show the claimed "heat sink [3] having a plurality of panels and being located inside a transparent enclosure [5]", as required by claim 1, which the examiner of the '340 application found important to the patentability (*supra*). However, Begemann is clearly applied to the same claim features in the same manner as in the copending '680 and '2324 proceedings. Thus, Begemann does not provide a new non-cumulative technological feature.

In addition, each of Abe, Waitl, Bogner, Matsubara, and Shimizu is applied to the same claim features in the same manner as in the copending '680 and '2324 proceedings. These features include the phosphor coating in receiving relationship to a primary LED radiation source to produce white light by down-converting in energy said LED radiation, as well as an LED to use in place of Begemann's LEDs to work properly with the phosphors coating (Request, pp. 20-25). As such, each of Abe, Waitl, Bogner, Matsubara, and Shimizu is applied in the same manner that (1) each of Schweber, Matsubara, and Shimizu is currently being applied in the '680 proceeding, and (2) each of Abe, Waitl, and Schweber is currently being applied in the '2324 proceedings, at least with regard to the phosphor coating that produces white light. Thus, Abe, Waitl, Bogner, Matsubara, and Shimizu are not applied in a different way with regard to the claimed "*coating for converting monochromatic light emitted by said chip to white light*" and therefore provide only a cumulative teaching to that already of record. Consequently, none of Abe, Waitl, Bogner, Matsubara, and Shimizu in combination with Begemann raises a substantial new question of patentability because that issue of patentability is currently being addressed in the copending proceedings.

Sugiura and Karwacki are irrelevant to claim 1 because neither teaches any feature not already taught by Begemann in view of any of Abe, Waitl, Bogner, Matsubara, and Shimizu. While it is acknowledged that the Requester proposes changing Begemann's LED with Sugiura's LED (Request, p. 20, last ¶), this is irrelevant since each of Abe, Waitl, Bogner, Matsubara, and Shimizu already teaches specific LEDs that would function with the specific phosphor coatings producing white light that each teaches. Thus, Sugiura would be, at best, cumulative to any of these references. In fact, Sugiura is worse than the other references since Sugiura does not discuss down-converting the LED light to white light with using a phosphor coating, as each of Abe, Waitl, Bogner, Matsubara, and Shimizu already teaches.

In addition, Karwacki is used only for teaching the use of multiple quantum wells as reflective layers in an LED which is only claimed in claim 9.

Based on the foregoing, then, **there is no substantial new question of patentability raised as to claim 1**.

2. Claim 7

Claim 7 reads,

> *7. A device as recited in **claim 1** wherein said chip includes*
>
> *a substrate on which epitaxial layers are grown,*
>
> *a buffer layer located on said substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,*
>
> *a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer,*
>
> *an active layer, said active layer emitting light when electrons jump to a valance state,*
>
> *a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and*
>
> *a contact layer on which an electron may be mounted for powering said chip.*

As to claim 7, Requester applies Sugiura for teaching the features of the LED chip. However, in both the '680 and '2324 Requests, Sugiura was found to teach each of the features of claim 7. (See the '680 proceedings, Determination dated 12/7/2012, p. 14, and the '2324 proceedings, Determination dated 12/7/2012, p. 21. See also the '2324 Request, dated 9/14/2012, pp. 146-148.) Therefore, Sugiura does not provide a new, non-cumulative technological feature that is not already being considered in conjunction with Begemann and at least one reference teaching the phosphor coating for converting the LED light to white light.

Again, Karwacki is not relevant to claim 7, and Requester does not rely on Karwacki for teaching any feature of claim 7 in the instant Request (Request, pp. 25-27).

Based on the foregoing, then, **there is no substantial new question of patentability raised as to claim 7**.

3. Claim 8

Claim 8 reads,

> *8. A device as recited in **claim 7** further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.*

As noted above, the requester of in the '2324 proceedings already proposed applying Begemann in view of Sugiura and Wait against claims 7-9, but it was found that the requester failed to show how Sugiura teaches the claimed reflective layers of claim 8 (the '2324 proceedings, Determination dated 12/7/2012, p. 21). Similarly, the requester of the '680 proceedings already proposed applying Begemann in view of Schweber and further in view of any of Matsubara, Sugiura, Abe, and Watabe against claim 8, but it was determined that none of Matsubara, Sugiura, Abe and Watabe taught the features of claim 8, particularly Sugiura (the '680 proceedings, Determination dated 12/7/12, p. 18).

However, a reconsideration of Sugiura shows that it does, in fact, teach the first and second reflective layers on opposite sides of the active layer, as required by claim 8. In each of the '680 and '2324 Determinations, it was indicated that one of Sugiura's first and second reflectors is the sapphire substrate and that claim 8 requires the substrate and the reflectors to be **separate** structures. (See the '680 proceedings, Determination dated 12/7/2012, p. 18 and the '2324 proceedings, Determination dated 12/7/2012, p. 21. Sugiura makes clear that the sapphire substrate is **not** a reflector but, instead, has a reflector deposited on the substrate, in the form of multilayer SiO_2 and TiO_2, thereby showing that the reflector is a separate structure:

> Next, the wafer is put into the MOCVD apparatus again, and, on the current narrowing layer **57**, there is grown a p-type GaN contact layer **58** into which Mg has been doped. After the growth of the p-type GaN contact layer **58**, the wafer is removed from within the MOCVD apparatus. Further, over approximately the whole surface of the p-type GaN contact layer **58**, **a multi-layer film comprising SiO_2 and TiO_2** is laminated by vapor deposition. Subsequently, by the use of the photolithography technique, the multi-layer film is processed into a predetermined shape, whereby a **first reflector 59** is formed. On the other hand, **the multi-layer film (mask) 51-comprising SiO_2 and TiO_2-formed on the sapphire substrate 50 is rendered into a second reflector**.

(Sugiura, col. 16, lines 20-32; emphasis added)

Thus, Sugiura is being viewed light of this evidence as factually teaching first and second reflectors on opposite sides of the active layer.

Because Sugiura presents a new non-cumulative technological teaching when taken in combination with Begemann and Sugiura and any of Abe, Waitl, Bogner, Matsubara, and Shimizu, there is a substantial likelihood that a reasonable examiner would consider this combined teaching important in deciding whether or not the claims are patentable. Accordingly, **Begemann in view of Sugiura and any of Abe, Waitl, Bogner, Matsubara, and Shimizu raises a substantial new question of patentability as to claim 8** of the '770 patent.

4. Claim 9

Claim 9 reads,

> *9. A device as recited in **claim 8** wherein said reflective layers include multiple quantum wells.*

As noted above, in the '680 proceedings, the requester already proposed applying Begemann in view of Schweber and further in view of any of Matsubara, Sugiura, Abe, and Watabe and further in view of Kano against claim 9. The requester relied on Kano for teaching multiple quantum wells as a reflector, but it was found that there were other deficiencies in the combination. In particular, it was found that the requester had failed to provide the required detailed explanation as to how Kano would be relied on to modify Sugiura to meet the required order of layers in each of claim 7, from which claim 9 indirectly depends (the '680 proceedings, Determination dated 12/7/2012, pp. 18-19).

In the '2324 proceedings, Karwacki was relied on for teaching the use of multiple quantum wells as reflective layers in an LED structure (the '2324 proceedings, Determination dated 12/7/2012, p. 25). In fact, Karwacki teaches replacing the "Distributed Bragg Reflectors (DBRs)" with "Quantum Well Mirror (QWM)" (abstract and ¶ [0002]). The QWM includes multiple quantum layers (Karwacki, ¶ [0018]). See also the instant Request, pp. 33-34 regard the use of Karwacki's QWMs to replace Sugiura's DBRs. Because Karwacki teaches the use of QWM to replace DBR, Karwacki appears to be a better reference than the Kano reference applied in the '680 proceedings.

In addition, in the '2324 proceedings, Karwacki is not combined with Sugiura but is instead combined with Abe and Larkins (the '2324 proceedings, Determination dated 12/7/2012, pp. 24-25). Therefore, the modification of Sugiura by Karwacki has not before been considered.

It is also noted the Karwacki is not present in the '680 proceedings.

Because Karwacki presents a new non-cumulative technological teaching when taken in combination with Sugiura, there is a substantial likelihood that a reasonable examiner would consider this combined teaching important in deciding

whether or not the claims are patentable. Accordingly, **Begemann in view of Sugiura, Karwacki and any of Abe, Waitl, Bogner, Matsubara, and Shimizu raise a substantial new question of patentability as to claim 9** of the '770 patent.

In summary, the above proposed combination raises a substantial new question of patentability as to claim 8 and 9, but **not** as to claims 1 and 7.

B. The Request indicates that Requester believes claims 1 and 7-9 are unpatentable over Begemann in view of Nakamura, Karwacki, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu

(See Request, pp. 1, 5 [Issue No. 2], and 30-51.)

This rejection is essentially the same as above except that Nakamura replaces Sugiura. Accordingly, much of the discussion above applies equally here.

Of the above references, Nakamura and Bogner are new art; the rest are old art because they are currently being considered in the '680 and '2324 reexamination proceedings, as noted above. Nakamura was not before the Office during the original examination nor is Nakamura present in either of the copending '680 and '2324 proceedings, so Nakamura is new art. Accordingly, the proposed combination cannot be excluded from raising a substantial new question of patentability solely on the basis of including some old art.

Nakamura, like Sugiura, is entirely unnecessary to reject claims 1 and 7. For the same reasons as indicated in the previous section (§ III(A)(1) and (2)), the proposed combination of references does **not** raise a substantial new question of patentability as to claims 1 and 7.

Because both Nakamura and Sugiura are relied on for their teachings directed to LED structures for use as Begemann's LEDs, Nakamura may be perceived as cumulative to Sugiura in this context. However, the LED structure presented in Nakamura is different from that in Sugiura and therefore not necessarily cumulative with regard to the LED structure. In particular, Nakamura teaches reflectors, **100** and **200**, on opposite sides of the active layer, as required by claim 8. This showing of reflectors is clearer than that in Sugiura; therefore, Nakamura is perhaps better than Sugiura in this regard. In addition, Karwacki is again applied in the instant Request for teaching the multiple quantum well reflectors, as required by claim 9, to replace Nakamura's reflectors **100**, **200** (Request, pp. 50-51).

Because Nakamura and Karwacki present new non-cumulative technological teachings when taken in combination with Begemann, there is a substantial likelihood that a reasonable examiner would consider this combined teaching important in deciding whether or not the claims are patentable. Accordingly,

Begemann in view of Nakamura, Karwacki and any of Abe, Waitl, Bogner, Matsubara, and Shimizu raises a substantial new question of patentability as to claims 8 and 9.

In summary, the above proposed combination raises a substantial new question of patentability as to claim 8 and 9, but **not** as to claims 1 and 7.

C. The Request indicates that Requester believes claims 1 and 7-9 are unpatentable over Begemann in view of Floyd, Karwacki, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu

(See Request, pp. 1, 5 [Issue No. 3], and 52-71.)

This rejection is essentially the same as above two proposed rejections except that Floyd replaces Nakamura or Sugiura. Accordingly, much of the discussion above applies equally here.

Of the above references, Floyd and Bogner are new art; the rest are old art because they are currently being considered in the '680 and '2324 reexamination proceedings, as noted above. Floyd was not before the Office during the original examination nor is Floyd present in either of the copending '680 and '2324 proceedings, so Floyd is new art. Accordingly, the proposed combination cannot be excluded from raising a substantial new question of patentability solely on the basis of including some old art.

Floyd, like Sugiura, is entirely unnecessary to reject claims 1 and 7. For the same reasons as indicated above in § III(A)(1) and (2), the proposed combination of references does **not** raise a substantial new question of patentability as to claims 1 and 7.

Because both Floyd and Sugiura are relied on for their teaching directed to LED structures for use as Begemann's LEDs, Floyd may be perceived as cumulative to Sugiura in this context. However, the LED structure presented in Floyd is different from that in Sugiura and therefore not necessarily cumulative with regard to the LED structure. In particular, Floyd teaches DBRs reflectors, **206** and **234**, on opposite sides of the active layer, as required by claim 8 depends. This showing of reflectors is clearer than that in Sugiura; therefore, Floyd is perhaps better than Sugiura in this regard. In addition, Karwacki is again applied in the instant Request for teaching the multiple quantum well reflectors, as required by claim 9, to replace Floyd's DBRs **206**, **234** (Request, pp. 70-71).

Because Floyd and Karwacki present new non-cumulative technological teachings when taken in combination with Begemann, there is a substantial likelihood that a reasonable examiner would consider this combined teaching important in deciding whether or not the claims are patentable. Accordingly, Begemann in view of Floyd,

Karwacki, and any of Abe, Waitl, Bogner, Matsubara, and Shimizu raises a substantial new question of patentability as to claims 8 and 9.

In summary, the above proposed combination raises a substantial new question of patentability as to claim 8 and 9, but **not** as to claims 1 and 7.

NOTICE RE PATENT OWNER'S CORRESPONDENCE ADDRESS

Effective May 16, 2007, 37 CFR 1.33(c) has been revised to provide that:

The patent owner's correspondence address for all communications in an *ex parte* reexamination or an *inter partes* reexamination is designated as the correspondence address of the patent.

> Revisions and Technical Corrections Affecting Requirements for *Ex Parte* and *Inter Partes* Reexamination, 72 FR 18892 (April 16, 2007) (Final Rule)

The correspondence address for any pending reexamination proceeding not having the same correspondence address as that of the patent is, by way of this revision to 37 CFR 1.33(c), automatically changed to that of the patent file as of the effective date.

This change is effective for any reexamination proceeding which is pending before the Office as of May 16, 2007, including the present reexamination proceeding, and to any reexamination proceeding which is filed after that date.

Parties are to take this change into account when filing papers, and direct communications accordingly.

In the event the patent owner's correspondence address listed in the papers (record) for the present proceeding is different from the correspondence address of the patent, it is strongly encouraged that the patent owner affirmatively file a Notification of Change of Correspondence Address in the reexamination proceeding and/or the patent (depending on which address patent owner desires), to conform the address of the proceeding with that of the patent and to clarify the record as to which address should be used for correspondence.

Telephone Numbers for reexamination inquiries:

Reexamination	(571) 272-7703
Central Reexam Unit (CRU)	(571) 272-7705
Reexamination Facsimile Transmission No.	(571) 273-9900

Conclusion

Extensions of time under 37 CFR 1.136(a) will not be permitted in these proceedings because the provisions of 37 CFR 1.136 apply only to "an applicant" and not to parties in a reexamination proceeding. Additionally, 35 U.S.C. 305 requires that reexamination proceedings "will be conducted with special dispatch" (37 CFR 1.550(a)). Extension of time in reexamination proceedings are provided for in 37 CFR 1.550(c).

After the filing of a request for reexamination by a third party requester, any document filed by either the patent owner of the third party requester must be served on the other party (or parties where two or more third-party-requester proceedings are merged) in the reexamination proceeding in the manner provided in 37 CFR 1.248. See 37 CFR 1.550(f).

The patent owner is reminded of the continuing responsibility under 37 CFR 1.565(a) to apprise the Office of any litigation activity, or other prior or concurrent proceeding, throughout the course of this reexamination proceeding. The third party requester is also reminded of the ability to similarly apprise the Office of any such activity or proceeding throughout the course of this reexamination proceeding. See MPEP §§ 2207, 2282 and 2286.

All correspondence relating to this *ex parte* reexamination proceeding should be directed as follows:

By **U.S. Postal Service Mail** to:

Mail Stop *Ex Parte* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

By FAX to: (571) 273-9900
Central Reexamination Unit

By hand to: Customer Service Window
Randolph Building
401 Dulany St.
Alexandria, VA 22314

By EFS-Web:

Registered users of EFS-Web may alternatively submit such correspondence via the electronic filing system EFS-Web, at

https://efs.uspto.gov/efile/myportal/efs-registered

EFS-Web offers the benefit of quick submission to the particular area of the Office that needs to act on the correspondence. Also, EFS-Web submissions are "soft scanned" (i.e., electronically uploaded) directly into the official file for the reexamination proceeding, which offers parties the opportunity to review the content of their submissions after the "soft scanning" process is complete.

Any inquiry concerning this communication or earlier communications from the Reexamination Legal Advisor or Examiner, or as to the status of this proceeding, should be directed to the Central Reexamination Unit at telephone number (571) 272-7705.

Signed:

/Erik Kielin/
Primary Examiner
Central Reexam Unit 3992

Conferees:

/Hetul Patel/
Primary Examiner, Art Unit 3992

/Jennifer C McNeil/

Supervisory Patent Examiner, Art Unit 3992

Order Granting / Denying Request For Ex Parte Reexamination	**Control No.** 90/012,957	**Patent Under Reexamination** 6465961
	Examiner ERIK KIELIN	**Art Unit** 3992

--The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

The request for *ex parte* reexamination filed *26 August 2013* has been considered and a determination has been made. An identification of the claims, the references relied upon, and the rationale supporting the determination are attached.

Attachments: a)☐ PTO-892, b)☒ PTO/SB/08, c)☐ Other: _____

1. ☒ The request for *ex parte* reexamination is GRANTED.

RESPONSE TIMES ARE SET AS FOLLOWS:

For Patent Owner's Statement (Optional): TWO MONTHS from the mailing date of this communication (37 CFR 1.530 (b)). **EXTENSIONS OF TIME ARE GOVERNED BY 37 CFR 1.550(c).**

For Requester's Reply (optional): TWO MONTHS from the **date of service** of any timely filed Patent Owner's Statement (37 CFR 1.535). **NO EXTENSION OF THIS TIME PERIOD IS PERMITTED.** If Patent Owner does not file a timely statement under 37 CFR 1.530(b), then no reply by requester is permitted.

2. ☐ The request for *ex parte* reexamination is DENIED.

This decision is not appealable (35 U.S.C. 303(c)). Requester may seek review by petition to the Commissioner under 37 CFR 1.181 within ONE MONTH from the mailing date of this communication (37 CFR 1.515(c)). **EXTENSION OF TIME TO FILE SUCH A PETITION UNDER 37 CFR 1.181 ARE AVAILABLE ONLY BY PETITION TO SUSPEND OR WAIVE THE REGULATIONS UNDER 37 CFR 1.183.**

In due course, a refund under 37 CFR 1.26 (c) will be made to requester:

a) ☐ by Treasury check or,

b) ☐ by credit to Deposit Account No. _____, or

c) ☐ by credit to a credit card account, unless otherwise notified (35 U.S.C. 303(c)).

cc:Requester (if third party requester)

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90012957	6465961
	Examiner	Art Unit
	ERIK KIELIN	3992

CPC- SEARCHED		
Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Reviewed prosecution history of US application 09/939,340 and co-pending reexamination proceedings 95/000,680 and 95/002,324	11/5/2013	/EK/

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

Doc code: IDS
Doc description: Information Disclosure Statement (IDS) Filed
PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2013-08-26
First Named Inventor	
Art Unit	3992
Examiner Name	Erik Kielin
Attorney Docket Number	35784-0004RX2

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5535230	A	1996-07-09	Abe	
	2	5777350	A	1998-07-07	Nakamura et al	
	3	5998925	A	1999-12-07	Shimizu et al	
	4	6015979	A	2000-01-18	Sugiura et al	
	5	6160833	A	2000-12-12	Floyd et al	
	6	6220722	B1	2001-04-24	Begemann	

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Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.K./

Receipt date: 08/26/2013	Application Number	90012957 - GAU: 3992
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Filing Date	2013-08-26
	First Named Inventor	
	Art Unit	
	Examiner Name	
	Attorney Docket Number	35784-0004RX2

	1	20020159490	A1	2002-10-31	Karwacki	

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FOREIGN PATENT DOCUMENTS Remove

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	CA2260389	CA	A1	1999-07-30	WEITZEL et al		☐
	2	EP977278	EP	A3	2000-05-31	Matsubara et al		☐
	3	WO2000017569	WO	A1	2000-03-30	BEGEMANN		☐

If you wish to add additional Foreign Patent Document citation information please click the Add button Add

NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Bogner, et al., "White LED," Proceedings of SPIE, pp. 143-150, January 28, 1999	☐
	2	RP Photonics Encyclopedia, "Bragg Mirrors," reprinted from http://www.rp-photonics.com/bragg_mirrors.html, reprinted on August 24, 2013	☐

If you wish to add additional non-patent literature document citation information please click the Add button Add

EXAMINER SIGNATURE

Examiner Signature	/Erik Kielin/	Date Considered	11/05/2013

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.K./

Receipt date: 08/26/2013	Application Number	90012957 - GAU: 3992
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Filing Date	2013-08-26
	First Named Inventor	
	Art Unit	
	Examiner Name	
	Attorney Docket Number	35784-0004RX2

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.K./

Receipt date: 08/26/2013	Application Number	90012957 - GAU: 3992
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (**Not for submission under 37 CFR 1.99**)	Filing Date	2013-08-26
	First Named Inventor	
	Art Unit	
	Examiner Name	
	Attorney Docket Number	35784-0004RX2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas A. Rozylowicz/	Date (YYYY-MM-DD)	2013-08-26
Name/Print	Thomas A. Rozylowicz	Registration Number	50620

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /E.K./

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Reexamination	Application/Control No.	Applicant(s)/Patent Under Reexamination
	90/012,957	6465961
	Certificate Date	Certificate Number

Requester	Correspondence Address:	☐ Patent Owner	☒ Third Party

FISH & RICHARDSON P.C. (DC)
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

LITIGATION REVIEW ☒	/EK/ (examiner initials)	08/27/2013 (date)
Case Name		Director Initials
Cao Group v. GE Lighting, et al. U.S. District-Utah (Central) 2:11cv00426 (Stayed for reexamination on 3/25/2013)		/JM/ for IY

COPENDING OFFICE PROCEEDINGS	
TYPE OF PROCEEDING	NUMBER
1. Inter partes reexamination	95/000,680
2. Inter partes reexamination	95/002,324
3.	
4.	

REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,957	08/26/2013	6465961

CONFIRMATION NO. 6150

REEXAM ASSIGNMENT NOTICE

109488
Maschoff Brennan
1389 Center Drive, Suite 300
Park City, UT 84098

OC000000063586684

Date Mailed: 09/05/2013

NOTICE OF ASSIGNMENT OF REEXAMINATION REQUEST

The above-identified request for reexamination has been assigned to Art Unit 3992. All future correspondence to the proceeding should be identified by the control number listed above and directed to the assigned Art Unit.

A copy of this Notice is being sent to the latest attorney or agent of record in the patent file or to all owners of record. (See 37 CFR 1.33(c)). If the addressee is not, or does not represent, the current owner, he or she is required to forward all communications regarding this proceeding to the current owner(s). An attorney or agent receiving this communication who does not represent the current owner(s) may wish to seek to withdraw pursuant to 37 CFR 1.36 in order to avoid receiving future communications. If the address of the current owner(s) is unknown, this communication should be returned within the request to withdraw pursuant to Section 1.36.

NOTICE OF USPTO EX PARTE REEXAMINATION PATENT OWNER STATEMENT WAIVER PROGRAM

The USPTO has implemented a pilot program where, after a reexamination proceeding has been granted a filing date and before the examiner begins his or her review, the patent owner may orally waive the right to file a patent owner's statement. See *"Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings,"* 75 FR 47269 (August 5, 2010). One goal of the pilot program is to reduce the pendency of reexamination proceedings and improve the efficiency of the reexamination process.

Ordinarily when ex parte reexamination is ordered, the USPTO must wait until after the receipt of the patent owner's statement and the third party requester's reply, or after the expiration of the time period for filing the statement and reply (a period that can be as long as 5 to 6 months), before mailing a first determination of patentability. The USPTO's first determination of patentability is usually a first Office action on the merits or a Notice of Intent to Issue Reexamination Certificate (NIRC).

Under the pilot program, the patent owner's oral waiver allows the USPTO to act on the first determination of patentability immediately after determining that reexamination will be ordered, and in a suitable case issue the reexamination order and the first determination of patentability (which could be a NIRC if the claims under reexamination are confirmed) at the same time.

Benefits to the Patent Owner for participating in this pilot program include reduction in pendency.

To participate in this pilot program, Patent Owners may contact the USPTO's Central Reexamination Unit (CRU) at 571-272-7705. The USPTO will make the oral waiver of record in the reexamination file in an interview summary and a copy will be mailed to the patent owner and any third party requester.

cc: Third Party Requester(if any)
FISH & RICHARDSON PC
P O BOX 1022
MINNEAPOLIS, MN 55440-1022

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

REEXAM CONTROL NUMBER	FILING OR 371 (c) DATE	PATENT NUMBER
90/012,957	08/26/2013	6465961

CONFIRMATION NO. 6150

FISH & RICHARDSON PC
P O BOX 1022
MINNEAPOLIS, MN 55440-1022

REEXAMINATION REQUEST NOTICE

Date Mailed: 09/05/2013

NOTICE OF REEXAMINATION REQUEST FILING DATE

(Third Party Requester)

Requester is hereby notified that the filing date of the request for reexamination is 08/26/2013, the date that the filing requirements of 37 CFR § 1.510 were received.

A decision on the request for reexamination will be mailed within three months from the filing date of the request for reexamination. (See 37 CFR 1.515(a)).

A copy of the Notice is being sent to the person identified by the requester as the patent owner. Further patent owner correspondence will be the latest attorney or agent of record in the patent file. (See 37 CFR 1.33). Any paper filed should include a reference to the present request for reexamination (by Reexamination Control Number).

cc: Patent Owner
109488
Maschoff Brennan
1389 Center Drive, Suite 300
Park City, UT 84098

/rbell/

Legal Instruments Examiner
Central Reexamination Unit 571-272-7705; FAX No. 571-273-9900

Patent Assignment Abstract of Title

Total Assignments: 1

Application #: 09939340 **Filing Dt:** 08/24/2001 **Patent #:** 6465961 **Issue Dt:** 10/15/2002
PCT #: NONE **Publication #:** NONE **Pub Dt:**
Inventor: Densen Cao
Title: SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS

Assignment: 1

Reel/Frame: 012126 / 0261 **Received:** 09/06/2001 **Recorded:** 08/24/2001 **Mailed:** 11/05/2001 **Pages:** 2
Conveyance: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).
Assignor: CAO, DENSEN **Exec Dt:** 08/13/2001
Assignee: CAO GROUP, INC.
8683 SOUTH 700 WEST
SANDY, UTAH 84070
Correspondent: PARSONS, BEHLE & LATIMER
DANIEL P. MCCARTHY
201 SOUTH MAIN STREET, SUITE 1800
SALT LAKE CITY, UT 84111

Search Results as of: 09/04/2013 10:19 AM

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
90/012,957	08/26/2013	6465961	35784-0004RX2	6150.

109488 7590 09/04/2013

Maschoff Brennan
1389 Center Drive, Suite 300
Park City, UT 84098

EXAMINER	
ART UNIT	PAPER NUMBER

MAIL DATE	DELIVERY MODE
09/04/2013	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patents and Trademark Office
P.O.Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

THIRD PARTY REQUESTER'S CORRESPONDENCE ADDRESS
FISH & RICHARDSON PC
P O BOX 1022
MINNEAPOLIS, MN 55440-1022

Date: MAILED

SEP 0 4 2013

CENTRAL REEXAMINATION UNIT

EX PARTE REEXAMINATION COMMUNICATION TRANSMITTAL FORM

REEXAMINATION CONTROL NO. : 90012957
PATENT NO. : 6465971
ART UNIT : 3992

Enclosed is a copy of the latest communication from the United States Patent and Trademark Office in the above identified ex parte reexamination proceeding (37 CFR 1.550(f)).

Where this copy is supplied after the reply by requester, 37 CFR 1.535, or the time for filing a reply has passed, no submission on behalf of the ex parte reexamination requester will be acknowledged or considered (37 CFR 1.550(g)).

Ex Parte Reexamination Interview Summary – Pilot Program for Waiver of Patent Owner's Statement	Control No. 90/012,957	Patent For Which Reexamination is Requested 6,465,961
	Examiner ANDREW FISCHER	Art Unit 3992

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address. --

All participants (USPTO official and patent owner):

(1) MANUEL SALDANA, CRU (3)

(2) TERRY S. JONES REG. NO. 62,039 (4)

Date of Telephonic Interview: 09/04/2013.

The USPTO official requested waiver of the patent owner's statement pursuant to the pilot program for waiver of patent owner's statement in *ex parte* reexamination proceedings.*

☐ The patent owner **agreed** to waive its right to file a patent owner's statement under 35 U.S.C. 304 in the event reexamination is ordered for the above-identified patent.

☒ The patent owner **did not agree** to waive its right to file a patent owner's statement under 35 U.S.C. 304 at this time.

The patent owner is not required to file a written statement of this telephone communication under 37 CFR 1.560(b) or otherwise. However, any disagreement as to this interview summary must be brought to the immediate attention of the USPTO, and no later than one month from the mailing date of this interview summary. Extensions of time are governed by 37 CFR 1.550(c).

*For more information regarding this pilot program, see *Pilot Program for Waiver of Patent Owner's Statement in Ex Parte Reexamination Proceedings*, 75 *Fed. Reg.* 47269 (August 5, 2010), available on the USPTO Web site at http://www.uspto.gov/patents/law/notices/2010.jsp.

☐ USPTO personnel were unable to reach the patent owner.

The patent owner may contact the USPTO personnel at the telephone number provided below if the patent owner decides to waive the right to file a patent owner's statement under 35 U.S.C. 304.

/MANUEL SALDANA/ 571-272-7740

Signature and telephone number of the USPTO official who contacted or attempted to contact the patent owner.

cc: Requester (if third party requester)

Litigation Search Report CRU 3999

Reexam Control No. 90/012,957

TO: ANDREW FISCHER	From: MANUEL SALDANA
Location: CRU	Location: CRU 3999
Art Unit: 3992	MDE 5D14
Date: 08/27/2013	Phone: (571) 272-7740
	MANUEL.SALDANA@uspto.gov

Search Notes

Litigation was found for US Patent Number: 6,465,961
DOCKET 2:11CV426 (NOT CLOSED).

1) I performed a KeyCite Search in Westlaw, which retrieves all history on the patent including any litigation.

2) I performed a search on the patent in Lexis CourtLink for any open dockets or closed cases.

3) I performed a search in Lexis in the Federal Courts and Administrative Materials databases for any cases found.

4) I performed a search in Lexis in the IP Journal and Periodicals database for any articles on the patent.

5) I performed a search in Lexis in the news databases for any articles about the patent or any articles about litigation on this patent.

Date of Printing: Aug 27, 2013

KEYCITE

C US PAT 6465961 SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS, Assignee: Cao Group, Inc. (Oct 15, 2002)

History

Direct History

=> 1 **SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS,** US PAT 6465961, 2002 WL 31314582 (U.S. PTO Utility Oct 15, 2002)

Patent Family

2 SEMICONDUCTOR LIGHT SOURCE HAS HEAT SINK WITH PANELS WHICH DIRECT EMISSION OF LIGHT FROM LIGHT SOURCE IN DESIRED DIRECTION, Derwent World Patents Legal 2003-101818

Assignments

3 ACTION: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS). NUMBER OF PAGES: 002, (DATE RECORDED: Aug 24, 2001)

Patent Status Files

.. Request for Re-Examination, (OG DATE: Jan 08, 2013)

.. Request for Re-Examination, (OG DATE: Nov 13, 2012)

.. Patent Suit(See LitAlert Entries),

Docket Summaries

7 CAO GROUP v. GE LIGHTING ET AL, (D.UTAH. May 10, 2011) (NO. 2:11CV00426), (28 USC 1338 PATENT INFRINGEMENT)

Litigation Alert

8 Derwent LitAlert P2011-22-82 (May 10, 2011) Action Taken: cause - 28 USC 1338 - complaint for PATENT INFRINGEMENT

Prior Art (Coverage Begins 1976)

C 9 ILLUMINATOR ASSEMBLY INCORPORATING LIGHT EMITTING DIODES, US PAT 5803579Assignee: Gentex Corporation, (U.S. PTO Utility 1998)

C 10 LIGHT-EMITTING DIODE ASSEMBLIES AND SYSTEMS THEREFORE, US PAT 4675575Assignee: E & G Enterprises, (U.S. PTO Utility 1987)

C 11 LIGHT EMITTING DIODE PLANAR LIGHT SOURCE WITH BLUE LIGHT OR ULTRAVIOLET RAY- EMITTING LUMINESCENT CRYSTAL WITH OPTIONAL UV FILTER, US PAT 5982092 (U.S. PTO Utility 1999)

C 12 LIGHT FIXTURE WITH AN LED LIGHT BULB HAVING A CONVENTIONAL CONNECTION POST, US PAT 5947588Assignee: Grand General Accessories Manufacturing, (U.S. PTO Utility 1999)

C 13 LONG LIGHT EMITTING APPARATUS, US PAT 5941626Assignee: Hiyoshi Electric Co., Ltd., (U.S. PTO Utility 1999)

C 14 PASSIVE AND ACTIVE INFRARED ANALYSIS GAS SENSORS AND APPLICABLE MULTICHANNEL DETECTOR ASSEMBLES, US PAT 5721430Assignee: Engelhard Sensor Technologies Inc., (U.S. PTO Utility 1998)

C 15 WEDGE-BASE LED BULB HOUSING, US PAT 5160200Assignee: R & D Molded Products, Inc., (U.S. PTO Utility 1992)

Click a docket number below to view a docket.

Patent Search Results

Edit Search

Results: 1 cases and their patents, totaling 1 items.

Re-run Search
This search was run on 8/27/2013

Update Docket(s) Email Docket(s)

Printer Friendly List
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Items 1 to 1 of 1

	Description	Docket Number
☐	Cao Group V. Ge Lighting Et Al	2:11cv426

Items 1 to 1 of 1

Update Docket(s) Email Docket(s)

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939340 (09) 6465961 October 15, 2002

UNITED STATES PATENT AND TRADEMARK OFFICE GRANTED PATENT

6465961

Get Drawing Sheet 1 of 16
Access PDF of Official Patent *
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Link to Claims Section

October 15, 2002

Semiconductor light source using a heat sink with a plurality of panels

INVENTOR: Cao, Densen - Sandy, Utah

APPL-NO: 939340 (09)

FILED-DATE: August 24, 2001

GRANTED-DATE: October 15, 2002

CORE TERMS: chip, layer, heat, sink, substrate, semiconductor, electrode, light source, electrically, conductive, array, depict, coating, electrical, cladding, emitted, enclosure, semiconductor devices, reflective, depicted, white light, interior, phosphor, insulative, emitting, adhesive, module, panel, convert, emit

ENGLISH-ABST:

A semiconductor light source for illuminating a physical space has been invented. In various embodiments of the invention, a semiconductor such as and LED chip, laser chip, LED chip array, laser array, an array of chips, or a VCSEL chip is mounted on a heat sink. The heat sink may have multiple panels for mounting chips in various orientations. The chips may be mounted directly to a primary heat sink which is in turn mounted to a multi-panel secondary heat sink. A TE cooler and air circulation may be provided to enhance heat dissipation. An AC/DC converter may be included in the light source fitting.

No Documents Found

No documents were found for your search terms

"6465961 OR 6,465,961"

Click "Save this search as an Alert" to schedule your search to run in the future.

- OR -

Click "Search Using Natural Language" to run your search as Natural Language search.

- OR -

Click "Edit Search" to return to the search form and modify your search.

Suggestions:

- Check for spelling errors.
- Remove some search terms.
- Use more common search terms, such as those listed in "Suggested Words and Concepts."
- Use a less restrictive date range.
- Use "OR" in between terms to search for one term or the other.

| **Save this Search as an Alert** || **Search Using Natural Language** || **Edit Search** |

In

No Documents Found

No documents were found for your search terms

"6465961 OR 6,465,961"

Click "Save this search as an Alert" to schedule your search to run in the future.

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- Use more common search terms, such as those listed in "Suggested Words and Concepts."
- Use a less restrictive date range.
- Use "OR" in between terms to search for one term or the other.

| **Save this Search as an Alert** || **Search Using Natural Language** || **Edit Search** |

In

1. Yatas Yatak ve Yorgan Sanayi Ticaret [ISE National -All Shares] drops on high volatility, News Bites - Central and Eastern Europe : Turkey, December 15, 2011 Thursday, 1060 words

2. CAO Group Files LED Light Source Patent Infringement Lawsuit, Marketwire, May 11, 2011 Wednesday 7:08 AM GMT, , 277 words, SALT LAKE CITY, UT; May 11, 2011

3. Weekly: Piramal Healthcare rises 4.4% on weak volume for a third consecutive week, a three week rise of 9.6%, Indian Company News Bites - Stock Report, March 5, 2011 Saturday, 2220 words

4. CAO Group's Patented Dynasty(TM) Integrated High Power LED Eliminates the Heat Sink; Opens More Applications to Energy Efficient Solid State Lighting Solutions , Business Wire, April 17, 2006 Monday 4:08 PM GMT, , 723 words, SANDY, Utah April 17, 2006

5. Corporation income tax returns, 1999., Statistics of Income. SOI Bulletin, June 22, 2002, Pg. 82(25), 92448367, 27884 words, Treubert, Patrice

6. Corporation income tax returns, 1999., Statistics of Income. SOI Bulletin, June 22, 2002, Pg. 82(25), 92448367, 27884 words, Treubert, Patrice

US District Court Civil Docket

U.S. District - Utah
(Central)

2:11cv426

Cao Group v. GE Lighting et al

This case was retrieved from the court on Friday, June 28, 2013

Date Filed:	**05/10/2011**	**Class Code:**	**OPEN**
Assigned To:	**Judge Dee Benson**	**Closed:**	
Referred To:	**Magistrate Judge Dustin B. Pead**	**Statute:**	**28:1338**
Nature of suit:	**Patent (830)**	**Jury Demand:**	**Plaintiff**
Cause:	**Patent Infringement**	**Demand Amount:**	**$0**
Lead Docket:	**None**	**NOS Description:**	**Patent**
Other Docket:	**None**		
Jurisdiction:	**Federal Question**		

Litigants	Attorneys
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Osram Sylvania
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Date	#	Proceeding Text
05/10/2011	1	Case has been indexed and assigned to Magistrate Judge Paul M. Warner. Plaintiff CAO Group is directed to E-File the Complaint and cover sheet (found under Complaints and Other Initiating Documents) and pay the filing fee of $ 350.00 by the end of the business day.NOTE: The court will not have jurisdiction until the opening document is electronically filed and the filing fee paid in the CM/ECF system. Civil Summons may be issued electronically. Prepare the summons using the courts PDF version and email it to utdecf_clerk@utd.uscourts.gov for issuance. (lnp) (Entered: 05/10/2011)
05/10/2011	2	COMPLAINT for Patent Infringement against All Defendants (Filing fee $ 350, receipt number 1088-1349535), filed by CAO Group. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Civil Cover Sheet) Assigned to Magistrate Judge Paul M. Warner (Straight, Samuel) (Entered: 05/10/2011)
05/10/2011	3	Report on the Filing of an action sent to the Director of the U.S. Patent and Trademark Office. (Attachments: # 1 Complaint) (lnp) (Entered: 05/11/2011)
05/23/2011	4	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Toshiba International. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)
05/23/2011	5	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Feit Electric. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)
05/23/2011	6	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Lighting Science Group. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)
05/23/2011	7	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Lights of America. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)
05/23/2011	8	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Nexxus Lighting. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)

05/23/2011	9	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Osram Sylvania. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)
05/23/2011	10	**RESTRICTED DOCUMENT**Summons Issued Electronically as to Sharp Electronics. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 05/23/2011)
06/29/2011	11	WAIVER OF SERVICE Returned Executed filed by CAO Group as to Sharp Electronics Waiver sent on 6/7/2011, answer due 8/8/2011. (Straight, Samuel) (Entered: 06/29/2011)
06/29/2011	12	NOTICE OF REQUIREMENTS for appearance phv mailed to attorney Benjamin Hershkowitz, for Defendant Sharp Electronics (alp) (Entered: 06/29/2011)
07/11/2011	13	**RESTRICTED DOCUMENT**Summons Issued Electronically as to GE Lighting. Instructions to Counsel:1. Click on the document number.2. If you are prompted for an ECF login, enter your 'Attorney' login to CM/ECF.3. Print the issued summons for service. (lnp) (Entered: 07/11/2011)
07/12/2011	14	WAIVER OF SERVICE Returned Executed filed by CAO Group as to Nexxus Lighting Waiver sent on 7/12/2011, answer due 9/12/2011. (McKinney, Mica) (Entered: 07/12/2011)
07/13/2011	15	NOTICE of Appearance by Alan L. Sullivan on behalf of Sharp Electronics (Sullivan, Alan) (Entered: 07/13/2011)
07/13/2011	16	NOTICE of Appearance by Amber M. Mettler on behalf of Sharp Electronics (Mettler, Amber) (Entered: 07/13/2011)
07/13/2011	17	MOTION for Admission Pro Hac Vice of Benjamin Hershkowitz, Registration fee $ 15, receipt number 1088-1391968, filed by Defendant Sharp Electronics. (Attachments: # 1 Exhibit A - Application, # 2 Exhibit B - ECF Registration Form, # 3 Text of Proposed Order for Admission Pro Hac Vice)(Mettler, Amber) (Entered: 07/13/2011)
07/13/2011	18	NOTICE OF ADR, e-mailed or mailed to Defendant Sharp Electronics. (alp) (Entered: 07/13/2011)
07/14/2011	19	ORDER granting 17 Motion for Admission Pro Hac Vice of Benjamin Hershkowitz for Sharp Electronics. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Magistrate Judge Paul M. Warner on 7/14/11. (alp) (Entered: 07/14/2011)
07/18/2011	20	STIPULATION re 2 Complaint, and Motion for Extension of TIme in Which to Respond by Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 07/18/2011)
07/18/2011	21	NOTICE OF DEFICIENCY re 20 Stipulation. The document 20 was filed as a Stipulation. The clerk requests the filer of the original document to refile the pleading as a Stipulated Motion for Extension of Time to Answer. The new pleading will receive a new document number on the docket. (asp) (Entered: 07/18/2011)
07/18/2011	22	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 07/18/2011)
07/18/2011	23	**RESTRICTED DOCUMENT** SUMMONS Returned Executed by CAO Group as to GE Lighting served on 7/12/2011, answer due 8/2/2011. (McKinney, Mica) (Entered: 07/18/2011)
07/19/2011	24	ORDER granting 22 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Sharp Electronics answer due 10/7/2011. Signed by Magistrate Judge Paul M. Warner on 07/19/2011. (asp) (Entered: 07/19/2011)
07/22/2011	25	MOTION for Extension of Time to File Answer re 2 Complaint, filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) (Entered: 07/22/2011)
07/27/2011	26	ORDER granting 25 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for GE Lighting answer due 9/2/2011. Signed by Magistrate Judge Paul M. Warner on 07/26/2011. (asp) (Entered: 07/27/2011)
07/28/2011	27	**RESTRICTED DOCUMENT** SUMMONS Returned Executed by CAO Group as to Lighting Science Group served on 7/15/2011, answer due 8/5/2011. (McKinney, Mica) (Entered: 07/28/2011)
07/28/2011	28	**RESTRICTED DOCUMENT** SUMMONS Returned Executed by CAO Group as to Osram Sylvania served on 7/15/2011, answer due 8/5/2011. (McKinney, Mica) (Entered: 07/28/2011)

08/03/2011	29	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) (Entered: 08/03/2011)
08/03/2011	30	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) (Entered: 08/03/2011)
08/04/2011	31	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) (Entered: 08/04/2011)
08/04/2011	32	ORDER granting 29 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Nexxus Lighting answer due 10/7/2011. Signed by Magistrate Judge Paul M. Warner on 08/04/2011. (asp) (Entered: 08/04/2011)
08/04/2011	33	ORDER granting 30 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Osram Sylvania answer due 10/7/2011. Signed by Magistrate Judge Paul M. Warner on 08/04/2011. (asp) (Entered: 08/04/2011)
08/04/2011	34	MOTION for Admission Pro Hac Vice of Paul T. Meiklejohn, Registration fee $ 15, receipt number 1088-1407308, filed by Defendant Toshiba International. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3)(Marsden, Milo) (Entered: 08/04/2011)
08/04/2011	35	MOTION for Admission Pro Hac Vice of Douglas E. Stewart, Registration fee $ 15, receipt number 1088-1407351, filed by Defendant Toshiba International. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3)(Marsden, Milo) (Entered: 08/04/2011)
08/04/2011	36	Stipulated MOTION for Extension of Time to File Answer to Complaint filed by Defendant Toshiba International. (Attachments: # 1 Text of Proposed Order 1)(Marsden, Milo) Modified on 8/8/2011 ; corrected relief from for Extension of Time to File Response/Reply to for Extension of Time to File Answer (asp). (Entered: 08/04/2011)
08/08/2011	37	ORDER granting 31 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Lighting Science Group answer due 10/7/2011. Signed by Magistrate Judge Paul M. Warner on 08/08/2011. (asp) (Entered: 08/08/2011)
08/08/2011	38	ORDER granting 36 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Toshiba International answer due 10/7/2011. Signed by Magistrate Judge Paul M. Warner on 08/08/2011. (asp) (Entered: 08/08/2011)
08/08/2011	39	ORDER granting 35 Motion for Admission Pro Hac Vice of Douglas F. Stewart,Paul T. Meiklejohn for Toshiba International. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov; granting 34 Motion for Admission Pro Hac Vice of Douglas F. Stewart,Paul T. Meiklejohn for Toshiba International. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Magistrate Judge Paul M. Warner on 08/08/2011. (asp) (Entered: 08/08/2011)
08/12/2011	40	MOTION for Admission Pro Hac Vice of Mark R. Malek, Registration fee $ 15, receipt number 1088-1412494, filed by Defendant Lighting Science Group. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Text of Proposed Order)(Greenwood, Christine) (Entered: 08/12/2011)
08/12/2011	41	MOTION for Admission Pro Hac Vice of Mark R. Warzecha, Registration fee $ 15, receipt number 1088-1412499, filed by Defendant Lighting Science Group. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Text of Proposed Order)(Greenwood, Christine) (Entered: 08/12/2011)
08/12/2011	42	MOTION for Admission Pro Hac Vice of Scott D. Nyman, Registration fee $ 15, receipt number 1088-1412505, filed by Defendant Lighting Science Group. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Text of Proposed Order)(Greenwood, Christine) (Entered: 08/12/2011)
08/12/2011	43	NOTICE of Appearance by Christine T. Greenwood on behalf of Lighting Science Group (Greenwood, Christine) (Entered: 08/12/2011)
08/15/2011	44	ORDER granting 40 Motion for Admission Pro Hac Vice of Mark Malek for Lighting Science Group. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Magistrate Judge Paul M. Warner on 8/15/11. (alp) (Entered: 08/15/2011)
08/15/2011	45	ORDER granting 42 Motion for Admission Pro Hac Vice of Scott Nyman for Lighting Science Group. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Magistrate Judge Paul M. Warner on 8/15/11. (alp) (Entered: 08/15/2011)

08/15/2011	46	ORDER granting 41 Motion for Admission Pro Hac Vice of Mark Warzecha for Lighting Science Group. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Magistrate Judge Paul M. Warner on 8/15/11. (alp) (Entered: 08/15/2011)
08/25/2011	47	**RESTRICTED DOCUMENT** SUMMONS Returned Executed by CAO Group as to Lights of America served on 8/11/2011, answer due 9/1/2011. (Straight, Samuel) (Entered: 08/25/2011)
09/02/2011	48	ANSWER to Complaint with Jury Demand, COUNTERCLAIM against CAO Group filed by GE Lighting.(Sanders, Gregory) (Entered: 09/02/2011)
09/02/2011	49	MOTION for Admission Pro Hac Vice of Jeffrey A. Andrews, Registration fee $ 15, receipt number 1088-1427427, filed by Counter Claimant GE Lighting, Defendant GE Lighting. (Attachments: # 1 Exhibit Application for Admission Pro Hac Vice, # 2 Exhibit ECF Registration Form, # 3 Text of Proposed Order Order for Pro Hac Vice Admission)(Sanders, Gregory) (Entered: 09/02/2011)
09/02/2011	50	MOTION for Admission Pro Hac Vice of Robert J. McAughan, Jr., Registration fee $ 15, receipt number 1088-1427428, filed by Counter Claimant GE Lighting, Defendant GE Lighting. (Attachments: # 1 Exhibit Application for Admission Pro Hac Vice, # 2 Exhibit ECF Registration Form, # 3 Text of Proposed Order Proposed Order)(Sanders, Gregory) (Entered: 09/02/2011)
09/02/2011	51	MOTION for Admission Pro Hac Vice of Daniel G. Nguyen, Registration fee $ 15, receipt number 1088-1427429, filed by Counter Claimant GE Lighting, Defendant GE Lighting. (Attachments: # 1 Exhibit Application for Admission Pro Hac Vice, # 2 Exhibit ECF Registration Form, # 3 Text of Proposed Order Proposed Order)(Sanders, Gregory) (Entered: 09/02/2011)
09/06/2011	52	ORDER granting 49 Motion for Admission Pro Hac Vice of Jeffrey A. Andrews,Robert J. McAughan, Jr,Daniel G. Nguyen for GE Lighting. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov; granting 50 Motion for Admission Pro Hac Vice of Jeffrey A. Andrews,Robert J. McAughan, Jr,Daniel G. Nguyen for GE Lighting. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov; granting 51 Motion for Admission Pro Hac Vice of Jeffrey A. Andrews,Robert J. McAughan, Jr,Daniel G. Nguyen for GE Lighting. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Magistrate Judge Paul M. Warner on 09/06/2011. (Attachments: # 1 Nguyen, # 2 McAughan) (asp) (Entered: 09/06/2011)
09/07/2011	53	NOTICE OF ADR, e-mailed or mailed to Plaintiff CAO Group, Defendants GE Lighting, Lighting Science Group, Toshiba International. (alp) (Entered: 09/07/2011)
09/08/2011	54	WAIVER OF SERVICE Returned Executed filed by CAO Group as to Feit Electric Waiver sent on 8/15/2011, answer due 10/14/2011. (Straight, Samuel) (Entered: 09/08/2011)
09/12/2011	55	NOTICE OF REQUIREMENTS for appearance phv mailed to attorney Paul Marron, for Defendant Feit Electric (alp) (Entered: 09/12/2011)
09/16/2011	56	Stipulated MOTION for Extension of Time to File Answer 48 Counterclaim filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) Modified on 9/20/2011 ; changed relief from for Extension of Time to File Response/Reply to for Extension of Time to File Answer (asp). (Entered: 09/16/2011)
09/20/2011	57	MOTION to Dismiss or Sever filed by Defendant GE Lighting. (Attachments: # 1 Text of Proposed Order)(McAughan, Robert). Added MOTION to Sever on 9/21/2011 (asp). (Entered: 09/20/2011)
09/20/2011	58	MEMORANDUM in Support re 57 MOTION to Dismiss or Sever filed by Defendant GE Lighting. (Attachments: # 1 Exhibit 1, # 2 Exhibit 2, # 3 Exhibit 3, # 4 Exhibit 4, # 5 Exhibit 5, # 6 Exhibit 6)(McAughan, Robert) (Entered: 09/20/2011)
09/21/2011	59	ORDER granting 56 Motion for Extension of Time to Answer re 48 Counterclaim. Answer deadline updated for CAO Group answer due 10/26/2011. Signed by Magistrate Judge Paul M. Warner on 09/20/2011. (asp) (Entered: 09/21/2011)
10/05/2011	60	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 10/05/2011)
10/05/2011	61	NOTICE of Appearance by Barbara K. Polich on behalf of Osram Sylvania (Polich, Barbara) (Entered: 10/05/2011)
10/05/2011	62	MOTION for Admission Pro Hac Vice of Alan D. Smith, Registration fee $ 15, receipt number 1088-1448775, filed by Defendant Osram Sylvania. (Attachments: # 1 Exhibit Application, # 2

		Exhibit ECF Registration Form, # 3 Text of Proposed Order Proposed Order for Admission Pro Hac Vice)(Polich, Barbara) (Entered: 10/05/2011)
10/05/2011	63	MOTION for Admission Pro Hac Vice of Christopher Dillon, Registration fee $ 15, receipt number 1088-1448779, filed by Defendant Osram Sylvania. (Attachments: # 1 Exhibit Admission Application, # 2 Exhibit ECF Registration Form, # 3 Text of Proposed Order Admission Pro Hac Vice)(Polich, Barbara) (Entered: 10/05/2011)
10/05/2011	64	MOTION for Admission Pro Hac Vice of Stephen A. Marshall, Registration fee $ 15, receipt number 1088-1448782, filed by Defendant Osram Sylvania. (Attachments: # 1 Exhibit Admission Application, # 2 Exhibit ECF Registration Form, # 3 Text of Proposed Order Admission Pro Hac Vice)(Polich, Barbara) (Entered: 10/05/2011)
10/06/2011	65	NOTICE OF ADR, e-mailed or mailed to Defendant Osram Sylvania. (alp) (Entered: 10/06/2011)
10/06/2011	66	ORDER granting 60 Motion for Extension of Time to Answer. Answer deadline updated for Sharp Electronics answer due 10/14/2011. Signed by Magistrate Judge Paul M. Warner on 10/5/11. (alp) (Entered: 10/06/2011)
10/06/2011	67	ORDER granting 62 63 64 Motions for Admission Pro Hac Vice of Alan D Smith,Stephen A. Marshall,Christopher Dillion for Osram Sylvania. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov;. Signed by Magistrate Judge Paul M. Warner on 10/6/11. (alp) (Entered: 10/06/2011)
10/07/2011	68	LIGHTS OF AMERICA, INC.S ANSWER to Complaint with Jury Demand, COUNTERCLAIM against CAO Group filed by Lights of America.(Phillips, Gregory) (Entered: 10/07/2011)
10/07/2011	69	MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Defendant Osram Sylvania. (Polich, Barbara) (Entered: 10/07/2011)
10/07/2011	70	MEMORANDUM in Support re 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Defendant Osram Sylvania. (Attachments: # 1 Exhibit AFTG-TG LLC, et. al. v. Feature Integration Technology Inc., et. al.)(Polich, Barbara) (Entered: 10/07/2011)
10/07/2011	71	MEMORANDUM in Opposition re 57 MOTION to Dismiss or Sever MOTION to Sever filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Exhibit D)(McKinney, Mica) (Entered: 10/07/2011)
10/07/2011	72	MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Defendant Lighting Science Group. (Attachments: # 1 Text of Proposed Order)(Greenwood, Christine) (Entered: 10/07/2011)
10/07/2011	73	MEMORANDUM in Support re 72 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Defendant Lighting Science Group. (Greenwood, Christine) (Entered: 10/07/2011)
10/07/2011	74	ANSWER to Complaint with Jury Demand filed by Toshiba International.(Stewart, Douglas) (Entered: 10/07/2011)
10/07/2011	80	COUNTERCLAIM against CAO Group, filed by Toshiba International. See document 74 for image. (asp) (Entered: 10/17/2011)
10/10/2011	75	ANSWER to Complaint with Jury Demand, COUNTERCLAIM against CAO Group filed by Nexxus Lighting.(Crockett, Robert) (Entered: 10/10/2011)
10/10/2011	76	NOTICE of Appearance by Peter W. Billings on behalf of Nexxus Lighting (Billings, Peter) (Entered: 10/10/2011)
10/12/2011	77	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 10/12/2011)
10/13/2011	78	ORDER granting 77 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Sharp Electronics answer due 10/21/2011. Signed by Magistrate Judge Paul M. Warner on 10/13/2011. (asp) (Entered: 10/13/2011)
10/14/2011	79	FEIT ELECTRIC COMPANY, INC.'S ANSWER to Complaint with Jury Demand, COUNTERCLAIM against CAO Group filed by Feit Electric.(Phillips, Gregory) (Entered: 10/14/2011)
10/19/2011	81	MOTION for Extension of Time to File Answer re 2 Complaint, filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) (Entered: 10/19/2011)
10/20/2011	82	ORDER granting 81 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline

		updated for Sharp Electronics answer due 10/28/2011. Signed by Magistrate Judge Paul M. Warner on 10/20/2011. (asp) (Entered: 10/20/2011)
10/21/2011	83	REPLY to Response to Motion re 57 MOTION to Dismiss or Sever MOTION to Sever filed by Defendant GE Lighting. (Attachments: # 1 Exhibit 1)(McAughan, Robert) (Entered: 10/21/2011)
10/24/2011	84	DOCKET TEXT ORDER FOR CASE TO BE REASSIGNED. A fully briefed dispositive motion is pending and all parties have not yet answered and/or consented to the jurisdiction of a magistrate judge. Accordingly, this court orders reassignment of this case to a district judge. No attached document. Signed by Magistrate Judge Paul M. Warner on 10/24/2011. (srs) (Entered: 10/24/2011)
10/24/2011	85	MOTION for Admission Pro Hac Vice of Gary W. Smith, Registration fee $ 15, receipt number 254P6T95, filed by Defendant Lights of America. (Attachments: # 1 Exhibit Order for Pro Hac Vice Admission, # 2 Exhibit A - Application for Admission Pro Hac Vice, # 3 Exhibit B - ECF Registration Form)(Phillips, Gregory) (Entered: 10/24/2011)
10/24/2011		Judge Dale A. Kimball added. Magistrate Judge Paul M. Warner no longer assigned to case. (jmr) (Entered: 10/24/2011)
10/24/2011	86	Case Reassigned to District Judge per failure of one or more party(s)to return the Consent/Reassignment Form. Case randomly assigned to Judge Dale A. Kimball. Magistrate Judge Paul M. Warner no longer assigned to the case. (jmr) (Entered: 10/24/2011)
10/26/2011		Judge Dee Benson added. Judge Dale A. Kimball no longer assigned to case per recusal. (rks) (Entered: 10/26/2011)
10/26/2011	87	ORDER OF RECUSAL Judge Dale Kimball recused. Case reassigned to Judge Dee Benson for all further proceedings. Signed by Judge Dale A. Kimball on 10/25/11. (rks) Modified correcting recusal judge on 11/2/2011 (rks). (Entered: 10/26/2011)
10/26/2011	88	Stipulated MOTION for Extension of Time to File Response/Reply as to 68 Answer to Complaint, Counterclaim filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit)(McKinney, Mica) (Entered: 10/26/2011)
10/26/2011	89	MOTION for Extension of Time to File Response/Reply as to 48 Answer to Complaint, Counterclaim filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit)(McKinney, Mica) (Entered: 10/26/2011)
10/27/2011	90	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Mettler, Amber) (Entered: 10/27/2011)
10/27/2011	91	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 10/27/2011)
10/27/2011	92	Stipulated MOTION for Extension of Time to File Answer as to 74 Answer to Complaint filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit)(McKinney, Mica) Modified on 11/2/2011 by changing event type from Motion for Extension of time to File Response/Reply to Motion for Extension of Time to File Answer (tls). (Entered: 10/27/2011)
10/27/2011	93	ORDER granting 89 Motion for Extension of Time to File Response to Counterclaim Responses due by 11/2/2011. Signed by Judge Dee Benson on 10/27/2011. (tls) (Entered: 10/28/2011)
10/27/2011	94	ORDER granting 88 Motion for Extension of Time to File Response/Reply Replies due by 11/7/2011. Signed by Judge Dee Benson on 10/26/2011. (tls) (Entered: 10/28/2011)
11/01/2011	100	ORDER granting 91 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Sharp Electronics answer due 11/11/2011. Signed by Judge Dee Benson on 10/31/2011. (tls) (Entered: 11/02/2011)
11/02/2011	95	RESPONSE re 75 Answer to Complaint, Counterclaim, filed by CAO Group. (McKinney, Mica) (Entered: 11/02/2011)
11/02/2011	96	RESPONSE re 48 Answer to Complaint, Counterclaim, filed by CAO Group. (McKinney, Mica) (Entered: 11/02/2011)
11/02/2011	97	RESPONSE re 68 Answer to Complaint, Counterclaim, filed by CAO Group. (McKinney, Mica) (Entered: 11/02/2011)
11/02/2011	98	RESPONSE re 79 Answer to Complaint, Counterclaim, filed by CAO Group. (McKinney, Mica) (Entered: 11/02/2011)

11/02/2011	99	ORDER granting 92 Motion for Extension of Time to Answer re 74 Answer to Complaint and Counterclaim. Answer deadline updated for CAO Group(a Utah corporation) answer due 11/7/2011. Signed by Judge Dee Benson on 10/31/2011. (tls) (Entered: 11/02/2011)
11/02/2011	101	MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. filed by Plaintiff CAO Group. (McKinney, Mica) (Entered: 11/02/2011)
11/02/2011	102	MEMORANDUM in Support re 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit A, # 2 Exhibit B, # 3 Exhibit C, # 4 Exhibit D, # 5 Exhibit E, # 6 Exhibit F, # 7 Exhibit G, # 8 Exhibit H, # 9 Exhibit I, # 10 Exhibit J, # 11 Exhibit K, # 12 Exhibit L, # 13 Exhibit M, # 14 Exhibit N, # 15 Exhibit O)(McKinney, Mica) (Entered: 11/02/2011)
11/07/2011	103	RESPONSE to 80 COUNTERCLAIM , to Toshiba International Corporation's Counterclaim filed by CAO Group. (McKinney, Mica) Modified on 11/8/2011 ; added docket relationship to 80 (asp). (Entered: 11/07/2011)
11/07/2011	104	MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation filed by Plaintiff CAO Group. (McKinney, Mica) (Entered: 11/07/2011)
11/07/2011	105	MEMORANDUM in Support re 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit, # 2 Exhibit, # 3 Exhibit, # 4 Exhibit, # 5 Exhibit, # 6 Exhibit, # 7 Exhibit)(McKinney, Mica) (Entered: 11/07/2011)
11/07/2011	106	MEMORANDUM in Opposition re 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM to Defendant Osram Sylvania's Motion to Dismiss Plaintiff 's Complaint Pursuant to Fed. R. Civ. P. 12(B)(6) filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit)(McKinney, Mica) (Entered: 11/07/2011)
11/07/2011	107	MEMORANDUM in Opposition re 72 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM to Lighting Science Group Corporation's Motion to Dismiss or, in the Alternative, Motion for More Definite Statement filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit, # 2 Exhibit)(McKinney, Mica) (Entered: 11/07/2011)
11/10/2011	108	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 11/10/2011)
11/14/2011	109	ORDER granting 108 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Sharp Electronics answer due 12/2/2011. Signed by Judge Dee Benson on 11/14/2011. (asp) (Entered: 11/15/2011)
11/17/2011	110	ORDER granting 85 Motion for Admission Pro Hac Vice of Gary W. Smith for Feit Electric,Gary W. Smith for Lights of America. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Judge Dee Benson on 11/17/11. (jlw) (Entered: 11/18/2011)
11/21/2011	111	REPLY to Response to Motion re 72 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Defendant Lighting Science Group. (Greenwood, Christine) (Entered: 11/21/2011)
11/23/2011	112	REPLY to Response to Motion re 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Defendant Osram Sylvania. (Attachments: # 1 Exhibit Veto Pro Pac Complaint)(Polich, Barbara) (Entered: 11/23/2011)
11/30/2011	113	NOTICE OF HEARING ON MOTION re: 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, 72 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, 57 MOTION to Dismiss or Sever MOTION to Sever : (Notice generated by chambers) Motion Hearing set for 3/14/2012 02:30 PM in Room 246 before Judge Dee Benson. (reb) (Entered: 11/30/2011)
12/01/2011	114	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 12/01/2011)
12/02/2011	115	ORDER granting 114 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Sharp Electronics answer due 12/30/2011. Signed by Judge Dee Benson on 12/02/11. (jlw) (Entered: 12/02/2011)
12/05/2011	116	RESPONSE to Motion re 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. filed by Defendant GE Lighting. (McAughan, Robert) (Entered: 12/05/2011)

12/05/2011	117	MEMORANDUM in Opposition re 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation filed by Counter Claimant Toshiba International. (Attachments: # 1 Affidavit Declaration of D. Stewart in support of contingent Rule 56(d) discovery request, # 2 Text of Proposed Order [Proposed] Order Denying CAO's Motion To Dismiss)(Stewart, Douglas) (Entered: 12/05/2011)
12/07/2011	118	MEMORANDUM in Opposition re 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. filed by Defendants Feit Electric, Lights of America. (Smith, Gary) (Entered: 12/07/2011)
12/21/2011	119	Stipulated MOTION for Extension of Time to File Response/Reply as to 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc., 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order Proposed Order)(McKinney, Mica) (Entered: 12/21/2011)
12/22/2011	120	NOTICE OF HEARING ON MOTION re: 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation, 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. : (Notice generated by chambers) Motion Hearing set for 3/23/2012 02:30 PM in Room 246 before Judge Dee Benson. (reb) (Entered: 12/22/2011)
12/22/2011	121	ORDER granting 119 Motion for Extension of Time to File Response/Reply re 119 Stipulated MOTION for Extension of Time to File Response/Reply as to 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc., 104 MOTION to Dismiss Replies due by 1/6/2012. Signed by Judge Dee Benson on 12/22/11. (jlw) (Entered: 12/22/2011)
12/29/2011	122	Stipulated MOTION for Extension of Time to File Answer re 2 Complaint, filed by Defendant Sharp Electronics. (Attachments: # 1 Text of Proposed Order)(Mettler, Amber) (Entered: 12/29/2011)
01/03/2012	123	ORDER granting 122 Motion for Extension of Time to Answer re 2 Complaint,. Answer deadline updated for Sharp Electronics answer due 1/20/2012. Signed by Judge Dee Benson on 12/30/2011. (asp) (Entered: 01/03/2012)
01/06/2012	124	REPLY to Response to Motion re 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. filed by Counter Defendant CAO Group. (McKinney, Mica) (Entered: 01/06/2012)
01/06/2012	125	REPLY to Response to Motion re 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation filed by Counter Defendant CAO Group. (McKinney, Mica) (Entered: 01/06/2012)
01/20/2012	126	ANSWER to Complaint with Jury Demand filed by Sharp Electronics.(Mettler, Amber) (Entered: 01/20/2012)
01/20/2012	127	CORPORATE DISCLOSURE STATEMENT under FRCP 7.1 filed by Defendant Sharp Electronics identifying Sharp Electronics Corporation as Corporate Parent. (Mettler, Amber) (Entered: 01/20/2012)
01/30/2012	128	STIPULATED Motion of Dismissal by CAO Group. (McKinney, Mica) Modified on 1/31/2012 by changing event type from Stipulation to Motion to Dismiss and modified text to reflect changes (tls). (Entered: 01/30/2012)
01/31/2012	129	MOTION to Withdraw Scott D. Nyman as Counsel of Record for Lighting Science in this matter filed by Defendant Lighting Science Group. (Attachments: # 1 Text of Proposed Order)(Greenwood, Christine) Modified on 2/1/2012 by changing event type from Motion for Miscellaneous Relief to Motion to Withdraw as Attorney (tls). (Entered: 01/31/2012)
01/31/2012	130	ORDER granting 128 Stipulated Motion to Dismiss between Plaintiff CAO Group and Defendant Sharp Electronics. Signed by Judge Dee Benson on 1/31/12. (jlw) (Entered: 02/01/2012)
02/01/2012	131	ORDER granting 129 Motion to Withdraw as Attorney. Attorney Scott D. Nyman withdrawn from case for Lighting Science. Signed by Judge Dee Benson on 2/1/12. (jlw) (Entered: 02/02/2012)
02/08/2012	132	MOTION for Admission Pro Hac Vice of John Shadrick Hilten , Registration fee $ 15, receipt number 4681049277, filed by Counter Claimant Nexxus Lighting, Defendant Nexxus Lighting. (Attachments: # 1 Exhibit Index to Exhibits, # 2 Exhibit A: Application for Pro Hac Vice Admission, # 3 Exhibit B: ECF Filing Form, # 4 Exhibit C: Order for Pro Hac Vice Admission)(Crockett, Robert) (Entered: 02/08/2012)

02/13/2012	133	ORDER granting 132 Motion for Admission Pro Hac Vice of John Shadrick Hilten for Nexxus Lighting,John Shadrick Hilten for Nexxus Lighting. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Judge Dee Benson on 02/10/2012. (asp) (Entered: 02/13/2012)
03/07/2012	134	***AMENDED****NOTICE OF HEARING ON MOTION re: 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation, 72 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, 57 MOTION to Dismiss or Sever MOTION to Sever, 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. : (Notice generated by chambers) Motion Hearing RESET for 3/14/2012 ***NEW TIME***01:30 PM in Room 246 before Judge Dee Benson. (reb) (Entered: 03/07/2012)
03/09/2012	135	***SECOND AMENDED****NOTICE OF HEARING ON MOTION re: 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation, 57 MOTION to Dismiss or Sever MOTION to Sever, 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. : (Notice generated by chambers) Motion Hearing set for 3/14/2012 01:30 PM in Room 246 before Judge Dee Benson. The 72 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, WILL NOT BE HEARD AT THIS HEARING. This motion may be rescheduled at a later date and time. (reb) (Entered: 03/09/2012)
03/13/2012	136	MOTION to Withdraw as Attorney Daniel G. Nguyen, filed by Defendant GE Lighting. (Attachments: # 1 Text of Proposed Order)(Nguyen, Daniel) (Entered: 03/13/2012)
03/14/2012	137	Minute Order. Proceedings held before Judge Dee Benson: Cnsl present. After arguments were heard and discussion held on 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM, 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation, 57 MOTION to Dismiss or Sever MOTION to Sever, 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc., Crt ruled: Granting 136 MOTION to Withdraw as Attorney Daniel G. Nguyen filed by Defendant GE Lighting; Denying 69 MOTION to Dismiss for Failure to State a Claim; Denying 57 MOTION to Dismiss or Sever filed by GE Lighting and Denying 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America Inc. and Feit Electric Company, Inc and 104 MOTION to Dismiss Inequitable Conduct Claim Filed by Toshiba International Corporation. Court made findings on the record. Cnsl to prepare the order. Motion Hearing held on 3/14/2012 re 69 MOTION TO DISMISS FOR FAILURE TO STATE A CLAIM filed by Osram Sylvania, 101 MOTION to Dismiss Inequitable Conduct Counterclaims Filed by General Electric Company, Lights of America, Inc. and Feit Electric Company, Inc. filed by CAO Group, 136 MOTION to Withdraw as Attorney Daniel G. Nguyen, filed by GE Lighting, 57 MOTION to Dismiss or Sever MOTION to Sever filed by GE Lighting, 104 MOTION to Dismiss Inequitable Conduct Counterclaim Filed by Toshiba International Corporation filed by CAO Group. Written Order to follow oral order: Y. Attorney for Plaintiff: Mark Bettilyon, Mica McKinney, Samuel Straight, Attorney for Defendant Robert J. McAughan, Barbara K. Polich, Gregory J. Sanders, Alan Smith and Douglas F. Stewart. Court Reporter: Ed Young. (reb) (Entered: 03/22/2012)
03/22/2012	138	ORDER re minute entry: 137 Order on Motion to Dismiss, Order on Motion to Sever, Order on Motion to Dismiss for Failure to State a Claim, Order on Motion to Withdraw as Attorney. Motion Hearing Follows oral order of 3/14/12. Signed by Judge Dee Benson on 3/22/12. (jlw) (Entered: 03/22/2012)
04/09/2012	139	Plaintiff's RESPONSE re 138 Order - Written Order Following Oral Order on Motion,,-Federal Rule of Civil Procedure 12(E) More Definite Statement as to Claims Against Sylvania - filed by CAO Group. (McKinney, Mica) (Entered: 04/09/2012)
04/09/2012	140	Plaintiff's RESPONSE re 138 Order - Written Order Following Oral Order on Motion,,- Federal Rule of Civil Procedure 12(E) More Definite Statement as to Defendant Lighting Science Group Corporation - filed by CAO Group. (McKinney, Mica) (Entered: 04/09/2012)
04/18/2012	141	Stipulated MOTION for Extension of Time to Respond to More Definite Statement filed by Defendant Lighting Science Group. (Attachments: # 1 Text of Proposed Order)(Malek, Mark) (Entered: 04/18/2012)
04/20/2012	142	Stipulated MOTION for Extension of Time to Respond to More Definite Statement filed by Defendant Osram Sylvania. (Attachments: # 1 Text of Proposed Order)(Marshall, Stephen) (Entered: 04/20/2012)
04/20/2012	143	ORDER granting 141 Motion for Extension of Time to Respond to Plaintiff's More Definite Statement. Signed by Judge Dee Benson on 4/19/12. (jlw) (Entered: 04/20/2012)

04/23/2012	144	ORDER granting 142 Motion for Extension of Time for Defendant Osram Sylvania to respond to Plaintiff's More Definite Statement to 5/11/12. Signed by Judge Dee Benson on 4/23/12. (jlw) (Entered: 04/23/2012)
05/10/2012	145	Stipulated MOTION for Extension of Time to File Response/Reply as to 140 Response (NOT to motion), Plaintiff's More Definite Statement as to Lighting Science Group, filed by Defendant Lighting Science Group. (Attachments: # 1 Text of Proposed Order)(Malek, Mark) Modified on 5/14/2012 ; changed relief from for Extension of Time to File Response/Reply to for Extension of Time (asp). (Entered: 05/10/2012)
05/11/2012	146	CORPORATE DISCLOSURE STATEMENT under FRCP 7.1 filed by Defendant Osram Sylvania identifying OSRAM AG; Siemens AG as Corporate Parent. (Marshall, Stephen) (Entered: 05/11/2012)
05/11/2012	147	ANSWER to Complaint with Jury Demand Answering More Definite Complaint (Dkt. No. 138), COUNTERCLAIM against CAO Group filed by Osram Sylvania.(Marshall, Stephen) (Entered: 05/11/2012)
05/14/2012	148	ORDER granting 145 Motion for Extension of Time. Signed by Judge Dee Benson on 05/14/2012. (asp) (Entered: 05/14/2012)
05/25/2012	149	MOTION for Admission Pro Hac Vice of Jon C. Cowen , Registration fee $ 15, receipt number 1088-1599946, filed by Defendant GE Lighting. (Attachments: # 1 Exhibit A - Application for Pro Hac Vice Admission, # 2 Exhibit B - Order for Pro Hac Vice Admission, # 3 Exhibit C - ECF Registration Form)(Phillips, Gregory) (Entered: 05/25/2012)
05/25/2012	150	ANSWER to Complaint with Jury Demand Answering More Definite Statement (Dkt. 140), COUNTERCLAIM against CAO Group filed by Lighting Science Group.(Warzecha, Mark) (Entered: 05/25/2012)
06/04/2012	151	RESPONSE re 147 Answer to Complaint, Counterclaim,from Osram Sylvania Inc. filed by CAO Group. (McKinney, Mica) (Entered: 06/04/2012)
06/04/2012	152	ORDER granting 149 Motion for Admission Pro Hac Vice of Jon C. Cowen for Feit Electric,Jon C. Cowen for Lights of America. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov. Signed by Judge Dee Benson on 6/4/12. (jlw) (Entered: 06/05/2012)
06/11/2012	153	REPORT OF ATTORNEY PLANNING MEETING. (Attachments: # 1 Exhibit Exhibit A, # 2 Exhibit Exhibit B)(McKinney, Mica) (Entered: 06/11/2012)
06/11/2012	154	REQUEST for Rule 16 Scheduling Conference re 153 Attorney Planning Meeting filed by Plaintiff CAO Group. (Attachments: # 1 Exhibit A)(McKinney, Mica) (Entered: 06/11/2012)
06/14/2012	155	Stipulated MOTION for Protective Order filed by Plaintiff CAO Group. (Attachments: # 1 Text of Proposed Order)(McKinney, Mica) (Entered: 06/14/2012)
06/15/2012	156	PROTECTIVE ORDER. Signed by Judge Dee Benson on 6/15/12. (jlw) (Entered: 06/15/2012)
06/18/2012	157	Plaintiff's RESPONSE re 150 Answer to Complaint, Counterclaim, of Lighting Science Group Corporation, filed by CAO Group. (McKinney, Mica) (Entered: 06/18/2012)
06/19/2012	158	NOTICE OF INITIAL PRETRIAL CONFERENCE: (Notice generated by Theresa Brown)The Attorneys Planning Meeting Report and Proposed Scheduling Order forms, available on the court web site at http://www.utd.uscourts.gov/documents/formpage.html, should be prepared 30 days before the Initial Pretrial Conference hearing date.NOTICE TO COUNSEL, The Court may enter a scheduling order and vacate the hearing if counsel(a) file a stipulated Attorneys Planning Meeting Report; and(b) e-mail a Proposed Scheduling Order to ipt@utd.uscourts.gov30 days before the scheduled hearing. See instructions at http://www.utd.uscourts.gov/documents/ipt.html Initial Pretrial Conference set for 8/15/2012 10:30 AM in Room 477 before Magistrate Judge Evelyn J. Furse. (tab) (Entered: 06/19/2012)
07/13/2012	159	MOTION for Admission Pro Hac Vice of David Lee Terrell , Registration fee $ 15, receipt number 1088-1631957, filed by Counter Claimant GE Lighting, Defendant GE Lighting. (Attachments: # 1 Exhibit Application for Admission Pro Hac Vice, # 2 Exhibit ECF Registration Form, # 3 Text of Proposed Order)(Sanders, Gregory) (Entered: 07/13/2012)
07/16/2012	160	Stipulated MOTION for Leave to File Amended Answer and Counterclaims filed by Defendant Nexxus Lighting. (Attachments: # 1 Exhibit Exhibit A, # 2 Text of Proposed Order Exhibit B)(Crockett, Robert) (Entered: 07/16/2012)

07/16/2012	161	ORDER granting 159 Motion for Admission Pro Hac Vice of David Lee Terrell for GE Lighting,David Lee Terrell for GE Lighting. Attorneys admitted Pro Hac Vice may download a copy of the District of Utahs local rules from the courts web site at http://www.utd.uscourts.gov Signed by Judge Dee Benson on 7/16/12. (jlw) (Entered: 07/16/2012)
07/18/2012	162	ORDER granting 160 Motion for Leave to File First Amended Answer and Counterclaims. Signed by Judge Dee Benson on 7/17/12. (jlw) (Entered: 07/18/2012)
07/18/2012	163	First Amended ANSWER to Complaint with Jury Demand , COUNTERCLAIM against CAO Group filed by Nexxus Lighting.(Crockett, Robert) (Entered: 07/18/2012)
08/08/2012	164	ANSWER to 163 Counterclaim - Nexxus Lighting Inc.'s First Amended Counterclaim - filed by CAO Group.(McKinney, Mica) (Entered: 08/08/2012)
08/15/2012	165	Minute Entry for proceedings held before Magistrate Judge Evelyn J. Furse: Initial Pretrial Conference held on 8/15/2012. After a discussion with counsel, the court sets scheduling order dates and directs Mr. Straight to submit a proposed scheduling order. After claim construction ruling, counsel for plaintiff will file a stipulated scheduling order and a trial will be set at that time. Attorney for Plaintiff: Sam Straight, Esq; Mica McKinney, Esq; Mark Bettilyon, Esq., Attorney for Defendant: Christine Greenwood, Esq Mark Warzecha, Esq; Mark Malek, Esq; Alan Smith, Esq; Robert Crockett, Esq; Greg Phillips, Esq; Gary Smith, Esq; Greg Sanders, Esq; David Terrell, Esq; Bryon Benevento, Esq; Steven Marshall, Esq; Barbara Polich, Esq.. Court Reporter: liberty court recorder.(Time Start: 10:45, Time End: 11:00, Room 477.) (tab) (Entered: 08/15/2012)
08/15/2012	166	This Minute Entry was entered in error. Minute Entry for proceedings held before Magistrate Judge Evelyn J. Furse: Initial Pretrial Conference held on 8/15/2012. After a discussion with counsel, the court sets scheduling order dates and an order will be issued forwith. Attorney for Plaintiff: Brian Steffensen, Esq., Attorney for Defendant: Jonathan Rupp. Esq. Court Reporter: liberty court recorder.(Time Start: 11:00, Time End: 11:10, Room 477.) (tab) Modified on 8/15/2012 (tab). (Entered: 08/15/2012)
08/17/2012	167	NOTICE of Change of Address by Stephen A. Marshall (Marshall, Stephen) (Entered: 08/17/2012)
08/27/2012	168	MOTION for Protective Order filed by Defendant Nexxus Lighting. (Attachments: # 1 Exhibit Index of Exhibits, # 2 Text of Proposed Order)(Crockett, Robert) (Entered: 08/27/2012)
08/27/2012	169	MEMORANDUM in Support re 168 MOTION for Protective Order filed by Defendant Nexxus Lighting. (Attachments: # 1 Exhibit Index of Exhibits, # 2 Exhibit A)(Crockett, Robert) (Entered: 08/27/2012)
08/27/2012	170	AFFIDAVIT/DECLARATION of Charles C. Carson in Support re 168 MOTION for Protective Order filed by Defendant Nexxus Lighting. (Attachments: # 1 Exhibit Index of Exhibits, # 2 Exhibit 1)(Crockett, Robert) (Entered: 08/27/2012)
09/04/2012	171	SCHEDULING ORDER - see order for details and deadlines. Signed by Magistrate Judge Evelyn J. Furse on 9/4/12. (jlw) (Entered: 09/04/2012)
09/13/2012	172	MEMORANDUM in Opposition re 168 MOTION for Protective Order and Request for Sanctions filed by Counter Defendant CAO Group, Plaintiff CAO Group. (Bettilyon, Mark) (Entered: 09/13/2012)
09/14/2012	173	CLERK'S NOTICE OF POSSIBLE ERROR re 172 Memorandum in Opposition to Motion. Description of possible error: Document appears to contain a Motion for Sanctions. If counsel desire to have a Motion for Sanctions on the docket, a separate Motion will need to be filed. (asp) (Entered: 09/14/2012)
10/01/2012	174	REPLY to Response to Motion re 168 MOTION for Protective Order filed by Defendant Nexxus Lighting. (Crockett, Robert) (Entered: 10/01/2012)
10/03/2012	175	ORDER REFERRING CASE to Magistrate Judge Dustin B. Pead under 28:636 (b)(1)(A), Magistrate to hear and determine all nondispositive pretrial matters. Motions referred to Dustin B. Pead.. Signed by Judge Dee Benson on 10/3/2012. (reb) (Entered: 10/03/2012)
10/26/2012	176	Stipulated MOTION to Stay filed by Counter Claimant Toshiba International, Defendant Toshiba International. (Attachments: # 1 Text of Proposed Order) Motions referred to Dustin B. Pead.(Benevento, Bryon) (Entered: 10/26/2012)
10/29/2012	177	ORDER granting 176 Motion to Stay for 120 days to allow the United States Patent and Trademark office time to consider the requests for reexamination of the patents-in-suit. Signed by Magistrate Judge Dustin B. Pead on 10/29/12. (jlw) (Entered: 10/29/2012)

03/19/2013	178	MEMORANDUM DECISION AND ORDER granting 168 Motion for Protective Order. CAOs request for fees it incurred by opposing Nexxus motion under Fed. R. Civ. P. 37(a)(5)(B) is DENIED. (Dkt. No. 172.) Signed by Magistrate Judge Dustin B. Pead on 3/19/13. (jlw) (Entered: 03/19/2013)
03/22/2013	179	Joint MOTION to Stay Action Pending Reexamination filed by Defendant GE Lighting. (Attachments: # 1 Text of Proposed Order) Motions referred to Dustin B. Pead.(McAughan, Robert) (Entered: 03/22/2013)
03/22/2013	180	ORDER granting 179 Motion to Stay Action Pending Reexamination proceedings initiated by the U.S. Patent and Trademark Office. Any party may seek a full or partial lifting of this stay, at any time, for good cause shown. Signed by Magistrate Judge Dustin B. Pead on 3/22/13. (jlw) (Entered: 03/22/2013)
03/25/2013	181	DOCKET TEXT ORDER Vacating 180 Order Granting 179 Motion to Stay Action Pending Reexamination. No attached document. Signed by Magistrate Judge Dustin B. Pead on 3/25/2013. (sku) (Entered: 03/25/2013)
03/25/2013	182	Stipulated MOTION to Stay filed by Defendant GE Lighting. (Attachments: # 1 Text of Proposed Order Proposed Order) Motions referred to Dustin B. Pead.(Terrell, David) (Entered: 03/25/2013)
03/25/2013	183	ORDER granting 182 Motion to Stay. All deadlines set in this Courts September 4, 2012 Scheduling Order are vacated and all proceedings in this matter are stayed in light of the following Reexamination proceedings initiated by the United States Patent and Trademark Office: 95/000,678; 95/000,679; 95/000,680; 95/002,242; 95/002,245; or 95/002,324. The Plaintiff is directed to inform the Court of the issuance by the United States Patent Office of a notice of intent to issue a reexamination certificate in any of the identified reexaminations within ten (10) days of the receipt of such certificate. Plaintiff shall serve any such notice filed with the Court on all Defendants. The stay shall be lifted forty-five (45) days after the Courts receipt of the notice filed by Plaintiff. Nothing in this order prevents a party from seeking a continuation of the stay. Signed by Magistrate Judge Dustin B. Pead on 3/25/13. (jlw) (Entered: 03/25/2013)

PTO/SB/08a (01-10)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	2013-08-26
First Named Inventor	
Art Unit	
Examiner Name	
Attorney Docket Number	35784-0004RX2

U.S.PATENTS Remove

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	5535230	A	1996-07-09	Abe	
	2	5777350	A	1998-07-07	Nakamura et al	
	3	5998925	A	1999-12-07	Shimizu et al	
	4	6015979	A	2000-01-18	Sugiura et al	
	5	6160833	A	2000-12-12	Floyd et al	
	6	6220722	B1	2001-04-24	Begemann	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2013-08-26
	First Named Inventor	
	Art Unit	
	Examiner Name	
	Attorney Docket Number	35784-0004RX2

	1	20020159490	A1	2002-10-31	Karwacki	

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Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] i	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	CA2260389	CA	A1	1999-07-30	WEITZEL et al		☐
	2	EP977278	EP	A3	2000-05-31	Matsubara et al		☐
	3	WO2000017569	WO	A1	2000-03-30	BEGEMANN		☐

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NON-PATENT LITERATURE DOCUMENTS Remove

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1	Bogner, et al., "White LED," Proceedings of SPIE, pp. 143-150, January 28, 1999	☐
	2	RP Photonics Encyclopedia, "Bragg Mirrors," reprinted from http://www.rp-photonics.com/bragg_mirrors.html, reprinted on August 24, 2013	☐

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EXAMINER SIGNATURE

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2013-08-26
	First Named Inventor	
	Art Unit	
	Examiner Name	
	Attorney Docket Number	35784-0004RX2

[1] See Kind Codes of USPTO Patent Documents at www.USPTO.GOV or MPEP 901.04. [2] Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5] Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
	Application Number	
	Filing Date	2013-08-26
	First Named Inventor	
	Art Unit	
	Examiner Name	
	Attorney Docket Number	35784-0004RX2

CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

OR

☐ That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(2).

☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☒ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

Signature	/Thomas A. Rozylowicz/	Date (YYYY-MM-DD)	2013-08-26
Name/Print	Thomas A. Rozylowicz	Registration Number	50620

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these record s.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS
First Named Inventor/Applicant Name:	Densen Cao
Filer:	Thomas A. Rozylowicz/Edward Faeth
Attorney Docket Number:	35784-0004RX2

Filed as Large Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
REQUEST FOR EX PARTE REEXAMINATION	1812	1	12000	12000
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**12000**

Electronic Acknowledgement Receipt

EFS ID:	16689297
Application Number:	90012957
International Application Number:	
Confirmation Number:	6150
Title of Invention:	SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS
First Named Inventor/Applicant Name:	Densen Cao
Customer Number:	26171
Filer:	Thomas A. Rozylowicz/Brenda Jurgens
Filer Authorized By:	Thomas A. Rozylowicz
Attorney Docket Number:	35784-0004RX2
Receipt Date:	26-AUG-2013
Filing Date:	
Time Stamp:	18:10:52
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$12000
RAM confirmation Number	6136
Deposit Account	061050
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part / zip	Pages (if appl.)

1	Transmittal Letter	TransmittalofExParteReexam.pdf	149188 62f9e57b1a941c8bf11fec461c7ed37e036a72a5	no	2
Warnings:					
Information:					
2		PetitionforExParteReexamination.pdf	2020334 8f2f164ccdfb138ec69b58424909a4b97252c52d	yes	74
	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Receipt of Orig. Ex Parte Request by Third Party		1	73	
	Reexam Certificate of Service		74	74	
Warnings:					
Information:					
3	Information Disclosure Statement (IDS) Form (SB08)	357840004RX2SB08.pdf	612522 dc0a232e2716ba408b8b73b0ea195a4d258fce7a	no	5
Warnings:					
Information:					
4	Reexam Miscellaneous Incoming Letter	AppendixB.pdf	3261254 2313952f32dcd2f81d11e46c676d1198087a8904	no	107
Warnings:					
Information:					
5	Reexam Miscellaneous Incoming Letter	AppendixD.pdf	655555 cb661601cf0d70547b5569157393fbf61946bfc4	no	17
Warnings:					
Information:					
6	Reexam Miscellaneous Incoming Letter	AppendixE.pdf	908580 075cec56fa8d8106c36b79eefc58d75345332755	no	23
Warnings:					
Information:					
7	Reexam Miscellaneous Incoming Letter	AppendixF.pdf	1922421 060c6a014dea85252d6cd5e8a7fbb43389a1f248	no	33
Warnings:					
Information:					
8	Reexam Miscellaneous Incoming Letter	AppendixJ.pdf	1558240 bf6cfdf1565331220689399988a1b64568f99471	no	31

Warnings:					
Information:					
9	Reexam Miscellaneous Incoming Letter	AppendixK.pdf	111020 aa68e1e215224eb7ac5a5cea99fb7aa1a8d7839e	no	8
Warnings:					
Information:					
10	Reexam Miscellaneous Incoming Letter	AppendixM.pdf	1652384 04912146e7ee59b8c298c83e3546fd4523064399	no	13
Warnings:					
Information:					
11	Reexam Miscellaneous Incoming Letter	AppendixN.pdf	478773 31459c8cf0f45cac42c196e0786e2bc48e1842e1	no	4
Warnings:					
Information:					
12	Reexam Miscellaneous Incoming Letter	AppendixA2.pdf	20007410 3ef202d36d55fbc0cc9bc8812a07c9a0e0d2a6ac	no	24
Warnings:					
Information:					
13	Reexam Miscellaneous Incoming Letter	AppendixC.pdf	415588 b8f4e72f9c586750c9505035b4a29b49afd5ac4b	no	9
Warnings:					
Information:					
14	Reexam Miscellaneous Incoming Letter	AppendixH2.pdf	15293792 60876254c52f2484dcd57d523d1018b169068aab	no	14
Warnings:					
Information:					
15	Reexam Miscellaneous Incoming Letter	AppendixG.pdf	2766037 a1eccb79213a3104ef684833ca90a6361c2c79ab	no	43
Warnings:					
Information:					
16	Reexam Miscellaneous Incoming Letter	AppendixL.pdf	516208 3a8e94fe3b06d74ad7d45a9843847ebbb4ed96f7	no	9
Warnings:					
Information:					
17	Reexam Miscellaneous Incoming Letter	AppendixI.pdf	3492698 982cde942f2d0a223414467d265ef5fdbd13eb0d	no	31

Warnings:					
Information:					
18	Fee Worksheet (SB06)	fee-info.pdf	29895 2d29db8e24e502e172525890ab05a3d3284954b6	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	55851899	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/57 (02-13)
Approved for use through 07/31/2015. OMB 0651-0064
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

(Also referred to as FORM PTO-1465)

REQUEST FOR *EX PARTE* RE EXAMINATION TRANSMITTAL FORM

Address to:
Mail Stop *Ex Parte* Reexam
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Attorney Docket No.: 35784-0004RX2

Date: August 26, 2013

1.. ☒ This is a request for ex parte reexamination pursuant to 37 CFR 1.510 of patent number 6465961 issued October 15, 2002. The request is made by:

☐ patent owner. ☒ third party requester.

2.. ☒ The name and address of the person requesting reexamination is:

Thomas A. Rozylowicz
Fish & Richardson P.C.
1425 K Street, NW, 11th Floor, Washington, DC 20005

3. Request claims ☐ small entity (37 CFR 1.27) or ☐ micro entity status (37 CFR 1.29).

4.. ☐ a. A check in the amount of $ _____ is enclosed to cover the reexamination fee, 37 CFR 1.20(c)(1);

☒ b. The Director is hereby authorized to charge the fee as set forth in 37 CFR 1.20(c)(1) to Deposit Account No. 06-1050;

☐ c. Payment by credit card. Form PTO-2038 is attached; or

☐ d. Payment made via EFS-Web.

5.. ☒ Any refund should be made by ☐ check or ☒ credit to Deposit Account No. 06-1050. 37 CFR 1.26(c). If payment is made by credit card, refund must be to credit card account.

6.. ☒ A copy of the patent to be reexamined having a double column format on one side of a separate paper is enclosed. 37 CFR 1.510(b)(4).

7.. ☐ CD-ROM or CD-R in duplicate, Computer Program (Appendix) or large table
☐ Landscape Table on CD

8.. ☐ Nucleotide and/or Amino Acid Sequence Submission
If applicable, items a. – c. are required.

a. ☐ Computer Readable Form (CRF)
b. Specification Sequence Listing on:

i. ☐ CD-ROM (2 copies) or CD-R (2 copies); **or**
ii. ☐ paper

c. ☐ Statements verifying identity of above copies

9.. ☐ A copy of any disclaimer, certificate of correction or reexamination certificate issued in the patent is included.

10.. ☒ Reexamination of claim(s) 1, 7, 8, and 9 is requested.

11.. ☒ A copy of every patent or printed publication relied upon is submitted herewith including a listing thereof on Form PTO/SB/08, PTO-1449, or equivalent.

12.. ☐ An English language translation of all necessary and pertinent non-English language patents and/or printed publications is included.

13.. ☒ The attached detailed request includes at least the following items:

a. A statement identifying each substantial new question of patentability based on prior patents and printed publications. 37 CFR 1.510(b)(1).

b. An identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited art to every claim for which reexamination is requested. 37 CFR 1.510(b)(2)

14. ☐ A proposed amendment is included (only where the patent owner is the requester). 37 CFR 1.510(e)

15. ☒ a. It is certified that a copy of this request (if filed by other than the patent owner) has been served in its entirety on the patent owner as provided in 37 CFR 1.33(c).
The name and address of the party served and the date of service are:

Maschoff Brennan

1389 Center Drive, Suite 300, Park City, UT 84098

Date of Service: August 26, 2013 ; **or**

☐ b. A duplicate copy is enclosed since service on patent owner was not possible. An explanation of the efforts made to serve patent owner **is attached.** See MPEP § 2220.

16. Correspondence Address: Direct all communication about the reexamination to:

☒ The address associated with Customer Number: 26171

OR

[Firm or individual Name Fish & Richardson P.C.

Address P.O. Box 1022		
City Minneapolis	State MN	Zip 55440-1022
Country United States		
Telephone 202-626-6395	Email tar@fr.com	

17. ☒ The patent is currently the subject of the following concurrent proceeding(s):

☐ a. Copending reissue Application No. _____

☒ b. Copending reexamination Control No. 95/002,242; 95/002,245; 95/000,680

☐ c. Copending Interference No. _____

☒ d. Copending litigation styled:

Cao Group, Inc. v. GE Lighting, Inc. et al., D. Utah, Docket No. 2:11-cv-00426-DB

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

/Thomas Rozylowicz/ — Authorized Signature

8/26/2013 — Date

Thomas A. Rozylowicz — Typed/Printed Name

50,620 — Registration No.

☐ For Patent Owner Requester

☒ For Third Party Requester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent of: Cao
U.S. Patent No.: 6,465,961
Issue Date: October 15, 2002
Serial No.: 09/939,340
Filing Date: August 24, 2001
Title: Semiconductor Light Source Using a Heat Sink With a Plurality of Panels

Mail Stop Ex Parte Reexam
Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REQUEST FOR EX PARTE REEXAMINATION

Reexamination is requested for claims 1, 7, 8, and 9 of **U.S. Patent No. 6,465,961** (the '961 patent), which issued on October 15, 2002, to assignee CAO Group, Inc.

APPENDIX A – United States Patent No. 6,465,961 to Cao

APPENDIX B – Relevant portions of the '961 patent file history

APPENDIX C – United States Patent No. 6,220,722 to Begemann

APPENDIX D – International Patent Application Publication No. WO 00/17569 to Begemann

APPENDIX E – Canadian Patent Application No. 2,260,389 to Waitl, et al.

APPENDIX F – United States Patent No. 5,777,350 to Nakamura, et al.

APPENDIX G – United States Patent No. 5,998, 925 to Shimizu, et al.

APPENDIX H – United States Patent No. 5,535,230 to Abe

APPENDIX I – United States Patent No. 6,015,979 to Sugiura et al.

APPENDIX J – European Patent Application Publication No. 0,977,278 to Matsubara et al.

APPENDIX K – United States Patent Application Publication No. 2002/0159490 to Karwacki

APPENDIX L – United States Patent No. 6,160,833 to Floyd, et al.

APPENDIX M – "White LED," Proceedings of SPIE, pp. 143-150 (January 28, 1999) by Bogner, et al.

APPENDIX N – RP Photonics Encyclopedia, "Bragg Mirrors," http://www.rp-photonics.com/bragg_mirrors.html, (last visited Aug. 24, 2013)

I. INTRODUCTION

This *ex parte* reexamination request seeks a ruling by the USPTO that claims 1, 7, 8, and 9 of U.S. Patent 6,465,961 (the '961 patent) are unpatentable.

On August 24, 2001, CAO Group, Inc. (hereinafter, "CAO") filed six patent applications directed to semiconductor light sources. Each of these applications shares a common specification. Unfortunately, the six applications[1] were assigned to four different examiners in different art units of the USPTO.

- The '770, '771 and '446 patent applications were assigned to Art Unit 2875 – Illumination.
- The '885 patent application was assigned to Art Unit 2829 – Semiconductors/Manufacturing & Measuring.
- The '001 patent application was assigned to Art Unit 2815 – Semiconductors.
- The '961 patent application was assigned to Art Unit 2821 – Electronic Circuits.

The '961 patent application was the first to be examined. Briefly, the '961 patent claims a semiconductor light source including a heat sink having a plurality of panels to which light emitting semiconductor devices are attached to facilitate emission of light in desired directions around the semiconductor light source. The '961 Examiner did not have the Begemann reference[2] and allowed the claims at the first office action.

In contrast, the Examiners for the other five related CAO applications did have the Begemann reference. During examination of the other applications, the USPTO rejected claims that are similar to those at issue in this reexamination on the basis of Begemann and/or Begemann in combination with other references from the semiconductor lighting field.

In fact, at the time the '961 patent issued, applicant had already received office actions for two of the five co-pending applications in which the USPTO had rejected similar claims on

[1] U.S. Patent 6,465,961 (USPA 09/939,340); U.S. Patent 6,634,770 (USPA 09/938,876); U.S. Patent 6,746,885 (USPA 09/938,875); U.S. Patent 6,634,771 (USPA 09/939,488); U.S. Patent 6,719,446 (USPA 09/938,777); U.S. Patent 7,224,001 (USPA 09/939,339).

[2] There are two filings of the same Begemann disclosure. Both documents will be referred to collectively as Begemann in this reexamination request because the disclosure contained in each of the respective documents is the same with only minor variations in wording. In related CAO applications, the USPTO relied on Begemann 6,220,722 ("Begemann '722"), which is § 102(e) prior art to reject claims in CAO's other related applications. However, the Begemann reference was also filed as a PCT application (WO 00/17569) ("Begemann '569"), which is both § 102(a) and § 102(b) prior art, as it published on March 30, 2000, more than one year before the '961 patent application was filed.

the basis of Begemann. However, applicant did not disclose, and the '961 Examiner did not consider, the Begemann reference as part of the '961 patent application.

Based on the art that the USPTO considered during prosecution of the related CAO applications and additional art that was not considered by the USPTO, the USPTO should grant this request for reexamination and find that claims 1, 7, 8, and 9 of the '961 patent are unpatentable.

In accordance with 37 C.F.R. § 1.510(b) this Request includes the following:

1. a statement pointing out each substantial new question of patentability based on prior patents and printed publications; (Section VII);

2. an identification of every claim for which reexamination is requested, and a detailed explanation of the pertinency and manner of applying the cited prior art to every claim for which reexamination is requested; (Section VII);

3. a copy of every patent or printed publication relied upon or referred to in paragraphs (1) and (2) above, accompanied by an English language translation of all the necessary and pertinent parts of any non-English language document (Appendices C-M);

4. a copy of the entire patent including the front face, drawings, and specification/claims (in double column format) for which reexamination is requested, and a copy of any disclaimer, certificate of correction, or reexamination certificate issued in the patent (Appendix A);

5. a certification by the third party requester that a copy of the request has been served in its entirety on the patent owner at the address provided for in § 1.33(c) (Certification Following Signature Page).

An electronic payment in the amount of $12,000 for the *ex parte* reexamination fee specified by 37 C.F.R. § 1.20(c)(1) is being paid at the time of filing this request.

II. CLAIMS FOR WHICH REEXAMINATION IS REQUESTED

In accordance with 37 C.F.R. § 1.510, requester OSRAM SYLVANIA Inc. ("OSRAM Sylvania" or "Requester"), the real party in interest, requests *ex parte* reexamination of claims 1, 7, 8, and 9 of the '961 patent, assigned to Cao Group, Inc. ("Patent Owner" or "CAO").

As explained below, claims 1, 7, 8, and 9 of are unpatentable over the prior art patents and publications identified and applied in this Request. As a result, the patents and printed publications relied upon in this request, and the manner in which they are applied to the claims, present a substantial new question of patentability with respect to at least one of the claims for which reexamination is requested. The below table identifies the various combinations that render claims 1, 7, 8, and 9 of the '961 patent unpatentable. Independent claims are shown in bold.

	Claims	Basis for Rejection
Issue No. 1	**1**, 7, 8, 9	Rendered obvious by Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Sugiura, and Karwacki
Issue No. 2	**1**, 7, 8, 9	Rendered obvious by Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Nakamura, and Karwacki
Issue No. 3	**1**, 7, 8, 9	Rendered obvious by Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Floyd, and Karwacki

III. IDENTIFICATION OF PATENTS AND PRINTED PUBLICATIONS PRESENTED TO PROVIDE GROUNDS FOR REJECTION

1. United States Patent No. 6,220,722 to Begemann (Appendix C)
2. International Patent Application Publication No. WO 00/17569 to Begemann (Appendix D)
3. Canadian Patent Application Publication No. 2,260,389 to Waitl, et al. (Appendix E)
4. United States Patent No. 5,777,350 to Nakamura et al. (Appendix F)
5. United States Patent No. 5,998,925 to Shimizu, et al. (Appendix G)
6. United States Patent No. 5,535,230 to Abe (Appendix H)
7. United States Patent No. 6,015,979 to Sugiura et al. (Appendix I)

8. European Patent Application Publication No. 0,977,278 to Matsubara et al. (Appendix J)
9. United States Patent Application Publication No. 2002/0159490 to Karwaki (Appendix K)
10. United States Patent No. 6,160,833 to Floyd, et al. (Appendix L)
11. "White LED," Proceedings of SPIE, pp. 143-150 (January 28, 1999) by Bogner, et al. (Appendix M)

It is believed that the references at Appendices C-M were not before the Examiner during ex parte prosecution of the '961 patent.

IV. CO-PENDING PROSECUTION AND LITIGATION

Requestor is aware of pending litigation concerning the '961 patent styled Cao Group, Inc. v. GE Lighting, Inc. et al., D. Utah, Docket No. 2:11-cv-00426-DB. Requester previously filed requests 95/002,242, 95/002,245, and 95/002,324 and is also aware that GE has filed requests 95/000678, 95/000679, and 95/000680 for U.S. Patents 6,634,770, 6,746,885, and 6,465,961 respectively. This reexamination request is being filed concurrently with an *ex parte* reexamination request for CAO patent 6,634,770.[3]

Requestor filed *inter partes* reexamination request 95/002,324 ("the '2,324 proceeding") for claims 1-20 of the '961 patent on September 14, 2012. On December 7, 2012 the USPTO issued a determination ordering reexamination for claims 1-7 and 10-20 of the '961 patent in the '2,324 proceeding. In response to the USPTO's determination, Requestor filed a petition on January 11, 2013 seeking reinstatement of several of the unadopted grounds of rejection proposed by Requestor related to claims 7, 8, and 9. On June 25, 2013 the USPTO dismissed Requester's petition as untimely.

This Request for *ex parte* reexamination presents additional references and combinations of references that were not present in the '2,324 proceeding.

[3] Cao Group, Inc. also has four currently pending patent applications claiming priority to two of the other five applications filed on August 24, 2001 along with the application for the '961 patent and sharing a common specification with the '961 patent. The currently pending applications are USPA 12/296,274 filed on 10/6/08, USPSA13/473,595 filed on 5/17/12, and 13/867,943 filed on 4/22/13 each of which claim priority USPA 09/939,339 (now to US Patent 7,224,001) and USPA 12/785,203 filed on 5/21/10 which claims priority to USPA 09/938,875 (now US Patent 6,746,885).

V. ORIGINAL PROSECUTION HISTORY

The application, which later issued as the '961 patent, was filed on August 24, 2001. (Appendix A, p. 1). Along with the application filing, CAO submitted an Information Disclosure Statement, Form 1449 citing 5 U.S. Patents. (Appendix B at Information Disclosure Statement, p. 1). The application was classified in class 315, subclass 58. (Appendix A, p. 1). The Examiner searched class 315, subclass 58 and 185; class 313, subclass 512; class 362 subclass 83.1, 800, 293, 230, 231, 235, 246, and 249; and class 250, subclass 339.13. (Appendix A, p. 1). The Examiner initialed Form 1449 noting that he considered the references cited by CAO in the Information Disclosure Statement. (Appendix B at Information Disclosure Statement (initialed by Examiner), p. 1). On July 30, 2002, the Examiner issued a notice of allowance, indicating that:

> "The limitation which distinguishes the claims of this application over the prior art is the limitation concerning **the heat sink having a plurality of panels and being located inside a transparent enclosure**." (Appendix B at Notice of Allowability, p. 2).
>
> "The prior art does not disclose proper motivation for combining references which disclose this limitation with the references which disclose the other limitations recited in the claims of this application." (Appendix B at Notice of Allowability, p. 2).

The Examiner also listed two U.S. patents in a Notice of References Cited included with the notice of allowance. (Appendix B at Notice of References Cited, p.1).

The '961 patent issued on October 15, 2002. On the cover of the '961 patent, the References Cited section lists the five U.S. patents cited in the original Information Disclosure Statement and the two U.S. patents indicated by the Examiner in the Notice of References Cited. Each of the two U.S. patents indicated by the Examiner is marked as being "cited by the examiner." (Appendix A, p. 1).

The Begemann, Waitl '389, Shimizu, Bogner, Floyd, Sugiura, Abe, Matsubara, Nakamura, and Karwaki references were not considered in the original prosecution. As described above, and as shown in more detail in the claim charts below, the Begemann and Waitl '389 references teach the claim elements that the examiner indicated as justification for the allowance of the claims in the '961 patent.

VI. THE REFERENCES RELIED UPON HEREIN PROVIDE NEW, NON-CUMULATIVE TECHNICAL TEACHINGS

A. Begemann Provides New, Non-Cumulative Technical Teachings

International Patent Application Publication No. WO 00/17569 to Begemann ("Begemann '569") qualifies as prior art under 35 U.S.C. § 102(a) and 35 U.S.C. § 102(b) because Begemann'569 was published on March 30, 2000, which is more than one year before the claimed priority date of the '961 patent.

This reexamination request is based on Begemann '569.[4] However, because Begemann '722 was cited extensively during examination of CAO's related patents, the text citations and direct quotations are taken from Begemann '722 with parallel citations provided to Begemann '569.

Neither Begemann reference was before the Examiner during the prosecution of the '961 patent. Both Begemann references present new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Begemann teaches limitations found in claim 1.

B. Waitl '389 Provides New, Non-Cumulative Technical Teachings

Canadian Patent Application Publication No. 2,260,389 to Waitl et al. ("Waitl '389") qualifies as prior art under 35 U.S.C. §§ 102(a) and 102(b) because it published on July 30, 1999, which is more than one year before the filing date of the '961 patent. Furthermore, Waitl '389 claimed priority to German Patent Application 19803936.0 DE ("Waitl '198") filed on January 30, 1998. Waitl '389 provides an English translation of Waitl '198. Subsequently Waitl '198 was used to claim foreign priority for United States Patent Application 09/237,778 (Waitl '778) filed January 26, 1999, and published as United States Patent Application Publication 2001/0045573 on November 29, 2001. As such, Waitl '778 qualifies as prior art under 35 U.S.C. § 102(e) because it was filed before the claimed priority date of the '961 patent. Finally, United States Patent No. 6,683,325 ("Waitl '325") was filed on August 12, 2002, as a continuation in

[4] Unlike Begemann '569, which qualifies as prior art under 35 U.S.C. § 102(a) and § 102(b), Begemann '722 qualifies as prior art under 35 U.S.C. § 102(e). Begemann '722 was filed on September 16, 1999, which is before the claimed priority date of the '961 patent.

part to Waitl '778. Waitl '325 also qualifies as prior art under 35 U.S.C. § 102(e) based on its claim of priority to Waitl '778, which was filed before the claimed priority date of the '961 patent. Waitl '325 differs from Waitl '778 only at col.5:62-65 of Waitl '325, in which a third glass composition is described.

None of the described Waitl references were before the Examiner during the prosecution of the '961 patent. Waitl '389 presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Waitl '389 teaches limitations found in claim 1.

C. Nakamura Provides New, Non-Cumulative Technical Teachings

United States Patent No. 5,777,350 to Nakamura, et al. qualifies as prior art under 35 U.S.C. § 102(a) and § 102(b) because it was patented on July 7, 1998, which is more than one year before the claimed priority date of the '961 patent. Nakamura was not before the Examiner during the prosecution of the '961 patent. Nakamura discloses details regarding the semiconductor light source. Nakamura presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Nakamura teaches limitations found in claims 7, 8, and 9.

D. Shimizu Provides New, Non-Cumulative Technical Teachings

United States Patent No. 5,998,925 to Shimizu, et al. qualifies as prior art under 35 U.S.C. § 102(a) and § 102(b) because it was patented on December 7, 1999, which is more than one year before the claimed priority date of the '961 patent. Shimizu was not before the Examiner during the prosecution of the '961 patent. Shimizu discloses details regarding the semiconductor light source. Shimizu presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Shimizu teaches limitations found in claim 1.

E. Abe Provides New, Non-Cumulative Technical Teachings

United States Patent No. 5,535,230 to Abe qualifies as prior art under 35 U.S.C. § 102(a) and § 102(b) because it was patented on July 9, 1996, which is more than one year before the claimed priority date of the '961 patent. Abe was not before the Examiner during the prosecution of the '961 patent. Abe was considered during the prosecution of CAO's related patent applications for its disclosure regarding the use of a phosphor conversion coating. Abe presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Abe teaches limitations found in claims 1 and 7.

F. Sugiura Provides New, Non-Cumulative Technical Teachings

United States Patent No. 6,015,979 to Sugiura, et al. qualifies as prior art under 35 U.S.C. § 102(a) and § 102(b) because it was patented on June 18, 2000, which is more than one year before the claimed priority date of the '961 patent. Sugiura was not before the Examiner during the prosecution of the '961 patent. Sugiura was considered during the prosecution of CAO's related patent applications for its disclosure regarding the details of the semiconductor light source. Sugiura presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Sugiura teaches limitations found in claims 7, 8, and 9.

G. Matsubara Provides New, Non-Cumulative Technical Teachings

European Patent Application Publication No. 0,977,278 to Matsubara, et al. qualifies as prior art under 35 U.S.C. §§ 102(a) and 102(b) because it was published on February 2, 2000, which is more than one year before the claimed priority date of the '961 patent. Matsubara was not before the Examiner during the prosecution of the '961 patent. Matsubara discloses details of the semiconductor light source. Matsubara presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of

patentability with respect to the claims of the '961 patent. In particular, Matsubara teaches limitations found in claim 1.

H. Karwaki Provides New, Non-Cumulative Technical Teachings

United States Patent Application Publication No. 2002/0159490 to Karwaki qualifies as prior art under 35 U.S.C. § 102(e) because it was filed on March 29, 2001, which is before the claimed priority date of the '961 patent. Karwaki was not before the Examiner during the prosecution of the '961 patent. Karwaki discloses the inclusion of quantum wells in reflective semiconductor layers. Karwaki presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Karwaki teaches limitations found in claim 9.

I. Floyd Provides New, Non-Cumulative Technical Teachings

United States Patent No. 6,160,833 to Floyd qualifies as prior art under 35 U.S.C. § 102(e) and 35 U.S.C. § 102(a) because it was filed on May 6, 1998 and issuedon December 12, 2000, which is before the claimed priority date of the '961 patent. Floyd was not before the Examiner during the prosecution of the '961 patent. Floyd discloses details of the semiconductor light source. Floyd presents new, non-cumulative teachings that were not previously considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Floyd teaches limitations found in claims 1, 7, 8, and 9.

J. Bogner Provides New, Non-Cumulative Technical Teachings

"White LED," Proceedings of SPIE, pp. 143-150 (January 28, 1999) by Bogner, et al. qualifies as prior art under 35 U.S.C. § 102(b) because it was published on January 28, 1999, which is more than one year before the claimed priority date of the '961 patent. Bogner was not before the Examiner during the prosecution of the '961 patent. Bogner discloses the use of a phosphor coating to produce white light from semiconductor light sources. Bogner presents new, non-cumulative teachings that were not previously

considered and therefore presents grounds for rejection that pose a substantial new question of patentability with respect to the claims of the '961 patent. In particular, Bogner teaches limitations found in claim 1.

VII. GROUNDS PRESENTING A SUBSTANTIAL NEW QUESTION OF PATENTABILITY WITH RESPECT TO AT LEAST ONE CLAIM OF THE '961 PATENT

An *ex parte* reexamination should be granted when there is a showing that there is a substantial new question of patentability with respect to at least one of the claims challenged in the request (the "substantial new question patentability" standard). In this section, the instant Request is shown to be sufficient to justify reexamination of claims 1, 7, 8, and 9 of the '961 patent. The grounds of rejection proposed by this Request are new, they are substantial, and they are based on patents and printed publications that are reasonably likely to be upheld as rendering the challenged claims unpatentable.

In the claim charts provided below, the Requester sets forth the manner of applying the various references to claims 1, 7, 8, and 9 of the '961 patent, thereby more fully demonstrating why the prior art applied herein is reasonably likely to be held as rendering these claims unpatentable.

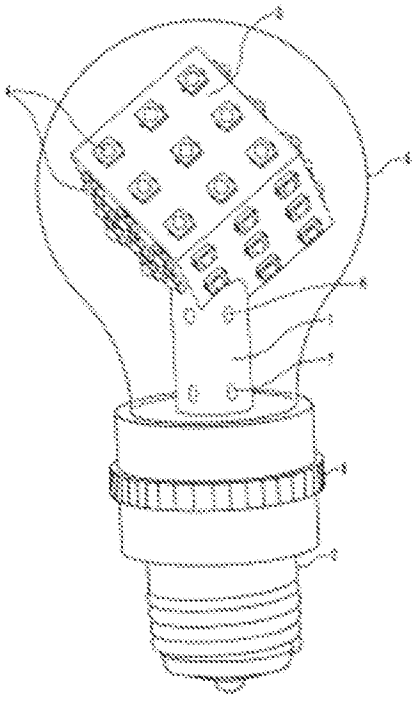
A. Issue No. 1: Claims 1, 7, 8, and 9 are rendered obvious by Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Sugiura, and Karwacki.

The following claim chart demonstrates in detail the correspondence between the claims 1, 7, 8, and 9 of the '961 patent and the pertinent teachings of Begemann '569 [5] in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Sugiura, and Karwacki. It would have been obvious to a person of ordinary skill in the art to combine the teachings of Begemann with those of Abe, Waitl '389, Bogner, Matsubara, or Shimizu because all six references relate to semiconductor based light sources for general illumination, which could be either incorporated

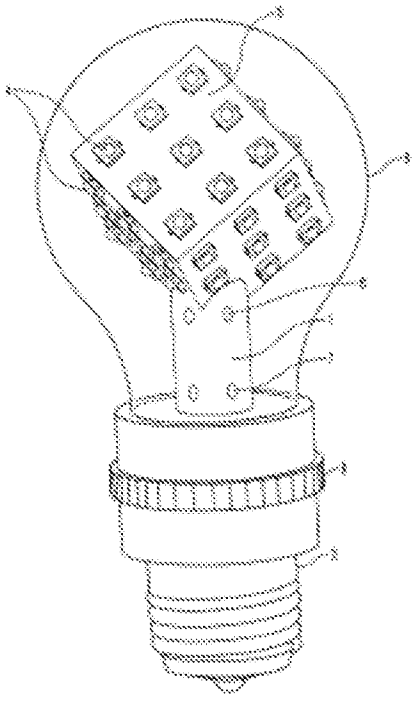
[5] This reexamination request is based on Begemann '569. However, because U.S. Patent No. 6,220,722 ("Begemann '722") was cited extensively during examination of CAO's related patents, the text citations and direct quotations are taken from Begemann '722 with parallel citations provided to Begemann '569. Although there are some minor variations in wording between Begemann '722 and Begemann '569, the material that is quoted and cited herein is identical in both Begemann references.

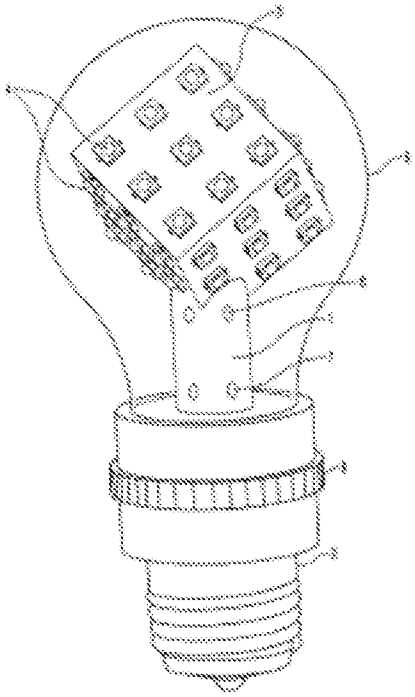
into Begemann's LED lamp structure or used to substitute elements of Begemann's LED structure to obtain predicable results.

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Sugiura with those of Begemann because Sugiura describes a semiconductor light source that could be used as a light source in the semiconductor-based lamps described by Begemann. Sugiura demonstrates that the semiconductor structure claimed in the '961 patent is well-known in the art, and as such it would be obvious to combine this teaching with that of Begemann. In addition, it would be obvious to a person of ordinary skill in the art would to combine the teachings of Karwacki with those of Begemann and Sugiura, because like Sugiura, Karwacki describes a semiconductor light source (a VCSEL) that could be used as a light source in the semiconductor-based lamps described by Begemann.

U.S. Patent No. 6,465,961 Claim 1	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
1. A semiconductor light source for emitting light to illuminate a space used by humans, the semiconductor light source comprising:	"The invention more particularly aims at providing a **LED lamp which can be relatively easily mass-produced, and which can be operated such that continuous, uniform lighting with a high luminous flux is obtained**." (Appendix C, col. 1:35-39 and Appendix D, p. 1:20-23)  FIG. 2 "FIG. 4 diagrammatically shows an application of a LED lamp, which requires an

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	asymmetric light distribution. T**he LED lamp (20) is used as outdoor lighting and is situated on a holder (21) which is secured to the wall (22) of a building.** The necessary luminous flux in the direction of the wall is much smaller than that in the opposite direction. The asymmetric light distribution required for this purpose can be simply adjusted by means of a LED lamp as described with reference to FIG. 3." (Appendix C, col. 5:15-24 and Appendix D, p. 6:22-27) Waitl '389 states: "The present invention relates to opto-electronic semiconductor elements, particularly suitable for general illumination." (Appendix E, p. 2:2-4)
a) an enclosure, said enclosure being fabricated from a material substantially transparent to white light,	Begemann describes an enclosure being fabricated from a material substantially transparent to white light in describing a (semi-)transparent envelope for a white-light-emitting lamp. "A favorable embodiment of the LED lamp is characterized in that the lamp is also provided with **a (semi-)transparent envelope**. **This envelope may be made of glass**, but is preferably made of a synthetic resin. The envelope serves as a mechanical protection for the LEDs. In addition, **the envelope may contribute to obtaining the uniform lighting** which can be obtained with the lamp. (Appendix C, col. 2:13-19, and Appendix D, p. 2:22-26)" "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin,** which envelops the gear column (1) and the substrate (3)." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. **Consequently, during operation of the LED lamp shown, white light is obtained**." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "By using one or more LED combinations in the colors green, red and blue or green, red, yellow and blue for each substrate face, **a LED lamp can be obtained which emits white light**. Such LED combinations composed of three different LEDs are preferably provided with a secondary optical system, in which the above-mentioned colors are blended so as to obtain white light." (Appendix C, col. 2:60-66 and Appendix D, p. 3:19-23)
b) an interior volume within said enclosure,	Begemann describes that the interior volume of the envelope is used to enclose the LEDs, gear column, and substrate. "A favorable embodiment of the LED lamp is characterized in that the lamp is also provided with a (semi-)transparent envelope. This envelope may be made of glass, but is preferably made of a synthetic resin. **The envelope serves as a mechanical protection for the LEDs**.

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	In addition, the envelope may contribute to obtaining the uniform lighting which can be obtained with the lamp." (Appendix C, col. 2:13-19 and Appendix D, p. 2:22-26) "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin, which envelops the gear column (1) and the substrate (3)**." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)
c) a heat sink located in said interior volume,	Begemann describes a heat sink located in the interior volume in the context of the substrate 3 and gear column 1 that enable good heat conduction. "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin, which envelops the gear column (1) and the substrate (3)**." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)  FIG. 2 "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1)** to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)
d) said heat sink being capable of drawing heat from one or more semiconductors devices,	Begemann describes that the heat sink removes the heat from the semiconductor device via the MC-PCB 12, substrate 3, and gear column 1. "**A particular aspect of the invention resides in that the heat-dissipating means remove the heat, generated during operation of the lamp, from the substrate via the gear column to the lamp cap and the mains supply connected thereto**." (Appendix C, col. 1:54-58 and Appendix D, p. 2:5-7)  FIG. 2 "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved.** In the present case, the substrate is made of a copper alloy. **Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive**. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "If LEDs with a high luminous flux (5 lm or more) are used, then a so-called **metal-core**

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	PCB is customarily used. **Such PCBs have relatively high heat conduction**. By providing these PCBs on the (preferably metal) substrate by means of a heat-conducting adhesive, a very good heat dissipation from the LED arrays to the gear column is obtained." (Appendix C, col. 2:53-59 and Appendix D, p. 3:14-18) "FIG. 3 is a schematic, sectional view of three types of **LEDs (4) which can suitably be used in the invented LED lamp**. FIG. 3-A shows a LED which comprises single-chip LEDs, which each have only one light point (11) per LED. **This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer**. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). **A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate.**" (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11)
e) said heat sink having a plurality of panels on it suitable for mounting semiconductor devices thereon,	Begemann describes a heat sink having a plurality of panels suitable for mounting semiconductor devices in describing a polyhedral substrate. "The invention relates to a LED lamp having a gear column which is connected, at its first end, to a lamp cap and, at its other end, to a substrate. **The substrate is provided with a regular polyhedron of at least four planes, the planes having at least one LED** having a luminous flux of at least 5 lm. The gear column also have heat-dissipating means which interconnect the substrate and the lamp cap." (Appendix C, Abstract and Appendix D, Abstract) "Better results, however, are achieved with substrates in the form of a hexahedron (**polyhedron of six faces, cube**). In practice it has been found that a good uniformity in light distribution can already be obtained using substrates in the form of a tetrahedron (regular polyhedron of four faces, pyramid)." (Appendix C, col. 2:5-10 and Appendix D, p. 2:16-19) "A particular aspect of the invention resides in that **the heat-dissipating means remove the heat, generated during operation of the lamp, from the substrate via the gear column to the lamp cap** and the mains supply connected thereto." (Appendix C, col. 1:54-58 and Appendix D, p. 2:5-7) "By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate. This applies in particular when the faces of the polyhedral substrate are substantially flat. Such a LED array generally comprises a number of LEDs which are provided on a flat printed circuit board (PCB)." (Appendix C, col. 2:45-51 and Appendix D, p. 3:9-13) "In the example described with respect to FIG. 2, **the substrate (3) is cube-shaped with six flat faces**, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs** (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)

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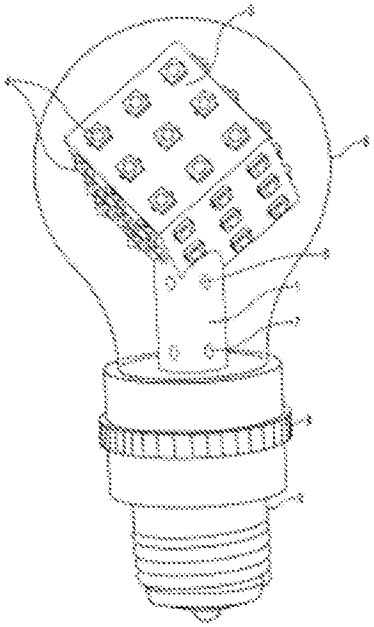
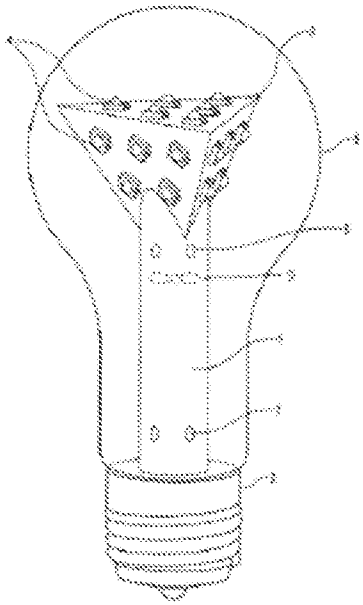
f) said panels on said heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,	Begemann describes that panels on the heat sink are oriented to facilitate emission of light in describing a light bulb that provides uniform or asymmetrical illumination. Furthermore, it can be seen in Fig. 1 that the substrate 3 panels are arranged to facilitate emission of light in all desired directions (omni-directional in the case of a traditional light bulb) or with reference to Fig. 4 adjusted so that asymmetrical distribution may also be achieved. "The invention more particularly aims at providing a LED lamp which can be relatively easily mass-produced, and which can be operated such that continuous, uniform lighting with a high luminous flux is obtained." (Appendix C, col. 1:35-39 and Appendix D, p. 1:20-23) "FIG. 4 diagrammatically shows an application of a LED lamp, which requires an asymmetric light distribution. The LED lamp (20) is used as outdoor lighting and is situated on a holder (21) which is secured to the wall (22) of a building. The necessary luminous flux in the direction of the wall is much smaller than that in the opposite direction. **The asymmetric light distribution required for this purpose can be simply adjusted by means of a LED lamp as described with reference to FIG. 3**." (Appendix C, col. 5:15-24 and Appendix D, p. 6:22-27)  FIG. 2  FIG. 1 "In the example described with respect to **FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube**. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. **Consequently, during operation of the LED lamp shown, white light is obtained**." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)

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g) at least one semiconductor chip capable of emitting light mounted on one of said panels,	Begemann describes at least one semiconductor chip capable of emitting light mounted on one of said panels in the context of mounting the LEDs to the substrate 3. "By using one or **more LED combinations in the colors green, red and blue or green, red, yellow and blue for each substrate face**, a LED lamp can be obtained which emits white light." (Appendix C, col. 2:60-63 and Appendix D, p. 3:19-21) "In this example, single LEDs of the same type are used, which have only one light point per LED (commonly referred to as single-chip LED). Consequently, the LED lamp shown is monochromatic." (Appendix C, col. 3:62-65 and Appendix D, p. 4:32-34) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. **Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4)**, which are secured to the faces by means of a heat-conducting adhesive. **In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED** or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "FIG. 3 is a schematic, sectional view of three types of LEDs (4) which can suitably be used in the invented LED lamp. FIG. 3-A **shows a LED which comprises single-chip LEDs, which each have only one light point (11) per LED**. This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). **A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate**." (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11)
h) said semiconductor chip being capable of emitting monochromatic light,	Begemann describes the semiconductor chip being capable of emitting monochromatic light in the context of green, red and blue or green, red, yellow and blue LED combinations. "By using one or more **LED combinations in the colors green, red and blue or green, red, yellow and blue** for each substrate face, a LED lamp can be obtained which emits white light." (Appendix C, col. 2:60-63 and Appendix D, p. 3:19-21) "In this example, single LEDs of the same type are used, which have only one light point per LED (commonly referred to as single-chip LED). Consequently, **the LED lamp shown is monochromatic**." (Appendix C, col. 3:62-65 and Appendix D, p. 4:32-34) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, **multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED**. These colors

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	are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with a**n array of LEDs, which preferably comprises at least one green, at least one red and at least one blue LED or at least one green, at least one red, at least one yellow and at least one blue LED or at least one white LED**. By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate." (Appendix C, col. 2:40-48 and Appendix D, p. 3:6-11)
i) said semiconductor chip being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, LED modules, laser modules, and VCSEL chips, and	Begemann describes LED chips, modules, and arrays. "FIG. 3 is a schematic, sectional view of three types of LEDs (4) which can suitably be used in the invented LED lamp. FIG. 3-A shows a LED which comprises **single-chip LEDs**, which each have only one light point (11) per LED. This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate." (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11) "A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with an **array of LEDs**, which preferably comprises at least one green, at least one red and at least one blue LED or at least one green, at least one red, at least one yellow and at least one blue LED or at least one white LED. By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate." (Appendix C, col. 2:40-48 and Appendix D, p. 3:6-11) Waitl '389 describes blue and UV LEDs. "Light-emitting diodes, providing white light, have recently been considered for general illumination purposes. **The LED itself emits blue, or UV light, from** which white light is generated. General illumination structures are customarily based on radial arrangements, suitable for insertion mounting. Luminescent conversion by LEDs, also known as LUCOLED designs, are typical. Surface mount structures are also used, particularly for TOPLED designs for surface mount LEDs. The article "White-light diodes are set to tumble in price" by Philip Hill, OLE, October 1997, pp. 17 to 20, describes details of such structures. The LUCOLED design, for example, utilizes blue emitters based on GaN, from which, by luminescence conversion, white light is generated." (Appendix E, p. 2:33-p. 3:10)
j) a coating for converting monochromatic light emitted by said chip to white light.	Abe, Waitl, Bogner, Matsubara, and Shimizu each describe a coating for converting monochromatic light to white light. Combining the teaching of any of these five references with Begemann would have been obvious to one skilled in the art to convert light produced by a light-emitting semiconducter device (i.e., an LED or laser) to produce white light. Replacing Begemann's RGB LEDs with a semiconductor light source (such as Sugiura's) of a single wavelength and a coating as described by either Abe, Waitl, Bogner, Matsubara, or Shimizu would have been obvious to one skilled in the art because the combination is one of known elements that would yield predictable results. In addition, Bogner states that luminescence conversion is a "far better and simpler solution" than a combination of RBG light sources for applications where "only white light is requested" (e.g., "interior lighting in

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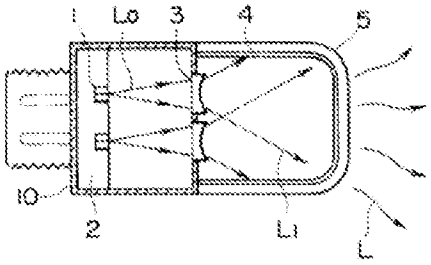
cars, instruments, courtesy lights, or general illumination"). (Appendix M, p. 143-144)

ABE

Abe describes a fluophor coating 4 for converting monochromatic light emitted by said chip to white light.

"Referring to FIG. l(a), a plurality of semiconductor laser elements 1 are buried in or mounted on a heat sink (radiator) 2, a diffusion lens 3 is arranged in front of each semiconductor laser element 1**. In addition, a fluophor 4 is provided on the inside wall surface of a vacuum glass tub**e 5 charged with argon gas or the like. A laser beam Lo emitted from each semiconductor laser element 1 is diffused through the diffusion lens 3, and **the fluorescent material of the fluophor 4 is excited by the diffused light Ll to obtain visible light L**." (Appendix H, col 4:22-30)

FIG. 1(a)



"The **fluorescent material of the fluophor 4 includes materials as shown in Table 2**, for example, and the optimum fluorescent material is selected depending on the oscillation wavelength of the semiconductor laser element 1 to be used." (Appendix H, col. 5:19-22)

Table 2

TABLE 2

FLUORESCENT SUBSTANCES AND LIGHT SOURCE COLORS

FLUORESCENT SUBSTANCE	LIGHT SOURCE COLOR
Calcium tungstate	Blue
Magnesium tungstate	Bluish white
Zin silicate	Green
Calcium halophosphate	White (daylight color)
Zinc beryllium silicate	Yellowish while
Calcium Silicate	Yellowish red
Cadmium borate	Red

"An illuminating light source device using a semiconductor laser as a first invention

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	comprises a semiconductor laser element for outputting a laser beam having a particular wavelength in the range from infrared rays to ultraviolet rays; a lens for diffusing the laser beam from the semiconductor laser element, and **a fluophor for converting the diffused laser beam from the diffusion lens into visible light**." (Appendix H, col. 2:29-36) **WAITL '389** Also, Waitl '389 describes the use of a phosphor coating to convert the monochromatic light emitted by the semiconductor chip (LED) to white light. In addition, Waitl '389 cites an article demonstrating that the use of conversion coatings to generate white light from LEDs is well known in the art. "Assembling a plurality of chips in a housing which has a **luminescence conversion layer, e.g. a phosphor** applied thereto, permits construction of a flat light source." (Appendix E, Abstract) "Preferably, the **LEDs emit ultraviolet (UV) light, and are used in combination with luminescence conversion materials to emit white or other visible light.** These elements can then be used for general illumination purposes." (Appendix E, p. 2:12-15) "Light-emitting diodes, providing white light, have recently been considered for general illumination purposes. **The LED itself emits blue, or UV light, from which white light is generated**. General illumination structures are customarily based on radial arrangements, suitable for insertion mounting. **Luminescent conversion by LEDs, also known as LUCOLED designs, are typical**. Surface mount structures are also used, particularly for TOPLED designs for surface mount LEDs. The article "White-light diodes are set to tumble in price" by Philip Hill, OLE, October 1997, pp. 17 to 20, describes details of such structures. The LUCOLED design, for example, utilizes blue emitters based on GaN, from which, by luminescence conversion, white light is generated." (Appendix E, p. 2:33-p. 3:10) "They are then surrounded by a common housing and/or cover. Luminescence conversion can be obtained by the common cover." (Appendix E, p. 8:23-25) "The outer bulb 31 is covered at its inner surface with a luminescence conversion layer 36. **The LEDs 34 may emit, for example, UV, or blue light**. The general principle is well known and reference is made, for example, to the referenced article in OLE of Oct. 1997 by Philip Hill." (AppendixE, p. 12:5-9) **BOGNER** Also, Bogner describes the generation of white light by combining blue-light-emitting LEDs with a phosphor conversion coating. "A far better and simpler solution for production of only white light represents luminescence conversion. The emitted light of a blue diode is used as primary source for exciting organic or inorganic fluorescent which is embedded in the epoxy resin. This technique allows to generate [*sic*] bright white light with only one blue chip. With the production start [*sic*] in June 98 Siemens OS was worldwide one of the first supplier for a single chip white LED in SMT technology. The so-called "Single Chip White LED" from Siemens is shown in fig. 3." (Appendix M, p. 144)

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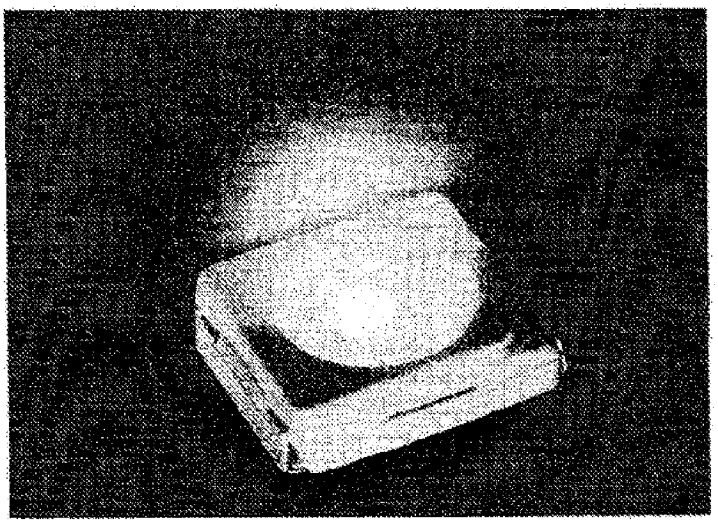


Fig.3: LW T676, the "Single Chip White LED" from Siemens

"For the production of a white LED with luminescence converter different methods can be used. One possibility is to coat the blue chip with a thin high concentrate mixture of resin and converter … A further method used also for the production of the Siemens Single Chip White LED is to mix the phosphor in the whole plastic volume … Fig. 8 shows a cross section of white TOPLED®. The chip is mounted on a premolded lead frame and embedded in the resin including the fluorescent. (Appendix M, p. 146-147)

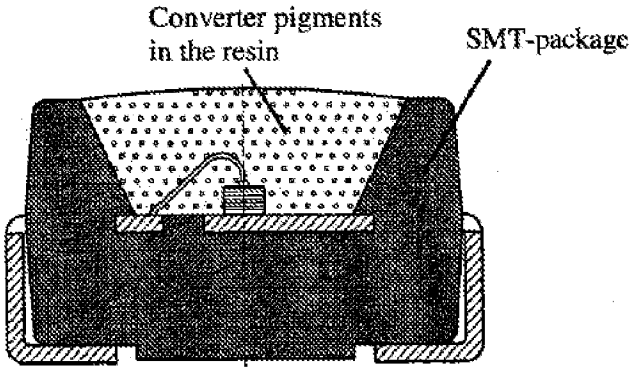
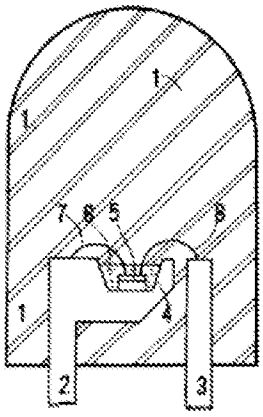
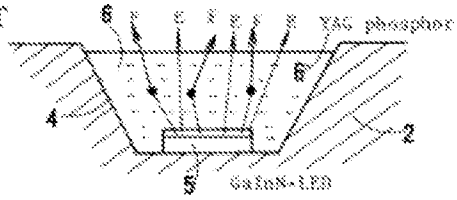


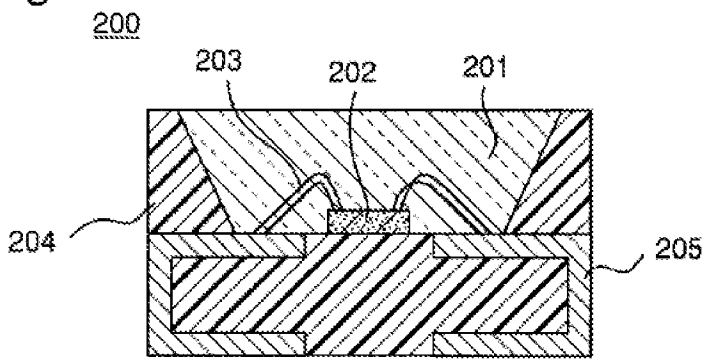
Fig.8: Cross section of white TOPLED®

"For white LED's the yellow light emitting phosphor [cerium-doped yttrium aluminum garnet $Y_3Al_5O_{12}:Ce^{3+}$] is ideally suited, since blue and yellow light are complementary colors, adding to white light after proper additive mixing." (Appendix M, p. 146)

MATSUBARA

Matsubara also describes a coating for converting monochromatic light emitted by said chip to white light in the context of a phosphor that is applied to the LED chip.

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	"The trial makes a **white color LED by assembling a high luminous blue LED having a GaInN active layer and a YAG (yttrium aluminum garnet) phosphor of yellow.** The technology of making blue GaInN-LEDs by growing a GaN crystal on a sapphire substrate and growing a GaInN active layer on the GaN film has been established. The white LED is an application of the GaInN blue LEDs. **The white LED was proposed by, Shuji Nakamura & Gerhard Fasol, "The Blue Laser Diode (GaN Based Light Emitters and Lasers)", January 1997, Springer, p 216-221(1997).**" (Appendix J, ¶ [0011]) Fig. 1(a) PRIOR ART  Fig. 1 (b) PRIOR ART  "**FIG. l(a) and FIG. l(b) show the proposed white LED**. A GaN layer and a GaInN active layer are grown on the sapphire substrate. A blue LED chip 5 is bonded on a bottom of a cavity 4 of a stem 2. A p-electrode (anode) and an n-electrode (cathode) are on the upper surface of the LED, and these electrodes are connected with the stems 2 and 3 by wires. **The cavity 4 is filled with a YAG phosphor 6 covering the GaInN blue LED 5. The YAG is a yellow phosphor** which absorbs blue light and emits yellow light." (Appendix J, ¶ [0012]) "**The YAG 6 converts the blue light to yellow light which has a longer wavelength. Yellow light and blue light are synthesized to white light.** Namely, human eyes feel the unified color of the blue light from the GaN LED and the yellow light from the YAG as white." (Appendix J, ¶ [0013]) **SHIMIZU** In addition, Shimizu describes a coating for converting monochromatic light emitted by an LED chip to white light (coating 201). "**The white light emitting diode comprising a light emitting component using a semiconductor as a light emitting layer and a phosphor which absorbs a part of light emitted by the light emitting component and emits light of wavelength different from**

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	that of the absorbed light, wherein the light emitting layer of the light emitting component is a nitride compound semiconductor and the phosphor contains garnet fluorescent material activated with cerium which contains at least one element selected from the group consisting of Y, Lu, Sc, La, Gd and Sm, and at least one element selected from the group consisting of Al, Ga and In and, and is subject to less deterioration of emission characteristic even when used with high luminance for a long period of time." (Appendix G, Abstract) *Fig.2*  "FIG. 2 shows a chip type light emitting diode, **wherein light emitting diode (LED chip) 202 is installed in a recess of a casing 204 which is filled with a coating material which contains a specified phosphor to form a coating 201**. The light emitting component 202 is fixed by using an epoxy resin or the like which contains Ag, for example, and an n electrode and a p electrode of the light emitting component 202 are connected to metal terminals 205 installed on the casing 204 by means of conductive wires 203. In the chip type light emitting diode constituted as described above, similarly to the lead type light emitting diode of FIG. 1, **fluorescent light emitted by the phosphor and LED light which is transmitted without being absorbed by the phosphor are mixed and output, so that the light emitting diode 200 also outputs light having a wavelength different from that of LED light emitted by the light emitting component 202**." (Appendix G, col. 8:51-67) "80 Parts by weight of the **fluorescent material** having a composition of $(Y_{0.8}Gd_{0.2})_3Al_5O_{12}$:Ce which has been made in the above process and 100 parts by weight of epoxy resin are sufficiently mixed to turn into slurry. The slurry is poured into the cup provided on the mount lead whereon the light emitting component is mounted. After pouring, the slurry is cured at 130° C for one hour. Thus **a coating having a thickness of 120 μm, which contains the phosphor**, is formed on the light emitting component. In Example 1, the coating is formed to contain the phosphor in gradually increasing concentration toward the light emitting component." (Appendix G, col. 24:32-43)
Claim 7	
7. A device as recited in claim 1 wherein said chip includes a substrate on which epitaxial layers are grown, a buffer layer located on said substrate, said buffer layer	Begemann describes semiconductor-based lamps and Sugiura describes the structure of a semiconductor light source, which could be readily substituted for Begemann's LEDs to obtain predictable results. As such, it would have been obvious and one of ordinary skill in the art would have been motivated to combine the teachings of Sugiura with that of Begemann and any of Abe/Waitl/Bogner/Matsubara/Shimizu. Sugiura in one example describes a semiconductor laser structure including a buffer layer 512 between the substrate 511 and a first cladding layer 513, a second cladding layer 517

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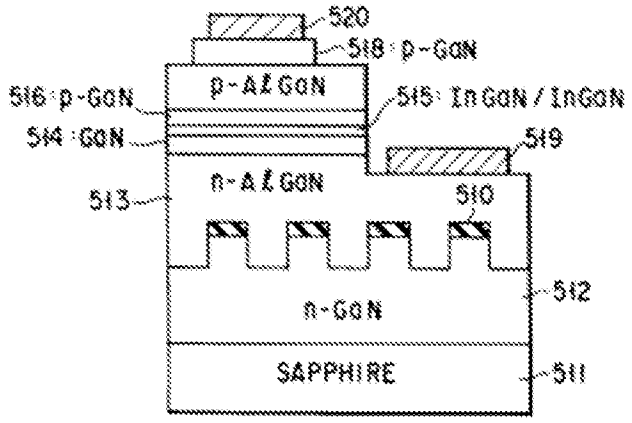
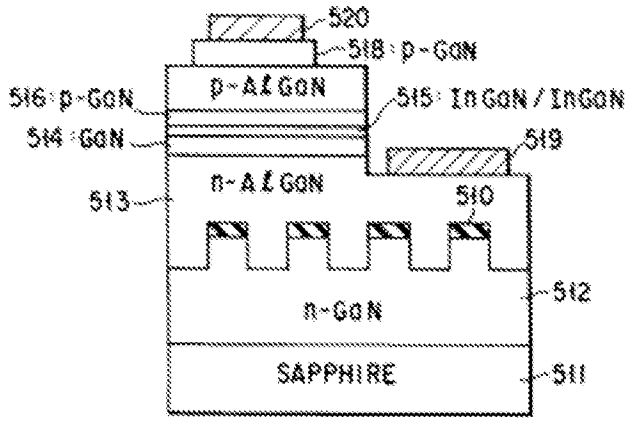
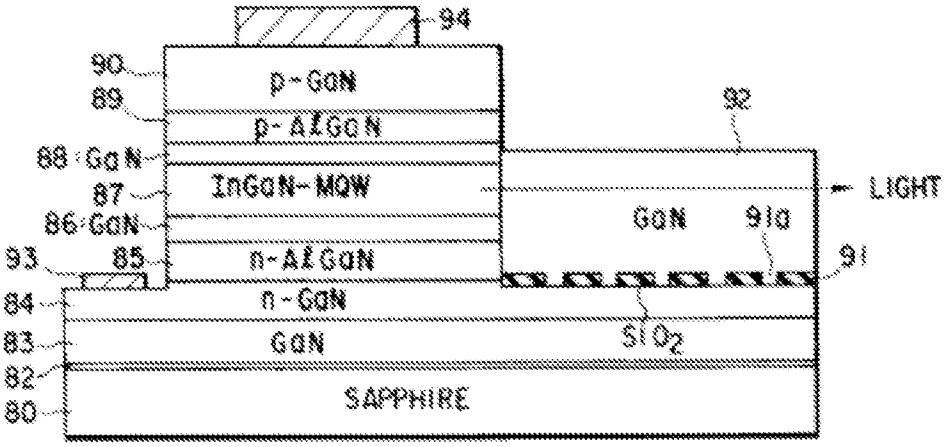
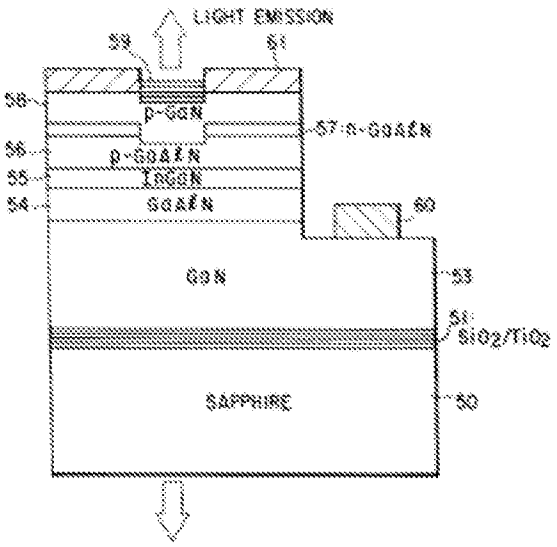
serving to mitigate differences in material properties between said substrate and other epitaxial layers, a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer, an active layer, said active layer emitting light when electrons jump to a valance state, a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and a contact layer on which an electron may be mounted for powering said chip.	(not labeled but described as the p-AlGaN) on either side of the active layer 515 and a contact layer 518. The first cladding layer 513 is adjacent to the buffer layer 512.  FIG.15 "Referring to FIG. 15, numeral 511 denotes a sapphire substrate, and, **on the sapphire substrate 511, an n-type GaN buffer layer 512 is formed**. On the GaN buffer layer 512, an Si02 mask 510 is provided in the form of stripes. By the use of this mask 510, the buffer layer 512 is etched down to a predetermined depth. On the GaN buffer layer 512 and the Si02 mask 510, **an n-type AlGaN clad layer 513** is formed flat by utilizing the lateral growth, and, **on the clad layer 513, an undoped GaN optical guide layer 514, a quantum well layer 515 consisting of an InGaN/InGaN, a p-type GaN optical guide layer 516, and a p-type AlGaN clad layer 517 are formed**. Further, a portion of the above-mentioned laminate or stack structure is removed from the surface side thereof down to the clad layer 513, and, on the clad layer 513 thus exposed, an n-side electrode 519 is formed. On the p-type AlGaN clad layer 517, a p-side electrode 520 is formed through a low-resistance **p-type GaN contact layer 518**. These electrodes 519 and 520 are each narrowed to a width of 3 μm … In the structure of this embodiment, an SiO_2 mask is formed in a portion of the hetero junction which has a stepped structure, and, on the SiO_2 mask, a crystal growth is effected by utilizing the lateral growth, whereby the n-type AlGaN clad layer 513 can be formed thick without causing the occurrence of cracks, and thus, no light can leak out from the clad layer 513. Due to this, the electromagnetic wave distribution of the light comes to spread centering around the **active layer**, whereby the optical confinement is greatly improved." (Appendix I, col. 23:62-24:38) The semiconductor structures and descriptions in Sigiura are consistent with the well-known double heterostructure (also known as a double heterojunction) wherein an active layer is sandwiched between two cladding layers. The double heterostructure was known to comprise the state of the art prior to the filing of the '961 patent's application. The double heterojunction functions as described in Abe: "As shown in FIG. 5, the semiconductor laser generally has a double hetero junction, in which the active layer (luminous layer) 100 is sandwiched between the clad layers 101 and 102 from both sides. The resultant layers are formed on a metal contact 103 and a substrate 104, while a contact layer 105, an insulating layer 106 and a metal contact 107 are laminated on the clad layer 101. The active layer 100 is a semiconductor having a small band gap (i.e., energy difference

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	between a valence band and a conduction band of the semiconductor), and the clad layers 101 and 102 are respectively n- and p-type semiconductors having a large band gap. When forward voltage is applied to the clad layers, electrons are flown from n-type region into the active layer 100, while holes are flown from p-type region into the active layer. These carriers (electrons and holes) are shut up in the active layer 100 by an energy barrier caused by the band gap difference in the hetero junction. The shut-up of the carriers promotes the efficient recombination of electrons and holes to generate spontaneously-emitting light. In this stage, the situation is similar to that of the LED, and light, which is not coherent, is emitted uniformly in all the directions." (Appendix H, col. 7:55-8:9)
Claim 8	
8. A device as recited in claim 7 further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.	Sugiura describes the semiconductor structure of claim 7 including a reflective layer on each side of the active layer in at least two examples. First, Sugiura describes a semiconductor laser including optical guide layers 514 and 516. More specifically, the semiconductor laser structure includes a buffer layer 512 between the substrate 511 and a first cladding layer 513, a first optical guide layer 514, a second cladding layer 517 (not labeled but described as the p-AlGaN) on either side of the active layer 515, a second optical guide layer 516, and a contact layer 518. The first cladding layer 513 is adjacent to the buffer layer 512 and the optical guide layers (514 and 516) are on either side of the active layer 515.  FIG.15 "Referring to FIG. 15, numeral 511 denotes a sapphire substrate, and, **on the sapphire substrate 511, an n-type GaN buffer layer 512 is formed**. On the GaN buffer layer 512, an Si02 mask 510 is provided in the form of stripes. By the use of this mask 510, the buffer layer 512 is etched down to a predetermined depth. On the GaN buffer layer 512 and the Si02 mask 510, **an n-type AlGaN clad layer 513** is formed flat by utilizing the lateral growth, and, **on the clad layer 513, an undoped GaN optical guide layer 514, a quantum well layer 515 consisting of an InGaN/InGaN, a p-type GaN optical guide layer 516, and a p-type AlGaN clad layer 517 are formed**. Further, a portion of the above-mentioned laminate or stack structure is removed from the surface side thereof down to the clad layer 513, and, on the clad layer 513 thus exposed, an n-side electrode 519 is formed. On the p-type AlGaN clad layer 517, a p-side electrode 520 is formed through a low-resistance **p-type**

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	GaN contact layer 518. These electrodes 519 and 520 are each narrowed to a width of 3 μm." (Appendix I, col. 23:62-24:14) Moreover, Sugiura provides more detail regarding the fuction of the optical guide layers in FIG. 11 and the associated text. The combined description of both FIG. 15 and FIG. 11 as "lasers" along with the depiction of light exiting from the edge of the active layer 87 in FIG. 11 would lead one of ordinary skill in the semiconductor art to conclude that optical guide layers (86 and 88 in FIG. 11 and by extension 514 and 516 in FIG. 15) guide light by reflectng and concentrating it to generate the coherent high intensity output of a laser relative to an LED. (*See* Appendix I col. 17:62-18:8; and col. 23:59-24:6)  FIG. 11 Second, Sugiura describes a semiconductor laser structure including reflective layers 51 and 59. Layers 51 and 59 are reflective and located on opposite sides of active layer 4; reflective layer 59 on contact layer 58 and reflective layer 51on the substrate 50. "Next, the wafer is put into the MOCVD apparatus again, and, on the current narrowing layer 57, there is grown a p-type GaN contact layer 58 into which Mg has been doped. After the growth of the p-type GaN contact layer 58, the wafer is removed from within the MOCVD apparatus. Further, over approximately the whole surface of the p-type GaN contact layer 58, a multi-layer film comprising $Si0_2$ and $Ti0_2$ is laminated by vapor deposition. **Subsequently, by the use of the photolithography technique, the multi-layer film is processed into a predetermined shape, whereby a first reflector 59** is formed. **On the other hand, the multi-layer film (mask) 51-comprising $Si0_2$ and $Ti0_2$-formed *on* the sapphire substrate 50 is rendered into a second reflector**." (Appendix I, col. 16:20-32; *See also* Appendix I, col. 15:50-17:7) "**[T]he multi-layer film--comprising SiO_2 and TiO_2 --used as a mask at the early stage of the growth is used as a reflector**, so that **a resonator** with a high reflectance can be obtained, whereby the threshold current can be reduced." (Appendix I, col. 17:3-7; *See also* Appendix I, col. 23:59-24:43)

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	 FIG. 9
Claim 9	
9. A device as recited in claim 8 wherein said reflective layers include multiple quantum wells.	The teaching in Karwacki of replacing a reflective layer in a semiconductor laser with a Quantum Well Mirror (QWM) may be applied to any of Sugiura's example semiconductor lasers described in relation to claim 8 to create a semiconductor light source with reflective layers including multiple quantum wells. Indeed, it would have been obvious to one of ordinary skill in the art to replace either reflective layers 51 and/or 59 or optical guide layers 514 and/or 516 with the QWM described by Karwacki to obtain predictable results. Karwacki's use of MQWs within a reflecting layer such that a laser's output wavelength may be tuned could be used to fine tune a laser within a semiconductor light source to the optimum absorption wavelength of the phosphor coating. Alternatively, Karwacki's laser design could be used to rapidly modulate the output wavelength of the laser in order to generate a broader spectrum white light. In addition, rapid modulation using laser MQWs is common in the semiconductor art for use in fiber optic communications. It should be noted that Sugiura describes the semiconductor device in FIG. 11 as a "distributed Bragg reflector (DBR) laser." (Appendix I, col. 17:62-64) As Sugiura's example semiconductor device depicted in FIG. 11 does not include reflective layers other than the optical guide layers 86 and 88, one of ordinary skill in the art can reasonably conclude that the optical guide layers 86 and 88 (and similarly 514 and 516 of FIG. 15) are DBRs. Furthermore, Karwacki specifically describes replacing DBRs with QWMs. (Appendix K, ¶ [0002]) Karwacki, therefore, can be viewed as explicitly suggesting such a replacement. "The present invention relates to semiconductor lasers that emit light at visible wavelengths, and more particularly, to Vertical-Cavity Surface Emitting Lasers (VCSELs) that produce N-frequencies of visible light in a single cavity by altering the optical length of the cavity through the use of a **Quantum Well Mirror (QWM) replacing one of the Distributed Bragg Reflectors (DBRs)** typically found in a VCSEL." (Appendix K, ¶ [0002]) "It is a further object of the present invention to provide for a VCSEL device that may be

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Sugiura, and Karwacki
	fabricated of different semiconductor materials that provide a desired bandgap for fundamental light frequencies of interest." (Appendix K, ¶ [0009]) "With reference to the drawing, FIG. 1 illustrates a schematic diagram of a tunable multi-frequency VCSEL device 10 of the present invention. **The VCSEL device 10 is tunable to N visible frequencies and comprises a QWM that replaces at least one of the DBRs commonly found in the prior art VCSEL devices**. As will be further described hereinafter, the QWM element in the VCSEL is tunable so as to develop one of the visible light frequencies, by applying a specific voltage to its electrode, making up the multiple visible light spectrum developed by the this device 10." (Appendix K, ¶ [0016]; *See also* Appendix K, ¶¶ [0018]-[0020]) "W**ith reference to FIG. 1, it is seen that a single QWM device 18 is used to replace one of the DBR of a typical VCSEL devic**e, such as those disclosed in U.S. Pat. Nos. 5,557,627 and 5,719,892. The fundamental frequency within the cavity can be set by applying a DC voltage, having a possible value between 0 to 10 volts, across the electrodes 26 and 28 of the QWM device 18. This will set a particular cavity length for the VCSEL device 10. If modulation is required, an additional time varying signal can be applied across the electrodes 26 and 28, in a manner to be described hereinafter with reference to FIG. 3." (Appendix K, ¶[0022])

B. Issue No. 2: Claims 1, 7, 8, and 9 are rendered obvious by Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Nakamura, and Karwacki.

The following claim chart demonstrates in detail the correspondence between the claims 1, 7, 8, and 9 of the '961 patent and the pertinent teachings of Begemann '569 [6] in view of, any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Nakamura, and Karwacki. It would have been obvious to a person of ordinary skill in the art to combine the teachings of Begemann with those of Abe, Waitl '389, Bogner, Matsubara, or Shimizu because all six references relate to semiconductor based light sources for general illumination, which could be either incorporated into Begemann's LED lamp structure or used to substitute elements of Begemann's LED structure to obtain predicable results.

It would have been obvious to a person of ordinary skill in the art to combine the teachings of Nakamura with those of Begemann because Nakamura describes a semiconductor light source that could be used as a light source in the semiconductor-based lamps described by

[6] This reexamination request is based on Begemann '569. However, because U.S. Patent No. 6,220,722 ("Begemann '722") was cited extensively during examination of CAO's related patents, the text citations and direct quotations are taken from Begemann '722 with parallel citations provided to Begemann '569. Although there are some minor variations in wording between Begemann '722 and Begemann '569, the material that is quoted and cited herein is identical in both Begemann references.

Begemann. Nakamura demonstrates that the semiconductor structure claimed in the '961 patent is well-known in the art, and as such it would be obvious to combine this teaching with that of Begemann. In addition, it would be obvious to a person of ordinary skill in the art would to combine the teachings of Karwacki with those of Begemann and Nakamura, because like Nakamura, Karwacki describes a semiconductor light source (a VCSEL) that could be used as a light source in the semiconductor-based lamps described by Begemann.

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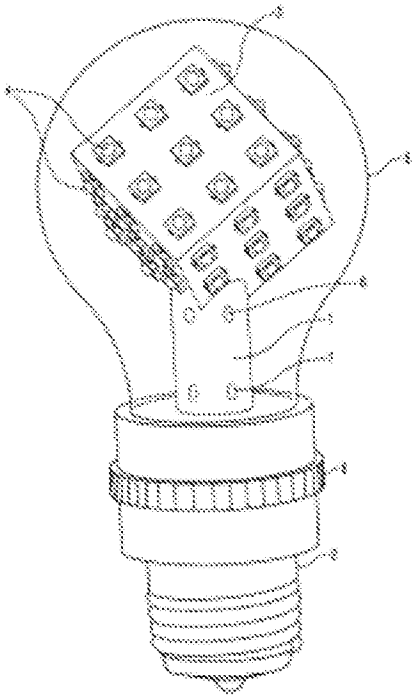
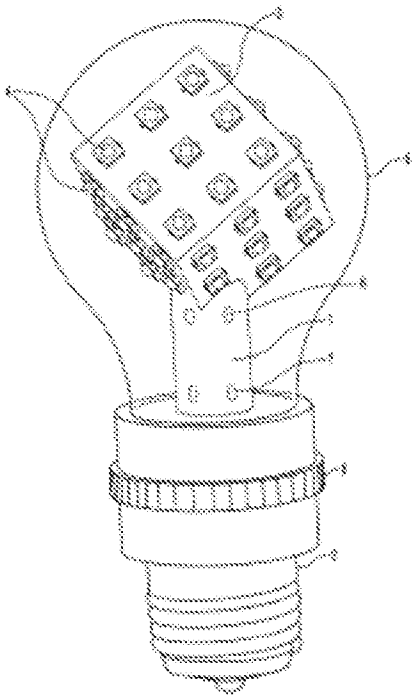
Claim 1	
1. A semiconductor light source for emitting light to illuminate a space used by humans, the semiconductor light source comprising:	"The invention more particularly aims at providing a **LED lamp which can be relatively easily mass-produced, and which can be operated such that continuous, uniform lighting with a high luminous flux is obtained**." (Appendix C, col. 1:35-39 and Appendix D, p. 1:20-23)  FIG. 2 "FIG. 4 diagrammatically shows an application of a LED lamp, which requires an asymmetric light distribution. T**he LED lamp (20) is used as outdoor lighting and is situated on a holder (21) which is secured to the wall (22) of a building.** The necessary luminous flux in the direction of the wall is much smaller than that in the opposite direction. The asymmetric light distribution required for this purpose can be simply adjusted by means of a LED lamp as described with reference to FIG. 3." (Appendix C, col. 5:15-24 and Appendix D, p. 6:22-27) Waitl '389 states: "The present invention relates to opto-electronic semiconductor elements, particularly

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Nakamura, and Karwacki
	suitable for general illumination." (Appendix E, p. 2:2-4)
a) an enclosure, said enclosure being fabricated from a material substantially transparent to white light,	Begemann describes an enclosure being fabricated from a material substantially transparent to white light in describing a (semi-)transparent envelope for a white-light-emitting lamp. "A favorable embodiment of the LED lamp is characterized in that the lamp is also provided with **a (semi-)transparent envelope**. **This envelope may be made of glass**, but is preferably made of a synthetic resin. The envelope serves as a mechanical protection for the LEDs. In addition, **the envelope may contribute to obtaining the uniform lighting** which can be obtained with the lamp. (Appendix C, col. 2:13-19, and Appendix D, p. 2:22-26)" "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin,** which envelops the gear column (1) and the substrate (3)." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. **Consequently, during operation of the LED lamp shown, white light is obtained**." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "By using one or more LED combinations in the colors green, red and blue or green, red, yellow and blue for each substrate face, **a LED lamp can be obtained which emits white light**. Such LED combinations composed of three different LEDs are preferably provided with a secondary optical system, in which the above-mentioned colors are blended so as to obtain white light." (Appendix C, col. 2:60-66 and Appendix D, p. 3:19-23)
b) an interior volume within said enclosure,	Begemann describes that the interior volume of the envelope is used to enclose the LEDs, gear column, and substrate. "A favorable embodiment of the LED lamp is characterized in that the lamp is also provided with a (semi-)transparent envelope. This envelope may be made of glass, but is preferably made of a synthetic resin. **The envelope serves as a mechanical protection for the LEDs**. In addition, the envelope may contribute to obtaining the uniform lighting which can be obtained with the lamp." (Appendix C, col. 2:13-19 and Appendix D, p. 2:22-26) "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Nakamura, and Karwacki
	(LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin, which envelops the gear column (1) and the substrate (3).**" (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)
c) a heat sink located in said interior volume,	Begemann describes a heat sink located in the interior volume in the context of the substrate 3 and gear column 1 that enable good heat conduction. "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin, which envelops the gear column (1) and the substrate (3).**" (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)  FIG. 2 "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1)** to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used,

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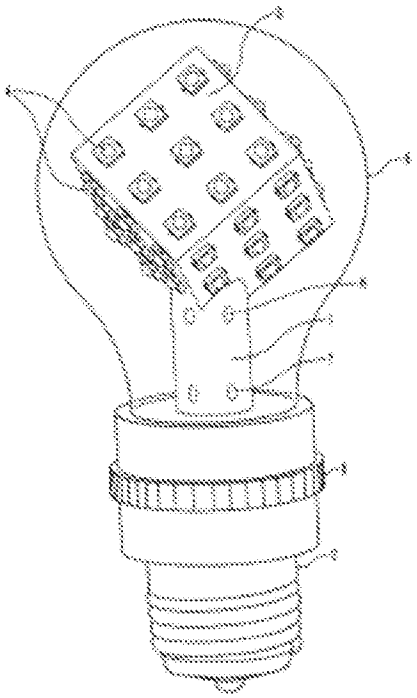
	which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)
d) said heat sink being capable of drawing heat from one or more semiconductors devices,	Begemann describes that the heat sink removes the heat from the semiconductor device via the MC-PCB 12, substrate 3, and gear column 1. "**A particular aspect of the invention resides in that the heat-dissipating means remove the heat, generated during operation of the lamp, from the substrate via the gear column to the lamp cap and the mains supply connected thereto**." (Appendix C, col. 1:54-58 and Appendix D, p. 2:5-7)  FIG. 2 "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved.** In the present case, the substrate is made of a copper alloy. **Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive**. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "If LEDs with a high luminous flux (5 lm or more) are used, then a so-called **metal-**

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	core PCB is customarily used. **Such PCBs have relatively high heat conduction**. By providing these PCBs on the (preferably metal) substrate by means of a heat-conducting adhesive, a very good heat dissipation from the LED arrays to the gear column is obtained." (Appendix C, col. 2:53-59 and Appendix D, p. 3:14-18) "FIG. 3 is a schematic, sectional view of three types of **LEDs (4) which can suitably be used in the invented LED lamp**. FIG. 3-A shows a LED which comprises single-chip LEDs, which each have only one light point (11) per LED. **This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer**. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). **A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate.**" (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11)
e) said heat sink having a plurality of panels on it suitable for mounting semiconductor devices thereon,	Begemann describes a heat sink having a plurality of panels suitable for mounting semiconductor devices in describing a polyhedral substrate. "The invention relates to a LED lamp having a gear column which is connected, at its first end, to a lamp cap and, at its other end, to a substrate. **The substrate is provided with a regular polyhedron of at least four planes, the planes having at least one LED** having a luminous flux of at least 5 lm. The gear column also have heat-dissipating means which interconnect the substrate and the lamp cap." (Appendix C, Abstract and Appendix D, Abstract) "Better results, however, are achieved with substrates in the form of a hexahedron (**polyhedron of six faces, cube**). In practice it has been found that a good uniformity in light distribution can already be obtained using substrates in the form of a tetrahedron (regular polyhedron of four faces, pyramid)." (Appendix C, col. 2:5-10 and Appendix D, p. 2:16-19) "A particular aspect of the invention resides in that **the heat-dissipating means remove the heat, generated during operation of the lamp, from the substrate via the gear column to the lamp cap** and the mains supply connected thereto." (Appendix C, col. 1:54-58 and Appendix D, p. 2:5-7) "By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate. This applies in particular when the faces of the polyhedral substrate are substantially flat. Such a LED array generally comprises a number of LEDs which are provided on a flat printed circuit board (PCB)." (Appendix C, col. 2:45-51 and Appendix D, p. 3:9-13) "In the example described with respect to FIG. 2, **the substrate (3) is cube-shaped with six flat faces**, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs** (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and

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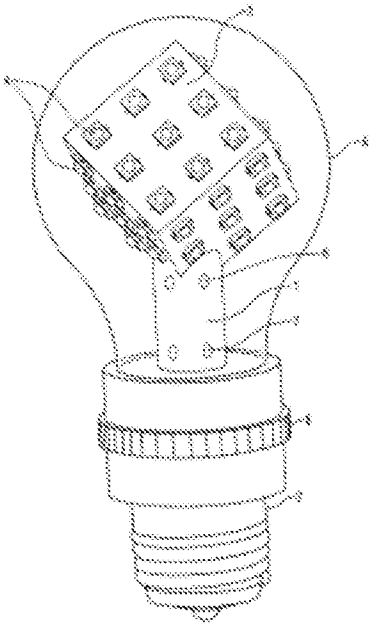
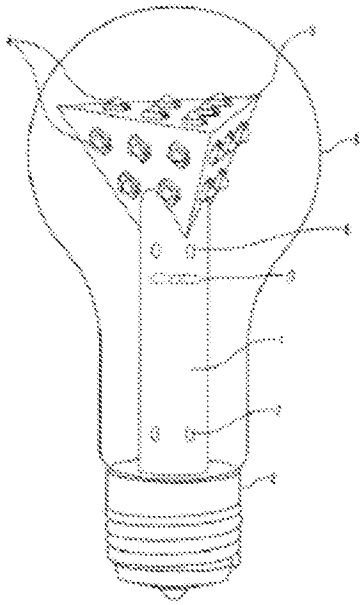
	Appendix D, p. 5:17-26)
f) said panels on said heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,	Begemann describes that panels on the heat sink are oriented to facilitate emission of light in describing a light bulb that provides uniform or asymmetrical illumination. Furthermore, it can be seen in Fig. 1 that the substrate 3 panels are arranged to facilitate emission of light in all desired directions (omni-directional in the case of a traditional light bulb) or with reference to Fig. 4 adjusted so that asymmetrical distribution may also be achieved. "The invention more particularly aims at providing a LED lamp which can be relatively easily mass-produced, and which can be operated such that continuous, uniform lighting with a high luminous flux is obtained." (Appendix C, col. 1:35-39 and Appendix D, p. 1:20-23) "FIG. 4 diagrammatically shows an application of a LED lamp, which requires an asymmetric light distribution. The LED lamp (20) is used as outdoor lighting and is situated on a holder (21) which is secured to the wall (22) of a building. The necessary luminous flux in the direction of the wall is much smaller than that in the opposite direction. **The asymmetric light distribution required for this purpose can be simply adjusted by means of a LED lamp as described with reference to FIG. 3**." (Appendix C, col. 5:15-24 and Appendix D, p. 6:22-27)  FIG. 2  FIG. 1 "In the example described with respect to **FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube**. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light

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	in the secondary optical system of each of the LEDs. **Consequently, during operation of the LED lamp shown, white light is obtained**." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)
g) at least one semiconductor chip capable of emitting light mounted on one of said panels,	Begemann describes at least one semiconductor chip capable of emitting light mounted on one of said panels in the context of mounting the LEDs to the substrate 3. "By using one or **more LED combinations in the colors green, red and blue or green, red, yellow and blue for each substrate face**, a LED lamp can be obtained which emits white light." (Appendix C, col. 2:60-63 and Appendix D, p. 3:19-21) "In this example, single LEDs of the same type are used, which have only one light point per LED (commonly referred to as single-chip LED). Consequently, the LED lamp shown is monochromatic." (Appendix C, col. 3:62-65 and Appendix D, p. 4:32-34) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. **Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4)**, which are secured to the faces by means of a heat-conducting adhesive. **In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED** or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "FIG. 3 is a schematic, sectional view of three types of LEDs (4) which can suitably be used in the invented LED lamp. FIG. 3-A **shows a LED which comprises single-chip LEDs, which each have only one light point (11) per LED**. This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). **A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate**." (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11)
h) said semiconductor chip being capable of emitting monochromatic light,	Begemann describes the semiconductor chip being capable of emitting monochromatic light in the context of green, red and blue or green, red, yellow and blue LED combinations. "By using one or more **LED combinations in the colors green, red and blue or green, red, yellow and blue** for each substrate face, a LED lamp can be obtained which emits white light." (Appendix C, col. 2:60-63 and Appendix D, p. 3:19-21) "In this example, single LEDs of the same type are used, which have only one light point per LED (commonly referred to as single-chip LED). Consequently, **the LED lamp shown is monochromatic**." (Appendix C, col. 3:62-65 and Appendix D, p. 4:32-34) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with

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	six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, **multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED**. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with a**n array of LEDs, which preferably comprises at least one green, at least one red and at least one blue LED or at least one green, at least one red, at least one yellow and at least one blue LED or at least one white LED**. By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate." (Appendix C, col. 2:40-48 and Appendix D, p. 3:6-11)
i) said semiconductor chip being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, LED modules, laser modules, and VCSEL chips, and	Begemann describes LED chips, modules, and arrays. "FIG. 3 is a schematic, sectional view of three types of LEDs (4) which can suitably be used in the invented LED lamp. FIG. 3-A shows a LED which comprises **single-chip LEDs**, which each have only one light point (11) per LED. This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate." (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11) "A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with an **array of LEDs**, which preferably comprises at least one green, at least one red and at least one blue LED or at least one green, at least one red, at least one yellow and at least one blue LED or at least one white LED. By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate." (Appendix C, col. 2:40-48 and Appendix D, p. 3:6-11) Waitl '389 describes blue and UV LEDs. "Light-emitting diodes, providing white light, have recently been considered for general illumination purposes. **The LED itself emits blue, or UV light, from** which white light is generated. General illumination structures are customarily based on radial arrangements, suitable for insertion mounting. Luminescent conversion by LEDs, also known as LUCOLED designs, are typical. Surface mount structures are also used, particularly for TOPLED designs for surface mount LEDs. The article "White-light diodes are set to tumble in price" by Philip Hill, OLE, October 1997, pp. 17 to 20, describes details of such structures. The LUCOLED design, for example, utilizes blue emitters based on GaN, from which, by luminescence conversion, white light is generated." (Appendix E, p. 2:33-p. 3:10)

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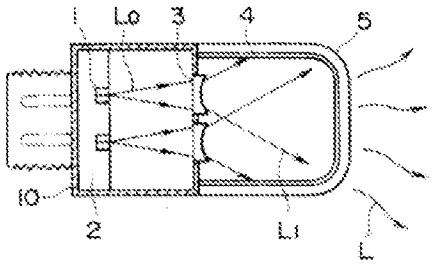
j) a coating for converting monochromatic light emitted by said chip to white light.	Abe, Waitl, , Bogner, Matsubara, and Shimizu each describe a coating for converting monochromatic light to white light. Combining the teaching of any of these five references with Begemann would have been obvious to one skilled in the art to convert light produced by a light-emitting semiconducter device (i.e., an LED or laser) to produce white light. Replacing Begemann's RGB LEDs with a semiconductor light source (such as Nakamura's) of a single wavelength and a coating as described by either Abe, Waitl, Bogner, Matsubara, or Shimizu would have been obvious to one skilled in the art because the combination is one of known elements that would yield predictable results. In addition, Bogner states that luminescence conversion is a "far better and simpler solution" than a combination of RBG light sources for applications where "only white light is requested" (e.g., "interior lighting in cars, instruments, courtesy lights, or general illumination"). (Appendix M, p. 143-144) **ABE** Abe describes a fluophor coating 4 for converting monochromatic light emitted by said chip to white light. "Referring to FIG. l(a), a plurality of semiconductor laser elements 1 are buried in or mounted on a heat sink (radiator) 2, a diffusion lens 3 is arranged in front of each semiconductor laser element 1**. In addition, a fluophor 4 is provided on the inside wall surface of a vacuum glass tub**e 5 charged with argon gas or the like. A laser beam Lo emitted from each semiconductor laser element 1 is diffused through the diffusion lens 3, and **the fluorescent material of the fluophor 4 is excited by the diffused light Ll to obtain visible light L**." (Appendix H, col 4:22-30) FIG. l(a)  "The **fluorescent material of the fluophor 4 includes materials as shown in Table 2**, for example, and the optimum fluorescent material is selected depending on the oscillation wavelength of the semiconductor laser element 1 to be used." (Appendix H, col. 5:19-22) Table 2

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TABLE 2

FLUORESCENT SUBSTANCES AND LIGHT SOURCE COLORS

FLUORESCENT SUBSTANCE	LIGHT SOURCE COLOR
Calcium tungstate	Blue
Magnesium tungstate	Bluish white
Zin silicate	Green
Calcium halophosphate	White (daylight color)
Zinc beryllium silicate	Yellowish white
Calcium Silicate	Yellowish red
Cadmium borate	Red

"An illuminating light source device using a semiconductor laser as a first invention comprises a semiconductor laser element for outputting a laser beam having a particular wavelength in the range from infrared rays to ultraviolet rays; a lens for diffusing the laser beam from the semiconductor laser element, and **a fluophor for converting the diffused laser beam from the diffusion lens into visible light**." (Appendix H, col. 2:29-36)

WAITL '389

Also, Waitl '389 describes the use of a phosphor coating to convert the monochromatic light emitted by the semiconductor chip (LED) to white light. In addition, Waitl '389 cites an article demonstrating that the use of conversion coatings to generate white light from LEDs is well known in the art.

"Assembling a plurality of chips in a housing which has a **luminescence conversion layer, e.g. a phosphor** applied thereto, permits construction of a flat light source." (Appendix E, Abstract)

"Preferably, the **LEDs emit ultraviolet (UV) light, and are used in combination with luminescence conversion materials to emit white or other visible light.** These elements can then be used for general illumination purposes." (Appendix E, p. 2:12-15)

"Light-emitting diodes, providing white light, have recently been considered for general illumination purposes. **The LED itself emits blue, or UV light, from which white light is generated**. General illumination structures are customarily based on radial arrangements, suitable for insertion mounting. **Luminescent conversion by LEDs, also known as LUCOLED designs, are typical**. Surface mount structures are also used, particularly for TOPLED designs for surface mount LEDs. The article "White-light diodes are set to tumble in price" by Philip Hill, OLE, October 1997, pp. 17 to 20, describes details of such structures. The LUCOLED design, for example, utilizes blue emitters based on GaN, from which, by luminescence conversion, white light is generated." (Appendix E, p. 2:33-p. 3:10)

"They are then surrounded by a common housing and/or cover. Luminescence

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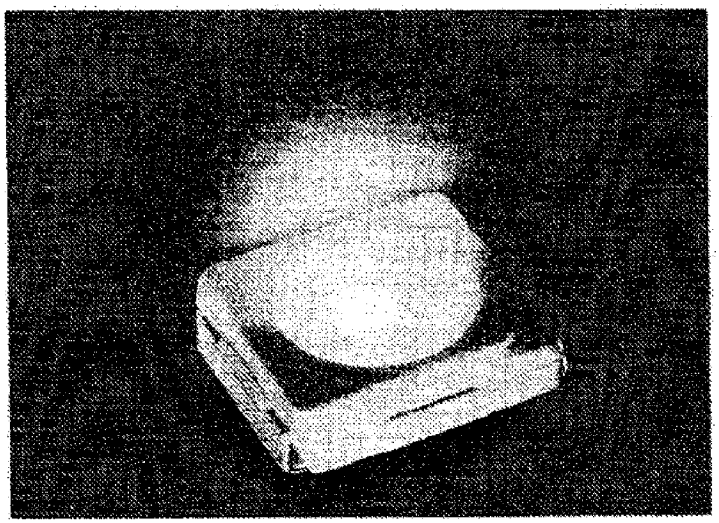
	conversion can be obtained by the common cover." (Appendix E, p. 8:23-25) "The outer bulb 31 is covered at its inner surface with a luminescence conversion layer 36. **The LEDs 34 may emit, for example, UV, or blue light**. The general principle is well known and reference is made, for example, to the referenced article in OLE of Oct. 1997 by Philip Hill." (Appendix E, p. 12:5-9) **BOGNER** Also, Bogner describes the generation of white light by combining blue-light-emitting LEDs with a phosphor conversion coating. "A far better and simpler solution for production of only white light represents luminescence conversion. The emitted light of a blue diode is used as primary source for exciting organic or inorganic fluorescent which is embedded in the epoxy resin. This technique allows to generate [*sic*] bright white light with only one blue chip. With the production start [*sic*] in June 98 Siemens OS was worldwide one of the first supplier for a single chip white LED in SMT technology. The so-called "Single Chip White LED" from Siemens is shown in fig. 3." (Appendix M, p. 144)  Fig.3: LW T676, the "Single Chip White LED" from Siemens "For the production of a white LED with luminescence converter different methods can be used. One possibility is to coat the blue chip with a thin high concentrate mixture of resin and converter … A further method used also for the production of the Siemens Single Chip White LED is to mix the phosphor in the whole plastic volume … Fig. 8 shows a cross section of white TOPLED®. The chip is mounted on a premolded leadframe and embedded in the resin including the fluorescent. (Appendix M, p. 146-147)

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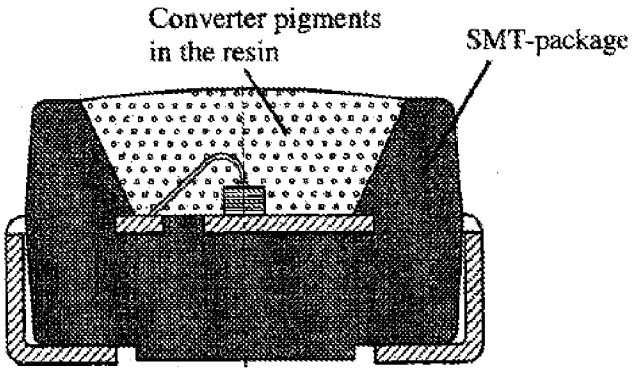

Fig.8: Cross section of white TOPLED®

"For white LED's the yellow light emitting phosphor [cerium-doped yttrium aluminum garnet $Y_3Al_5O_{12}:Ce^{3+}$] is ideally suited, since blue and yellow light are complementary colors, adding to white light after proper additive mixing." (Appendix M, p. 146)

MATSUBARA

Matsubara also describes a coating for converting monochromatic light emitted by said chip to white light in the context of a phosphor that is applied to the LED chip.

"The trial makes a **white color LED by assembling a high luminous blue LED having a GaInN active layer and a YAG (yttrium aluminum garnet) phosphor of yellow.** The technology of making blue GaInN-LEDs by growing a GaN crystal on a sapphire substrate and growing a GaInN active layer on the GaN film has been established. The white LED is an application of the GaInN blue LEDs. **The white LED was proposed by, Shuji Nakamura & Gerhard Fasol, "The Blue Laser Diode (GaN Based Light Emitters and Lasers)", January 1997, Springer, p 216-221(1997).**" (Appendix J, ¶ [0011])

Fig. 1(a)
PRIOR ART

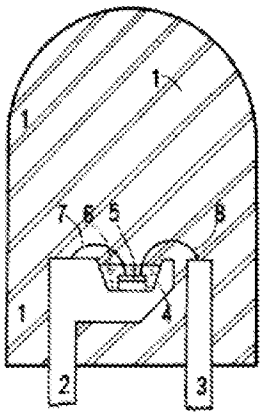

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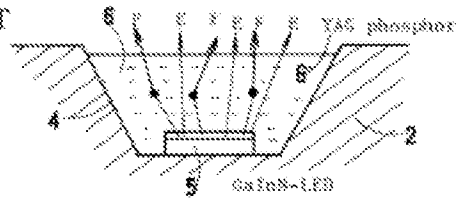
Fig. 1 (b)

PRIOR ART



"**FIG. l(a) and FIG. l(b) show the proposed white LED**. A GaN layer and a GaInN active layer are grown on the sapphire substrate. A blue LED chip 5 is bonded on a bottom of a cavity 4 of a stem 2. A p-electrode (anode) and an n-electrode (cathode) are on the upper surface of the LED, and these electrodes are connected with the stems 2 and 3 by wires. **The cavity 4 is filled with a YAG phosphor 6 covering the GaInN blue LED 5. The YAG is a yellow phosphor** which absorbs blue light and emits yellow light." (Appendix J, ¶ [0012])

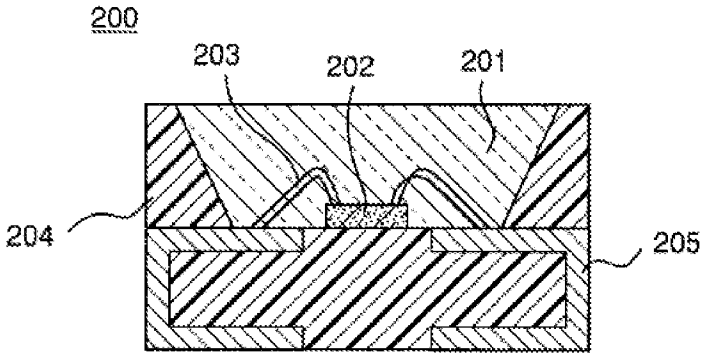
"**The YAG 6 converts the blue light to yellow light which has a longer wavelength. Yellow light and blue light are synthesized to white light.** Namely, human eyes feel the unified color of the blue light from the GaN LED and the yellow light from the YAG as white." (Appendix J, ¶ [0013])

SHIMIZU

In addition, Shimizu describes a coating for converting monochromatic light emitted by an LED chip to white light (coating 201).

"**The white light emitting diode comprising a light emitting component using a semiconductor as a light emitting layer and a phosphor which absorbs a part of light emitted by the light emitting component and emits light of wavelength different from that of the absorbed light**, wherein the light emitting layer of the light emitting component is a nitride compound semiconductor and the phosphor contains garnet fluorescent material activated with cerium which contains at least one element selected from the group consisting of Y, Lu, Sc, La, Gd and Sm, and at least one element selected from the group consisting of Al, Ga and In and, and is subject to less deterioration of emission characteristic even when used with high luminance for a long period of time." (Appendix G, Abstract)

Fig.2



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	"FIG. 2 shows a chip type light emitting diode, **wherein light emitting diode (LED chip) 202 is installed in a recess of a casing 204 which is filled with a coating material which contains a specified phosphor to form a coating 201**. The light emitting component 202 is fixed by using an epoxy resin or the like which contains Ag, for example, and an n electrode and a p electrode of the light emitting component 202 are connected to metal terminals 205 installed on the casing 204 by means of conductive wires 203. In the chip type light emitting diode constituted as described above, similarly to the lead type light emitting diode of FIG. 1, **fluorescent light emitted by the phosphor and LED light which is transmitted without being absorbed by the phosphor are mixed and output, so that the light emitting diode 200 also outputs light having a wavelength different from that of LED light emitted by the light emitting component 202**." (Appendix G, col. 8:51-67) "80 Parts by weight of the **fluorescent material** having a composition of $(Y_{0.8}Gd_{0.2})_3Al_5O_{12}$:Ce which has been made in the above process and 100 parts by weight of epoxy resin are sufficiently mixed to turn into slurry. The slurry is poured into the cup provided on the mount lead whereon the light emitting component is mounted. After pouring, the slurry is cured at 130° C for one hour. Thus **a coating having a thickness of 120 μm, which contains the phosphor**, is formed on the light emitting component. In Example 1, the coating is formed to contain the phosphor in gradually increasing concentration toward the light emitting component." (Appendix G, col. 24:32-43)
Claim 7	
7. A device as recited in claim 1 wherein said chip includes a substrate on which epitaxial layers are grown, a buffer layer located on said substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers, a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer, an active layer, said active layer emitting light when electrons jump to a valance state, a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and a contact layer on which an electron may be mounted for powering said chip.	Begemann describes semiconductor-based lamps and Nakamura describes the structure of a semiconductor light source, which could be readily substituted for Begemann's LEDs to obtain predictable results. As such, it would have been obvious and one of ordinary skill in the art would have been motivated to combine the teachings of Nakamura with that of Begemann and any of Abe/Waitl/Bogner/Matsubara/Shimizu. Nakamura describes a semiconductor structure for a nitride based light-emitting semiconductor device (FIGS. 1, 11 and 14 reproduced below). Nakamura's device explicitly illustrates and describes the claimed semiconductor structure of: 1 – a substrate upon which epitaxial layers are grown –substrates 11, 151, 211 (*See* Appendix F, col. 6:49-55; col. 19:46-47; and col. 23:35-38), 2 – a buffer layer located on said substrate – buffer layers 152, 212, and described but not shown in FIG. 1 (*See* Appendix F, col. 6:55-63; col. 19:46-47; and col. 23:35-38), 3 – a first cladding layer adjacent to the buffer layer – clad layers 13, 154 or 155, and 213, 214, or 215 (*See* Appendix F, col. 7:8-22; col. 12:26-50; col. 19:55-20:12; 20:66-21:45; col. 24:6-29; and 25:65-26:9) , 4 – an active layer positioned between first and second clading layers – active layers 14, 156, and 216 (*See* Appendix F, col. 7:23-67; col. 20:38-39; and 23:45-24:5), 5 – a second cladding layer – clad layers 61 or 62, 158 or 157, and 218 or 217 (*See* Appendix F, col. 8:4-60; col. 20:13-55; and col. 24:54-25:5), and 6 – a contact layer – contact layers 15, 159, and 219 (*See* Appendix F, col. 9:23-30; col. 21:24-45; and col. 25:51-26:27) **Nakamura's first and fourth embodiments**

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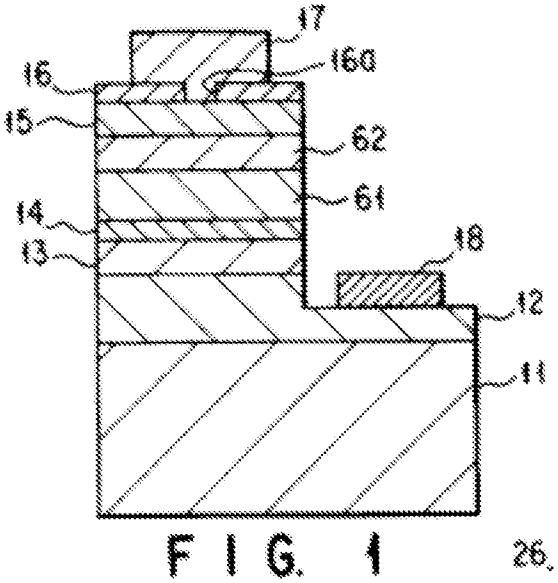

F I G. 1

"FIG. 1 shows a cross-sectional view schematically illustrating a structure of a light-emitting device (LD structure) according to the first embodiment of the present invention. Referring to FIG. 1, the light-emitting device comprises **a substrate 11** on which an n-type contact layer 12, **an n-type clad layer 13, an active layer 14, a first p-type clad layer 61**, a second p-type clad layer 62 and **a p-type contact layer 15 are superimposed in the mentioned order**. On the surface of the p-type contact layer 15, there is formed a current-contracting layer 16 formed of an insulating material and having an opening 16a formed therein. On the surface of this current-contracting layer 16 is formed a positive electrode (p-electrode) 17 connected to the p-type contact layer 15 through the opening 16a. On the other hand, a negative electrode (n-electrode) 18 is formed on the surface of the n-type contact layer 12. In the case of an LED device, the positive electrode 17 is directly formed on the p-type contact layer 15, without forming the current-contracting layer 16… **Although a buffer layer is not specifically shown in FIG. 1, a buffer layer formed of GaN or AlN several hundred angstroms in thickness is often formed between the substrate and the nitride semiconductor for the purpose of relieving the mismatching of lattice constants of these materials**. Since, however, this buffer layer can be omitted if the substrate is formed of SiC or ZnO whose lattice constant is very close to that of the nitride semiconductor, the buffer layer is not shown in FIG. 1" (Appendix F, col. 6:31-63)

Although the layers as illustrated in FIG. 1 do not directly show a first cladding layer adjacent to a buffer layer as claimed, Nakamura's detailed description provides the necessary support for such ordering. As described below the cladding layers and contact layers may be reconfigured. Not only does this description provide support for omitting the contact layer 12 such that clading layer 13 is adjacent to the buffer layer (as recited in claim 7), it also serves to illustrate the general lack of novelty regarding the semicondutor structure elements included in claim 7. It thus becomes aparent to one of ordinary skill in the art that these limitations in claim 7 are simply a recitation of the basic semiconductor layers of light-emitting semiconductor devices.

"According to a fourth embodiment of the present invention… The construction of the light-emitting device according to the fourth embodiment is not shown in the drawing,

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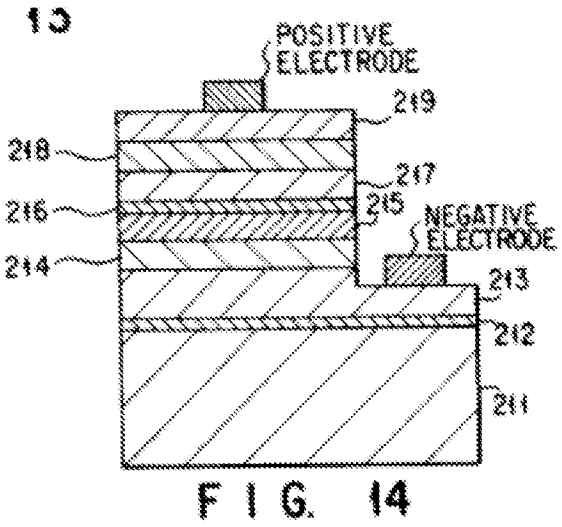
	but is **fundamentally the same as shown in FIG. 1**, i.e., the materials and thicknesses of the substrate, the n- and p-type contact layers, the active layer, and the n- and p-type clad layers are the substantially the same as those described with reference to FIG. 1. Main feature of this fourth embodiment resides in that the first p-type clad layer 61 shown in FIG. 1 has a thickness within the range of 10 angstroms to 1.0 μm. According to this fourth embodiment, **either the n-type contact layer 12 or** the n-type clad layer 13 **shown in FIG. 1 may be omitted**, and further either the second p-type clad layer 62 or the p-type contact layer 15, or both of them may be omitted." (Appendix F, col. 12:26-50) The omission of the n-type contact layer in Fig. 1 according to the teaching of Nakamura would position the n-type clad layer 13 adjacent to the buffer layer (described but not shown) formed between the substrate and the nitride semiconductor. **Nakamura's eighth embodiment**  F I G. 14 "FIG. 14 shows a cross-sectional view schematically illustrating a structure of a light-emitting device according to the eighth embodiment of the present invention. The light-emitting device shown in FIG. 14 comprises **a substrate 211 on which a buffer layer 212 for alleviating a lattice mismatching between the substrate 211 and the nitride semiconductor layer**, an n-type contact layer 213 for forming a negative electrode thereon, **a second n-type clad layer 214, a first n-type clad layer 215, an active layer 216, a first p-type clad layer 217, a second p-type clad layer 218 and a p-type contact layer 219** for forming a positive electrode thereon are superimposed in the mentioned order." (Appendix F, col. 23:33-44) Similar to FIG. 1 the layers as illustrated in FIG. 14 do not directly show a first cladding layer adjacent to a buffer layer as claimed, however, Nakamura's detailed description provides the necessary support for such ordering. As described below the cladding layers and contact layers may be reconfigured, such that by omitting the clad layers 214 and 215 contact layer 213 may serve as a cladding layer and thus the clading layer 213 is adjacent to the buffer layer (as claimed). Again, not only does this description provide support for general reconfiguration of Nakamura's semiconductor layers as illustrated in FIG. 14, it also serves to illustrate the general lack of novelty regarding the semicondutor sturcutre elements included in claim 1.

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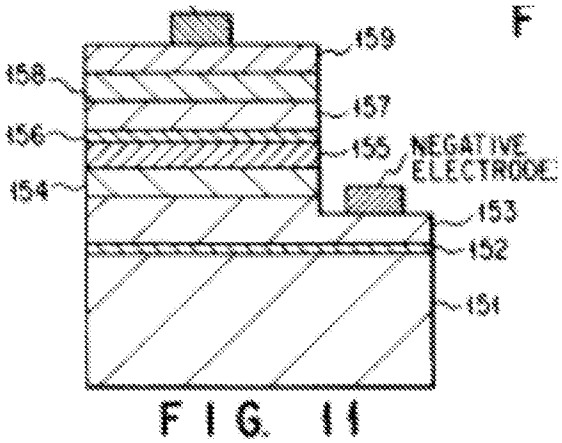
	"In the structure of a light-emitting device, the first n-type clad layer 215 may be omitted, allowing the second n-type clad layer 214 to function, taking the place of the first n-type clad layer 215, or the first p-type clad layer 217 may be omitted, allowing the second p-type clad layer 218 to function, taking the place of the first p-type clad layer 217 as described hereinafter." (Appendix F, col. 24:23-29) "**It may be also possible in a case to omit both of the first n-type clad layer 215 and the second n-type clad layer 214, thus rendering the n-type contact layer 213 to function as a clad layer**, and likewise to omit both of the first p-type clad layer 217 and the second p-type clad layer 218, thus rendering the p-type contact layer 219 to function as a clad layer. However, if these clad layers are omitted, the emission output will be greatly diminished as compared with the case where these clad layers are not omitted. Therefore, the structure of light-emitting device shown in FIG. 14 is one of the most preferable structures in the present invention." (Appendix F, col. 25:65-26:9) Of course Nakamura states that the configuration shown in FIG. 14 is the most preferable and that omission of cladding layers 215 and 214 diminish the light emited from the structure (Appendix F, col. 25:65-26:9), but such a statement does not contradict the fact that the semiconductor structure recited in claim 7 was known prior to the filing of the '961 patent's application. **Nakamura's seventh embodiment**  FIG. 11 "FIG. 11 shows a cross-sectional view schematically illustrating a structure of a light-emitting device according to the seventh embodiment of the present invention. The light-emitting device shown in FIG. 11 comprises **a substrate 151 on which a buffer layer 152 for alleviating a lattice mismatching between the substrate 151 and the nitride semiconductor**, an n-type contact layer 153 for forming a negative electrode is thereon, a second n-type clad layer 154**, a first n-type clad layer 155, an active layer 156, a second p-type clad layer 158 and a p-type contact layer 159 for forming a positive electrode thereon** are superimposed in the mentioned order." (Appendix F, 19:43-54) Similar to FIGS. 1 and 14 the layers as illustrated in FIG. 11 do not directly show a first cladding layer adjacent to a buffer layer as claimed, however, Nakamura's detailed description provides the necessary support for such ordering. Unlike

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	Nakamura's description of FIGS. 1 and 14, the description regarding FIG. 11 does not directly state that certain layers can be "omitted." However, the device structure in FIG. 11 is substantially similar to the structure of the device shown in FIG. 14. Read in light of Nakamura's teachings regarding the reconfigurability of the cladding and contact layers in FIG. 14 it would be appropriate to conclude that the example structure illustrated in FIG. 11 may be constructed without clad layers 153 and 154 thus rendering contact layer 153 to function as a clad layer thereby providing a clad layer adjacent to buffer layer 152. In addition, the clad layers of Nakamarua's devices serve to confine carriers within the chip. Nakamura states that the clad layers are barrier layers. "When the active layer 14 is of an SQW or MQW structure, a device of very high emission output can be obtained. By the expressions of SQW and MQW structures, it is meant a structure of active layer from which a light emission of inter-quantum level through a non-doped Inx Ga1-x N composition can be obtained. For example, an active layer of the SQW structure is constituted by a single layer (well layer) formed of a single composition of Inx Ga1-x N (0<x<1), and **the clad layers 13 and 61 sandwiching the active layer constitute barrier layers**." (Appendix F, col. 7:33-42) The semiconductor structures and descriptions in Nakamura are consistent with the well-known double heterostructure (also known as a double heterojunction) wherein an active layer is sandwiched between two cladding layers. The double heterostructure was known to comprise the state of the art prior to the filing of the '961 patent's application. (See, e.g., Nakamura, col. 1:19-40 ("The light-emitting device such as a blue LED or a blue-green LED formed of nitride semiconductor materials and now actually used has a double-heterostructure. This light-emitting device is fundamentally constructed such that an n-type contact layer …, and n-type clad layer…, an n-type active layer …, a p-type clad layer … and a p-type contact layer … are superimposed on a substrate") and col. 25:46-50, ("With these combinations, it is possible to form a double-heterostructure of nitride semiconductor layers having an excellent crystallinity, thus making it possible to greatly improving the emission output.") The double heterojunction functions as described in Abe: "As shown in FIG. 5, the semiconductor laser generally has a double hetero junction, in which the active layer (luminous layer) 100 is sandwiched between the clad layers 101 and 102 from both sides. The resultant layers are formed on a metal contact 103 and a substrate 104, while a contact layer 105, an insulating layer 106 and a metal contact 107 are laminated on the clad layer 101. The active layer 100 is a semiconductor having a small band gap (i.e., energy difference between a valence band and a conduction band of the semiconductor), and the clad layers 101 and 102 are respectively n- and p-type semiconductors having a large band gap. When forward voltage is applied to the clad layers, electrons are flown from n-type region into the active layer 100, while holes are flown from p-type region into the active layer. These carriers (electrons and holes) are shut up in the active layer 100 by an energy barrier caused by the band gap difference in the hetero junction. The shut-up of the carriers promotes the efficient recombination of electrons and holes to generate spontaneously-emitting light. In this stage, the situation is similar to that of the LED, and light, which is not coherent, is emitted uniformly in all the directions." (Appendix H, col. 7:55-8:9)

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Claim 8	
8. A device as recited in claim 7 further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.	Nakamura describes the semiconductor structure of claim 7 including a reflective layer on each side of the active layer in at least two examples. Nakamura describes adding multi-layered reflective films 100 and 200 to the structures illustrated and described with respect to FIGS. 11 and 14 and illustrated in FIGS. 12 and 15 respectively. "According to the seventh embodiment of the present invention, **it is also possible to dispose as a light-reflecting film a first multi-layered film 100 consisting of at least two kinds of nitride semiconductor layers, each differing in composition on the outer side of the first n-type clad layer 155, and/or a second multi-layered film 200 consisting of at least two kinds of nitride semiconductor layers, each differing in composition on the outer side of the second p-type clad layer 158**. FIG. 12 schematically illustrates a sectional view of a light-emitting device provided with such a light-reflecting film, and FIG. 13 shows a perspective view of the light-emitting device shown in FIG. 12. These Figures illustrate a structure of a laser device **wherein the reference numeral 100 represents a first multi-layered film, and 200, a second multi-layered film. The first multi-layered film 100 and the second multi-layered film 200 are each formed of nitride semiconductors differing in composition and in refractive index which are alternately superimposed under the condition, for example, of $\lambda/4$ n (λ: wavelength; n: refractive index) thereby forming a two or more-ply structure so as to reflect the emission wavelength of the active layer 156**. As seen in FIG. 12, the first multi-layered film 100 is interposed between the second n-type clad layer 154 and the n-type contact layer 153, and the second multi-layered film 200 is interposed between the second p-type clad layer 158 and the p-type contact layer 159, so that if a laser oscillation is effected using for example a stripe electrode of 10 μm or less as a positive electrode as shown in FIG. 13, **the light emission from the active layer 156 can be confined through these multi-layered films in the active layer to easily allow the generation of a laser oscillation**. The conductivity type of these multi-layered films is determined by the doping of a donor impurity or an acceptor impurity. The first multi-layered film 100 is interposed between the second n-type clad layer 154 and the n-type contact layer 153 in the embodiment shown in FIG. 12. However, the first multi-layered film 100 may be formed within the n-type contact layer 153. It is also possible to form the second multi-layered film 200 within the p-type contact layer 159. Even if these multi-layered films are formed within these contact layers, **the effect of confining the light emission of the active layer 156** is the same. It is also possible to omit either one of the first multi-layered film 100 and the second multi-layered film 200. If the first multi-layered film 100 is omitted for example, a light-reflecting film may be formed on the surface of the sapphire substrate 151 in place of the first multi-layered film 100." (Appendix F, col. 21:47-22:27)

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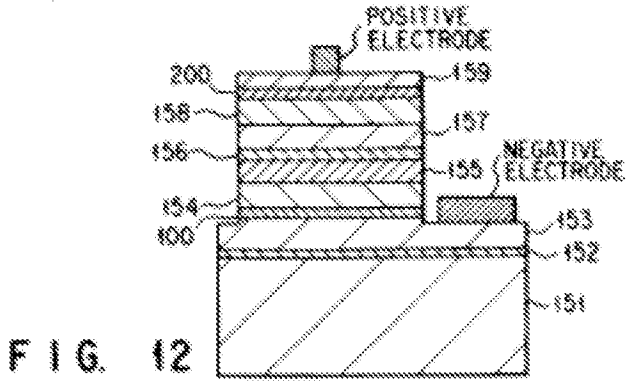
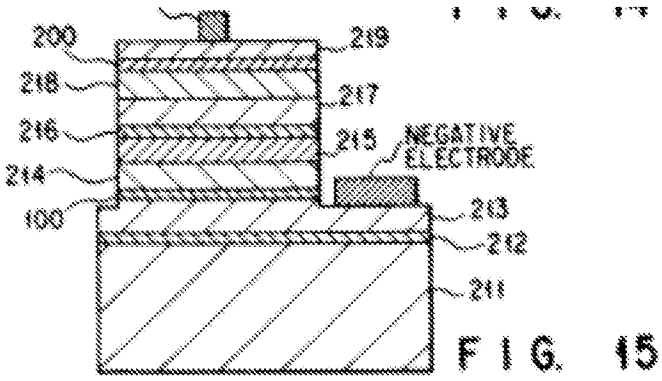
	 F I G. 12 "FIG. 15 schematically shows a cross-section of a structure of a light-emitting device according to another example of the present invention. A perspective view of this light-emitting device is the same as that shown in FIG. 13. **The light-emitting device shown in this FIG. 15 illustrates an example wherein the same multi-layered films 100 and 200 as explained in detail with reference to FIG. 12 are employed**." (Appendix F, col. 26:28-35)  F I G. 15 With the exception of the reflective multi-layered films 100 and 200, the ordering and numbering of the layers in FIGS. 12 and 15 is the same as in FIGS. 11 and 14. Accordingly, one of skill in the art would have understood that the nature, function, and interchangeabilty of these layers would be the same as described for FIGS. 11 and 14.
Claim 9	
9. A device as recited in claim 8 wherein said reflective layers include multiple quantum wells.	The teaching in Karwacki of replacing a reflective layer in a semiconductor laser with a Quantum Well Mirror (QWM) may be applied to any of Nakamura's example light-emitting semiconductor devices described in relation to claim 8 to create a semiconductor light source with reflective layers including multiple quantum wells. Indeed, it would have been obvious to one of ordinary skill in the art to replace the reflective layers 100 and 200 with the QWM described by Karwacki to obtain predictable results. Karwacki's use of MQWs within a reflecting layer such that a laser's output wavelength may be tuned could be used to fine tune a laser within a

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Nakamura, and Karwacki
	semiconductor light source to the optimum absorption wavelength of the phosphor coating. Alternatively, Karwacki's laser design could be used to rapidly modulate the output wavelength of the laser in order to generate a broader spectrum white light. In addition, rapid modulation using laser MQWs is common in the semiconductor art for use in fiber optic communications. It should be noted that Nakamura's description of the multi-layered films 100 and 200 are that of distributed Bragg reflectors (DBRs). (*See* Appendix F, col. 21:62-22:1 and Appendix N, "Bragg Mirrors") Karwacki specifically describes replacing DBRs with QWMs. (Appendix K, ¶ [0002]) Karwacki, therefore, can be viewed as explicitly suggesting such a replacement. "The present invention relates to semiconductor lasers that emit light at visible wavelengths, and more particularly, to Vertical-Cavity Surface Emitting Lasers (VCSELs) that produce N-frequencies of visible light in a single cavity by altering the optical length of the cavity through the use of a **Quantum Well Mirror (QWM) replacing one of the Distributed Bragg Reflectors (DBRs)** typically found in a VCSEL." (Appendix K, ¶ [0002]) "It is a further object of the present invention to provide for a VCSEL device that may be fabricated of different semiconductor materials that provide a desired bandgap for fundamental light frequencies of interest." (Appendix K, ¶ [0009]) "With reference to the drawing, FIG. 1 illustrates a schematic diagram of a tunable multi-frequency VCSEL device 10 of the present invention. **The VCSEL device 10 is tunable to N visible frequencies and comprises a QWM that replaces at least one of the DBRs commonly found in the prior art VCSEL devices**. As will be further described hereinafter, the QWM element in the VCSEL is tunable so as to develop one of the visible light frequencies, by applying a specific voltage to its electrode, making up the multiple visible light spectrum developed by the this device 10." (Appendix K, ¶ [0016]; *See also* Appendix K, ¶¶ [0018]-[0020]) "**With reference to FIG. 1, it is seen that a single QWM device 18 is used to replace one of the DBR of a typical VCSEL devic**e, such as those disclosed in U.S. Pat. Nos. 5,557,627 and 5,719,892. The fundamental frequency within the cavity can be set by applying a DC voltage, having a possible value between 0 to 10 volts, across the electrodes 26 and 28 of the QWM device 18. This will set a particular cavity length for the VCSEL device 10. If modulation is required, an additional time varying signal can be applied across the electrodes 26 and 28, in a manner to be described hereinafter with reference to FIG. 3." (Appendix K, ¶[0022])

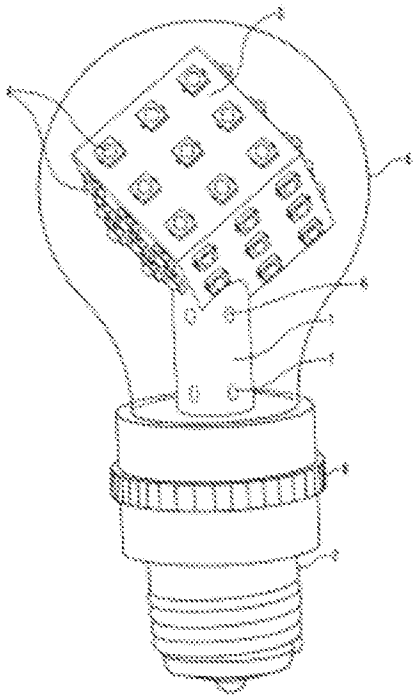
C. Issue No. 3: Claims 1, 7, 8, and 9 are rendered obvious by Begemann in view of, any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Floyd, and Karwacki.

The following claim chart demonstrates in detail the correspondence between the claims 1, 7, 8, and 9 of the '961 patent and the pertinent teachings of Begemann '569 [7] in view of, any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Floyd, and Karwacki. It would have been obvious to a person of ordinary skill in the art to combine the teachings of Begemann with those of Abe, Waitl '389, Bogner, Matsubara, or Shimizu because all six references relate to semiconductor based light sources for general illumination, which could be either incorporated into Begemann's LED lamp structure or used to substitute elements of Begemann's LED structure to obtain predicable results.

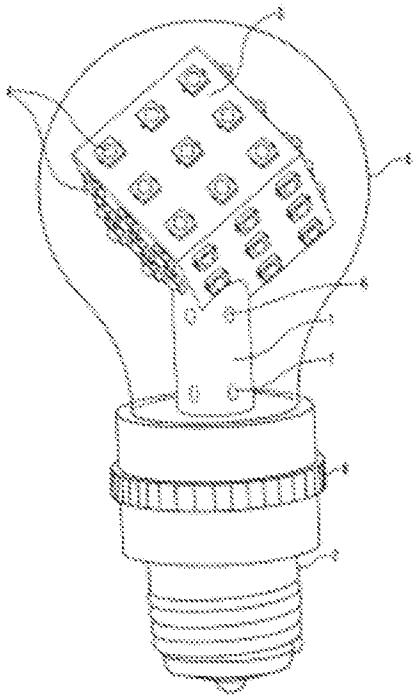
It would have been obvious to a person of ordinary skill in the art would to combine the teachings of Floyd with those of Begemann because Floyd describes a semiconductor light source that could be used as a light source in the semiconductor-based lamps described by Begemann. Floyd demonstrates that the semiconductor structure claimed in the '961 patent is well-known in the art, and as such it would be obvious to combine this teaching with that of Begemann. In addition, it would be obvious to a person of ordinary skill in the art to combine the teachings of Karwacki with those of Begemann and Floyd, because like Floyd, Karwacki describes a semiconductor light source (a VCSEL) that could be used as a light source in the semiconductor-based lamps described by Begemann.

U.S. Patent No. 6,465,961 Claim 1	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Floyd, and Karwacki
1. A semiconductor light source for emitting light to illuminate a space used by humans, the semiconductor light source comprising:	"The invention more particularly aims at providing a **LED lamp which can be relatively easily mass-produced, and which can be operated such that continuous, uniform lighting with a high luminous flux is obtained**." (Appendix C, col. 1:35-39 and Appendix D, p. 1:20-23)

[7] This reexamination request is based on Begemann '569. However, because U.S. Patent No. 6,220,722 ("Begemann '722") was cited extensively during examination of CAO's related patents, the text citations and direct quotations are taken from Begemann '722 with parallel citations provided to Begemann '569. Although there are some minor variations in wording between Begemann '722 and Begemann '569, the material that is quoted and cited herein is identical in both Begemann references.

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Floyd, and Karwacki
	 FIG. 2 "FIG. 4 diagrammatically shows an application of a LED lamp, which requires an asymmetric light distribution. T**he LED lamp (20) is used as outdoor lighting and is situated on a holder (21) which is secured to the wall (22) of a building.** The necessary luminous flux in the direction of the wall is much smaller than that in the opposite direction. The asymmetric light distribution required for this purpose can be simply adjusted by means of a LED lamp as described with reference to FIG. 3." (Appendix C, col. 5:15-24 and Appendix D, p. 6:22-27) Waitl '389 states: "The present invention relates to opto-electronic semiconductor elements, particularly suitable for general illumination." (Appendix E, p. 2:2-4)
a) an enclosure, said enclosure being fabricated from a material substantially transparent to white light,	Begemann describes an enclosure being fabricated from a material substantially transparent to white light in describing a (semi-)transparent envelope for a white-light-emitting lamp. "A favorable embodiment of the LED lamp is characterized in that the lamp is also provided with **a (semi-)transparent envelope**. **This envelope may be made of glass**, but is preferably made of a synthetic resin. The envelope serves as a mechanical protection for the LEDs. In addition, **the envelope may contribute to obtaining the uniform lighting** which can be obtained with the lamp. (Appendix C, col. 2:13-19, and Appendix D, p. 2:22-26)" "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin,** which envelops the gear column (1) and the substrate (3)." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Floyd, and Karwacki
	"In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. **Consequently, during operation of the LED lamp shown, white light is obtained**." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "By using one or more LED combinations in the colors green, red and blue or green, red, yellow and blue for each substrate face, **a LED lamp can be obtained which emits white light**. Such LED combinations composed of three different LEDs are preferably provided with a secondary optical system, in which the above-mentioned colors are blended so as to obtain white light." (Appendix C, col. 2:60-66 and Appendix D, p. 3:19-23)
b) an interior volume within said enclosure,	Begemann describes that the interior volume of the envelope is used to enclose the LEDs, gear column, and substrate. "A favorable embodiment of the LED lamp is characterized in that the lamp is also provided with a (semi-)transparent envelope. This envelope may be made of glass, but is preferably made of a synthetic resin. **The envelope serves as a mechanical protection for the LEDs**. In addition, the envelope may contribute to obtaining the uniform lighting which can be obtained with the lamp." (Appendix C, col. 2:13-19 and Appendix D, p. 2:22-26) "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin, which envelops the gear column (1) and the substrate (3)**." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)
c) a heat sink located in said interior volume,	Begemann describes a heat sink located in the interior volume in the context of the substrate 3 and gear column 1 that enable good heat conduction. "FIG. 1 shows a first embodiment of the invented Light-emitting giode [sic] lamp (LED lamp). This lamp comprises a tubular, hollow gear column (1), which is connected with one end to a lamp cap (2). The other end of the gear column (1) is connected to a substrate (3), which is provided with a number of LEDs (4). The space within the hollow gear column (1) accommodates the electronic gear necessary for controlling the LEDs (4). During operation of the lamp, these LEDs generate a luminous flux of 5 lm or more. **The lamp is further provided with an envelope (5) of a synthetic resin, which envelops the gear column (1) and the substrate (3)**." (Appendix C, col. 3:39-50 and Appendix D, p. 4:17-23)

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Floyd, and Karwacki
	 FIG. 2 "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1)** to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)
d) said heat sink being capable of drawing heat from one or more semiconductors devices,	Begemann describes that the heat sink removes the heat from the semiconductor device via the MC-PCB 12, substrate 3, and gear column 1. "**A particular aspect of the invention resides in that the heat-dissipating means remove the heat, generated during operation of the lamp, from the substrate via the gear column to the lamp cap and the mains supply connected thereto**." (Appendix C, col. 1:54-58 and Appendix D, p. 2:5-7)

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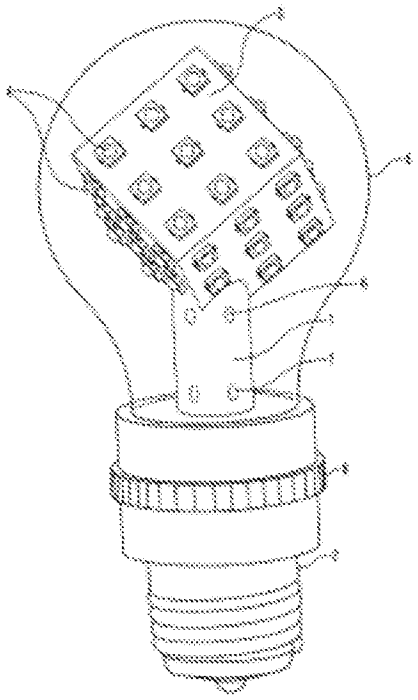

FIG. 2

"In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved.** In the present case, the substrate is made of a copper alloy. **Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive**. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)

"If LEDs with a high luminous flux (5 lm or more) are used, then a so-called **metal-core PCB** is customarily used. **Such PCBs have relatively high heat conduction**. By providing these PCBs on the (preferably metal) substrate by means of a heat-conducting adhesive, a very good heat dissipation from the LED arrays to the gear column is obtained." (Appendix C, col. 2:53-59 and Appendix D, p. 3:14-18)

"FIG. 3 is a schematic, sectional view of three types of **LEDs (4) which can suitably be used in the invented LED lamp**. FIG. 3-A shows a LED which comprises single-chip LEDs, which each have only one light point (11) per LED. **This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer**. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). **A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate.**" (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11)

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e) said heat sink having a plurality of panels on it suitable for mounting semiconductor devices thereon,	Begemann describes a heat sink having a plurality of panels suitable for mounting semiconductor devices in describing a polyhedral substrate. "The invention relates to a LED lamp having a gear column which is connected, at its first end, to a lamp cap and, at its other end, to a substrate. **The substrate is provided with a regular polyhedron of at least four planes, the planes having at least one LED** having a luminous flux of at least 5 lm. The gear column also have heat-dissipating means which interconnect the substrate and the lamp cap." (Appendix C, Abstract and Appendix D, Abstract) "Better results, however, are achieved with substrates in the form of a hexahedron (**polyhedron of six faces, cube**). In practice it has been found that a good uniformity in light distribution can already be obtained using substrates in the form of a tetrahedron (regular polyhedron of four faces, pyramid)." (Appendix C, col. 2:5-10 and Appendix D, p. 2:16-19) "A particular aspect of the invention resides in that **the heat-dissipating means remove the heat, generated during operation of the lamp, from the substrate via the gear column to the lamp cap** and the mains supply connected thereto." (Appendix C, col. 1:54-58 and Appendix D, p. 2:5-7) "By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate. This applies in particular when the faces of the polyhedral substrate are substantially flat. Such a LED array generally comprises a number of LEDs which are provided on a flat printed circuit board (PCB)." (Appendix C, col. 2:45-51 and Appendix D, p. 3:9-13) "In the example described with respect to FIG. 2, **the substrate (3) is cube-shaped with six flat faces**, and is connected to gear column (1) via a vertex of the cube. **The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs** (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)
f) said panels on said heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,	Begemann describes that panels on the heat sink are oriented to facilitate emission of light in describing a light bulb that provides uniform or asymmetrical illumination. Furthermore, it can be seen in Fig. 1 that the substrate 3 panels are arranged to facilitate emission of light in all desired directions (omni-directional in the case of a traditional light bulb) or with reference to Fig. 4 adjusted so that asymmetrical distribution may also be achieved. "The invention more particularly aims at providing a LED lamp which can be relatively easily mass-produced, and which can be operated such that continuous, uniform lighting with a high luminous flux is obtained." (Appendix C, col. 1:35-39 and Appendix D, p. 1:20-23) "FIG. 4 diagrammatically shows an application of a LED lamp, which requires an asymmetric light distribution. The LED lamp (20) is used as outdoor lighting and is situated on a holder (21) which is secured to the wall (22) of a building. The necessary luminous flux in the direction of the wall is much smaller than that in the opposite direction. **The asymmetric light distribution required for this purpose can be simply adjusted by means of a LED lamp as described with reference to FIG. 3**." (Appendix C, col. 5:15-24 and Appendix D, p. 6:22-27)

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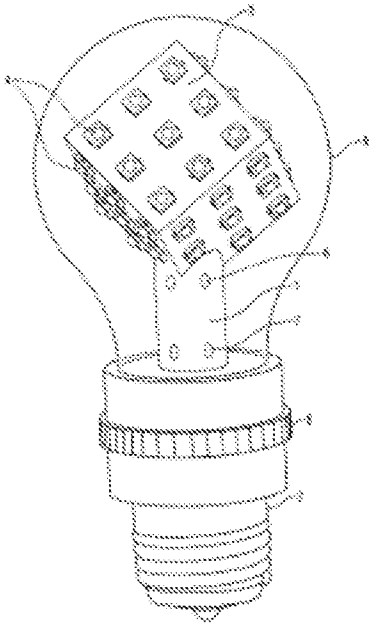
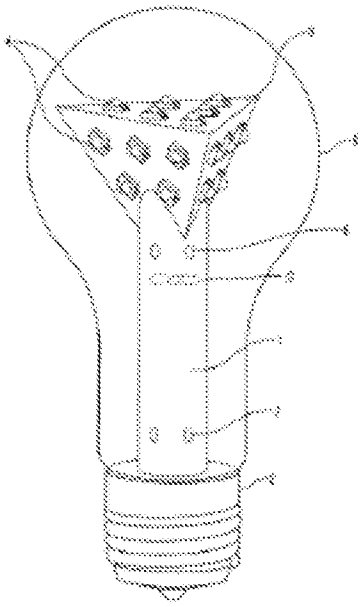
	 FIG. 2  FIG. 1 "In the example described with respect to **FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube**. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. **Consequently, during operation of the LED lamp shown, white light is obtained**." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26)
g) at least one semiconductor chip capable of emitting light mounted on one of said panels,	Begemann describes at least one semiconductor chip capable of emitting light mounted on one of said panels in the context of mounting the LEDs to the substrate 3. "By using one or **more LED combinations in the colors green, red and blue or green, red, yellow and blue for each substrate face**, a LED lamp can be obtained which emits white light." (Appendix C, col. 2:60-63 and Appendix D, p. 3:19-21) "In this example, single LEDs of the same type are used, which have only one light point per LED (commonly referred to as single-chip LED). Consequently, the LED lamp shown is monochromatic." (Appendix C, col. 3:62-65 and Appendix D, p. 4:32-34) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. **Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4)**, which are secured to the faces by means of a heat-conducting adhesive. **In this example, multiple-chip LEDs are used, which each have three light points (green, red and blue) per**

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	LED or four light points (green, red, yellow, blue) per LED. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "FIG. 3 is a schematic, sectional view of three types of LEDs (4) which can suitably be used in the invented LED lamp. FIG. 3-A **shows a LED which comprises single-chip LEDs, which each have only one light point (11) per LED**. This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). **A heat-conducting adhesive between MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate**." (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11)
h) said semiconductor chip being capable of emitting monochromatic light,	Begemann describes the semiconductor chip being capable of emitting monochromatic light in the context of green, red and blue or green, red, yellow and blue LED combinations. "By using one or more **LED combinations in the colors green, red and blue or green, red, yellow and blue** for each substrate face, a LED lamp can be obtained which emits white light." (Appendix C, col. 2:60-63 and Appendix D, p. 3:19-21) "In this example, single LEDs of the same type are used, which have only one light point per LED (commonly referred to as single-chip LED). Consequently, **the LED lamp shown is monochromatic**." (Appendix C, col. 3:62-65 and Appendix D, p. 4:32-34) "In the example described with respect to FIG. 2, the substrate (3) is cube-shaped with six flat faces, and is connected to gear column (1) via a vertex of the cube. The substrate (3) is made of a metal or a metal alloy, thereby enabling a good heat conduction from the LEDs (4) to the gear column (1) to be achieved. In the present case, the substrate is made of a copper alloy. Each one of the faces of the pyramid is provided with a number of (eight or nine) LEDs (4), which are secured to the faces by means of a heat-conducting adhesive. In this example, **multiple-chip LEDs are used, which each have three light points (green, red and blue) per LED or four light points (green, red, yellow, blue) per LED**. These colors are mixed so as to obtain white light in the secondary optical system of each of the LEDs. Consequently, during operation of the LED lamp shown, white light is obtained." (Appendix C, col. 4:23-38 and Appendix D, p. 5:17-26) "A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with a**n array of LEDs, which preferably comprises at least one green, at least one red and at least one blue LED or at least one green, at least one red, at least one yellow and at least one blue LED or at least one white LED**. By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate." (Appendix C, col. 2:40-48 and Appendix D, p. 3:6-11)
i) said semiconductor chip being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser	Begemann describes LED chips, modules, and arrays. "FIG. 3 is a schematic, sectional view of three types of LEDs (4) which can suitably be used in the invented LED lamp. FIG. 3-A shows a LED which comprises **single-chip LEDs**, which each have only one light point (11) per LED. This light point (11) is placed on a so-called MC-PCB (12), which is responsible for a good heat transfer. Light point (11) is provided with a primary optical system (13), by means of which the radiation characteristic of the LED can be influenced. The LED (4) is also provided with two electrical connections (14). Via these connections, the LED is soldered onto the substrate (3). A heat-conducting adhesive between

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chips, LED modules, laser modules, and VCSEL chips, and	MC-PCB (12) and substrate (3) is responsible for a good heat dissipation from the LED to the substrate." (Appendix C, col. 4:53-65 and Appendix D, p. 6:3-11) "A further embodiment of the invented LED lamp is characterized in that the faces of the polyhedron are provided with an **array of LEDs**, which preferably comprises at least one green, at least one red and at least one blue LED or at least one green, at least one red, at least one yellow and at least one blue LED or at least one white LED. By virtue of the shape of the substrate, such an array of LEDs can be readily provided, often as a separate LED array, on the faces of the substrate." (Appendix C, col. 2:40-48 and Appendix D, p. 3:6-11) Waitl '389 describes blue and UV LEDs. "Light-emitting diodes, providing white light, have recently been considered for general illumination purposes. **The LED itself emits blue, or UV light, from** which white light is generated. General illumination structures are customarily based on radial arrangements, suitable for insertion mounting. Luminescent conversion by LEDs, also known as LUCOLED designs, are typical. Surface mount structures are also used, particularly for TOPLED designs for surface mount LEDs. The article "White-light diodes are set to tumble in price" by Philip Hill, OLE, October 1997, pp. 17 to 20, describes details of such structures. The LUCOLED design, for example, utilizes blue emitters based on GaN, from which, by luminescence conversion, white light is generated." (Appendix E, p. 2:33-p. 3:10)
j) a coating for converting monochromatic light emitted by said chip to white light.	Abe, Waitl, Bogner, Matsubara, and Shimizu each describe a coating for converting monochromatic light to white light. Combining the teaching of any of these five references with Begemann would have been obvious to one skilled in the art to convert light produced by a light-emitting semiconducter device (i.e., an LED or laser) to produce white light. Replacing Begemann's RGB LEDs with a semiconductor light source (such as Floyd's) of a single wavelength and a coating as described by either Abe, Waitl, Bogner, Matsubara, or Shimizu would have been obvious to one skilled in the art because the combination is one of known elements that would yield predictable results. In addition, Bogner states that luminescence conversion is a "far better and simpler solution" than a combination of RBG light sources for applications where "only white light is requested" (e.g., "interior lighting in cars, instruments, courtesy lights, or general illumination"). (Appendix M, p. 143-144) **ABE** Abe describes a fluophor coating 4 for converting monochromatic light emitted by said chip to white light. "Referring to FIG. l(a), a plurality of semiconductor laser elements 1 are buried in or mounted on a heat sink (radiator) 2, a diffusion lens 3 is arranged in front of each semiconductor laser element 1**. In addition, a fluophor 4 is provided on the inside wall surface of a vacuum glass tub**e 5 charged with argon gas or the like. A laser beam Lo emitted from each semiconductor laser element 1 is diffused through the diffusion lens 3, and **the fluorescent material of the fluophor 4 is excited by the diffused light Ll to obtain visible light L**." (Appendix H, col 4:22-30)

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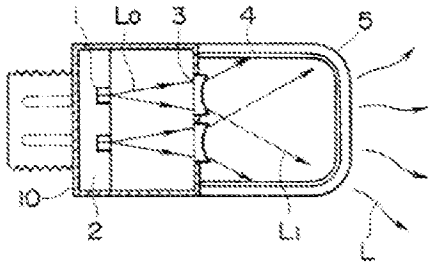
FIG. 1(a)



"The **fluorescent material of the fluophor 4 includes materials as shown in Table 2**, for example, and the optimum fluorescent material is selected depending on the oscillation wavelength of the semiconductor laser element 1 to be used." (Appendix H, col. 5:19-22)

Table 2

TABLE 2

FLUORESCENT SUBSTANCES AND LIGHT SOURCE COLORS

FLUORESCENT SUBSTANCE	LIGHT SOURCE COLOR
Calcium tungstate	Blue
Magnesium tungstate	Bluish white
Zin silicate	Green
Calcium halophosphate	White (daylight color)
Zinc beryllium silicate	Yellowish while
Calcium Silicate	Yellowish red
Cadmium borate	Red

"An illuminating light source device using a semiconductor laser as a first invention comprises a semiconductor laser element for outputting a laser beam having a particular wavelength in the range from infrared rays to ultraviolet rays; a lens for diffusing the laser beam from the semiconductor laser element, and **a fluophor for converting the diffused laser beam from the diffusion lens into visible light**." (Appendix H, col. 2:29-36)

WAITL '389

Also, Waitl '389 describes the use of a phosphor coating to convert the monochromatic light emitted by the semiconductor chip (LED) to white light. In addition, Waitl '389 cites an article demonstrating that the use of conversion coatings to generate white light from LEDs is well known in the art.

"Assembling a plurality of chips in a housing which has a **luminescence conversion layer, e.g. a phosphor** applied thereto, permits construction of a flat light source." (Appendix E, Abstract)

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	"Preferably, the **LEDs emit ultraviolet (UV) light, and are used in combination with luminescence conversion materials to emit white or other visible light.** These elements can then be used for general illumination purposes." (Appendix E, p. 2:12-15) "Light-emitting diodes, providing white light, have recently been considered for general illumination purposes. **The LED itself emits blue, or UV light, from which white light is generated**. General illumination structures are customarily based on radial arrangements, suitable for insertion mounting. **Luminescent conversion by LEDs, also known as LUCOLED designs, are typical**. Surface mount structures are also used, particularly for TOPLED designs for surface mount LEDs. The article "White-light diodes are set to tumble in price" by Philip Hill, OLE, October 1997, pp. 17 to 20, describes details of such structures. The LUCOLED design, for example, utilizes blue emitters based on GaN, from which, by luminescence conversion, white light is generated." (Appendix E, p. 2:33-p. 3:10) "They are then surrounded by a common housing and/or cover. Luminescence conversion can be obtained by the common cover." (Appendix E, p. 8:23-25) "The outer bulb 31 is covered at its inner surface with a luminescence conversion layer 36. **The LEDs 34 may emit, for example, UV, or blue light**. The general principle is well known and reference is made, for example, to the referenced article in OLE of Oct. 1997 by Philip Hill." (Appendix E, p. 12:5-9) **BOGNER** Also, Bogner describes the generation of white light by combining blue-light-emitting LEDs with a phosphor conversion coating. "A far better and simpler solution for production of only white light represents luminescence conversion. The emitted light of a blue diode is used as primary source for exciting organic or inorganic fluorescent which is embedded in the epoxy resin. This technique allows to generate [*sic*] bright white light with only one blue chip. With the production start [*sic*] in June 98 Siemens OS was worldwide one of the first supplier for a single chip white LED in SMT technology. The so-called "Single Chip White LED" from Siemens is shown in fig. 3." (Appendix M, p. 144)

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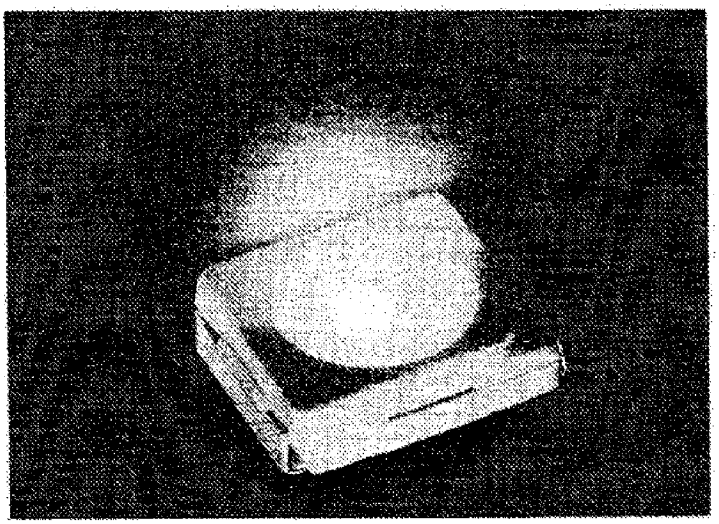

Fig.3: LW T676, the "Single Chip White LED" from Siemens

"For the production of a white LED with luminescence converter different methods can be used. One possibility is to coat the blue chip with a thin high concentrate mixture of resin and converter … A further method used also for the production of the Siemens Single Chip White LED is to mix the phosphor in the whole plastic volume … Fig. 8 shows a cross section of white TOPLED®. The chip is mounted on a premolded leadframe and embedded in the resin including the fluorescent. (Appendix M, p. 146-147)

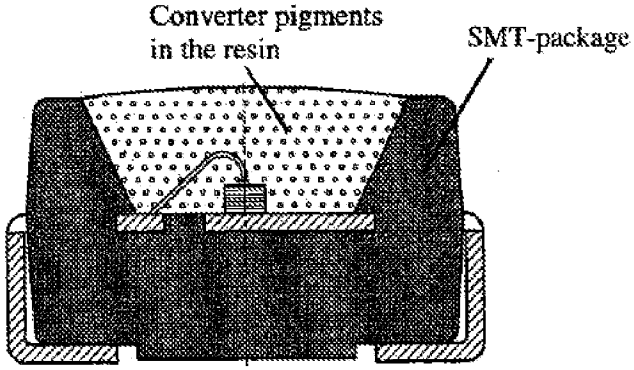

Fig.8: Cross section of white TOPLED®

"For white LED's the yellow light emitting phosphor [cerium-doped yttrium aluminum garnet $Y_3Al_5O_{12}:Ce^{3+}$] is ideally suited, since blue and yellow light are complementary colors, adding to white light after proper additive mixing." (Appendix M, p. 146)

MATSUBARA

Matsubara also describes a coating for converting monochromatic light emitted by said chip to white light in the context of a phosphor that is applied to the LED chip.

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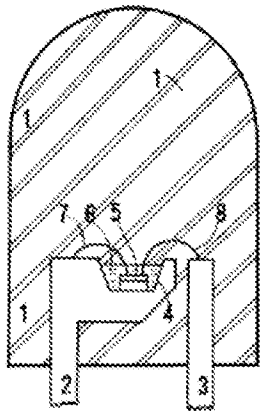
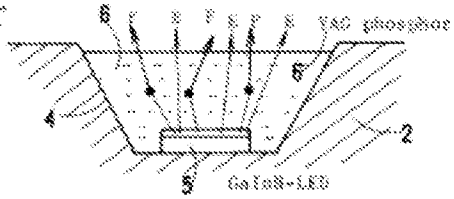
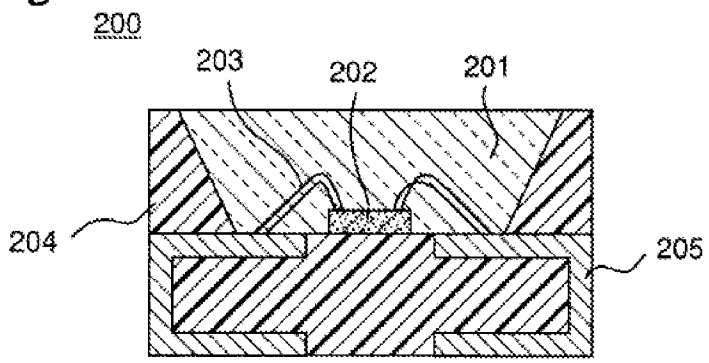
	"The trial makes a **white color LED by assembling a high luminous blue LED having a GaInN active layer and a YAG (yttrium aluminum garnet) phosphor of yellow.** The technology of making blue GaInN-LEDs by growing a GaN crystal on a sapphire substrate and growing a GaInN active layer on the GaN film has been established. The white LED is an application of the GaInN blue LEDs. **The white LED was proposed by, Shuji Nakamura & Gerhard Fasol, "The Blue Laser Diode (GaN Based Light Emitters and Lasers)", January 1997, Springer, p 216-221(1997).**" (Appendix J, ¶ [0011]) Fig. 1(a) PRIOR ART  Fig. 1(b) PRIOR ART  "**FIG. l(a) and FIG. l(b) show the proposed white LED**. A GaN layer and a GaInN active layer are grown on the sapphire substrate. A blue LED chip 5 is bonded on a bottom of a cavity 4 of a stem 2. A p-electrode (anode) and an n-electrode (cathode) are on the upper surface of the LED, and these electrodes are connected with the stems 2 and 3 by wires. **The cavity 4 is filled with a YAG phosphor 6 covering the GaInN blue LED 5. The YAG is a yellow phosphor** which absorbs blue light and emits yellow light." (Appendix J, ¶ [0012]) "**The YAG 6 converts the blue light to yellow light which has a longer wavelength. Yellow light and blue light are synthesized to white light.** Namely, human eyes feel the unified color of the blue light from the GaN LED and the yellow light from the YAG as white." (Appendix J, ¶ [0013]) **SHIMIZU** In addition, Shimizu describes a coating for converting monochromatic light emitted by an LED chip to white light (coating 201). "**The white light emitting diode comprising a light emitting component using a semiconductor as a light emitting layer and a phosphor which absorbs a part of light emitted by the light emitting component and emits light of wavelength different from that**

U.S. Patent No. 6,465,961	Teaching of Begemann in view of one of Abe/Waitl/Bogner/Matsubara/Shimizu, Floyd, and Karwacki
	of the absorbed light, wherein the light emitting layer of the light emitting component is a nitride compound semiconductor and the phosphor contains garnet fluorescent material activated with cerium which contains at least one element selected from the group consisting of Y, Lu, Sc, La, Gd and Sm, and at least one element selected from the group consisting of Al, Ga and In and, and is subject to less deterioration of emission characteristic even when used with high luminance for a long period of time." (Appendix G, Abstract) *Fig.2*  "FIG. 2 shows a chip type light emitting diode, **wherein light emitting diode (LED chip) 202 is installed in a recess of a casing 204 which is filled with a coating material which contains a specified phosphor to form a coating 201**. The light emitting component 202 is fixed by using an epoxy resin or the like which contains Ag, for example, and an n electrode and a p electrode of the light emitting component 202 are connected to metal terminals 205 installed on the casing 204 by means of conductive wires 203. In the chip type light emitting diode constituted as described above, similarly to the lead type light emitting diode of FIG. 1, **fluorescent light emitted by the phosphor and LED light which is transmitted without being absorbed by the phosphor are mixed and output, so that the light emitting diode 200 also outputs light having a wavelength different from that of LED light emitted by the light emitting component 202**." (Appendix G, col. 8:51-67) "80 Parts by weight of the **fluorescent material** having a composition of $(Y_{0.8}Gd_{0.2})_3Al_5O_{12}$:Ce which has been made in the above process and 100 parts by weight of epoxy resin are sufficiently mixed to turn into slurry. The slurry is poured into the cup provided on the mount lead whereon the light emitting component is mounted. After pouring, the slurry is cured at 130° C for one hour. Thus **a coating having a thickness of 120 μm, which contains the phosphor**, is formed on the light emitting component. In Example 1, the coating is formed to contain the phosphor in gradually increasing concentration toward the light emitting component." (Appendix G, col. 24:32-43)
Claim 7	
7. A device as recited in claim 1 wherein said chip includes a substrate on which epitaxial layers are grown, a buffer layer located on said	Begemann describes semiconductorbased lamps and Floyd describes the structure of a blue-emitting semiconductor light source, which could be readily substituted for Begemann's LEDs to obtain predictable results. As such, it would have been obvious and one of ordinary skill in the art would have been motivated to combine the teachings of Floyd with that of Begemann and any of Abe/Waitl/Bogner/Matsubara/Shimizu. Floyd describes with reference to FIG. 2 the claimed semicinductor structure. 1 – a substrate upon which epitaxial layers are grown – sapphire substrate 202,

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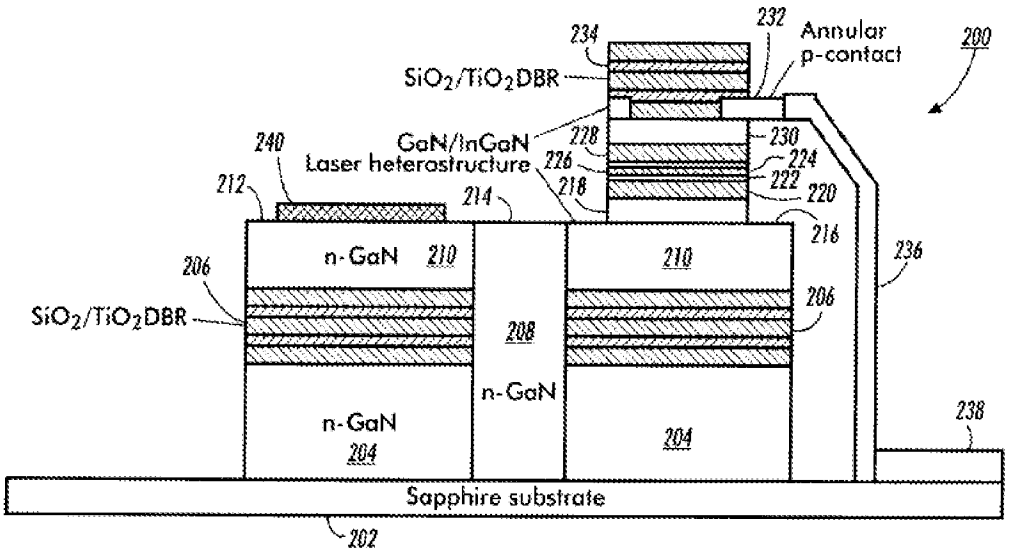
substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers, a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer, an active layer, said active layer emitting light when electrons jump to a valance state, a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and a contact layer on which an electron may be mounted for powering said chip.	2 – a buffer layer located on said substrate – n-GaN layer 210, 3 – a first cladding layer adjacent to the buffer layer – first cladding layer 218, 4 – an active layer positioned between first and second clading layers – active layer 222, 5 – a second cladding layer – second cladding layer 226, and 6 – a contact layer – contact layer 228.  FIG. 2 "The laser heterostructure is then deposited on the **GaN layer 210**. Using Organometallic Vapor Phase Epitaxy ("OMPVE"), **a lower n-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 218 is deposited on the GaN layer 210**. The n-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 218 has a thickness of 0.5 μm and is silicon doped to a concentration of $5x10^{17}$ cm^{-3}. A first lower n-GaN confinement layer 220 is deposited upon the lower cladding layer 218. The n-GaN confinement layer 220 has a thickness of 100 nanometers and is silicon doped to a concentration of 10^{18} cm^{-3}. **An $In_{0.15}Ga_{0.85}N$/GaN multiple quantum well active layer 222** is deposited on the confinement layer 220. The $In_{0.15}Ga_{0.85}N$/GaN multiple quantum well active layer 222 is undoped and has a thickness of 120 nm. A second upper p-GaN confinement layer 224 is deposited upon the multiple quantum well active layer 222. The p-GaN confinement layer 224 has a thickness of 100 nanometers and is magnesium doped to a concentration of 10^{18} cm^{-3}. **An upper p-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 226** is deposited on the confinement layer 224. The p-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 226 has a thickness of 0.5 μm and is magnesium doped to a concentration of $5x10^{17}$ cm^{-3}. A third **p-GaN contact layer 228** is deposited on the upper cladding layer 226. The contract layer 228 has a thickness of 120 nanometers and is magnesium doped to a concentration of $5x10^{17}$ cm^{-3}. The multiple quantum well layer 222 forms the active region for emission of light in the blue wavelengths of 390 to 430 nanometers." (Appendix L, col. 3:61-4:21) Although GaN layer 210 is not specifically identified as a "buffer" layer in FIG. 2, it functions as such by providing a low defect density region upon which to grow the laser heterostructure and thereby serves to mitigate the differences in material properties between the substrate and other epitaxial layers.

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	More particularly, Floyd describes the problem with GaN-based lasers as such: "One ongoing problem with blue lasers in general is that gallium nitride and its alloys with indium and aluminum are used as the semiconductor layers in the blue laser structure. GaN itself cannot be used as a practical substrate. The problem is the lack of a suitable, lattice-matched substrate for the GaN semiconductor layers. **Without a substrate with a lattice constant close to that of GaN, there will be a high density of extended defects in the nitride layers.** An active layer of GaN and its alloys on a poorly lattice matched substrate will emit coherent blue light poorly and inefficiently, if at all. **The most commonly used and most readily available substrate is sapphire (Al_2O_3)**. Sapphire, however, has a similar crystal structure to GaN. An approximate epitaxial relationship between a sapphire substrate and a GaN alloy semiconductor laser structure can be obtained by matching specific crystallographic directions. **However, a lattice mismatch of approximately 15 percent results from such a semiconductor structure**. … **It is another object of the present invention to provide a suitable lattice matched substrate for a blue VCSEL**." (Appendix L, col. 1:34-59) "The present invention provides an independently addressable, vertical cavity surface emitting laser ("VCSEL") in the blue wavelength range of 390 to 430 nanometers. The gallium nitride-based laser structure is grown by selective area epitaxy and lateral mask overgrowth. **By appropriate patterning of a dielectric mask on the gallium nitride layer on a sapphire substrate, areas in a second gallium nitride layer can have a low defect density upon which the remainder of the laser structure can be formed.**" (Appendix L, col. 1:62-2:4) "The GaN layer 210 consists of three sections: a first or end section 212 atop one portion of the dielectric film DBR 206, a second or middle section 214 atop the exposed stripe 208 of the GaN base layer 204 and a third or end section 216 atop another portion of the dielectric film DBR 206. **The two end portions 212 and 216 since they are deposited on top of the dielectric film 206 are in the low defect density regions of the GaN layer 210.** The middle section 214 since it is deposited on the GaN base layer 204 is in the high defect density regions of the second GaN layer 210." (Appendix L, col. 3:48-58) Moreover, in the Brief Description of the Drawings section, Floyd states that "FIG. 1 is a cross-sectional side view of the semiconductor layers of the substrate and **buffer layer** of the semiconductor structure of the present invention." (Appendix L, col. 2:13-15) This structure is analogous to the structure shown in FIG. 2 and upon which the laser heterostructure is grown.

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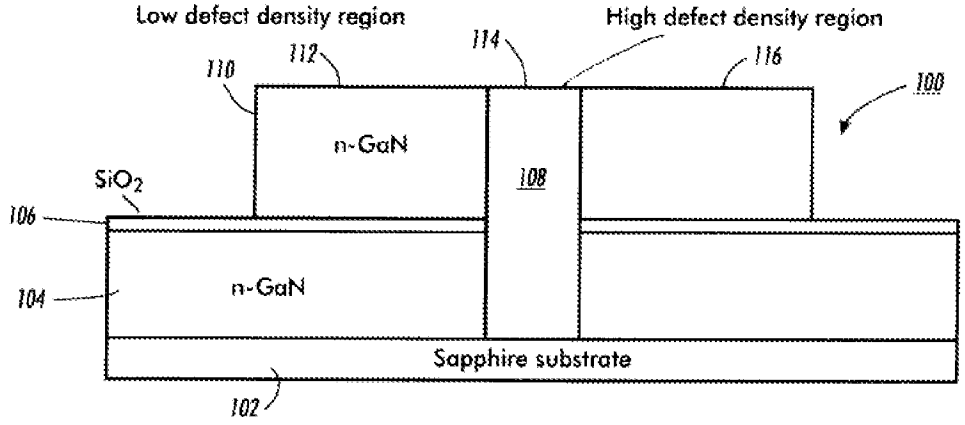

FIG. 1

"The **GaN layer 110 consists of three sections: a first or end section 112 atop one portion of the dielectric film 106, a second or middle section 114** atop the exposed stripe 108 of the GaN base layer 104 and a third or end section 116 atop another portion of the dielectric film 106. **The two end portions 112 and 116 since they are deposited on top of the dielectric film 106 are in the low defect density regions of the GaN layer 110.** The middle section 114 since it is deposited on the other first GaN base layer 104 is in the high defect density regions of the second GaN layer 110. The laser heterostructures will be grown by epitaxy upon one section of the lateral overgrowth of the GaN layer 110 upon the dielectric film 106 and the linear stripe 108 of the GaN base layer 104. **The subsequent growth of GaN based laser heterostructures over a patterned substrate 110 leads to low defect crystal areas 112 and 116** away from the high defect crystal area 114." (Appendix L, col. 2:61-3:10)

The semiconductor structures and descriptions in Floyd are consistent with the well-known double heterostructure (also known as a double heterojunction) wherein an active layer is sandwiched between two cladding layers. The double heterostructure was known to comprise the state of the art prior to the filing of the '961 patent's application.

The double heterojunction functions as described in Abe:

"As shown in FIG. 5, the semiconductor laser generally has a double hetero junction, in which the active layer (luminous layer) 100 is sandwiched between the clad layers 101 and 102 from both sides. The resultant layers are formed on a metal contact 103 and a substrate 104, while a contact layer 105, an insulating layer 106 and a metal contact 107 are laminated on the clad layer 101.

The active layer 100 is a semiconductor having a small band gap (i.e., energy difference between a valence band and a conduction band of the semiconductor), and the clad layers 101 and 102 are respectively n- and p-type semiconductors having a large band gap. When forward voltage is applied to the clad layers, electrons are flown from n-type region into the active layer 100, while holes are flown from p-type region into the active layer.

These carriers (electrons and holes) are shut up in the active layer 100 by an energy barrier caused by the band gap difference in the hetero junction. The shut-up of the carriers promotes the efficient recombination of electrons and holes to generate spontaneously-emitting light. In this stage, the situation is similar to that of the LED, and light, which is not coherent, is emitted

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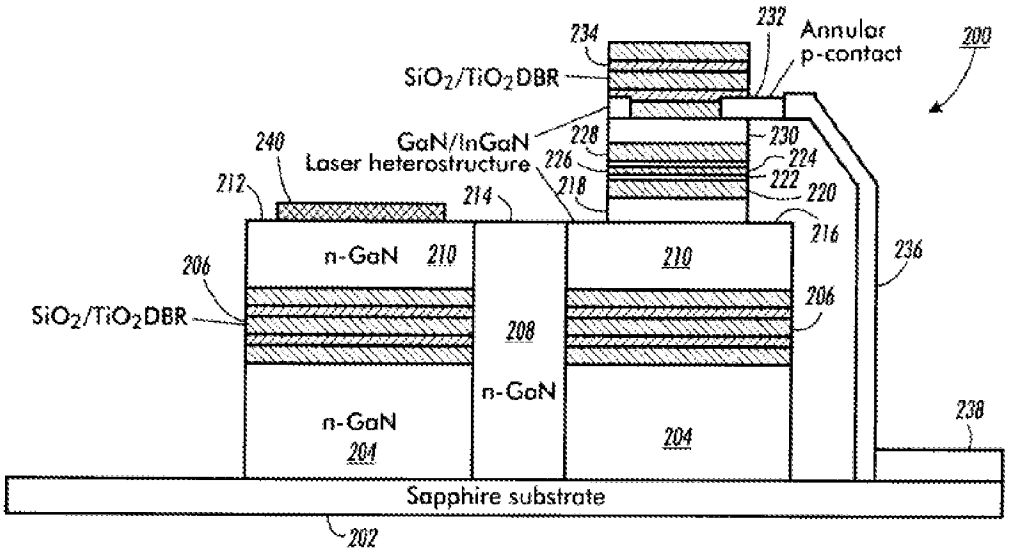
	uniformly in all the directions." (Appendix H, col. 7:55-8:9)
Claim 8	
8. A device as recited in claim 7 further comprising a first and a second reflective layers, each of said first and second reflective layers being located on opposite sides of said active layer, said reflective layers serving to reflect light emitted by said active layer.	Floyd describes the semiconductor structure of claim 7 including a reflective layer on each side of the active layer. In particular, Floyd describes two distributed Bragg reflectors (DBRs) 206, 234 on either side of active layer 222. The lower DBR 206 extends on both sides of thin stripe 208.  FIG. 2 "A narrow bandwidth **distributed Bragg reflector ("DBR") 206** of approximately 8 to 12 alternating layers of dielectric film materials such as n-SiO_2 and n-TiO_2 is then deposited on the GaN base layer 204 by plasma-enhanced chemical vapor deposition ("PECVD") or by electron beam evaporation. For example, the **lower n-DBR 206** may be a 10 quarter-wave stack at the light emission wavelength in the blue spectrum for the laser structure 200. For an emission wavelength of 400 nm, the thicknesses of the n-SiO_2 and n-TiO_2 layers are a quarter of the wavelength which is nominally 69 nm in the SiO_2 and nominally 45 nm in the TiO_2. The lower DBR 206 will be approximately 1.14 microns thick." (Appendix L, col. 3:23-35) "The narrow bandwidth **distributed Bragg reflector ("DBR") 234** consists of approximately 8 to 12 alternating layers of dielectric film materials such as n-SiO_2 and n-TiO_2 which are deposited on the GaN contact layer 228 by plasma-enhanced chemical vapor deposition ("PECVD") or by electron beam evaporation. For example, **the upper p-DBR 234** may be a 10 quarter-wave stack at the light emission wavelength in the blue spectrum for the laser structure 230. The thicknesses of the n-SiO_2 and n-TiO_2 layers are a quarter of the wavelength which is nominally 69 nm in the SiO_2 and nominally 45 nm in the TiO_2. The upper DBR 234 will be approximately 1.14 microns thick." (Appendix L, col. 4:48-61) " The laser heterostructure is then deposited on the **GaN layer 210**. Using Organometallic

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	Vapor Phase Epitaxy ("OMPVE"), **a lower n-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 218 is deposited on the GaN layer 210**. The n-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 218 has a thickness of 0.5 μm and is silicon doped to a concentration of $5x10^{17}$ cm^{-3}. A first lower n-GaN confinement layer 220 is deposited upon the lower cladding layer 218. The n-GaN confinement layer 220 has a thickness of 100 nanometers and is silicon doped to a concentration of 10^{18} cm^{-3}. **An $In_{0.15}Ga_{0.85}N$/GaN multiple quantum well active layer 222** is deposited on the confinement layer 220. The $In_{0.15}Ga_{0.85}N$/GaN multiple quantum well active layer 222 is undoped and has a thickness of 120 nm. A second upper p-GaN confinement layer 224 is deposited upon the multiple quantum well active layer 222. The p-GaN confinement layer 224 has a thickness of 100 nanometers and is magnesium doped to a concentration of 10^{18} cm^{-3}. **An upper p-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 226** is deposited on the confinement layer 224. The p-$Al_{0.08}Ga_{0.92}N$ aluminum gallium nitride cladding layer 226 has a thickness of 0.5 μm and is magnesium doped to a concentration of $5x10^{17}$ $^{cm-3}$. A third **p-GaN contact layer 228** is deposited on the upper cladding layer 226. The contract layer 228 has a thickness of 120 nanometers and is magnesium doped to a concentration of $5x10^{17}$ $^{cm-3}$. The multiple quantum well layer 222 forms the active region for emission of light in the blue wavelengths of 390 to 430 nanometers." (Appendix L, col. 3:61-4:21)
Claim 9	
9. A device as recited in claim 8 wherein said reflective layers include multiple quantum wells.	The teaching in Karwacki of replacing a reflective layer in a semiconductor laser with a Quantum Well Mirror (QWM) may be applied to Floyd's blue-emitting semiconductor VCSEL laser to create a semiconductor laser with reflective layers including multiple quantum wells. Indeed, it would have been obvious to one of ordinary skill in the art to replace either distributed Bragg reflector ("DBR") 206 or 234 with the QWM described by Karwacki to obtain predictable results. Karwacki's use of MQWs within a reflecting layer such that a laser's output wavelength may be tuned could be used to fine tune a laser within a semiconductor light source to the optimum absorption wavelength of the phosphor coating. Alternatively, Karwacki's laser design could be used to rapidly modulate the output wavelength of the laser in order to generate a broader spectrum white light. In addition, rapid modulation using laser MQWs is common in the semiconductor art for use in fiber optic communications. "The present invention relates to semiconductor lasers that emit light at visible wavelengths, and more particularly, to Vertical-Cavity Surface Emitting Lasers (VCSELs) that produce N-frequencies of visible light in a single cavity by altering the optical length of the cavity through the use of a **Quantum Well Mirror (QWM) replacing one of the Distributed Bragg Reflectors (DBRs)** typically found in a VCSEL." (Appendix K, ¶ [0002]) "It is a further object of the present invention to provide for a VCSEL device that may be fabricated of different semiconductor materials that provide a desired bandgap for fundamental light frequencies of interest." (Appendix K, ¶ [0009]) "With reference to the drawing, FIG. 1 illustrates a schematic diagram of a tunable multi-frequency VCSEL device 10 of the present invention. **The VCSEL device 10 is tunable to N visible frequencies and comprises a QWM that replaces at least one of the DBRs commonly found in the prior art VCSEL devices**. As will be further described hereinafter, the QWM element in the VCSEL is tunable so as to develop one of the visible light frequencies, by applying a specific voltage to its electrode, making up the multiple visible light spectrum developed by the this device 10." (Appendix K, ¶ [0016]; *See also* Appendix K, ¶¶ [0018]-[0020) "**With reference to FIG. 1, it is seen that a single QWM device 18 is used to replace one of**

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	the DBR of a typical VCSEL device, such as those disclosed in U.S. Pat. Nos. 5,557,627 and 5,719,892. The fundamental frequency within the cavity can be set by applying a DC voltage, having a possible value between 0 to 10 volts, across the electrodes 26 and 28 of the QWM device 18. This will set a particular cavity length for the VCSEL device 10. If modulation is required, an additional time varying signal can be applied across the electrodes 26 and 28, in a manner to be described hereinafter with reference to FIG. 3." (Appendix K, ¶[0022])

VIII. CONCLUSION

From the foregoing charts, it can readily be seen that the teachings of Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Sugiura, and Karwacki render obvious claims 1, 7, 8, and 9; the teachings of Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Nakamura, and Karwacki render obvious claims 1, 7, 8, and 9; and the teachings of Begemann in view of any of (Abe, Waitl '389, Bogner, Matsubara, or Shimizu), Floyd, and Karwacki render obvious claims 1, 7, 8, and 9. Thus, claims 1, 7, 8, and 9 are unpatentable under 35 U.S.C. § 103(a).

For the foregoing reasons, substantial and new questions of patentability with respect to claims 1, 7, 8, and 9 of the '961 patent have been raised. The references cited above render issued claims 1, 7, 8, and 9 of the '961 patent unpatentable at least under 35 U.S.C. § 103(a). Reexamination of issued claims 1, 7, 8, and 9 is hereby requested.

Respectfully submitted,

Dated: 8/26/2013

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CERTIFICATE OF SERVICE

I, Edward G. Faeth, hereby certify that on August 26, 2013, a true and correct copy of the attached REQUEST FOR EX PARTE REEXAMINATION UNDER 35 U.S.C. § 302 AND 37 C.F.R. § 1.510 in its entirety was served by First Class Mail, postage prepaid, to the person at the address listed below pursuant to 37 CFR § 1.510(b)(5).

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**** CONTINUING DATA ***************************

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**** FOREIGN APPLICATIONS *********************

		STATE OR COUNTRY	SHEETS DRAWING	TOTAL CLAIMS	INDEPENDENT CLAIMS
Foreign Priority claimed	☐ yes ☐ no				
35 USC 119 (a-d) conditions met	☐ yes ☐ no ☐ Met after Allowance			20	4
Verified and Acknowledged	Examiner's Signature Initials				

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TITLE

SEMICONDUCTOR LIGHT SOURCE USING A HEAT SINK WITH A PLURALITY OF PANELS

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