

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hisense USA Corporation
Petitioner

v.

Brightplus Ventures LLC
Patent Owner

Patent No. 8,294,075
Filing Date: August 5, 2010
Issue Date: October 23, 2012
Title: SOLID-STATE LUMINAIRES FOR GENERAL ILLUMINATION

Inter Partes Review No. IPR2023-01410

**PETITIONER'S OPPOSITION TO PATENT OWNER'S CONTINGENT
MOTION TO AMEND UNDER 37 C.F.R. § 42.121**

TABLE OF CONTENTS

I.	Introduction.....	1
II.	The Motion Fails to Comply with Section 316(d) Or Rule 42.121.	2
A.	The Substitute Claims Add New Matter and Violate the Written Description and Definiteness Requirements	2
III.	Proposed Substitute Claims 34 and 35 Are Not Patentable in View of the Prior Art Used in the Original Grounds.	3
A.	Substitute Claim 34: Prior Art Involved in the Original Grounds Discloses Extended and Angled Reflectors.	3
1.	Ground 1 – Mok, Holman, and Lamb in view of the Knowledge of a POSITA.....	3
2.	Ground 2 – Epstein, Holman, and Lamb in view of the Knowledge of a POSITA.....	7
B.	Substitute Claim 35: Prior Art Involved in the Original Grounds Discloses Optical Cavities Around a Solid State Lighting Device.....	8
IV.	Proposed Substitute Claims 34-35 Are Not Patentable in View of Other Prior Art, Including Prior Art of Record.....	10
A.	The Prior Art Discloses Extended and Angled Reflectors that Form Optical Cavities	10
V.	One of Skill in The Art Would Have Been Motivated to Combine the Features of the Prior Art with Either Ground I or Ground II.	16
VI.	Conclusion	25

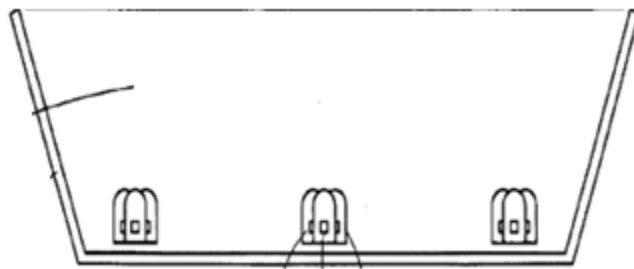
LIST OF EXHIBITS

EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 8,294,075 (“the ’075 Patent”)
1002	Prosecution History of U.S. Patent No. 8,294,075
1003	Declaration of Morgan Pattison, Ph.D.
1004	Curriculum Vitae of Morgan Pattison, Ph.D.
1005	US 2006/0227545 to Mok <i>et al.</i> (“Mok”)
1006	WO 03/056876 to Holman <i>et al.</i> (“Holman”)
1007	US 2005/0135115 to Lamb <i>et al.</i> (“Lamb”)
1008	US 2005/0265029 to Epstein <i>et al.</i> (“Epstein”)
1009	Counterclaim filed by PO in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 9 (N.D. Ga. Sep. 16, 2022)
1010	Scheduling Order in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 35 (N.D. Ga.)
1011	Judicial Caseload Profile for the Northern District of Georgia
1012	Cover Pleading to Patent Owners’ Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.)
1013	Cover Pleading to Patent Owner’s Supplemental Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.) served June 21, 2023
1014	US 2006/0082698 to Ko <i>et al.</i> (“Ko”)
1015	Han-Ping D. Shieh, et al., <i>Micro-Optics for Liquid Cristal Displays Applications</i> , IEEE/OSA Journal of Display Tech., Vol. 1, No. 10, Sep. 2005.
1016	Declaration of P. Morgan Pattison, Ph.D. in Response to Patent Owner’s Contingent Motion to Amend
1017	US 2006/0083023 to Ayabe <i>et al.</i> (“Ayabe”)
1018	US 2005/0274972 to Roth <i>et al.</i> (“Roth”)
1019	US 2007/0188425 to Saccomanno (“Saccomanno”)
1020	Taiwanese Patent Application No. 93218806, entitled DIRECT TYPE BACKLIGHT MODULE/ DIRECT TYPE BACKLIGHT MODULE to Chang

1021	Certified Translation of Exhibit 1020, Taiwanese Patent Application No. 93218806, entitled DIRECT TYPE BACKLIGHT MODULE/ DIRECT TYPE BACKLIGHT MODULE to Chang (“Chang”)
1022	US 2006/0186425A1 to Yano <i>et al.</i> (“Yano”)
1023	Transcript of July 12, 2024 Deposition of William Bohannon in Related Case No. IPR2023-01168
1024	Transcript of September 23, 2024 Deposition of William Bohannon
1025	US 6495861 to Hiroki (“Hiroki”)
1026	Korean Patent Application No. 2002/009578, entitled Electronic Display Board for indication equipment to Lee <i>et al.</i> (“Lee”)
1027	Certified Translation of Exhibit 1026, Korean Patent Application No. 2002/009578, entitled Electronic Display Board for indication equipment to Lee <i>et al.</i> (“Lee”)
1028	Japanese Patent Application No. 07199829, entitled Light emitting unit, display device, and illumination device to Hiratsuka (“Hiratsuka”)
1029	Certified Translation of Exhibit 1028, Japanese Patent Application No. 07199829, entitled Light emitting unit, display device, and illumination device to Hiratsuka (“Hiratsuka”)
1030	Certificate of Translation for Ex. 1028, Japanese Patent Application No. 07199829, entitled Light emitting unit, display device, and illumination device to Hiratsuka (“Hiratsuka”)
1031	Exhibit 8 to Deposition of William Bohannon in Related Case No. IPR2023-01168, 3M United States, Prism Films
1032	Exhibit 9 to Deposition of William Bohannon in Related Case No. IPR2023-01168, Vikuiti™ Brightness Enhancement Film (BEF) II
1033	Vikuiti™ Brightness Enhancement Film II (BEF II)
1034	Vikuiti™ Brightness Enhancement Film (BEF) III
1035	LUXEON® Power Light Sources

I. Introduction

Patent Owner failed to meet the requirements for amendment. The substitute claims cover a well-known panel design that employs an angled reflector with angled side walls. This design is described in many prior art references, including the prior art of record in this proceeding. A practically ubiquitous and common design for lighting panels employs a large reflective surface with angled side walls to form an optical chamber. LEDs sit within this chamber on the reflective surface. The perimeter of the reflector has angled side walls, upon which sit a diffuser, BEF, or other light management films. It looks like this:



Ex. 1017, Fig. 2. Patent Owner now attempts to capture through substitute claims such well-known designs. This is improper. The '075 patent describes nothing of the sort. Further, such designs are already disclosed in the prior art.

Patent Owner's substitute claims also lack written support as they borrow angled sidewall disclosures from an entirely different claim element, the apertures, and graft that onto the reflector, while at the same time lacking clarity on whether

the claims require a reflector or a reflector sheet, or if the two terms have the same meaning. PO's substituted claims are improper and PO's motion should be denied.

II. The Motion Fails to Comply with Section 316(d) Or Rule 42.121.

A. The Substitute Claims Add New Matter and Violate the Written Description and Definiteness Requirements

First, there is no antecedent basis for “the reflector” as recited in substitute claim 34. The claim describes only a “reflector sheet,” but as amended the claim recites “a *reflector sheet* on the first side of the at least one substrate, wherein the *reflector* is extended and angled with respect to the surface of the substrate.” Based on PO's proposed amendment, it is unclear whether the claim requires both a reflector *and* a reflector sheet, or if PO equates a reflector with a reflector sheet.

The substitute claims also broaden the previously claimed extended, parallel reflector to a reflector with angled side-walls. This is a fundamental failure, as there is simply no support in the specification for angled reflectors. Rather, angled sidewalls are only described in the specification as pertaining to apertures in the reflector. Ex. 1001, 3:42-51; 11:35-37, 11:48-51; Figs. 5A, and 7. In fact, the entire specification is directed to a stacked arrangement of substrate, reflector, diffuser, and BEFs.

The phrase “extended and angled” as recited in substitute claim 34 is indefinite. It could mean that the reflector is perpendicular to the substrate and

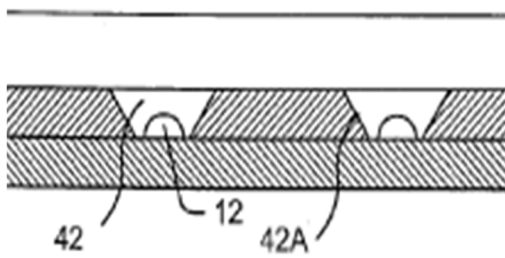
extends upward from the substrate. Or it could mean that some portion of the reflector is parallel to the substrate and some portion is angled (at some unspecified angle) to the reflector. Such broad and imprecise claim language is indefinite, especially when measured against the lack of disclosure in the specification. Further, the substitute claims now require the reflector to be angled relative to the surface of the substrate. Yet, the claim also requires that the reflector be “arranged parallel to the principal plane of the lighting panel.” A reflector cannot be both angled and parallel to a plane defined by the substrate.

III. Proposed Substitute Claims 34 and 35 Are Not Patentable in View of the Prior Art Used in the Original Grounds.

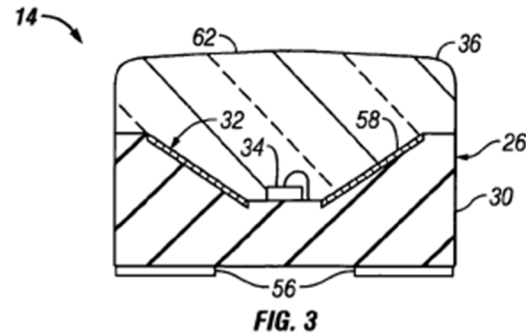
A. Substitute Claim 34: Prior Art Involved in the Original Grounds Discloses Extended and Angled Reflectors.

1. Ground 1 – Mok, Holman, and Lamb in view of the Knowledge of a POSITA

Patent Owner is wrong that Mok is silent about an angled reflector. Mok discloses a reflective surface 50 on base panel 12 (e.g. PCB) with mounted light emitting elements 14. *See, e.g.*, Ex. 1005 at Fig. 1; [0021]. Mok also discloses that the light emitting elements 14 comprise a reflector cup 32 that may be formed in the base portion. *See, e.g., id.* at Fig. 3; [0027]-[0028]; Ex. 1016, ¶¶12-13. Further, Mok discloses a reflective coating 58 provided within the reflector cup at least under the interpretation of “a reflector.” Ex. 1005, [0028]; Ex. 1016, ¶¶12-13.



'075 Patent, Fig. 5A (annotated)



Ex. 1005, Fig. 3

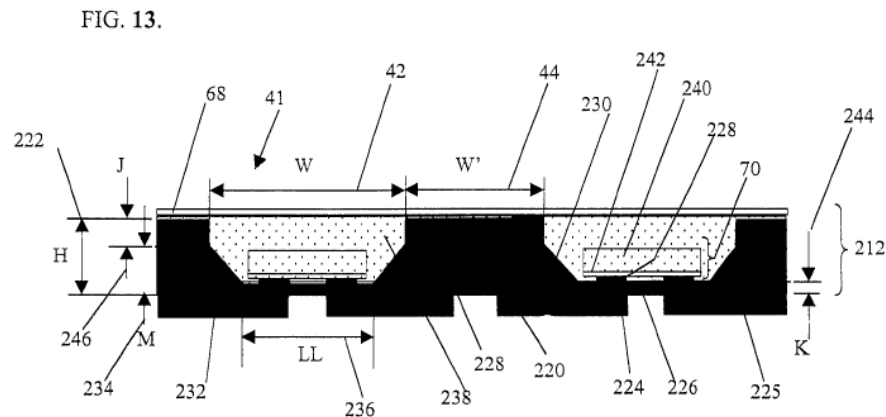
To the extent Mok's reflective coating 58 is not deemed a reflector, it would have been obvious to modify Mok's reflective surface 50 to cover the angled sidewalls of reflector cup 32. Ex. 1016, ¶13. For example, Mok discloses that "the reflective surface 50 may be deposited directly on the base panel 12 by any of a wide range of processes...." Ex. 1005 at [0021]. The reflective surface 50 may comprise diffuse reflective surfaces such as white paint, which is the same or similar to a reflective coating 58. *Id.*, [0021], Ex. 1016, ¶¶11-13. And it would have been obvious to deposit reflective surface 50 directly on all surfaces, including the sidewalls of reflector cup 32, by the very same process the reflective surface 50 may be deposited directly on the base panel 12. Ex. 1016, ¶¶11-13. Such a modification would be obvious to a POSITA because the reflector cup 32 and reflective surface 50 are both made of metal and serve the same purpose, to collect light for greater and more uniform illumination. Ex. 1005 at [0016], [0021]; Ex. 1016, ¶¶11-13. Additionally, the reflective surface 50 may also be a "sheet-like material" which a

POSITA would understand to be deformable and easily modified to encompass both the parallel portion of reflector surface 50 and the angled side walls of reflector cup 32. *Id.*

A POSITA would be motivated to make either of these modifications because having a larger reflective surface further improves light collection and illumination of the system. Ex. 1016, ¶¶11-13. Further, manufacturing the reflector cup 32 and reflective surface 50 on one process would lead to greater uniformity and manufacturing efficiency. *Id.* Thus, Mok discloses reflective surfaces 50 and 58 that are both extended and angled with respect to the substrate. *Id.*

Patent Owner is also wrong that Holman is limited to a flat reflecting layer 76. For example, Holman's sloped sidewalls 230 are angled and reflecting, and therefore form a reflector that is extended and angled with respect to the surface of the substrate 48. *See* Ex. 1006, at 7, FIG. 1, 13-15. Holman also discloses LEDs 70 mounted on composite reflective base layer 220 (reflected cavity structure layer laminated to insulating layer 225). Ex. 1016, ¶¶14-16. Sloped sidewalls 230, with angle α , can be the same material as the base layer or a deposited material. *See* Ex. 1006 at Figure 13-15 and pp. 38-40. Moreover, Holman's disclosures and teachings relative to Figures 7 and 8 are explicitly linked by Holman to its teachings relative to Figures 13-15 and thus it would have been obvious to incorporate those features, particularly since they serve the same goal of maximizing reflective surfaces to

increase light output. 13-15. *See* Ex. 1006 at 40-41 (“The same type of integration applies to the arrangements of FIG. 14 and FIG. 7, and also to the light sources of either FIG. 13 or FIG. 14 and the system of FIG. 8.”).



Id. at Fig. 13; Ex. 1016, ¶¶14-16.

Finally, Patent Owner is also wrong that Lamb does not disclose angled and extended reflectors as in the '075 Patent. Lamb's shaped reflector 17 is angled and extended with respect to the substrate. Lamb discloses that it was known in the prior art to shape a reflector that is both angled and extended with respect to the surface of the substrate. Ex. 1007, at Fig. 1; [0304]-[0035].

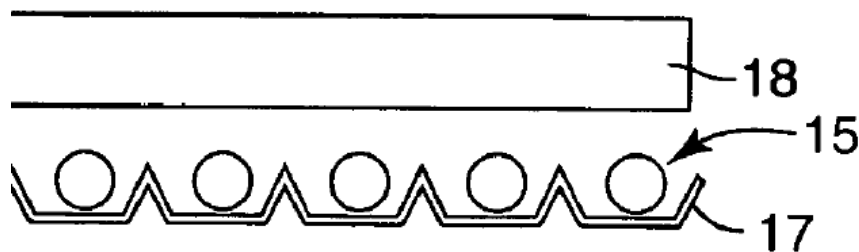
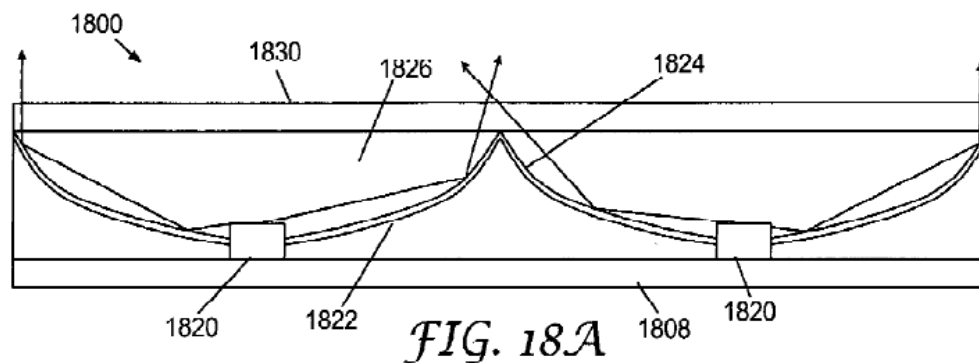


FIG. 1
PRIOR ART

To the extent Patent Owner argues that Lamb does not disclose a substrate or base layer, such would have been obvious to one of skill in the art. Ex. 1016, ¶¶17-18. Indeed, Lamb explicitly discloses placing light sources 185a and 185b on a substrate (light guide 140), such as in the exemplary embodiment shown in Figure 2. *See* Ex. 1007, at Fig. 2, [0037]; Ex. 1016, ¶18.

2. Ground 2 – Epstein, Holman, and Lamb in view of the Knowledge of a POSITA

Patent Owner is also wrong that Epstein is silent about a reflector that is angled and extended with respect to the base panel. Epstein discloses a reflective surface that may be “parabolic, elliptical or have some other shape.” Ex. 1008 at [0107], Fig. 18A and B; Ex. 1016, ¶¶19-20



A curved shape, including a parabolic shape is both angled and extended at different points along its surface. Ex. 1016, ¶¶19-21. Epstein’s disclosure of “other shapes” would also encompass extended and angled reflective surfaces in view of such disclosures in other prior art of record, including but not limited to, Mok and

Holman. Epstein's Figure 20B also discloses a reflective surface that is extended and angled relative to a base layer 608 as shown below. *Id.* at Fig. 20B; *see also* [0096].

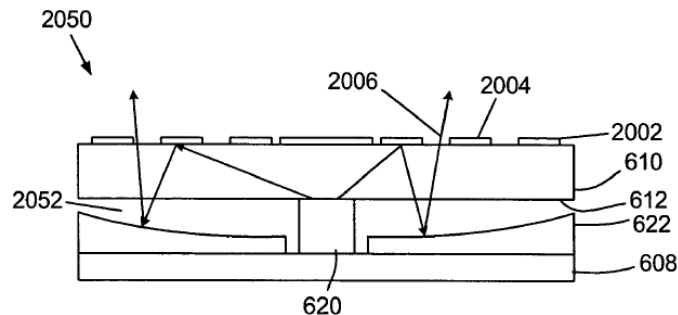


FIG. 20B

Additionally, as set forth in the Petition, Epstein's reflector with apertures 423 also disclosed extended and angled reflectors. *See* Paper 1 at 44-45, Ex. 1003 at [0048].

For the same reasons set forth in § III.A.1, Holman and Lamb each also disclose a reflector that is extended and angled with respect to the surface of the substrate. In short, Patent Owner has focused only on specific embodiments or figures in the prior art, and myopically misconstrued those disclosures. Patent Owner has failed to identify or distinguish the other, and in some cases broader, disclosures of the prior art. Such teachings, disclose or render obvious the new features of substitute claim 34.

B. Substitute Claim 35: Prior Art Involved in the Original Grounds Discloses Optical Cavities Around a Solid State Lighting Device.

As discussed *infra*, prior art from the Grounds already discloses extended and angled reflectors. These disclosures include the formation of optical cavities around

LEDs by the extended and angled reflectors. Examples of such disclosures, completely ignored by PO, include:

- Mok’s disclosure of a reflective cup 32 that form an optical cavity around the LED. Ex. 1005 at [0021], [0027]-[0028]; Figures 1, 3; Ex. 1016, ¶23.
- Holman’s disclosures in Figures 13, 14, and 15 regarding the use of two-dimensional light source panels combining LED back planes with interior walls that are reflective and create a cavity. Ex. 1006 at p. 39-41; Ex. 1016, ¶24.
- Lamb’s disclosure that for direct-backlit systems, it was well-known for the reflector to form optical cavities around each lighting source using “shaped reflectors.” Ex. 1007 at FIG. 1 and [0034]-[0035]; Ex. 1016, ¶25.
- Epstein’s disclosure that reflective sheet 1822 forms apertures that create an optical cavity around each LED 1820 disposed on substrate 1808. Ex. 1008 at [0106]-[0107] and Figs. 18A and 18B; Ex. 1016, ¶26.

Each of these references, alone or in combination, teach and disclose the use of a reflector or reflective surfaces to form an optical cavity around one or more solid state lighting devices. Thus Ground 1 (Mok, Holman, and Lamb), as well as Ground 2 (Epstein, Holman, and Lamb) disclose or render obvious the new features of substitute claim 35. Patent Owner’s proposed substitute claims should be rejected.

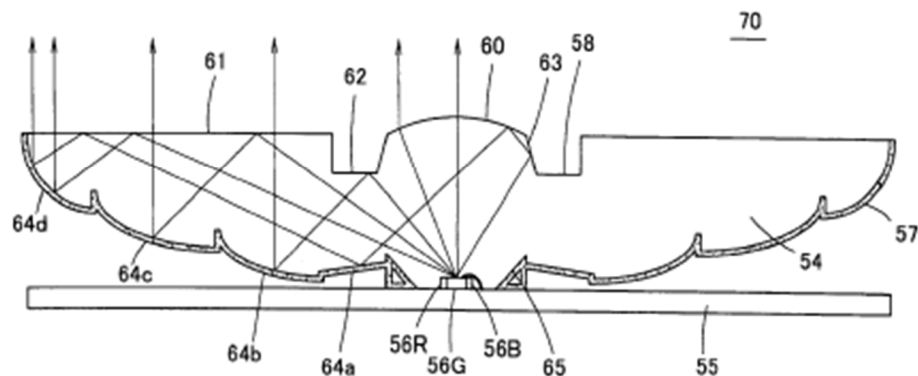
IV. Proposed Substitute Claims 34-35 Are Not Patentable in View of Other Prior Art, Including Prior Art of Record

A. The Prior Art Discloses Extended and Angled Reflectors that Form Optical Cavities

Substitute claims 34 and 35 attempt to cover a design that was conventional and well-known in lighting panel design. In fact, such prior art was known to Patent Owner because it formed part of the prior art cited on the face of the '075 patent itself. Tellingly, Patent Owner fails to address this prior art in its Motion, which reflects a lack of fidelity to its duty of candor before the Patent Office. Other prior art also discloses this feature.

For example, Ayabe (Ex. 1017) is cited on the face of the '075 patent and describes and shows, for example in Figure 32, that lighting panels used reflectors that are extended and angled and house more than one solid state lighting device. Ex. 1016, ¶¶28-30.

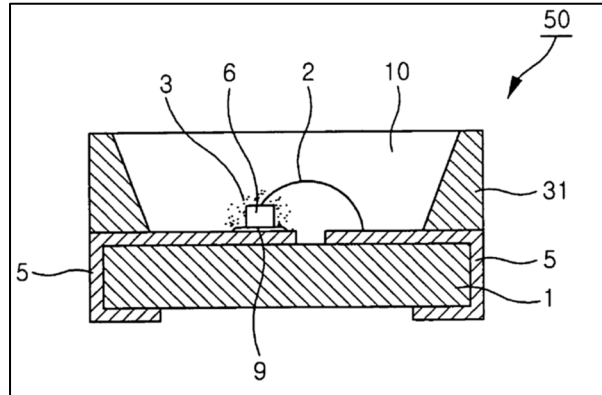
Fig. 32



The design in FIG. 32 is described by Ayabe as having “light emitting devices” 56R, 56G, and 56B (such as LED chips) installed on the surface of “wiring board” 55 and a “reflecting member 57” that is “comprised of a plurality of annular reflecting areas” 64b–64d and “shaped like a concave mirror for reflecting light.” Ex. 1017, Fig. 32, [0091] – [0092], [0097], [0135] - [0139]. Ayabe further describes and shows that there may be multiple reflecting members 57 arranged along wiring board 55. *Id.*, [0089], Figs. 9–10.

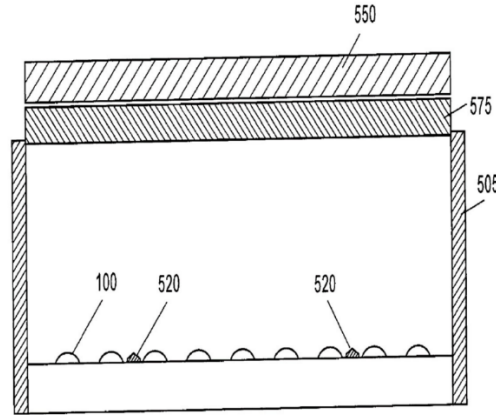
The reflecting members 57 in Ayabe are a reflector that is “extended and angled” with respect to the surface of a substrate (wiring board 55) to form a “reflective optical cavity” bounded by annular reflecting areas 64b–64d around the solid state lighting device(s) (light emitting devices 56R, 56G, and 56B). *Id.* at Figs. 32, 34, 35. Ayabe’s other disclosures include extended and angled reflectors that form optical cavities via backward sloped surfaces of reflecting members that house solid state lighting sources. *See, e.g., id.* at [0021]-[0024]; Figs. 2, 34-35; Claims 1-4, 6-7; Ex. 1016, ¶¶28-30. Roth (Ex. 1018), is also cited on the face of the ’075 patent and discloses the features of substitute claims 34 and 35. Ex. 1016, ¶¶31-32. Roth shows a light emitting device structure 50 in which an LED is mounted on substrate 1. Ex. 1018 at [0024]. Roth discloses an angled reflector 31 on substrate 1 creating an optical cavity. *Id.* at Fig. 2, [0028]. Roth also discloses that the substrate may be a metal substrate, which one of skill in the art would understand is reflective.

Id. at [0030]. Thus, Roth discloses extended and angled reflectors that form an optical cavity around an LED. Ex. 1016, ¶¶31-32.



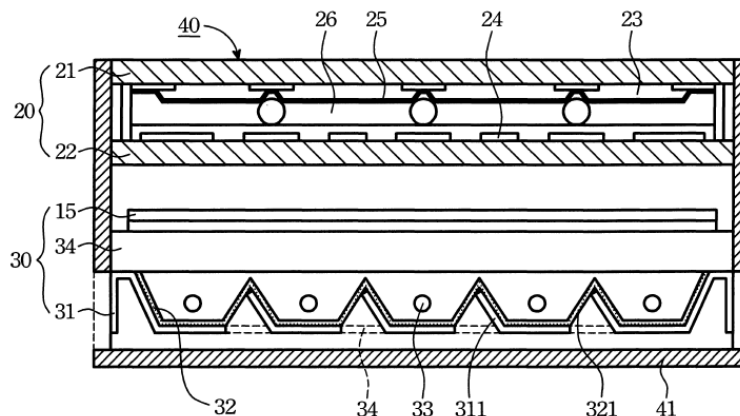
1018 at Fig. 2.

Saccomanno (Ex. 1019) is also cited on the face of the '075 patent and discloses extended and angled reflectors that form optical cavities to house at least one LED. Ex. 1016, ¶¶33-35. For example, Figures 4 and 5 of Saccomanno, and their accompanying description, disclose a lighting panel in which a reflector is extended and angled. *See, e.g.*, Ex. 1019, Figs. 4 and 5; [0038]-[0040]. Reflector 505 is angled at 90° relative to the substrate and also extends upwards, all of which forms an optical cavity around at least one LED. *Id.*



A stated goal of the invention is to receive “excess light [that] may be light emitted from the light sources at angles that do not reach the element being illuminated.” *Id.* at [0023]. Saccomano further states that Figures 4 and 5 show “[a]lternate exemplary approaches” that are not limiting. *Id.* at [0038]. Thus, to capture excess light at angles that do not reach the element being illuminated, a POSITA would be motivated to modify the angle the reflector 505 with respect to the substrate beyond the 90° angle shown in Figure 5. Ex. 1016, ¶35.

Finally, Chang (Ex. 1021) also discloses this element in a backlight display. Ex. 1016, ¶¶36-37.

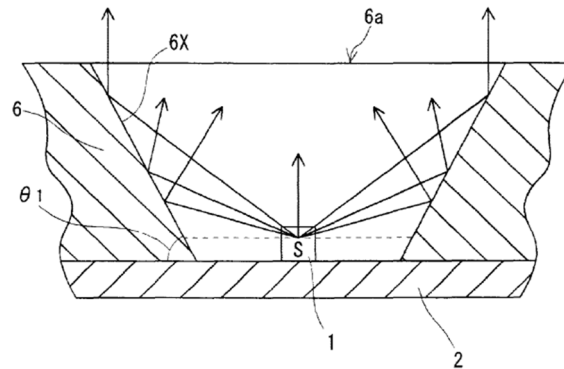


Chang relates to a direct backlight panel design that involves a base plate, reflector, lighting element, diffusion sheet, and optical film to enhance brightness. As shown in FIG. 6 of Chang, reflector 32 is angled and extended forming optical cavities around light emitting components 33, which can be LEDs.

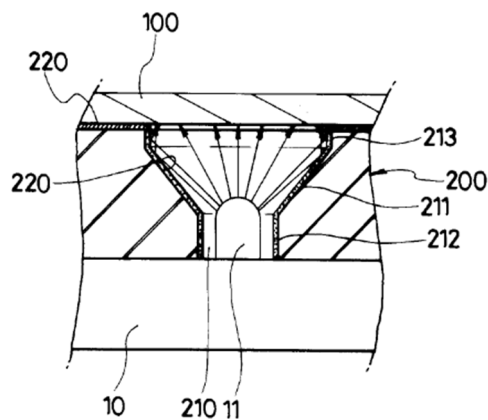
There is also a wealth of other prior art not explicitly cited on the face of the '075 patent that discloses extended and angled reflectors that form optical cavities as recited in substitute claims 34 and 35. This further demonstrates that the elements of substitute claims 34 and 35 were common and well-known as of the priority date of the '075 patent.

For example, Hiroki (Ex. 1025) discloses “a substrate; a semiconductor light-emitting element mounted on the substrate; and a reflector having an aperture having a slant surface in an inner wall thereof and to be rested on the substrate in a manner encompassing the semiconductor light emitting element by the slant surface.” Ex. 1025, at 2:49-54. As shown by the figures in Hiroki, “[t]he reflector 6 is rested on the substrate 2 to accommodate the LED element 1 mounted on the substrate 2 in a center of a space surrounded by the slant surface.” *Id.* at 4:31-33; *see also* Figs. 1-5, 12-14. Thus, reflector 6 is extended and angled with respect to the substrate 2 and forms an optical cavity around the LED element 1. *See* Ex. 1016, ¶¶38-39.

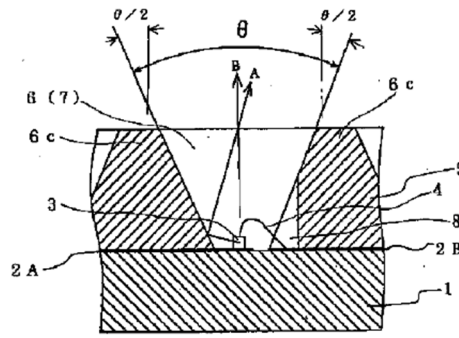
FIG. 4



Id., Fig. 4. Lee (Ex. 1027) similarly discloses LED lamps 11 that are installed on LED substrate 10 through an insertion hole 210 that has an inclined surface 211. Ex. 1027, [0034]-[0035]. Lee further discloses that a “coating layer 230 is formed on an inner surface of the insertion hole 210 to allow light of the LED lamp 11 installed on the LED substrate 10 to be smoothly reflected.” *Id.* at [0037]. As shown by Figure 3, this reflective coating 230 on the inclined surface 211 of the insertion hole 210 is a reflector that is extended and angled with respect to the surface of the substrate, and that forms a reflective optical cavity around the LED. *See id.*, Fig. 3.



Id., Fig. 3; Ex. 1016, ¶¶40-41. The same is disclosed by Hiratsuka (Ex. 1029), which describes an LED chip 3 on a substrate 1 through a light emitting hole 6, which is a “is a truncated cone-shaped inclined surface.” Ex. 1029, at [0005]. “This inclined surface is a reflecting surface 7.” *Id.* The inclined reflecting surface 7 is a reflector that is extended and angled with respect to the surface of the substrate 1 and that forms a reflective optical cavity around the LED 3. *See id.*, Figs. 3, 4, 9.



Id., Fig. 3; *See* Ex. 1016, ¶¶42-43.

V. One of Skill in The Art Would Have Been Motivated to Combine the Features of the Prior Art with Either Ground I or Ground II.

To the extent Patent Owner argues that the features disclosed by the existing art or new art would not be combined with the current grounds, Patent Owner is wrong.

First, as to existing art, those features are found explicitly in the art already of record. For both Grounds 1 and 2, for the same reasons articulated in the Petition, such features would have been combined or used with the existing disclosures.

Petition at 11-14, 34-36. In instituting *inter partes* review, the Board also found that the Petition's reasons for combining the art in Grounds 1 and 2, respectively, were sufficient. *See, e.g.*, Paper 7 at 35, 56.

With respect to Ground 1 and the new elements of substitute claims 34 and 35, the features of Mok, Holman, and Lamb are readily combinable with the disclosures relied upon in Ground 1. For example, Mok's reflective cavity is already an integral part of the embodiments of Mok, such as those shown in Figures 3 and 5. Thus, a POSITA would apply Mok's teachings relative to these embodiments to further Mok's goal of increasing light output and light uniformity.

Substitute claims 34 and 35 are rendered obvious by Mok alone, but they are also disclosed by the combination of Mok with Holman and/or Lamb. These references describe similar LED lighting systems, and Mok states that "any of a wide variety of configurations" may be used, and "other configurations are possible." Ex. 1005, [0020]; Ex. 1003, ¶111. Thus, a POSITA would be motivated to combine Mok's reflective structure with the sloped sidewalls 230 of Holman or the shaped reflector 17 of Lamb to create a reflector that is extended and angled with respect to the surface of the substrate that forms an optical cavity. These modifications would create a larger area for light reflection, meaning greater light output from a device, which are stated goals of each of the references. Ex. 1016, ¶¶16, 23-25.

Similarly, with respect to Ground 2, Epstein's disclosures in Figures 19 and 20 simply provide additional details related to light extraction features that are part of, and consistent with, Epstein's disclosures in Figs. 7 and 11. Thus, a POSITA would know these teachings could be used to create a reflector that is extended and angled and forms an optical cavity to further Epstein's goal of creating a more efficient lighting system. Substitute claims 34 and 35 are rendered obvious by Epstein alone, moreover, a POSITA would also be motivated to modify the reflective surface of Epstein with the sloped sidewalls 230 of Holman or the shaped reflector 17 of Lamb to create a reflector that is extended and angled with respect to the surface of the substrate that forms an optical cavity. Epstein, Holman, and Lamb all utilize the same elements and are aimed at "increasing the overall efficiency" of lighting systems. Ex. 1008, [0121]; *see also* Ex. 1006, at 2; Ex. 1007, [0006]; Ex. 1003, ¶¶123-125. Epstein also states that its reflective surface "may be paraboloidal, elliptical or have some other shape." Ex. 1008, [0107]. Thus, Epstein itself recognizes that its reflective surface can be modified as suggested by Holman and/or Lamb. Further, by combining the disclosure of Epstein with that of Holman and/or Lamb, the references' respective goals of improving efficiency would be achieved, because a larger reflector sheet with angled sidewalls forming an optical cavity would give more surface area for reflecting light, thereby creating as much illumination as possible from the LEDs. Ex. 1016, ¶¶19-20, 24-26. Accordingly,

such teachings are readily combinable with the prior art in the Grounds as set forth in the Petition.

Second, as to new art, such disclosures are readily combinable with the existing grounds. For example, Ayabe was cited during prosecution of the '075 patent. It relates to the same field of the invention, discusses common and well-known architectures for creating optical chambers, and is consistent with the overall aim of the '075 patent, which is to improve the nature and quality of the light for lighting panel designs. Ex. 1016, ¶¶44-53. Ayabe, the Ground 1 references, and the Ground 2 references all utilize similar components and are aimed at the common goal of creating more efficient lighting systems with uniform light emission. *See, e.g.*, Ex. 1017, [0018]-[0019]; Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006]; Ex. 1008, [0003]; Ex. 1016, ¶¶44-53. Ayabe also states that “other shapes of the light irradiation surface of the light guiding unit or of the reflecting member... can be adopted.” Ex. 1017, [0119]. And as Ayabe teaches, utilizing a light mixing chamber leads to greater, more uniform light mixing. Ex. 1017, [0007]; Ex. 1016, ¶¶44-53. Thus, a POSITA would be motivated to combine the reflecting members 57 of Ayabe with the reflector cup 32 and reflective surface 50 of Mok, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb (Ground 1), or the reflective sheet 1822 and apertures of Epstein, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb (Ground 2) to create a reflector that is

extended and angled with respect to the substrate that forms an optical cavity for the same reason, creating more uniform and efficient lighting. Ex. 1016, ¶¶44-53.

Roth was also cited on the face of the patent and relates to improving the color of light, which would be of interest to anyone designing lighting panels. *Id.* With respect to Ground 1, a POSITA would be motivated to combine the angled reflector 31 of Roth with the reflector cup 32 and reflective surface 50 of Mok, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity. Roth and the Ground 1 references are readily combinable because they are all aimed at similar systems with the same components. *See, e.g.* Ex. 1016, ¶¶44-53. Furthermore, creating an extended and angled reflector forming an optical cavity would mean greater surface area for light reflection, and thus greater, more uniform light emission—a stated goal of Roth and the Ground 1 references. *See, e.g.* Ex. 1016, ¶¶44-53; Ex. 1018, [0006]; Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006].

With respect to Ground 2, a POSITA would be motivated to combine the angled reflector 31 of Roth with the reflective sheet 1822 and apertures of Epstein, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity. A POSITA would have a reasonable expectation of success in

combining these references, as they are all in the same field of endeavor and utilize similar components. Ex. 1016, ¶¶54-57. Further, such a modification would increase light emission, as sought by Roth and the Ground 2 References. Ex. 1016, ¶¶44-57; Ex. 1018, [0007], [0028]; Ex. 1006, at 2; Ex. 1007, [0006]; Ex. 1008, [0003].

Next, Saccomanno relates to, among other things, improving “diffusely illuminated LCD panels and with a collimated backlight comprising a plurality of LEDs.” *Id.*, ¶42; Ex. 1019 at [0008]. This is similar to the systems described in both Grounds 1 and 2. Ex. 1016, ¶¶44-57. Saccomanno further recognizes that the “sizes, configurations, numbers, and positioning of various structural parts and materials used ... can be changed to produce different effects, desired characteristics, and/or to achieve different applications than those exemplified herein.” Ex. 1019, [0063]. Thus, a POSITA would be motivated to combine the reflector 505 of Saccomanno with the reflector cup 32 and reflective surface 50 of Mok (Ground 1) or the reflective sheet 1822 and apertures of Epstein (Ground 2), as well as the sloped sidewalls 230 of Holman (Ground 1 and 2), and/or the shaped reflector 17 of Lamb (Ground 1 and 2) to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity. Ex. 1016, ¶¶44-57. The references of Ground 1 and Ground 2 are respectively aimed at creating more efficient uniform lighting. Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006]; Ex. 1008, [0003]. Saccomanno also seeks to “provide a more uniform illumination.” Ex. 1019, [0004].

Thus, a POSITA would be motivated to add Saccomanno to either combination to create better, more uniform lighting. Ex. 1016, ¶¶44-57.

Chang also relates to a backlight system with an arrangement of layers of optical films that are positioned “to increase the light uniformity of the entire display product and brightness.” Ex. 1021 at 6; Ex. 1016, ¶¶44-57. This is similar to the goals of both Ground 1 and Ground 2’s references. *See, e.g.*, Ex. 1016, ¶¶44-57; Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006]; Ex. 1008, [0003]. Thus, with respect to Ground 1, a POSITA would be motivated to combine the reflector 32 of Chang with the reflector cup 32 and reflective surface 50 of Mok, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity. And with respect to Ground 2, a POSITA also would be motivated to combine the reflector 32 of Chang with the reflective sheet 1822 and apertures of Epstein, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity. This is because the combinations with Ground 1 and Ground 2 would lead increased light uniformity and brightness, as is sought by Chang and both Grounds. Ex. 1016, ¶¶44-57.

Hiroki is related to a “chip-type semiconductor light-emitting device capable of improving radiation center brightness” and “reducing change or variation in

center brightness even if there is positional deviation of the LED element relative to the substrate.” Ex. 1025, 2:39-46. The references of both Ground 1 and 2 are also aimed at similar systems and have similar goals as Hiroki. *See, e.g.*, Ex. 1016, ¶¶44-57; Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006]. Thus, A POSITA would also be motivated to combine the reflector 6 of Hiroki with the reflector cup 32 and reflective surface 50 of Mok, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb, with respect to Ground 1, or apertures of Epstein, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb, with respect to Ground 2, to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity, as this would further the references common goal of creating brighter, more uniform light emission. Ex. 1016, ¶¶44-57.

Similar to the goals of both the Ground 1 and Ground 2 references, Lee is aimed at “collecting light of LED lamps” in a more efficient way to “transmit luminous light.” Ex. 1027, [0020]-[0021]; *see also* Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006]. By combining the reflective coating 230 on the inclined surface 211 of Lee with the reflector cup 32 and reflective surface 50 of Mok, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb, with respect to Ground 1, or the reflective sheet 1822 and apertures of Epstein, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb, with respect to Ground 2, to create a reflector that is extended and angled with respect to the

substrate that forms an optical cavity this goal would be furthered, as these modifications would create greater and brighter light. Ex. 1016, ¶¶44-57. Further, given Lee utilizes similar components as both the references in Ground 1 and Ground 2, a POSITA would have a reasonable expectation of success with these combinations.

Finally, Hiratsuka seeks to “improve brightness and luminance by efficiently radiating incident light on a reflection surface from LED chips from an aperture of a housing.” Ex. 1029, at Abstract. Hiratsuka further states that its invention seeks to create a “light-emitting unit, display device, and lighting system that boast an increase in the luminance or amount of light that will be irradiated from the light-emitting holes, improving the brightness.” *Id.*, [0041]. With respect to Ground 1, a POSITA would be motivated to combine the inclined reflecting surface 7 of Hiratsuka with the reflector cup 32 and reflective surface 50 of Mok, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb. And with respect to Ground 2, a POSITA would be motivated to combine the inclined reflecting surface 7 of Hiratsuka with the reflective sheet 1822 and apertures of Epstein, the sloped sidewalls 230 of Holman, and/or the shaped reflector 17 of Lamb. Hiratsuka is aimed at a similar goal as the Ground 1 and Ground 2 references, and all the references are in the same field of endeavor. Ex. 1016, ¶¶44-57; Ex. 1005, [0006]-[0007]; Ex. 1006, at 2; Ex. 1007, [0006]; Ex. 1008, [0003]. By combining Hiratsuka

with the Ground 1 or Ground 2 references to create to create a reflector that is extended and angled with respect to the substrate that forms an optical cavity, a POSITA would know the brightness and light output of a system would be improved, as sought by Hiratsuka, Ground 1, and Ground 2.

Overall, these disclosures would be highly relevant to one of skill in the art designing panels and attempting to improve lighting panel designs. As Dr. Pattison explains, the designs offered by these references would all improve efficiency as well as the quality and uniformity of light output by the backlight system. Ex. 1016, ¶¶44-57. Thus, a person of ordinary skill in the art would be motivated to modify the art presented in the original grounds to include the additional disclosures of Ayabe, Roth, Saccomanno, Chang, Hiroki, Lee, or Hiratsuka to provide increased efficiency and more on-axis light. *Id.*

VI. Conclusion

Patent Owner's substitute claims are invalid.

Respectfully submitted,

By: /s/ Matias Ferrario
Matias Ferrario
Registration No. 51,082

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on the date below a copy of this
**PETITIONER'S OPPOSITION TO PATENT OWNER'S CONTINGENT
MOTION TO AMEND** has been served via email on the following:

hni@nilawfirm.com
twang@nilawfirm.com
nmassand@nilawfirm.com

Dated: September 30, 2024

By: /s/ Matias Ferrario
Matias Ferrario
Registration No. 51,082