

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. 7,690,812
Filing Date: March 15, 2007
Issue Date: April 6, 2010
Title: APPARATUS AND METHODS FOR CONFORMABLE DIFFUSE
REFLECTORS FOR SOLID STATE LIGHTING DEVICES

Inter Partes Review No. IPR2023-01385

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

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LIST OF EXHIBITS

EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 7,690,812 (“the ’812 Patent”)
1002	Prosecution History of U.S. Patent No. 7,690,812
1003	Declaration of P. Morgan Pattison, Ph.D.
1004	Curriculum Vitae of P. Morgan Pattison, Ph.D.
1005	US 7,497,592 to Chou (“Chou”)
1006	US 2006/0262310A1 to Starry (“Starry”)
1007	US 2007/0103908 to Tabito <i>et al.</i> (“Tabito”)
1008	Counterclaim filed by Patent Owner in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 9 (N.D. Ga. Sep. 16, 2022)
1009	Scheduling Order in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 35 (N.D. Ga.)
1010	Judicial Caseload Profile for the Northern District of Georgia
1011	Cover Pleading to Patent Owner’s Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.)
1012	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
1013	U.S. Pub. No. 2006/0187660 to Liu (“Liu”)
1014	U.S. Patent No. 7,324,174 to Tabito (“Tabito 174”)
1015	Declaration of P. Morgan Pattison, Ph.D.
1016	U.S. Patent No. 7,481,553 to Kim <i>et al.</i> (“Kim”)
1017	U.S. Pub. No. 2007/0064171 (“Sharp”)
1018	U.S. Pub. No. 2003/0223249 to Lee <i>et al.</i> (“Lee”)
1019	Transcript of the September 10, 2024 Deposition of Mr. Bohannon

EXHIBIT	DESCRIPTION
1020	Declaration of P. Morgan Pattison, Ph.D.
1021	Japanese Patent Pub. No. 2004-139871 A to Shimizu et al. (“Shimizu”)
1022	Certified translation of Shimizu
1023	U.S. Pat. Pub. No. 2006/0221610 A1 to Chew et al. (“Chew”)
1024	U.S. Pat. Pub. No. 2002/0021085 A1 to Ng (“Ng”)
1025	U.S. Pat. Pub. No. 2006/0227545 A1 to Mok et al. (“Mok”)
1026	Taiwanese Patent Application No. 93218806, entitled DIRECT TYPE BACKLIGHT MODULE/ DIRECT TYPE BACKLIGHT MODULE to Chang (“Chang”)
1027	Certified Translation of Chang

I. Introduction

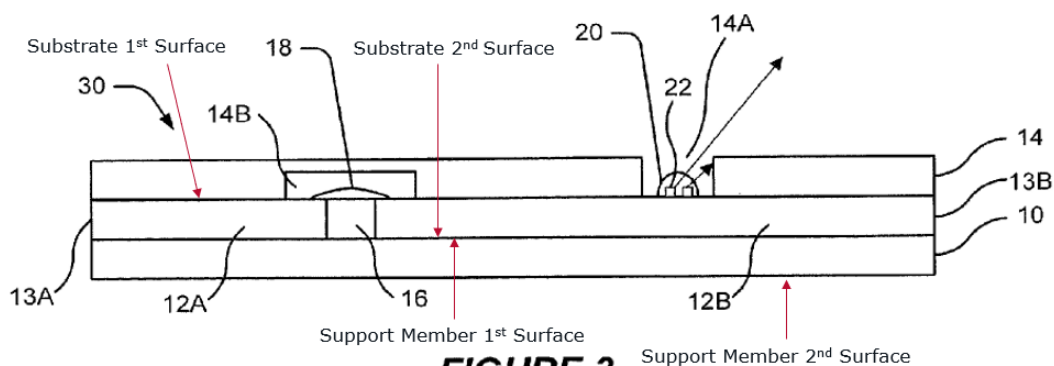
Patent Owner (“PO”) failed to meet the requirements for amendment in its Revised Contingent Motion to Amend Under 37 C.F.R. § 42.121 (“rMTA”), both substantively and procedurally.

In its preliminary guidance on PO’s original MTA, the Board found that Petitioner showed a reasonable likelihood that the originally proposed substitute claims were obvious based on the combination of Kim and Sharp. Paper 18 at 9. In response, PO added a plethora of limitations to the sole independent substitute claim and proposed twelve additional dependent substitute claims. However, in PO’s attempt to add a substantial number of new limitations, it proposed an unworkable independent claim (*see* Section II) and failed to comply 37 C.F.R. § 42.121 by adding new matter and failing to set forth written description support for each proposed substitute claim (*see* Section III). PO also added dependent claims stating that a newly added feature is “configured to” perform certain functions. However, these claims lack enablement because both the specification and the substitute claims are completely silent as to how the features are actually configured to perform the claimed functions (*see* Section IV). Finally, despite the numerous new limitations, all of the limitations were well known designs disclosed in the prior art, which a POSA would be motivated to combine. All the substitute claims are rendered obvious in view of the prior art (*see* Section V). PO’s rMTA should be denied.

II. The Sole Independent Substitute Claim 25 is Indefinite.

Claim 25 recites that “the second surface of the substrate is in direct contact with the first surface of the support member and the second surface of the substrate faces away from the first surface of the support member.” rMTA, 4-5 & Appx. A. The second surface (or any surface) of the substrate cannot both *face away from* and *also be in direct contact with* the first surface of the support member. Thus, substitute claim 25 is inescapably indefinite.

PO relied on “Figs. 3 and 4; 5:36-37” as support for this feature. rMTA, 5. The cited portion merely states “Each of the first and second substrates 13A and 13B are mounted on a support member 10.” Ex. 1001, 5:36-37. In Figs. 3 and 4, regardless whether any surface of the substrate 13A or 13B is regarded as the “second surface of the substrate,” it is *never both* “in direct contact with” and “fac[ing] away from” the first surface (or any surface) of the support member 10.



Ex. 1001, Fig. 3 (annotated).

Because of this impossibility, claim 25 fails to inform a POSA of the scope of

the invention. *Nautilus, Inc. v. Biosig Instruments, Inc.*, 572 U.S. 898, 910 (2014). Critically, because of the fatal indefiniteness of the sole independent claim 25, all the substitute claims are unpatentable.

III. The Motion to Amend Fails to Comply with 35 C.F.R. § 42.121.

The motion to amend fails to comply with 35 C.F.R. § 42.121 for multiple independent reasons.¹ First, PO failed to “set forth written description support for each proposed substitute claim *as a whole*, and not just the features added by the

¹ Further, PO does not cite “the original disclosure” and thus violates § 42.121(b)(1). PO also violates 42.121(a)(3) by failing to clearly list the original claims for which the new claims are to be substituted. *Compare* rMTA §II (only identifying claims substitute claims 25-28 as contingent and as replacing claims 1, 12, 15, and 18) with *id.*, §III (stating that substitute claims are proposed for claims 1-7, 10-12, 16-17, and 19); *Lectrosonics*, IPR2018-01129, Paper 15 at 5. PO identifies original claim 18 as being replaced but fails to show how it is amended, in violation of § 42.121(b). *See* rMTA, Appendix A (showing substitute claim 28 as replacing claim 4, not claim 18). Proposed substitute claim 37 says it is the “proposed substitute for Claim 19.” Motion, Appendix A, claim 37. The redlined language does not correspond to original claim 19, violating § 42.121(a)(3). *See Lectrosonics*, IPR2018-01129, Paper 15 at 8 (“motion must show clearly the changes”).

amendment.” *Lectrosonics, Inc. v. Zaxcom, Inc.*, IPR2018-01129, 01130, Paper 15 at 8 (PTAB Feb. 25, 2019) (Precedential) (emphasis added); *id.* (“This applies equally to independent claims and dependent claims, even if the only amendment to a dependent claim is in the identification of the claim from which it depends.”). Instead, PO only points to alleged support for individual limitations that were added. This alone warrants denial of the rMTA. This is particularly so where PO added numerous limitations to independent substitute claim 25 without explaining how the specification sets forth written description support for the claim as a whole.

Second, PO merely states that “[t]hese amendments find support at ...” and provides bare citations with no explanation as to how the amendments allegedly find support in the original disclosure, which fails to comply with § 42.121(a)(2)(ii). *See Lectrosonics*, IPR2018-01129, Paper 15 at 7-8.

Third, as explained below, in addition to the inoperable and unsupported features in independent claim 25, numerous newly added elements in the substitute dependent claims lack support. To the extent that PO contends it would have been obvious based on its citations or portions of the disclosure, this is insufficient. *See Ariad Pharms., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1352 (Fed. Cir. 2010) (*en banc*) (“[A] description that merely renders the invention obvious does not satisfy the requirement.”) (citations omitted).

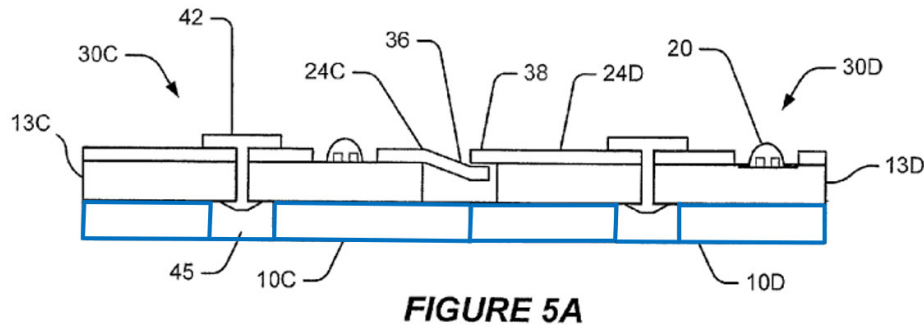
Substitute claim 27 recites: “The solid state lighting tile of claim 25, wherein

the plurality of perforation apertures *are disposed distally from* the solid state lighting elements and *protruding features.*” (emphasis added). There is no discussion in the portions cited by PO or anywhere else in the specification regarding the positioning of the perforation apertures with respect to any protruding features on the solid state lighting tile. *See, e.g.*, Ex. 1001, 7:29-38 (no discussion of the relative positioning of the perforation apertures). LWI 18 “is but one example of a surface protrusion that can occur on a surface of the tile substrate,” (’812 Patent, 5:48-50) but the ’812 Patent does not show or discuss any other protruding features or where they would be arranged with respect to any other element, including any perforation apertures. Therefore, there is no support for perforation apertures disposed distally from protruding features.

Substitute claim 31 recites: “The solid state lighting tile of claim 25, further comprising a mechanical fastening device configured to *pass through* the reflector sheet and *the first surface of the support member* and thereby *attach the reflector sheet to the support member.*” PO points to “Fig. 5A; 2:13-16; 6:12-17” as support. rMTA, 7.

FIG. 5A shows a mechanical fastener (“rivets 42”) passing through the reflector sheet 24C/24D and the substrate 13C/13D but *not* through any *surface* of the support member 10C/10D. Instead, a recess 45 is provided in the support member to accommodate the rivet. Ex. 1001, 6:49-53 (“The rivets 42 can include retention

flanges that can *contact a bottom side of the substrates 13C and 13D*. The support members 10C and 10D can include *recesses 45 corresponding to the retention flanges of the rivets 42.*) (emphasis added). The rivet attaches the reflector sheet to the *substrate 13D*, not the support member 10C:



Ex. 1001, FIG. 5 (support member surfaces highlighted in blue). Likewise, FIG. 5B shows a support member without recesses and a reflector sheet with push-pins 43 that anchor the reflector sheet to the substrate, but these do not “pass through ... the first surface of the support member.”

PO points to nothing in the specification that describes or suggests that a mechanical fastening device passes through the first surface of the support member or attaches the reflector sheet to the support member. Rather the “plastic rivets 42 [are] configured to *hold the reflector sheets 24 in place relative to the substrates 13.*” Ex. 1001, 6:47-49. In all embodiments, the mechanical fastening device attaches the reflector sheet to the substrate, and there is no discussion with respect to the support member other than providing recesses for rivets. *See id.*, 6:40-7:24.

Substitute claim 33 recites: “The solid state lighting tile of claim 25, wherein

the plurality of *perforation apertures are configured* to ensure that the *reflector sheet conforms to the shape of the support member*.” (emphasis added). PO cited to 5:63-65 (“the reflector sheet 24 may be attached to a housing and not attached to the substrate. For example, the reflector sheet 24 may be bonded to a support structure near the edges of the reflector sheet 24”) specifically as support for claim 33 and “7:25-38 and Fig. 6” as support for claim 32. rMTA at 6-7. However, these citations do not describe or even suggest conforming the reflector sheet to the shape of the *support member*, which is separated from the reflective sheet by the substrate, let alone doing so by configuring the perforation apertures.

Substitute claim 35 recites: “The solid state lighting tile of claim 25, wherein the solid state lighting tile comprises *a third reflector sheet* mounted on and in direct contact with the second surface of the substrate.” (emphasis added). Similarly, **Substitute claim 36** recites: “The solid state lighting tile of claim 35, wherein the *third reflector sheet overlaps* in part with the second reflector sheet.” (emphasis added). Despite claiming a third reflector sheet, PO can only point to *two* reflector sheets disclosed by the specification: “reflector sheets 24C and 24D, indicating more than one reflector sheet.” (rMTA, 7-8). The specification only describes first and second reflector sheets and how they overlap with respect to each other. *See* ’812 Patent, 1:63-2:3, 7:18-24, FIGs. 5A, 5B. There is no discussion, disclosure, or suggestion of a third reflector sheet or how it would be used with respect to the first

and second reflector sheets such that all three would simultaneously be in contact with the surface of the substrate. Nor is there any disclosure of how a third reflector sheet would overlap in part with a second reflector sheet as claimed in claim 36.

Accordingly, the rMTA fails to comply with 35 C.F.R. § 42.121.

IV. Substitute Claims 29, 30, 32, and 33 are Not Enabled

Substitute claims 29, 30, 32, and 33 recite that “the plurality of perforation apertures are configured to” (1) “reduce distortion of the reflector sheet” (claim 29); (2) “provide thermal expansion zones for the reflector sheet” (claim 30); (3) “reduce distortion of the reflector sheet due to thermal expansion” (claim 32); and (4) “ensure that the reflector sheet conforms to the shape of the support member” (claim 33).

While the specification states that the perforation apertures “can serve to provide designated expansion zones in the event that the solid state lighting bars experience thermal expansion and/or contraction” and “can be isolated to the designated expansion zones in order to reduce buckling, warping, and/or distortion that might undesirably affect uniformity” (Ex. 1001, 7:32-38), there are no teachings in the specification regarding how to actually configure any perforation apertures to reduce distortion or provide thermal expansion zones. Ex. 1020, ¶13.

As explained *supra* in relation to substitute claim 33, conforming the reflector sheet to the shape of the support member is not described in the specification. Even if it were, there is nothing to explain how a POSA would configure *the perforation*

apertures to ensure the reflector sheet conforms to the shape of the support member, which is underneath the substrate. This is especially so in situations where the support member does not have the same general shape as the substrate. *Id.*, ¶14.

The specification's bare disclosures do not enable a POSA to make and use the purported invention without undue experimentation. The complete silence in the specification and in the rMTA warrants denial with respect to these substitute claims as they fail to provide any teachings, disclosures, or other information that would allow a POSA to make and use the purported invention. To the extent PO contends that a POSA would know how to configure the perforation apertures as claimed despite the lack of disclosure in the '812 Patent, then claims 29, 30, 32, and 33 are obvious based on the knowledge of a POSA. *Id.*, ¶15.

V. Prior Art Renders Proposed Substitute Claims 25–37 Invalid.

A. Substitute Claims 25–37 are Rendered Obvious by Kim in View of Sharp, Starry, Shimizu, and the Knowledge of a POSA.

Kim and Sharp were addressed in Petitioner's opposition to the original MTA, and Starry was addressed in the Petition. *See* Paper 1 at 13, Paper 16 at 1-2.

Japanese Patent Pub. No. 2004-139871 A to Shimizu *et al.* ("Shimizu") was filed on October 18, 2002 and published on May 13, 2004. Shimizu is prior art under at least 35 U.S.C. §§ 102(a), (b), and (e), and addresses problems where "warping or bending of the reflective plate may occur when the lighting device reaches a high temperature due to continuous operation of the light source," and "uneven brightness

occurs on the display screen of the liquid crystal display device, leading to a decrease in image quality.” Ex. 1022, Abstract, [0007].

1. A POSA Would Have Been Motivated to Combine Kim, Sharp, Shimizu, and Starry.

Petitioner and its expert previously explained why a POSA would have been motivated to combine Kim and Sharp. *See* Paper 16 at 1-2; Ex. 1015, ¶45-47; *see also* Paper 18 at 15; Ex. 1020, ¶45.

A POSA would also have been motivated to combine Kim, Sharp and Shimizu. Ex. 1020, ¶52-57. All disclose reflectors and LEDs in a backlight assembly. A POSA would have been motivated to apply Shimizu’s teachings regarding multiple overlapping reflector sheets to the system disclosed in Kim and Sharp. Ex. 1020, ¶54-55. Shimizu discloses a reflector arrangement making it “possible to obtain a backlight device that does not undergo warping or bending of the reflective plate and provides uniform emission without uneven brightness even when the temperature increases.” Ex. 1022, [0078]; *see also id.*, [0077], [0079]. Moreover, the overlapping reflector sheets prevent contact and stress between adjacent edges during thermal expansion and prevent the reflector from creasing as it thermally expands. Ex. 1020, ¶53-54. Furthermore, consistent with Kim’s recognized “great demand” for large display screen devices, a POSA would have found it obvious and advantageous to assemble multiple reflector sheets to build a large-sized LCD device since a single large reflector sheet would have incurred

higher manufacturing cost and exacerbated deformation issues than a combination of multiple smaller reflector sheets with overlaps as proposed by Shimizu. *See* Ex. 1020, ¶54. Multiple smaller reflectors provide advantages over one large reflector sheet, including better thermal expansion and correction of manufacturing defects, and better modality and scalability, which helps achieve Kim’s intended goal of “improved productivity” and “reduce production costs.” *Id.*; Ex. 1016, 2:50-53.

A POSA would also have been motivated to apply Shimizu’s teachings regarding mechanical fasteners to hold the reflector sheet components in place. *See* Ex. 1022, [0013], [0021], [0027], [0030]-[0035], [0051], Figs. 4, 6, 10-13; Ex. 1020, ¶56. Shimizu’s “locking device 6 is disposed straddling both adjacent edges 19 of adjacent reflective plate constituents 5,” and it is possible to lock a plurality of reflective plate constituents using a single locking device, “thereby reducing the number of locking devices 6.” Ex. 1022, [0033]. This advantage aligns with Kim’s goals, for example, to “improve[] productivity and reduce[] production costs.” Ex. 1016, 2:50–53; Ex. 1020, ¶56. This, combined with the advantages of using multiple reflectors, translates to improved manufacturing efficiency and a reduction in production costs because the manufacturing tolerances can be greater, requiring less precision during manufacturing. Ex. 1020, ¶57.

Further, while Kim describes a reflector sheet, it does not describe the specific thickness of that reflector sheet. Starry expressly discloses the claimed thickness,

explaining that “[f]or certain markets it is critical that the backlight reflector is relatively thin, i.e., less than 250 μm and often less than 150 μm , to minimize the thickness of the completed display.” Starry, [0006]; Ex. 1020, ¶50. A POSA would have been motivated to use the “relatively thin” reflector sheet disclosed by Starry to “minimize the thickness of the completed display.” Starry, [0006]; Ex. 1020, ¶50.

Finally, Kim, Sharp, Shimizu, and Starry are all in the same field of display backlight assemblies. Thus, this combination is nothing more than the use of known solutions described by Sharp, Shimizu, and Starry in a similar system described by Kim, which is ready for improvement, to yield predictable results with a reasonable expectation of success. Ex. 1020, ¶48, 51, 57. For example, one obvious implementation would involve assembling multiple reflectors in an overlapping and compact manner as disclosed by Shimizu, with a preferable thickness, to provide a large, thin lighting panel with various desirable features for use in Kim. *Id.*

2. Substitute Claim 25

***[Substitute Claim 25 Preamble]* A solid state lighting tile, comprising:**

Kim describes “a liquid crystal display (LCD) module using the backlight assembly” “including at least one light emitting diode (LED) as a light source.” Ex. 1016, 1:13–14, FIG. 2; Ex. 1015, ¶24; Ex. 1020, ¶17.

***[Substitute Claim 25A]* a support member comprising a first surface and a second surface;**

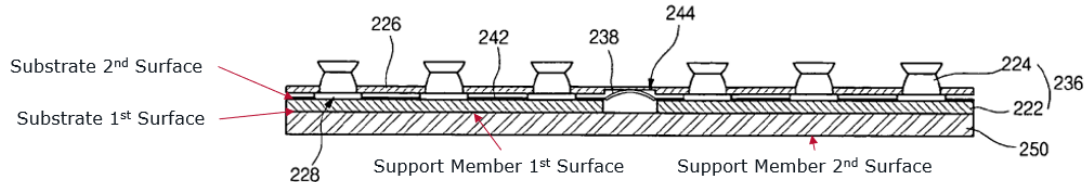
Kim describes an LCD panel 110 with “a bottom frame 150 covering a

backside of the backlight assembly.” Ex. 1016, 4:5-9. The bottom frame 150/250/350 is a support member with first and second surfaces.

[Substitute Claim 25B] a substrate comprising a first surface and a second surface mounted on the first surface of the support member such that the [first] surface of the substrate is in direct contact with the first surface of the support member and the second surface of the substrate faces away from the first surface of the support member;

As stated in Section II, this term is unworkable and renders the claim indefinite. Petitioner treats this limitation as reciting the “[first] surface of the substrate is in direct contact with the first surface”

Kim discloses that “[a] plurality of PCBs 122 are disposed in a matrix on an inner surface of the bottom frame 150.”



Ex. 1016, Fig. 3 (annotated). The PCB 122/222 (substrate) has first and second surfaces, and is mounted on the first surface of the support member. As shown above, the first surface of the PCB 122/222 (surface) is in direct contact with the first surface of the bottom frame 150/250/350 (support member) and the second surface of the PCB 122/222 (substrate) faces away from the first surface of the bottom frame 150/250/350 (support member). Ex. 1020, ¶19.

[Substitute Claim 25C] a plurality of solid state lighting elements mounted

on the second surface of the substrate;

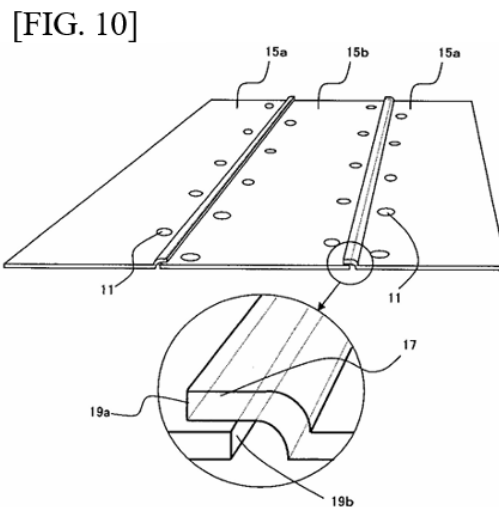
Kim discloses, as shown in Fig. 3, “a plurality of LEDs 224 mounted on the PCB 222 in a row.” Ex. 1016, 5:24–25. As stated above, LEDs 224 are solid state lighting elements and PCB 222 is a substrate, with the LEDs 224 mounted on the second surface of the PCB 222. Ex. 1015, ¶24; Ex. 1020, ¶20.

***[Substitute Claim 25D]* a reflector sheet on and in direct contact with the second surface of the substrate, the reflector sheet configured to overlap in part with a second reflector sheet and configured to conform to a shape of a plurality of protruding features on the solid state lighting tile;**

Kim discloses the reflective sheet 26/126/226/326 is disposed on the PCB 22/122/222/322. *See e.g.*, Ex. 1016, 6:15-16 (“reflective sheet 326 is disposed on the PCB 322.”); Ex. 1020, ¶21. A POSA would have recognized that the reflective sheet 326 is in direct contact with the second surface of the PCB 322, despite a “thin film line 342,” because the majority of the PCB 322 would have been in direct contact with the reflective sheet 326 when the reflective sheet 326 is deposited on the PCB 322. Ex. 1020, ¶22. To the extent that PO argues that there is an air gap between the reflective sheet 326 and the PCB 322 due to a specific base shape of the LED 244/344 illustrated in FIG. 4B, this gap would not exist with Kim as modified by Sharp (*see infra* Claim 25I) where a space is left between the hole and the LED, as the reflective sheet 326 would not contact the base of the LED 244/344 as shown in Fig. 3. Ex. 1020, ¶23. Additionally, this is described as “an exemplary embodiment,” and a POSA would have understood that such a gap would have not

existed in other embodiments for LED 244 with a different base shape and/or where a thin, flexible reflector is used. *Id.*

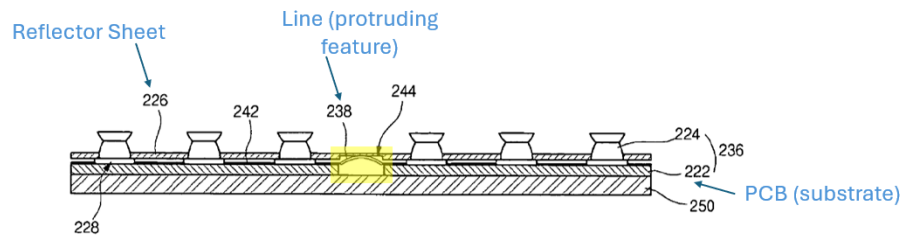
As discussed above, Shimizu describes multiple overlapping reflective sheets where “the vicinity of the adjacent sides 19a and 19b of the reflector plate member 15a and the adjacent reflector plate member 15b are overlapped.” Ex. 1022, [0048]. This is shown in Fig. 10 (below).



See also id., [0050] (explaining that “the adjacent side 19a and the adjacent side 19b do not contact each other, and expand so as to increase the area of the overlapping portion 17. Therefore, stress due to contact between adjacent sides does not occur, and it is possible to prevent the occurrence of warpage or bending.”).

As discussed above, it would have been obvious to combine Kim and Shimizu, for example, to assemble multiple overlapping reflective sheets for large display screen devices to achieve better thermal expansion and correction of manufacturing defects, and better modality and scalability. Ex. 1020, ¶54.

Fig. 3 of Kim, reproduced below, illustrates “a portion of the reflective sheet 226 corresponding to a space between the adjacent LED units 236 has a concave portion 244 to prevent the reflective sheet 226 from contacting the line 238. That is, the reflective sheet 226 includes the concave portion 244 so that a projected portion of the line 238 is not pressed by the reflective sheet 226.” Ex. 1016, 5:36–41.



Ex. 1016, Fig. 3 (annotated). As shown highlighted above, the reflective sheet 226 conforms to a shape of the line 238 (a protruding feature) via the concave portion 244. Ex. 1015, ¶25–28; Ex. 1020, ¶21; Paper 18 at 12. Kim shows the same type of conformance as Figure 3 of the '812 Patent and conforms under the agreed construction. See Paper 19 at 2-3; Paper 21 at 5-6; *see also* Paper 18 at 12.

The combination renders obvious “a plurality of protruding features” not only because Kim explicitly discloses a plurality of lines 238/338 (protruding features) but also because multiple Kim’s reflector sheet structures in the combined system would have included multiple instances of the conformance discussed above. See, e.g., Ex. 1016, FIG. 4A; *id.*, 5:32-33 (“The adjacent LED units 236 are interconnected by the line 238.”) & 5:51-52; Ex. 1020, ¶24.

[Substitute Claim 25E] wherein the protruding features are separate from

and not in contact with the solid state lighting elements;

Kim Figs. 3 and 4A show multiple lines 238/338 that are separate and not in contact with the LEDs 224/334. Ex. 1016, Fig. 3; *see also* Paper 18 at 11-12. Lines 238/338 are protruding features on the tile, and LEDs 224/334 are solid state lighting elements. Ex. 1016, Fig. 3; Ex. 1015, ¶24–25; Ex. 1020, ¶25.

***[Substitute Claim 25F]* wherein the reflector sheet comprises a plurality of circular apertures;**

Similar to Fig. 6 of the '812 Patent, the alleged support for this claim limitation, Kim Figs. 2, 3, and 4A, show a plurality of holes 128/228/328 (circular apertures) in the reflective sheet 226. Ex. 1016, Figs. 2 & 4A; *id.*, 2:5-7; Ex. 1015, ¶29; Ex. 1020, ¶26; *see also* Paper 18 at 11-12 (“Kim similarly shows reflective sheet 226 having holes corresponding to respective LEDs 224....”). Moreover, circular apertures provide a more predictable and even thermal expansion unlike shapes with corners, reducing the possibility of deformation. Ex. 1020, ¶27.

***[Substitute Claim 25G]* wherein each of the plurality of apertures is configured to surround a corresponding one of the solid state lighting elements;**

Kim Figs. 2, 3, and 4A, show each of the plurality of holes 128/228/328 (apertures) in the reflective sheet 226 is configured to surround a corresponding one of the LEDs 124 (solid state lighting elements). Ex. 1016, Figs. 2 & 4A; *id.*, 2:5-8; Ex. 1015, ¶29; Ex. 1020, ¶28; *see also* Paper 18 at 11-12.

***[Substitute Claim 25H]* wherein the reflector sheet a thickness of less than**

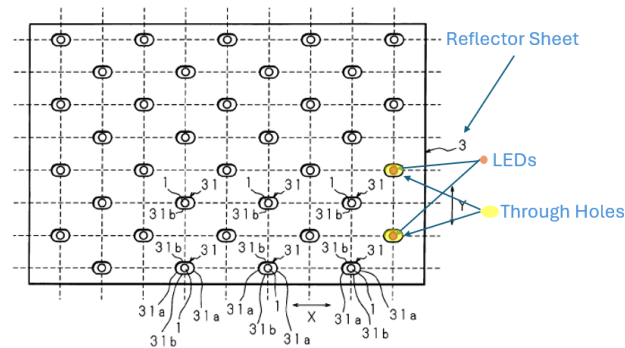
0.25mm;

Kim does not explicitly provide the specific thickness of the reflector sheet. *See* Ex. 1016, 4:33-46. In a similar field, Starry expressly discloses a reflector sheet of preferable thickness less than 0.25 mm, explaining that “[f]or certain markets it is critical that the backlight reflector is relatively thin, i.e., less than 250 μm and often less than 150 μm , to minimize the thickness of the completed display.” Ex. 1006, [0006]. As discussed above, a POSA would have found it obvious and advantageous to configure the reflector sheet to have a preferable thickness less than 0.25 mm as disclosed by Starry to achieve a thin lighting system. Ex. 1020, ¶29, 49-51.

[Substitute Claim 25I] wherein the reflector sheet does not contact the solid state lighting elements; and

As explained in Petitioner’s original opposition, Kim does not specify if the reflective sheet contacts the LEDs, but Sharp describes a gap between the diode and reflector that is preferred because it can prevent the reflective sheet from contacting the LED when it thermally expands. Paper 16, 6-7; Ex. 1017, [0009]; *see also* Ex. 1015, ¶32; Paper 18, 10-15 (preliminarily agreeing the combination of Kim and Sharp disclose this limitation). Sharp’s figure 3, reproduced below, illustrates the gap between the edge of through-holes 31 in the reflection sheet 3 and the LEDs 1. Ex. 1017, [0046], [0051]; *see also* Fig. 1.

FIG. 3



Ex. 1017, Fig. 3 (annotated).

A POSA would have been motivated to apply Sharp's gap between the reflecting sheet through-holes and the LEDs to Kim. Ex. 1015, ¶45-47. Indeed, Sharp identifies the advantage of having a "reflection sheet without being influenced by the mount position of the light emitting diode substrate even when there is an irregularity in the positional relationship between the light emitting diode and the through-hole due to the mount position of the light emitting diode substrate." Ex. 1017, [0011]. Additionally, Kim seeks to "improve[] productivity and reduce[] production costs." Ex. 1016, 2:50–53; Ex. 1015, ¶29. Sharp's system improves productivity and reduces production costs because the manufacturing tolerances can be greater, thereby requiring less precision during manufacturing. Ex. 1015, ¶33.

[Substitute Claim 25J] wherein the reflector sheet comprises a plurality of perforation apertures, the perforation apertures being separate and distinct from the apertures configured to surround the solid state lighting elements.

Shimizu's Figure 10, reproduced above, shows a plurality of holes 11 (perforation apertures). It would have been obvious to a POSA that, in the

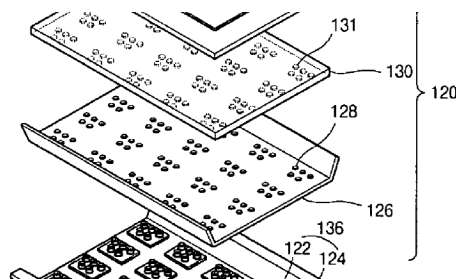
combination, Shimizu's holes 11 would be separate and distinct from Kim's holes 128/228/328 (circular apertures to accommodate/surround the LEDs) because these holes 11 are arranged on the edge of each reflector plate and used to accommodate "the locking portion 14 of the locking device 6" to lock the multiple reflecting plate structures. *See, e.g.*, Ex. 1022, [0027]-[0028], [0033], FIGs. 5, 6, 10; Ex. 1020, ¶56.

3. Substitute Claim 26 – The solid state lighting tile of claim 25, wherein each of the solid state lighting elements includes a plurality of LED emitter chips configured to emit a single wavelength.

Kim discloses that "the LED 124 may emit light using LED chips" and that "the LED 124 ... may include a plurality of LED chips emitting red, green, blue and white colors, *respectively*." Ex. 1016, 4:51-52, 4:61-62 (emphasis added). A POSA would understand that the LED chips in Kim are configured to emit a single wavelength. Ex. 1020, ¶32.

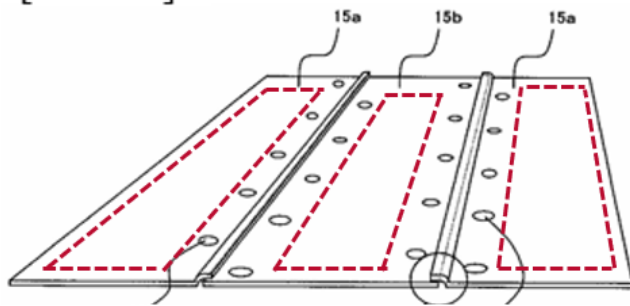
4. Substitute Claim 27 – The solid state lighting tile of claim 25, wherein the plurality of perforation apertures are disposed distally from the solid state lighting elements and protruding features.

Figures 5 and 10 of Shimizu show holes 11 (perforation apertures) in the reflector plate assembly 5. Figure 2 of Kim shows an LCD module comprised of a reflector sheet 126 with a plurality of holes 128 (circular apertures) for LEDs 124.

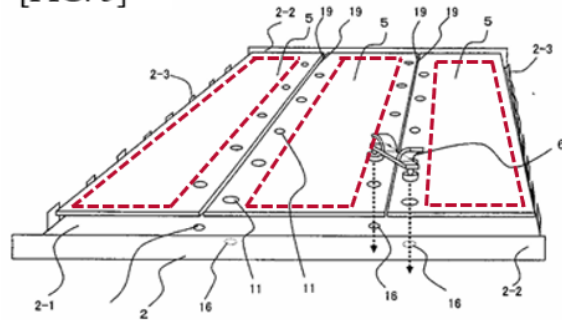


Kim, Fig. 2 (cropped). A POSA, employing Shimizu’s teaching of multiple reflectors, would understand that Kim’s plurality of holes for accommodating the LEDs would be within the regions outline in red:

[FIG. 10]



[FIG. 5]



Ex. 1022, Figs. 5 & 10 (cropped and annotated); Ex. 1020, ¶56. Such an arrangement would have included perforation apertures that would be distally located from both Kim’s LEDs and protruding features since the holes 11 are for securing the reflector sheets in place and correspond to holes 16 in the housing 2 for insertion of the locking device 6. *See* Ex. 1022, [0027]-[0028], [0033]; Ex. 1020, ¶56.

5. Substitute Claim 28 – The solid state lighting tile of claim 25, wherein the plurality of perforation apertures are circular in shape.

See supra substitute claims 25J and 27. As shown in Figs. 5 and 10 of Shimizu, the plurality of perforation apertures are circular in shape. *See also* Ex. 1022, [0040] (describing hole 11 as “a circular hole”); Ex. 1020, ¶42.

6. Substitute Claim 29 – The solid state lighting tile of claim 25, the plurality of perforation apertures are configured to reduce distortion of the reflector sheet.

Shimizu discloses that the holes 11 (perforation apertures) have “a gap

corresponding to the amount of expansion when the reflective plate constituent 5 thermally expands.” Ex. 1022, [0034]. Thus, the holes 11 are configured (i.e., include a gap) to reduce distortion of the reflector sheet by allowing it to thermally expand and not bend or warp. *Cf. id.*, [0011] (“it is possible to prevent the reflector from being bent or warped”); Ex. 1020, ¶42-44.

7. **Substitute Claim 30 – The tile of claim 25, wherein the plurality of perforation apertures are configured to provide thermal expansion zones for the reflector sheet.**

See supra Substitute Claim 29.

8. **Substitute Claim 31 – The solid state lighting tile of claim 25, further comprising a mechanical fastening device configured to pass through the reflector sheet and the first surface of the support member and thereby attach the reflector sheet to the support member.**

Shimizu and Sharp both disclose the use of mechanical fasteners to secure the reflector sheet and other components in place. A POSA would prefer using mechanical fasteners, as opposed to chemical means, to avoid potential delamination or detachment issues due to high heat from continuous operation of the LEDs. Ex. 1020, ¶46. Shimizu’s fastening device 6 penetrates through to the back of the housing 2 and “holds the light source 4 and the reflective plate constituent 5 in the housing 2.” *See* Ex. 1022, [0021]; *id.*, Fig. 4, Fig. 6, Fig. 10-13, [0013], [0027], [0030]-[0035], [0051]; Ex. 1020, ¶43, 56-57. Sharp discloses the use of lamp clips or the like to secure the reflector sheet 3 and substrate 2 to housing 5. Ex. 1017, [0047]-[0049]; Ex. 1020, ¶33, 46-48. The fastening devices of both Shimizu and/or

Sharp would pass through the reflector sheet and the first surface of the bottom frame (support member) of Kim. Ex. 1020, ¶33, 43, 47-48, 56.

9. **Substitute Claim 32 – The solid state lighting tile of claim 25, wherein the plurality of perforation apertures are configured to reduce distortion of the reflector sheet due to thermal expansion.**

See supra Substitute Claim 29.

10. **Substitute Claim 33 – The solid state lighting tile of claim 25, wherein the plurality of perforation apertures are configured to ensure that the reflector sheet conforms to the shape of the support member.**

As discussed above with respect to Substitute Claim 29, the holes 11 are configured to reduce distortion of the reflector sheet by allowing it to thermally expand and not bend or warp. It would have been obvious to a POSA that by being configured to hold the reflector sheet in place (via the locking device 6) and preventing bending or warping caused by thermal expansion, the holes 11 ensure that the reflector remains flat, which the same shape as the housing 2/bottom frame 150 (support member) in Shimizu/Kim. Ex. 1020, ¶42-45.

11. **Substitute Claim 34 – The solid state lighting tile of claim 26 wherein each of the solid state lighting elements comprises a dome shaped element disposed over the plurality of LED emitter chips.**

As discussed above with respect to Substitute Claim 26, Kim discloses that LED 124 may include a plurality of LED chips. Figs. 3 and 4 of Kim show a dome-shaped element disposed over the plurality of LED emitter chips. Similarly, the '812 Patent shows the solid state emitter 20 in figures 3-5 as having a rounded shape.

PO does not contend that it invented this element. Indeed, it was well known

as of the filing date of the '812 Patent that LEDs had dome-shaped elements/lenses. Ex. 1020, ¶¶35-37. For example, Sharp shows LEDs having a dome-shaped lens. Sharp, Fig. 1 (element 1). Numerous other disclosures from prior to the filing date of the illustrate that LED generally had dome-shaped emitters as of 2007. Ex. 1020, ¶¶36. Therefore, to the extent PO contends that Kim does not disclose a dome-shaped element disposed of the LED chips, it would have been obvious based on Sharp or the knowledge of a POSA that the LED emitter chips could have a dome-shaped element disposed of over the top of the LED chips for more uniform light distribution and the reduction of hotspots. Ex. 1020, ¶¶37.

12. Substitute Claim 35 – The solid state lighting tile of claim 25, wherein the solid state lighting tile comprises a third reflector sheet mounted on and in direct contact with the second surface of the substrate.

As discussed above with respect to '812 Substitute Claim 25D, Kim discloses reflector sheets in direct contact with the second surface of the substrate, and a POSA would be motivated to use the overlapping reflector sheets disclosed in Shimizu. Figure 10 of Shimizu shows first, second, and third reflectors and each overlap with an adjacent reflector sheet. A POSA would understand that using the reflector sheets of Shimizu with the inventions disclosed in Kim would result in the third reflector sheet mounted on and in direct contact with the second surface of the substrate such that it overlapped with the second reflector sheet. Ex. 1020, ¶¶41, 56.

13. Substitute Claim 36 – The solid state lighting tile of claim 35, wherein the

third reflector sheet overlaps in part with the second reflector sheet.

See supra Substitute Claim 25D and Substitute Claim 35.

14. Substitute Claim 37 – The solid state lighting tile of claim 35, wherein the reflector sheets are flexible.

Starry discloses the reflector sheet is flexible. *See* Starry, [0075] (“Nonwoven sheets having a thickness of about 250 μ m and greater still exhibit useful and improved properties, such as *flexibility*, low cost, and high photopic reflectance”) (emphasis added). As explained above, it would have been obvious to combine Starry and the resulting combination renders obvious multiple flexible reflector sheets. Ex. 1020, ¶38, 49-51.

VI. Conclusion

The rMTA should be denied because it fails to comply with 35 C.F.R. § 42.121 and PO’s substitute claims are unpatentable.

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 REVISED
CONTINGENT MOTION TO AMEND has been served via email on the
following:

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

Dated: December 9, 2024

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