

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hisense USA Corporation

Petitioner

v.

Brightplus Ventures LLC

Patent Owner

Case IPR2023-01385

U.S. Patent No. 7,690,812

PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	THE ’812 PATENT DISCLOSES IMPROVED SOLID STATE LIGHTING TILES AND/OR PANELS.....	2
III.	EXPERT TESTIMONY, LEVEL OF SKILL IN THE ART, AND CLAIM CONSTRUCTION	3
A.	DECLARATION EVIDENCE	3
B.	PERSON OF ORDINARY SKILL IN THE ART.....	4
C.	CLAIM CONSTRUCTION - PETITIONER GLOSSES OVER ITS OWN PROPOSED CLAIM CONSTRUCTION FROM THE DISTRICT COURT	4
I.	“CONFIGURED TO CONFORM TO A SHAPE OF A FEATURE” PROTRUDING “REFLECTOR SHEET CONFIGURED TO CONFORM TO A SHAPE OF A PROTRUDING FEATURE ON THE [SOLID STATE LIGHTING] TILE” — U.S. PATENT NO. 7,690,812 (CLAIMS 1, 15, 18, 21, 23)	5
IV.	PRIOR ART CITED BY PETITIONER.	6
A.	CHOU.....	6
B.	STARRY	7
C.	TABITO	8
V.	GROUND 1 - CHOU IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 1, 12, 15 AND 18.	9
A.	CHOU IN VIEW OF A POSITA FAILS TO DISCLOSE [FROM CLAIM 1C] “THE REFLECTOR SHEET CONFIGURED TO CONFORM TO A SHAPE OF A PROTRUDING FEATURE ON THE TILE.”	10
I.	<i>CHOU WAS INTENDED FOR A COMPLETELY DIFFERENT PURPOSES THAN THE ’812 PATENT.</i>	16
B.	CHOU IN VIEW OF A POSITA FAILS TO DISCLOSE THE ELEMENTS OF CLAIMS 12 AND 18 “WHEREIN THE REFLECTOR SHEET COMPRISES AN	

	APERTURE CONFIGURED TO BE POSITIONED PROXIMATE TO THE SOLID STATE LIGHTING ELEMENT, WHEREIN THE REFLECTOR SHEET DOES NOT CONTACT THE SOLID STATE LIGHTING ELEMENT.”	17
I.	<i>A POSITA WOULD NOT BE MOTIVATED TO MODIFY THE REFLECTOR IN CHOU TO NOT CONTACT THE SOLID STATE LIGHT ELEMENT</i>	21
II.	<i>PETITIONER IMPROPERLY REFERENCES TABITO, DESPITE THE REFERENCE NOT INCLUDED AS A PART OF GROUND 1</i>	21
VI.	GROUND 2 - CHOU AND STARRY IN VIEW OF A POSITA FAIL TO RENDER OBVIOUS DEPENDENT CLAIMS 2-6 AND 21.....	23
A.	A POSITA WOULD NOT BE MOTIVATED TO COMBINE CHOU AND STARRY	23
B.	CHOU IN VIEW OF STARRY AND A POSITA FAILS TO RENDER OBVIOUS DEPENDENT CLAIMS 2 AND 21 “WHEREIN THE REFLECTOR SHEET COMPRISES A DIFFUSE REFLECTOR.”	26
C.	CHOU IN VIEW OF STARRY AND A POSITA FAILS TO RENDER OBVIOUS DEPENDENT CLAIM 3 “WHEREIN THE REFLECTOR SHEET COMPRISES A POLYMER BASED POROUS MATERIAL.”	27
D.	CHOU IN VIEW OF STARRY AND A POSITA FAILS TO RENDER OBVIOUS DEPENDENT CLAIMS 4-6 “WHEREIN THE REFLECTOR SHEET COMPRISES A THICKNESS OF LESS THAN APPROXIMATELY 1.0 MILLIMETER.” WHEREIN THE REFLECTOR SHEET COMPRISES A THICKNESS OF LESS THAN APPROXIMATELY 05 MILLIMETERS." HEREIN THE REFLECTOR SHEET COMPRISES A THICKNESS OF LESS THAN APPROXIMATELY 0.25 MILLIMETERS."	28
VII.	GROUND 3 - CHOU AND TABITO IN VIEW OF A POSITA FAIL TO RENDER OBVIOUS DEPENDENT CLAIMS 7, 10-11, 14, 16-17, 19-20, AND 23.....	29
A.	CHOU IN VIEW OF TABITO AND A POSITA FAILS TO RENDER OBVIOUS INDEPENDENT CLAIM 20.....	29
B.	DEPENDENT CLAIMS 7, 10-11, 14, 16-17, 19, AND 23.	32
VIII.	CONCLUSION.....	32

Exhibit List

Exhibit	Description
2006	Declaration of William K. Bohannon (“Bohannon Decl.”)
2007	Curriculum vitae of William K. Bohannon
2008	Joint Claim Construction Statement
2009	Brightplus Ventures LLC’s Opening Claim Construction Brief
2010	Hisense’ Opening Claim Construction Brief

* * * *

USE OF EMPHASIS IN QUOTATIONS

All emphases in quotations and exhibit citations have been added, unless otherwise indicated.

APPLICABLE STATUTES

References to 35 U.S.C. §§ 102 and 103 are to the AIA versions applicable to the '812 Patent.

I. INTRODUCTION

Brightplus Ventures LLC (“Patent Owner” or “Brightplus”) submits this Response showing that each of the 3 grounds set forth by Hisense USA Corporation (“Petitioner” or “Hisense”) fail to render obvious challenged claims 1-7, 10-12, 14-21, and 23 of U.S. Patent No. 7,690,812 (“the ’812 Patent”).

As to Ground 1, Chou in view of a POSITA would not render obvious independent claims 1 and 15 nor dependent claims 12 and 18 as Chou fails to disclose at least the claimed element of a reflector sheet configured to conform to a shape of a protruding feature on the tile of claims 1 and 15 as well as additional limitations in the dependent claims.

As to Ground 2, a POSITA would not be motivated to combine LEDs mounted on a single circuit board and reflector sheet disposed on the circuit board of Chou with Starry’s edge lighting arrangement with a specific diffuse reflector positioned within an optical cavity. Furthermore, numerous elements of the dependent claims challenged in Ground 2 are not taught by either Chou or Starry.

As to Ground 3, Chou and Tabito in view of a POSITA would not render obvious the challenged dependent claims as Chou does not render obvious the independent claims that claims 7, 10-11, 14, 16-17, 19 and 23 depend from. Furthermore, neither Chou nor Tabito teach the explicit limitations of independent claim 20.

Accordingly, Patent Owner respectfully requests that the Board deny the petition for *inter partes* review of Claims 1-7, 10-12, 14-21, and 23 of the '812 Patent on the merits.

II. THE '812 PATENT DISCLOSES IMPROVED SOLID STATE LIGHTING TILES AND/OR PANELS.

The '812 Patent was published on April 6, 2010, and claims priority to U.S. Patent Application 11/687,160 filed on March 16, 2007.

The '812 Patent discloses a solid state lighting tile that includes a substrate, solid state light elements mount of the substrate, and a reflector on a surface of the substrate. '812 Patent, Abstract.

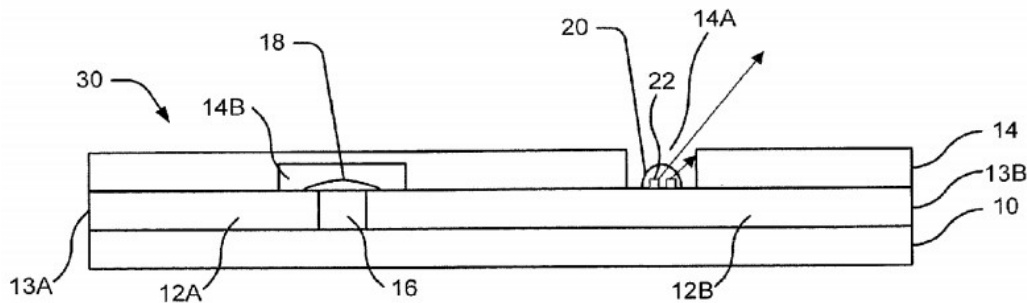


FIGURE 3

The '812 Patent further discloses that “the reflector sheet of yet[sic] further embodiments can be configured to conform to a shape of a protruding feature on the tile.” *Id.* at 1:57-59 “The tile 12B also includes a reflector sheet 14, configured to reflect and diffuse light transmitted from the emitter 20.” *Id.* at 4:59-60. Additionally, the '812 Patent describes many different embodiments in which the reflector is on the substrate, such as “a reflector sheet 14 may be mounted on the

multiple bars”. *Id.* at 5:5-7. “A solid state lighting bar 30...can include a support member 10, on which is provide a solid state lighting tile substrate 13B that corresponds to solid state lighting tile 12B. The tile 12B can also include a solid state emitter mounted on the surface of the substrate” *Id.* at 4:52-63.

Further, the '812 Patent describes a variety of protruding features over which the reflector may be configured to conform. Examples include wire interconnects and other features on the tiles, “[t]he substrates 13A, 13B can also include surface protrusions, such as, for example, a large wire interconnect (LWI)”. *Id.* at 4:62-64. “The LWI 18 is but one example of a surface protrusion that can occur on a surface of the tile substrate.” *Id.* at 5:48-50.

III. EXPERT TESTIMONY, LEVEL OF SKILL IN THE ART, AND CLAIM CONSTRUCTION

A. Declaration Evidence

This Preliminary Response is supported by the declaration of William K. Bohannon, an expert with long-standing experience in the industry. Ex. 2006. Mr. Bohannon has (30) years of commercial industrial electronics experience including experience in the areas of LCD, Plasma, CRT and Large Screen Display Equipment: LCD manufacturing, substrates, drivers, and other related components for rear screen displays including Avionics and cockpit displays. *Id.* at ¶¶ 8-10.

B. Person of Ordinary Skill in the Art

On or before March 16, 2007, a POSITA relating to the technology of the '812 Patent would have: (a) a Bachelor's of Science degree in a technical field and at least four years of experience in the field of design and/or manufacture of display systems; (b) a Master's of Science degree in a technical field and at least two years of experience in the field of design and/or manufacture of display systems; or (c) a PhD in a technical field relating to the design and/or manufacture of display systems. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education. *Id.* at ¶¶ 31-34.

C. Claim Construction - Petitioner Glosses Over its Own Proposed Claim Construction from the District Court

Although Petitioner asserts that no terms in the '812 Patent need construction, it has proposed a construction for a term in the '812 Patent in the parallel litigation. Under Petitioner's proposed construction, there is no doubt that Chou does not disclose this limitation. However, even under the plain and ordinary meaning proposed by Patent Owner below, Chou fails to disclose or render obvious this limitation.

- i. **“configured to conform to a shape of a feature” | protruding “reflector sheet configured to conform to a shape of a protruding feature on the [solid state lighting] tile” — U.S. Patent No. 7,690,812 (claims 1, 15, 18, 21, 23)**

Patent Owner Brightplus' Proposed Construction 1:22-cv-02774	Petitioner Hisense's Construction 1:22-cv-02774
Plain and ordinary meaning. In the alternative, “reflector sheet that provides cover and relief for a shape of a protruding feature on the [solid state lighting] tile”	the reflector sheet overlays (e.g., by deformation), and has the same shape, outline, or contour of a protruding feature

Petitioner argues that the reflector sheet “has the same shape, outline, or contour of a protruding feature”, however the actual language of claim 1 requires conformance “to *a* shape of a protruding feature.” In contrast, Patent Owner argues that the plain and ordinary meaning should apply.

The claim does not recite “*the*” shape as Petitioner’s construction requires. As the Federal Circuit has held, “[t]hat ‘a’ or ‘an’ can mean ‘one or more’ is best described as a rule, rather than merely as a presumption or even a convention.” *SanDisk Corp. v. Kingston Tech. Co.*, 695 F.3d 1348, 1360 (Fed. Cir. 2012). Since claim 1 expressly contemplates conformance to one of many possible shapes of a protruding feature, Petitioner’s construction is unduly narrow.

Second, the specification makes clear that there are several ways of achieving “conformance”—including by *not* taking on the exact shape of the protruding feature. The ’812 patent provides several examples of protruding

features, such as “long wire interconnect” or “LWI” 18 in the following excerpts from Figs. 3 and 4:

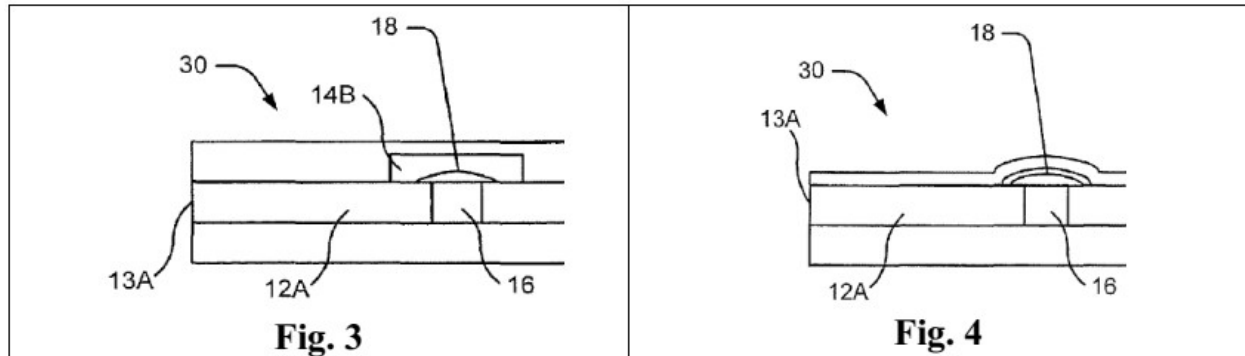


Figure 3 shows a “recess” 14B formed in the reflector “to provide relief for surface protrusions, such as LWI 18.” As shown in figure 3, the “shape” of the reflector sheet does not conform to the shape of protrusion 18. As such, to the extent the Board construes this term, Patent Owner’s construction should be adopted.

IV. PRIOR ART CITED BY PETITIONER.

A. Chou

United States Patent No. 7,497,892 (Ex. 1005 - “Chou”) was filed February 28, 2008, and issued on March 3, 2009. Petitioner relies on Chou as the primary reference for each of the asserted Grounds 1, 2, and 3.

Chou describes a design for a light source assembly, emphasizing the use of LEDs and a reflector sheet to enhance lighting efficiency, particularly in the context of LCDs. Ex. 2006 at ¶ 44. The invention introduces variations in circuit board layouts, LED placements, and reflector sheet designs to achieve the desired results.

Id.

Chou is directed to a light source assembly that comprises a circuit board, a plurality of spot light sources, and a reflector sheet having holes corresponding to the spot light sources on the circuit board. Chou at Abstract.

Chou further discloses that “each first hole corresponds to one spot light source and the reflector sheet adjacent to each first hole forms an angle between about 0 degrees to about 90 degrees with the circuit board”. Chou at 2:19-22. As shown in Fig. 2, “The hole 750 has at least one slit 760 extended from the periphery of the hole 750... In practice, the shape of the hole 750 depends on the light source used.” *Id.* at 3:7-22. The reflector sheet 700 adjacent to the hole 750 forms an angle θ between about 0 degree to about 90 degree with circuit board 500. The angle θ will change with the height of... LED600..., the length of lead 650 of... LED600..., and the amount of solder 800.” *Id.* at 3:42-49.

B. Starry

United States Patent Application Publication No. US 2006/0262310 (Ex. 1006 – “Starry”) was published on November 23, 2006. Petitioner relies on Starry as a secondary reference for Ground 2.

Starry discloses a diffuse reflective article disposed in an optical cavity for lighting an LCD display. In detail, “The light guide 3 directs light towards the display panel 7... A diffuse reflector of the present invention is placed behind the light guide 3 and reflects light towards the liquid crystal display 7.” Starry at ¶ 0034.

The backlight uses a “cold cathode fluorescent lamp light source” or “a backlight liquid crystal optical display with a light emitting diode light source”, both embodiments depict the light sources in an “optical cavity” *Id.* at ¶ 0039. “The present invention further includes an optical display, comprising: (I) a structure defining an optical cavity; (ii) a light source positioned within the optical cavity; (iii) a display panel through which light from the light source passes; and (iv) a diffuse reflector positioned within the optical cavity for reflecting light from the light source toward the display...” *Id.* at ¶ 0015. A POSITA would know the incompatibility of Starry with Chou as discussed in detail below. Ex. 2006 at ¶¶ 63-67.

C. Tabito

United States Patent Application Publication No. US 2007/0103908 (Ex. 1007 – “Tabito”) was published on May 10, 2007. Petitioner relies on Tabito as a secondary reference for Ground 3.

Tabito describes a light transmitting LCD apparatus. The device is formed by several rows of many light emitting units mounted on an interconnection substrate and a heat dissipating plate, as well as a reflecting section formed by a number of reflective sheet pieces and a reflective plate secured to reflective plate supports formed on the heat dissipating plate. Tabito at 1.

V. GROUND 1 - CHOU IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 1, 12, 15 AND 18.

Petitioner relies on Chou as its primary reference for Gound 1. But Petitioner fails to demonstrate that a POSITA in view of Chou would render obvious Claims 1, 12, 15, and 18. Ex. 2006 at ¶¶53-62.

Claim 1 recites:¹

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

[*1A*] a substrate;

[*1B*] a solid state lighting element mounted on a surface of the substrate; and

[*1C*] a reflector sheet on the surface of the substrate, the reflector sheet configured to conform to a shape of a protruding feature on the tile.

'812 Patent, Claim 1.

Claim 15² recites:

[*Preamble*] A method of forming a solid state lighting device comprising:

[*15A*] providing a substrate of a solid state lighting tile;

[*15B*] mounting a solid state lighting element on a surface of the substrate; and

¹ The elements in Claim 1 are numbered to match Petitioner's numbering.

² The elements of Claim 15 are nearly identical to Claim 1 except in a method form and will therefore be discussed together.

[15C] positioning a reflector sheet on the surface of the substrate, the reflector sheet configured to conform to a shape of a protruding feature on the solid state lighting tile.

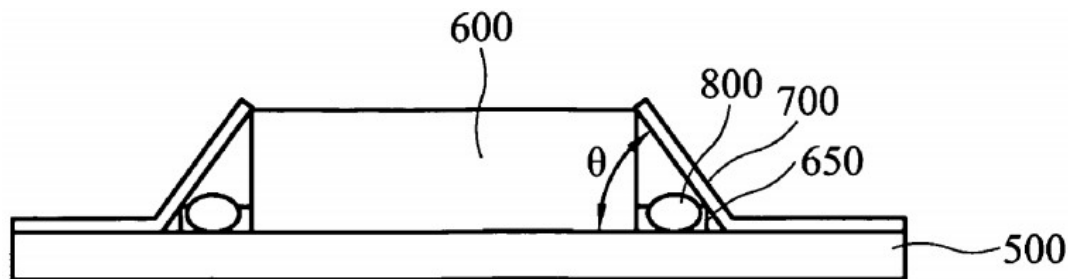
'812 Patent, Claim 15.

Even with the knowledge of a POSITA, Chou does not teach or render obvious elements 1C or 15C as understood in view of the specification of the '812 Patent.

A. Chou in View of a POSITA Fails to Disclose [from Claim 1C] “the reflector sheet configured to conform to a shape of a protruding feature on the tile.”

Petitioner cites Chou as rendering obvious the third clauses of claims 1 and 15 of the '812 Patent. Petitioner advances the same arguments for both clauses. However, Petitioner is incorrect that this limitation is taught by Chou.

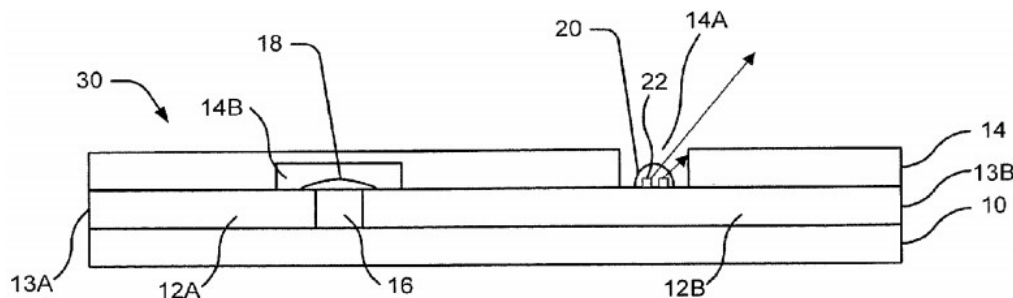
Petitioner argues: “Figure 3A of Chou discloses a reflector sheet 700 positioned to conform to the protruding features [of] the LED 600, including the lead 650 and solder 800.” Petition at 17 (*citing* Chou at 3:42-51). As Petitioner points out, the angle θ (theta) described by the reflector meeting the top of the LED is determined by the “*height of the spotlight source (LED 600), the length of the lead 650 of the spotlight source (LED 600), and the amount of solder 800.*” Petition at 17 (emphasis added)



Chou FIG. 3A

First, the fact that the angle θ of the reflector sheet 700 changes with the “height of the spotlight source (LED 600), the length of the lead 650 of the spotlight source (LED 600), and the amount of solder 800” means that Chou is not the same as a “reflector sheet configured to conform to a shape of a protruding feature on the tile” as claimed in the '812 Patent. These elements for which the angle θ of the reflector sheet changes are not the same as *a protruding feature* on the tile as claimed in the '812 Patent. Ex. 2006 at ¶¶54-55.

For example, referencing Figure 3 of the '812 patent, the invention is described as follows: “A solid state lighting bar 30...can include a support member 10, on which is provide a solid state lighting tile substrate 13B that corresponds to solid state lighting tile 12B. The tile 12B can also include a solid state emitter mounted on the surface of the substrate...The substrates 13A, 13B can also include surface protrusions...” '812 Patent, 4:52-63.



'812 Patent FIGURE 3

As seen from the figures and from the specification, the specification shows that surface protrusions 18 of the '812 patent, are distinguished from the solid state emitters 20 in the '812 Patent. In the '812 Patent, the reflector 14 is configured to conform to the protrusion 18. Ex. 2006 at ¶¶54-55.

The '812 patent describes protruding features over which the reflector may be configured to conform. For example, the specification states: “The substrates 13A, 13B can also include surface protrusions, such as, for example, a large wire interconnect (LWI” ('812 Patent, 4:62 – 64); and “The LWI 18 is but one example of a surface protrusion that can occur on a surface of the tile substrate” (*id.* at 5:48-50). Importantly, the '812 Patent distinguishes the surface protrusion or protruding feature from the solid state emitter. Ex. 2006 at ¶55.

As discussed, there was no intent to include the solid state emitters within the definition of “protrusions.” Had the inventors intended to do so, they would have drafted claims that distinctly name the solid state emitters as protrusions. Rather, claims 1 and 15 of the '812 - contrary to the assertions of Petitioner – do not

contemplate a reflector that conforms to the shape of the solid state light emitters but instead a reflector that conforms to features on the surface of the tile substrate. '812 Patent, Claims.

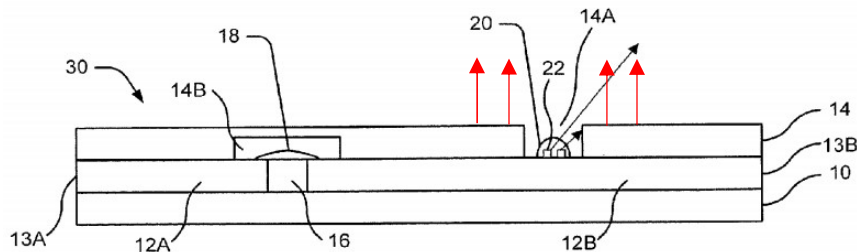
More specifically, the '812 Patent distinguishes and excludes light emitters as protruding features. Both Petitioner and Patent Owner agree that the '812 Patent's prosecution history describes element 14a as an aperture, which is not equivalent to conforming to the protruding feature. After an Office Action from the USPTO, Applicant argued that "the apertures cited in the Office Action are not synonymous with a reflector sheet conforming to a shape of a protruding feature." *See* Ex. 1002 at 127. Applicant further stated "an aperture might be provided to conform to a hole, which is substantially the opposite of a protruding feature. In this regard, 'a same shape, outline, or contour' of a protruding feature would include a similarly protruding feature." *Id.* at 154.

Second, a POSITA would understand that the deformable material described by Chou is intended to form an angle θ between about 0 degrees and about 90 degrees. Therefore, the only deformity described by Chou is shown in Fig. 31, where the reflector extends at angle θ . Chou explicitly explains the reflector sheet can have slits to allow for the reflector to extend at angle theta, or that the reflector sheet can be a "deformable material, such as a resin" to extend at an angle theta. Both embodiments cover the same type of deformity, and there is no disclosure offered

by Chou that presents anything contrary to that one example of deformity. Petitioner does not offer any reason why a POSITA would recognize that the deformable material would result in any other embodiment than what is disclosed by Chou, nor that a POSITA would be motivated to modify Chou to conform to the shape, outline, contour of LED 600, lead 650, and solder 800.

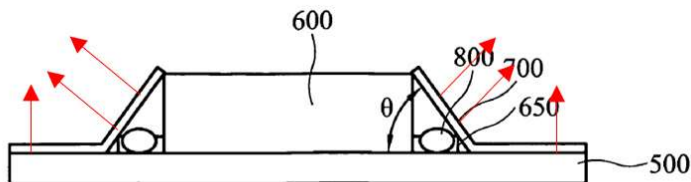
Third, Chou does not disclose a reflector configured to conform to the *shape* of a protruding feature, rather Chou only discloses a reflector configured to conform to the *height and width* of the solid state light emitter. Ex. 2006 at ¶56. As discussed above, Petitioner relies on the argument that “the angle of the reflector sheet ‘will change with the height of the spotlight source (LED 600), the length of the lead 650 of the spotlight LED source (LED 600), and the amount of the solder 800).’” Petition at 17 (*citing* Chou at 3:45-47). This is further explained by an examination of FIG. 3 of Chou which shows that the reflector is arranged to meet the emitting surface of the LED by deflecting upward. Ex. 2006 at ¶ 56. However, this arrangement is counter to the teaching of the '812 patent. *Id.*

On the other hand, the '812 patent, in several instances, describes a reflector that is normal to the emission surface of the LED. That is, the reflector conforms to protruding features but, in general, conforms to the plane of the substrate. This is intended to ensure that light reflected off of the reflector propagates in a direction perpendicular to the surface of the reflector. *Id.* at ¶ 57.



'812 Patent FIGURE 3

In contrast angling the reflector, as in Chou, would cause light to propagate at angles that are not optimal for backlighting an LCD display. *Id.* at ¶ 58.



Chou FIG. 3A

A POSITA would understand that the angled portions of the reflector in Chou as defined by the angle θ in Fig 3a reflect light away from the LCD display as illustrated above. *Id.* at ¶ 58.

Petitioner also asserts that “[a] POSITA would recognize that this variance in angle θ indicates that the reflector sheet is conforming to the protrusions that the reflector sheet overlays”. Petition at 19. However, the reflector adjusting at angle θ is not equivalent to the reflector having the same “shape, outline, or contour” under Petitioner’s own proposed construction of this claim element. *See* Ex. 2009 at ____.

Chou does not disclose a change of the angle θ in response to a change in the shape of the LED, the lead 650 or the solder 800, only a change in the height of the LED

or the length of lead 650 or the amount of solder 800. None of those embodiments describe a change in shape, and therefore a POSITA would understand that Chou does not disclose the reflector to conform to the shape of a protruding feature. The embodiments of the '812 Patent are different and distinct from the deformity disclosed by Chou, such as the reflector conforming to a protruding feature by taking on the exact same shape as the feature or by providing a recess for the protrusion that has a similar contour. Chou, therefore, fails to teach this claim element.

i. Chou was Intended for a Completely Different Purposes than the '812 Patent.

Petitioner emphasizes Chou's use of slits to "create relief areas for the reflector sheet relative to a protruding feature." Petition at 18 (*citing* Chou at 3:7-8). However, Petitioner misses the point of these inventions. A reflector sheet is meant to overlay the substrate in a way so as to improve the reflective qualities of the substrate. Ex. 2006 at ¶59. Slits cut into the reflector would reduce the surface integrity of the reflector and thus reduce its reflective qualities *Id.*

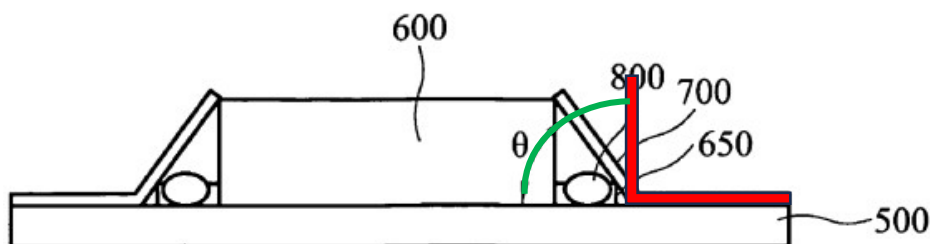
The reflector of Chou is intended to cover features of the solid state emitters (*e.g.*, hide from view the leads 650) so that only the light emitting surface of solid state emitter is visible from a planar view. *Id.* at ¶ 60. On the other hand, the reflector of the '812 patent is intended to cover protrusions on the surface of the substrate without reducing the overall reflective quality of the reflector (by, for example, creating recess in the reflector to accommodate the protrusions). *Id.* Chou

and the '812 Patent are separate and distinct inventions and do not overlap. *Id.* In the present Petition, Petitioner is attempting, through selective quotation, to overbroaden the invention of Chou to cover an aspect of the reflector that a POSITA in view of Chou would not contemplate. *Id.* at ¶ 60.

B. Chou in View of a POSITA Fails to Disclose the Elements of Claims 12 and 18 “wherein the reflector sheet comprises an aperture configured to be positioned proximate to the solid state lighting element, wherein the reflector sheet does not contact the solid state lighting element.”

As Claims 12 and 18 are similar, Patent Owner will respond to both together. Petitioner argues that a “POSITA would have been motivated to modify the reflector sheet shown in Figure 3A *to slightly increase the angle θ* such that the reflector sheet does not contact the solid state lighting element 600...A POSITA would have been motivated to make this modification to avoid mechanical friction between the reflector 700 and the solid state lighting element.” Petition at 20 (emphasis added)

Respectfully, Figure 3A of Chou is reproduced again below to demonstrate the absurdity of Petitioner's argument:



Chou FIG. 3A

As can be seen in the illustration above, increasing the *angle* θ would have the end of Chou's reflector sheet in contact with nothing - neither the solder nor the surface of the light emitter. Ex. 2006 at ¶61. The reflector sheet would be flapping around, leaving a gap between the reflector and the light emitter. *Id.* Chou states that “In this embodiment, the reflector sheet 1700 can be a deformable material, such as a resin film having reflecting function,” in reference to Figure 3A. Chou at 4:30-32. Thus, the reflector sheet comprising of a deformable material and unmoored at its end would be then move around in a portable display such as in “a tablet or laptop computer, or in a display that is mounted in a moving object e.g. a display in a vehicle such as a boat, airplane train or car” as Petitioner rather absurdly suggests. Petition at 20; *see* Ex. 2006 at ¶ 61.

Furthermore, applications such as those proposed by Petitioner almost always employ edge lighting systems rather than backlighting systems. Ex. 2006 at ¶62. A POSITA would know that only the larger TVs and monitors use direct lit backlights instead of the compact edge lit backlights used in boat, airplane, train or car, these applications would be most affected by having a reflector sheet that is not secured to a surface moving around during transport or motion. *Id.* Petitioner's argument here is factually and logically incorrect.

Likely recognizing the fallacy of its argument, Petitioner argues in the alternative that “[a] POSITA would also recognize that the LED component itself is

commonly packaged in a clear protective casing or lens...Thus, any contact with the reflector sheet is with the protective casing or lens rather than the LED chip itself.” Petition at 20. This line of reasoning seems to contradict Petitioner’s previous argument. Chou does not use the term “LED chip” in its specification. Presumably, Petitioner is referring to the die or dice that are commonly disposed in an SMD package, as the “protective casing or lens,” for lighting applications of LEDs.

Whether or not this is the case is immaterial as Petitioner’s argument seems to be that the presence of this “protective case or lens” would obviate the need for the reflector to be in contact with the surface of the LED in the arrangement proposed by Chou. For the reasons advanced above, this does not follow factually or logically. The reflector would still be unmoored and able to move about in transport potentially causing damage to the LED. Ex. 2006 at ¶61. Furthermore, a POSITA would know that most edge lit backlights as well as some direct lit backlights do not use a “protective casing or lens” on the LEDs. *Id.* at ¶ 62.

Next, Petitioner states “to the extent there is no such lens or casing on the LED, this would further motivate a POSITA to increase the angle theta such that the reflector sheet does not contact the solid state lighting element 600...A POSITA would recognize that such a modification would reduce the risk of a short circuit based on contact between a reflector sheet made of a conductive material...and the lead 650 or solder 800.” Petition at 20-21. For the reasons described above, leaving

the end of the reflector sheet unrestrained would *increase* the risk of a short circuit if such a conductive reflector were employed. Ex. 2006 at ¶ 61. The likelihood that it would make contact with either the solder, the conductive traces disposed on the surface of the die or the Gallium Nitride semiconductor that makes up the surface of the die are increased in such an arrangement. *Id.* Of course, this argument ignores that Chou employs a “a deformable material, such as a resin film having reflecting function” rather than a conductive material. Chou at 4:30 – 32.

Throwing another flawed argument against the wall and seeing what sticks, Petitioner argues that Figure 1A of Chou discloses the limitations of claims 12 and 18. Figure 1A of Chou describes an arrangement which the specification describes as prior art where a reflector that does not conform to any protruding features (*i.e.*, is completely flat) is shown to not extend beyond the solder 800 connected to LED 600. However, Petitioner cannot show that the reflector of Figure 1A of Chou is “configured to conform to a shape of a protruding feature on the tile” as the prior art shows a flat reflector on a flat surface.

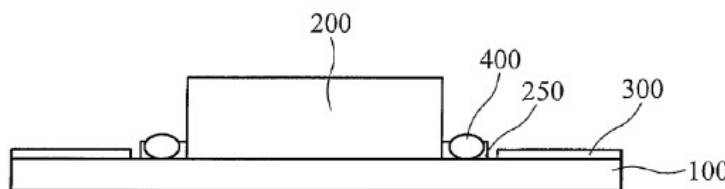


FIG. 1A (PRIOR ART)

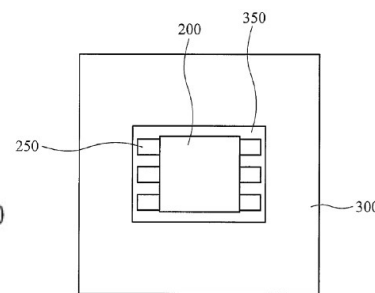


FIG. 1B (PRIOR ART)

i. *A POSITA Would not be Motivated to Modify the Reflector in Chou to Not Contact the Solid State Light Element*

Furthermore, Petitioner is incorrect that a POSITA would be motivated to modify the reflector in Chou to slightly increase the angle θ to not contact the solid state lighting element. Petition at 20 (*citing* Ex. 1003 at ¶ 47). As stated above, the modification would lead the reflector sheet to freely move around, which could cause more damage and mechanical friction between the reflector 700 and the solid-state lighting element 600. Petitioner and its expert claims that the “[t]he motivation to make this modification is to avoid mechanical friction between the reflector 700 and the solid state lighting element 600, which could lead to damage to either the reflector 700 or the solid state lighting element 600.” Ex. 1003 at ¶ 47. However, neither Petitioner nor its expert present any factual basis for the existence of the mechanical friction between the reflector 700 and the lighting element 600. On the contrary, Chou talks about a deformable material such as resin, which a POSITA would understand would not cause any concerning damage, if any at all.

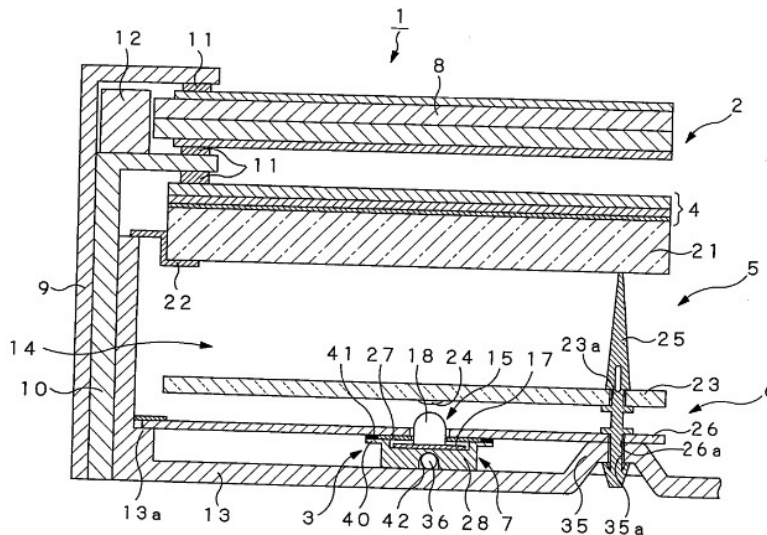
ii. *Petitioner Improperly References Tabito, Despite the Reference Not Included as a Part of Ground 1*

After making 4 attempts with Chou, Petitioner then turns to Tabito, despite it not being one of the references asserted for Ground 1. Petition at 22. Petitioner claims: “Tabito ... describes placing an insulator between an aluminum reflecting plate and terminals of the LED.” *Id.* (*citing* Tabito at ¶ 0074). However,

Tabito. Figure 4 of Tabito is shown below:



Tabito shows the reflecting plate 26 abutting the surface of the LED:



Chou FIG.2

Likewise, Petitioner's comments regarding insulation appear to be unrelated to the substance of the '812 patent generally and claims 12 and 18 in particular.

As such, Petitioner's Ground 1 fails to render claims 1, 12, 15 and 18 obvious.

VI. GROUND 2 - CHOU AND STARRY IN VIEW OF A POSITA FAIL TO RENDER OBVIOUS DEPENDENT CLAIMS 2-6 AND 21.

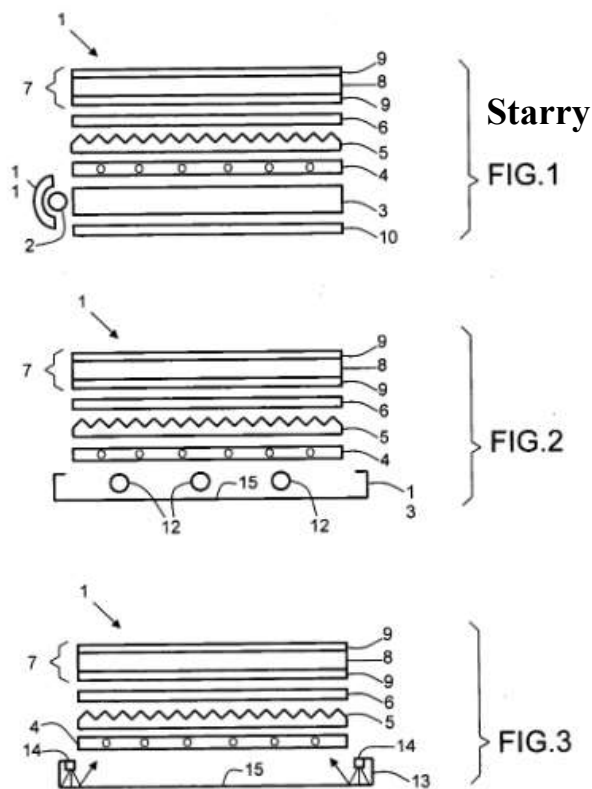
Just as Chou in view of a POSITA does not render Independent Claims 1 and 15 obvious, Petitioner cannot demonstrate that the addition of Starry renders obvious dependent claims 2-6 and 21. Ex. 2006 at ¶63.

A. A POSITA Would Not be Motivated to Combine Chou and Starry

Petitioner contends that a POSITA would be motivated to combine the backlighting system of Chou with the diffuse reflector and specific thicknesses for the reflector of Starry. *Id.*

As discussed above, Chou relates to a light source assembly comprising an LED or LEDs mounted on a circuit board and reflector sheet disposed on the circuit board. Starry discloses a diffuse reflective article disposed in an optical cavity for lighting an LCD display. Ex. 2006 at ¶¶ 63-67.

Petitioner does not provide any of the figures of Starry as it would be apparent as to why the diffuse reflective article disclosed therein would not be appropriate for combination with Chou.



Figures 1-3 of Starry are the only figures that show the diffuse reflective article in use in a display. In Figure 1, the diffuse reflector 10 is disposed under a waveguide employed to transmit light in an edge-lighting arrangement. In an edge-

lighting arrangement, light propagates from a light source (a CCFL in Starry) within a waveguide 3. Ex. 2006 at ¶ 64. The light exits the waveguide either towards or away from the LCD panel 7; light exiting away from the LCD panel is reflected back into the waveguide by diffuse reflector 10. *See* Starry at ¶¶ 0033-34. Figure 2 of Starry shows a back scattering arrangement for the purpose of illuminating an LCD panel. In this arrangement, light propagates 360 degrees from CCFLs 12, light propagating towards the diffuse reflector 15 is reflected back towards the LCD panel. *Id.* at ¶ 0039. The arrangement in Figure 3 of Starry functions on largely the same principles as the arrangement in Figure 2 save that the arrangement in Figure 3 employs 2 LEDs 14 as light sources which are arranged so that all of the produced light is directed to reflect off of the diffuse reflector 15. *Id.*

None of the figures of Starry nor its specification describe an arrangement wherein the light sources are arranged on the same substrate as the diffuse reflector 10. Ex. 2006 at ¶66. The arrangements in Starry are not compatible with the arrangement of Chou. In addition to the incompatibility with Starry's teachings of housing the light source and reflector in an "optical cavity," Starry's invention primarily focuses on using CCFLs as light sources rather than back lit LEDs. *Id.* at ¶ 66. A POSITA would not look to an edge-lighting or back scattering arrangement for a component for use in a back lighting arrangement. *Id.* at ¶ 63.

The remaining figures (Figures 4-11) of Starry illustrate the reflectivity of the diffuse reflector disclosed therein and the luminance of the LCD panel when the diffuse reflector is employed. Starry at FIGs. 4-11. It is not apparent from the specification that the diffuse reflector of Starry would achieve the illustrated desired results of Starry were it applied to the surface of the circuit board of Chou. Ex. 2006 at ¶ 67.

B. Chou in view of Starry and a POSITA Fails to Render Obvious Dependent Claims 2 and 21 “wherein the reflector sheet comprises a diffuse reflector.”

Petitioner advances the same arguments for claims 2 and 21 as discussed above. Again, a POSITA would not be motivated to combine Starry with Chou. Starry describes using a diffusive reflector in an edge-lighting or back-scattering arrangement in an optical cavity. Ex. 2006 at ¶ 63; *See also* Starry at Figures 1-3. In such arrangements, the light emitting elements are not arranged (nor can they be) on the same substrate or PCB on which the diffusive reflector is arranged. Ex. 2006 at ¶64. On the other hand, Chou teaches that the light emitting elements be arranged on the surface of the same substrate on which a reflector is arranged. *See generally* Chou. There is no indication in Starry that the diffusive reflector described therein can be cut (nor the material used) to accommodate the arrangement of light emitting elements required by Chou and retain the reflective properties that are described in

Starry. Ex. 2006 at ¶¶ 67-68; *See also* Starry at Figures 4-11 and accompanying description.

Petitioner's claim "Starry describes a similar backlighting system as Chou" is factually incorrect. Petition at 27. As described above, Starry does not describe a backlighting system as would be understood by a POSITA to be combinable with Chou. Ex. 2006 at ¶¶ 63-66.

C. Chou in view of Starry and a POSITA Fails to Render Obvious Dependent Claim 3 "wherein the reflector sheet comprises a polymer based porous material."

Petitioner contends Starry teaches a "polymer-based porous material" within the context of claim 3 of the '812 patent by citing the following language from Starry: "A preferred embodiment of nonwoven sheet diffuse reflector comprises a consolidated sheet of flash-spun plexifilamentary film-fibrils, wherein the fibrils comprise polymer containing pores. The polymer preferably comprises polyolefin." Petition at 28. On the other hand, the '812 patent teaches that the "reflector sheet 14 may be microcellular polyethylene terephthalate (MCPET), which may have a typical thickness of approximately 1mm." '812 Patent, 5:7-9. Non-woven film fibrils of polyolefin have the consistency of a surgical mask commonly worn during the COVID-19 pandemic whereas an MCPET sheet is more rigid. Ex. 2006 at ¶ 69. A POSITA would know that the more rigid material is desirable since its reflective shape can be maintained. Ex. 2006 at ¶ 70. The pores of non-woven film fibrils of

polyolefin are a result of the irregular overlap of the fibers as opposed to the pores of an MCPET sheet which consists of billions of micro-bubbles. *Id.* The two are not equivalent. The former under magnification looks like a sponge whereas the latter looks like a tangle of overlapping strings. *Id.*

Petitioner overstretches in attempting to liken the two materials as they have entirely different material compositions, chemistries and properties.

D. Chou in view of Starry and a POSITA Fails to Render Obvious Dependent Claims 4-6 “wherein the reflector sheet comprises a thickness of less than approximately 1.0 millimeter.” wherein the reflector sheet comprises a thickness of less than approximately 0.5 millimeters.” herein the reflector sheet comprises a thickness of less than approximately 0.25 millimeters.”

Petitioner relies on the same portions of Starry to argue that it discloses the limitations of claims 4, 5 and 6. However, the argument that “Starry discloses a reflector sheet of preferable thickness between 0.25 and 0.15mm” renders the limitations of claims 4, 5, 6 obvious is weak and its expert declaration does nothing more than merely regurgitating the argument. *See* Petition at 28-29.

While the range of 0.15 to 0.25 is within the range of 0 to 1, it is exclusive of a significant portion of the latter range. *Ex. 2006* at ¶ 71. Starry states that a reflector should be “relatively thin ... to minimize the thickness of the completed display.” Starry at ¶ 0006. However, the '812 patent teaches a far thicker reflector in disclosing “reflector sheet 14 may be microcellular polyethylene terephthalate (MCPET), which may have a typical thickness of approximately *1mm*.” '812 Patent,

5:7-9. (emphasis added). This preferred embodiment of the reflector sheet envisioned in the '812 patent is outside of the range described by Starry. *Id.* Petitioner does not present any evidence to address this discrepancy.

As such, claim 4's claimed thickness of less than 1.0 millimeter is not obvious in view of Chou combined with Starry.

Claims 5 and 6 also disclose ranges (0 to 0.5 millimeters and 0 to 0.25 millimeters, respectively) that include a significant range of thicknesses that are outside of that described by Starry. 80% of the range described by claim 5 is outside of the range described by Starry and 60% of the range described by claim 6 is outside of the range described by Starry.

VII. GROUND 3 - CHOU AND TABITO IN VIEW OF A POSITA FAIL TO RENDER OBVIOUS DEPENDENT CLAIMS 7, 10-11, 14, 16-17, 19-20, AND 23.

Just as Chou in view of a POSITA does not render Independent Claims 1 and 15 obvious, Petitioner cannot demonstrate that the combination with the addition of Tabito renders obvious dependent claims 7, 10-11, 14, 16-17, 19, 21 and 23. Furthermore, the combination of Chou and Tabito also fails to render independent claim 20. Ex. 2006 at ¶ 72.

A. Chou in view of Tabito and a POSITA Fails to Render Obvious Independent Claim 20

Independent claim 20 recites:

[20 Preamble] A method of forming a solid state lighting device comprising:

[20A] providing a substrate of a solid state lighting tile;

[20B] mounting a solid state lighting element on a surface of the substrate;

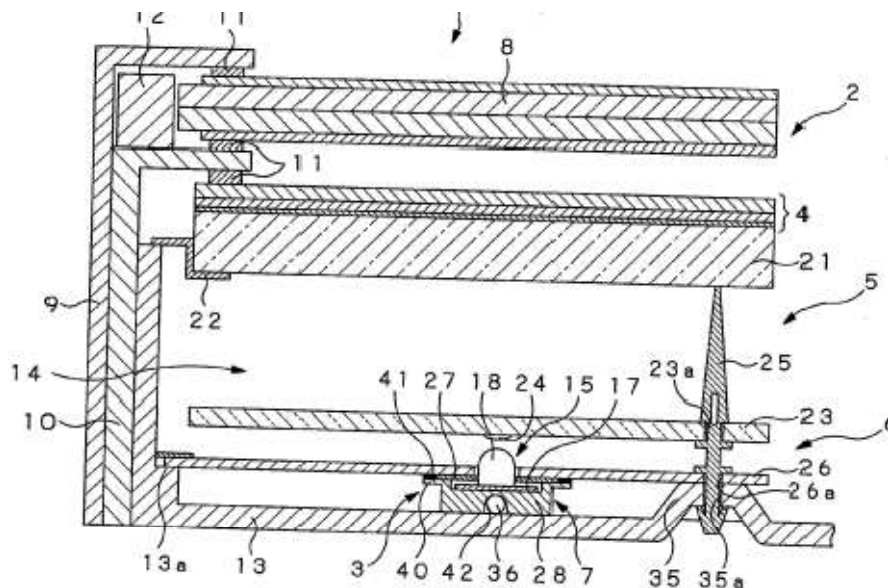
[20C] positioning a reflector sheet on the surface of the substrate;

[20D] forming a plurality of mounting posts in the substrate; and

[20E] forming a plurality of alignment holes in the reflector sheet, wherein at least a portion of the alignment holes are configured to receive at least a portion of the mounting posts when the reflector sheet is attached to the surface of the substrate.

Petitioner argues that Tabito discloses claim element 20D and references its own arguments to claim 7. However, claim 7 does not claim the requirement that mounting posts are formed in the substrate. As Petitioner correctly states, “Tabito describes an ‘optical stud member 25,’ that is ‘mounted to the back panel 13.’” Petition at 38 (*citing* Tabito at ¶¶ 0081, 0088). However, Tabito’s mounting of stud members *to the back panel* does not disclose or teach forming mounting posts *in the substrate* as claimed. Ex. 2006 at ¶ 72.

Indeed, Tabito distinguishes the back panel from the substrate.



Tabito FIG. 2

The LED unit 18 is mounted on an interconnection substate 17. Tabito at ¶¶ 0051, 0053. At no point in Tabito is it suggested that the mounting posts are formed in the substrate. Ex. 2006 at ¶ 72. It's evident from the figures that the mounting posts are mounted to the back panel 13. *Id.*; See Tabito at ¶0083 (“Each optical stud member 25 is a unitary member formed of a polymer material of a milk-white color exhibiting light conductivity, mechanical strength and a certain degree of elasticity, such as polycarbonate, and is mounted to a mounting member 35 formed as one with the back panel 13, as shown in FIGS. 2 and 6.”).

As such, neither Chou nor Tabito discloses or teaches this element, and the combination fails to render claim 20 obvious.

B. Dependent Claims 7, 10-11, 14, 16-17, 19, and 23.

Just as Chou in view of a POSITA does not render Independent Claims 1 and 15 obvious, Petitioner cannot demonstrate that the combination with the addition of Tabito renders obvious dependent claims 7, 10-11, 14, 16-17, 19, and 23. Ex. 2006 at ¶ 73.

Tabito is directed to providing backlighting for a larger sized LCD display. A backlight section sending out illuminating light is formed by a plural number of rows made up of many light emitting units arranged on the back Surface of a liquid crystal display panel. Ex. 2006 at ¶ 74. Tabito does not disclose any of the elements of independent claim 1 which are absent from Chou such that Chou in view of Tabito and further in view of a POSITA would render obvious independent claims 1 and 15. As such, this combination fails to render obvious dependent claims 7, 10-11, 14, 16-17, 19, and 23.

VIII. CONCLUSION

The Board should exercise its discretion to deny the petition on each of Grounds 1 thru 3 for the reasons above.

Respectfully submitted,

/Hao Ni/
Hao Ni
Counsel for Petitioner

CERTIFICATE OF COMPLIANCE

Per 37 C.F.R. §42.24(a) and (d), the undersigned hereby certifies that the
Petition complies with the type-volume limitation of 37 C.F.R. §42.24(a)(i)
because, exclusive of exempted portions, it contains 5995 words as counted by the
word-processing program used to prepare it.

Dated: June 14, 2024,

Respectfully submitted,

/s/ Hao Ni
Hao Ni (Reg. No. 53,858)
hni@nilawfirm.com
Timothy Wang (Reg. No. 61,554)
twang@nilawfirm.com
Neal Massand
nmassand@nilawfirm.com
Ni, Wang & Massand, PLLC
8140 Walnut Hill Lane, Suite 500
Dallas, Texas 75231
(t) (972) 331-4600
(f) (972) 314-0900

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that the above-captioned Mandatory Notice was served on counsel of record for the Petitioner by filing this document through the Patent Review Processing System as well as by delivering a copy via electronic mail to:

MFerrario@kilpatricktownsend.com (Lead Counsel)
MMorlock@kilpatricktownsend.com (Back-Up Counsel)

Dated: June 14, 2024

/s/ Hao Ni
Hao Ni (Reg. No. 53,858)