

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hisense USA Corporation

Petitioner

v.

Brightplus Ventures LLC

Patent Owner

Case IPR2023-01411

U.S. Patent No. 7,872,705

PATENT OWNER'S RESPONSE

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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 '705 Patent.

I. INTRODUCTION

Brightplus Ventures LLC (“Patent Owner” or “Brightplus”) submits this Response showing that each of the 4 grounds set forth by Hisense USA Corporation (“Petitioner” or “Hisense”) fails to render obvious challenged claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31-34. of U.S. Patent No. 7,872,705 (“the ’705 Patent”).

As to Ground 1, a number of elements of independent claims 1 and its dependents are not disclosed by Johnson, and the missing elements would not be obvious to a POSITA.

As to Ground 2, a number of elements of independent claims 1 and its dependents are not disclosed by Suzuki, and the missing elements would not be obvious to a POSITA.

As to Ground 3, because Johnson in Ground 1 does not render independent claim 1, obvious, the addition of Fine to Johnson do not render dependent claims 32 and 33 obvious.¹

¹ Although the Petition’s headings only challenge claim 32 in Ground 3, the sub-headings challenge both claims 32 and 33.

As to Ground 4, a POSITA would not be motivated to combine Suzuki with elements of Fine. Furthermore, numerous elements in at least claims 6, 22, and 28 are not disclosed by either Suzuki or Fine.²

Accordingly, Patent Owner respectfully requests that the Board deny the petition for *inter partes* review of claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31-34 of the '705 Patent on the merits.

II. THE '705 PATENT DISCLOSES AN IMPROVED LED BACKLIGHT SYSTEM FOR LCD DISPLAYS.

The '705 Patent was filed on July 29, 2007, and issued on January 18, 2011.

The '705 Patent is directed to liquid crystal displays having enhanced lighting uniformity. Ex, 1001 - '705 Patent, 1:6-8. Generally, the field includes direct backlighting or backlighting by edge illumination. *Id.* 1:54-56.

The '705 Patent recognized a need for “displays systems that are light in weigh, have a thin profile, that enable use of large screens, and that are uniformly lit over the entire display with superior color and contrast.” *Id.* 2:53-56.

Specifically, the '705 Patent provides for an LCD system comprising an LCD panel, at least one waveguide element comprising a plurality of light entry regions, a first light-emitting source positioned to emit light into the one of the plurality of

² Tellingly, by having to combined elements from Fine to Suzuki to challenge the same claims it challenged with Suzuki alone, Petitioner tacitly admits that Suzuki alone does not render obvious the challenged claims in Ground 4.

light entry regions and at least a second light-emitting source positioned to emit light into a second light entry region of the waveguide element. *Id.* 2:64-3:5.

This is illustrated by the exemplary light guides below:

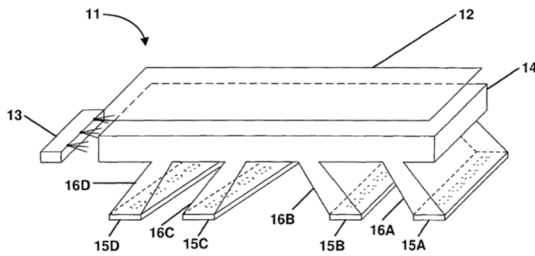


FIG.2

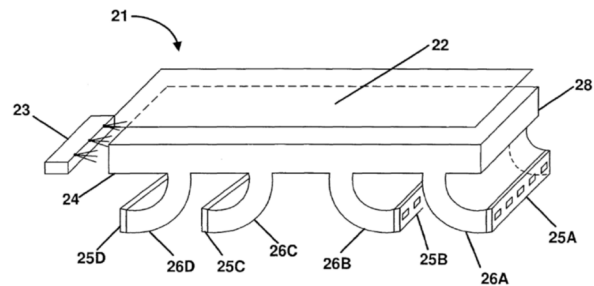


FIG.3

With this multiple entry lightguide structure, this allows for more uniform lighting, removes the “headlight effect” or “hot spot” on the panel and allows for larger screen sizes.

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 Ex. 2006, ¶¶ 7-15.

B. Person of Ordinary Skill in the Art

On or before July 29, 2007, a POSITA relating to the technology of the '705 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. Ex. 2006, ¶¶ 34-37.

C. Claim Construction**i. “each LED of the first plurality of LEDs and second plurality of LEDs is adapted to output substantially the same wavelength” – Claim 9**

For clarity, this term should be construed to mean “all the LEDs in the first plurality of LEDs and the second plurality of LEDs are adapted to output the same wavelength.” Claim 9 uses the wording “each” to mean that *all* of the LEDs in the first plurality and all of the LEDs in the second plurality are adapted to output substantially the same wavelength. The '705 Patent does not discuss or envision any mechanism wherein one LED from the first plurality of LEDs and one LED from the second plurality of LEDs (collectively have substantially the same wavelength

respect to each other while another LED from the first plurality of LEDs and another LED from the second plurality of LEDs have the same wavelength respect to each other but different a different wavelength with respect to other LEDs in the first or second plurality of LEDs.

In fact, the only disclosure from the '705 Patent that relates to claim 9 states:

Additionally, multiple strips may be connected to one another in any suitable orientation, such as in an end-to-end orientation, or in a side-to-side orientation, in order to yield a single composite light source to emit light into the waveguide element. Where multiple strips are utilized, each strip may be adapted to emit light of substantially the same wavelength as other strips

'705 Patent, 11:59-66.

D. Petitioner Omits its Own Proposed Claim Construction from the District Court

Although Petitioner asserts that no terms in the '705 Patent need construction, it has proposed a construction for a term in the '705 Patent in the parallel litigation. Ex. 2008 at 4. These terms are discussed below.

i. “waveguide element” – Claims 1, 17, 22 and 28

Brightplus's Proposed Construction 1:22-cv-02774	Hisense's Construction 1:22-cv-02774
light spreading element	An element designed to confine and direct light to the whole panel using internal reflection.

ii. “light entry regions” – Claim 1

Brightplus's Proposed Construction 1:22-cv-02774	Hisense's Construction 1:22-cv-02774
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regions for receiving light	openings in a physical device that allow light to enter the device so that it can be guided (confined and directed by reflection).
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However, based on Petitioner's arguments in the Petition, the differing constructions of these claim terms are immaterial to the challenged grounds. As such, Patent Owner points these out for the purposes of completeness only.

IV. PRIOR ART CITED BY PETITIONER.

A. Johnson

Petition's primary reference for Grounds 1 and 3 is U.S. Patent No. 6,608,614 Ex. 1005 ("Johnson"). Johnson issued from Patent Application Number 09/602,066 with a filing date of June 22nd, 2000.

Johnson is directed to a backlight for a liquid-crystal display. The backlight includes a first LED array that provides light with a first chromaticity and a second array that provides light with a second chromaticity. A combining element combines the light from the first LED array and the second LED array and directs the combined light towards the LCD. Johnson, Abstract. Further, Johnson states, the "[b]acklight assembly 10 includes a base 14 that has a principal or first LED array 16 disposed thereon. First LED array 16 is comprised of a plurality of LEDs 18... LEDs 18 provide light with a first chromaticity, which in the present embodiment is white or near-white." Johnson, 2:54-62.

Johnson discloses a control system that is operationally connected to the second LED array. The controller adjusts the brightness of at least one LED in the second LED array, thereby adjusting the chromaticity of the combined light. Johnson, 2:5-8.

B. Suzuki

Petitioner's primary reference for Grounds 2 and 4 is U.S. Patent Publication No. 2006/0220090 (Ex. 1006 – "Suzuki"). Suzuki was filed February 28th, 2006, and published October 5th, 2006.

Suzuki is directed to a surface illuminator for a liquid crystal display and provides a surface illuminator employing an array of discrete light sources. Suzuki, Abstract.

Suzuki describes an edge lighting arrangement for illuminating an LCD panel employing an array of light sources which are arranged around the periphery of the light guide. The light sources may be LEDs. Suzuki preferentially employs R,G,B LEDs whose light is combined within the light guide to produce light which is perceived as white when it is emitted from the surface of the light guide. Suzuki [0008] Suzuki employs reflective panels on the surfaces of the light guide which are perpendicular to the surfaces on which the light sources are mounted. Ex. 2006, ¶ 48. In order to prevent imbalanced color mixture resulting from light emissions from the LEDs mounted nearest these reflective surfaces mixing with emissions from

other LEDs at inappropriate locations in the lightguide, Suzuki provides that “the end light source LEDs 8R may be made to emit light in a quantity smaller than that emitted by the other LEDs 7R by a predetermined amount by supplying the end light source LEDs 8R with a current smaller than a current supplied to the LEDs 7R by a predetermined amount. Alternatively, R (red) emission LEDs having low emission efficiency may be used as the end light source LEDs 8R.” Suzuki, [0044] In this way, Suzuki seeks to optimize the color balance of the light in the lightguide by hard coding the emission intensity of the LEDs mounted nearest to the reflective surfaces. Ex. 2006, ¶ 48.

C. Fine

Petitioner's secondary reference for Grounds 3 and 4 is U.S. Patent No. 8,128,272. (Ex. 1007 – “Fine”) Fine issued from Patent Application Number 11/921,305 with a PCT filing date of June 7th, 2006, which purported claims the benefit of US provisional application no. 60/687,865 filed on June 7, 2010.

Fine is directed to an illumination apparatus having a light emitting source embedded in a flexible waveguide material. Fine, Abstract. Fine also discloses various uses of the waveguide and display device. Fine, 20:4-9.

V. GROUND 1 – JOHNSON IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 32, AND 34

Petitioner relies on Johnson as its primary reference for Ground 1. But Petitioner fails to demonstrate that Johnson in view of a POSITA would render

obvious Claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31-34. Ex. 2006, ¶¶53-61.

Claim 1 recites:³

[*Preamble*] A liquid crystal display (LCD) system comprising:

[*IA*] a LCD panel;

[*IB*] at least one waveguide element comprising a plurality of light entry regions;

[*IC*] a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the at least one waveguide element at a first light entry region of the plurality of light entry regions;

[*ID*] a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the at least one waveguide element at a second light entry region of the plurality of light entry regions; and

[*IE*] a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.

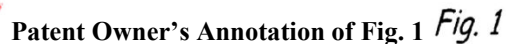
'705 Patent, Claim 1.

Even with the knowledge of a POSITA, Johnson does not teach or render obvious elements *IC* or *IE* as understood in view of the specification of the '812 Patent. Ex. 2006, ¶¶54-58.

A. Johnson Fails to Disclose [Claim 1C] “a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and

³ The elements in Claim 1 are numbered to match Petitioner's numbering.

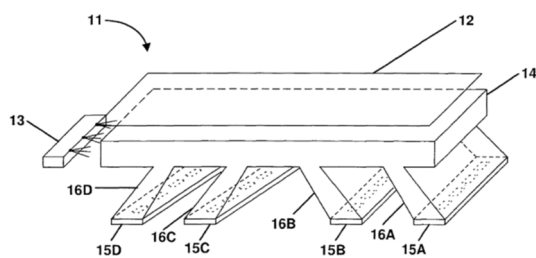
Petitioner argues that LED array 16 described in Johnson as the “first light emitting source comprising a first plurality of LEDs,” discloses this element. Petition, at 17. Petitioner substantiates that the LED array 16 is arranged in a “first strip” by misrepresenting the disclosure of Johnson. Petitioner claims that “the LEDS 18 (in yellow) are arranged in a first strip,” based on its annotated figure: Petition, at 17-18.



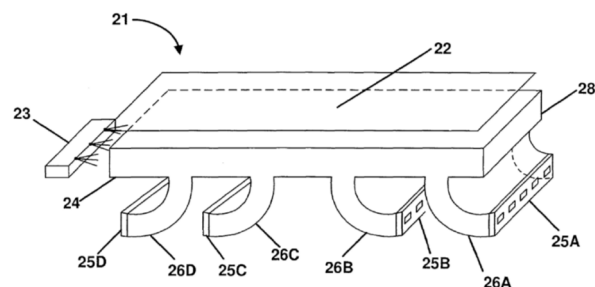
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added) A POSITA would understand from this that that **LED array 16** refers to all the LEDs in one substrate that houses the plurality of LEDs 18 refers to the following in yellow highlight: Ex. 2006, ¶ 54-55. Johnson is not referring a single bottom row as Petitioner misrepresents as the “LED array 16.”

In contrast, the '705 Patent and claim 1 recite that the backlighting unit comprises multiple LED *strips*, wherein the light strips are separate. For example, Fig. 2 illustrates multiple lights strips 13, and 15A-15D. '705 Patent, 12:51-62. A POSITA would understand that the '705 does not teach a single backlight LED array comprising a substrate, and more importantly that a two dimensional backlight LED array is not equivalent to an LED strip as disclosed by the '705 Patent. *See* Ex. 2006, ¶ 55-56. As such, the LED array 16 disclosed in Johnson is not equivalent to a first plurality of LEDs arranged in a “first strip” as claimed in by the '705 Patent nor would it be suitable for the waveguides disclosed in the '705 Patent such as the ones below which are designed for separate LED strips.



'075 Patent FIG.2



'075 Patent FIG.3

B. Johnson Fails to Disclose [Claim 1E] “a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.”

Petitioner states that “Johnson describes a common control circuit (control system 40), including a processor 44b and controller 44... Further, the processor driven controller electrically communicates commands to vary the power supplied to the LEDs. Petition, at 19. *Citing* Johnson, 3:66-4:6 (“Processor 44b then refers to the chromaticity data stored in memory 44a to determine how to adjust the LEDs 32 in second LED array 30...” Petition, at 19-20. Petitioner, however, has this control system of Johnson does not teach or disclose “a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs” as taught in the ’705 Patent. Ex. 2006 ¶¶ 57-58.

Johnson describes a control system 40, which includes a power supply 42 and a controller 44 Johnson, 3:44-47. The controller 44 adjusts the power supplied to the second LED array 30. *Id.*, 4:3-6. Here, the control system in the Johnson only adjusts the power supplied to the LEDs. This is not equivalent to the common control circuit as disclosed in the ’705 Patent. Ex. 2006 ¶¶ 57-58.

The ’705 patent describes the common control circuit as follows:

“A light source in a LCD system of the invention may include a LED that emits any of white light, blue light, red light, green light, or light of any desirable wavelength...Such ***clusters may be independently controlled.*** In another embodiment, a light source includes a blue LED coated or otherwise covered with phosphors to upconvert blue light to white light.”

'705 Patent, 11:19 - 26 (emphasis added)

“Such components may include one or more *common control circuits* (e.g., integrated circuits or processors) *to regulate, for example, power to the LEDs, intensity of the emitted light, wavelength of the emitted light, and/or other parameters...* Moreover, multiple strips may be subject to control from a single master control circuit or CPU.”

'705 Patent, 12:6 - 15 (emphasis added).

Thus, unlike Johnson, the '705 patent contemplates that the common control circuit will be employed to “regulate...power to the LEDs, intensity of the emitted light, **wavelength of the emitted light, and/or other parameters.**” *Id.* As taught in the '705 patent, a common control circuit is a means to vary the power supplied to the LEDs as well as the intensity and wavelength of the emitted light. Johnson does not disclose a system similar to the common control circuit of the '705 patent. Ex. 2006 ¶ 58. The control system 40 of Johnson does not regulate the wavelength or other parameters of the first led array 16. *Id.* The first LED array in Johnson only emits white light. Johnson, 2:60-62; the controller 44 only adjusts the power supplied to the LED array. Therefore, the control system 40 in Johnson does not teach or suggest the claimed common control circuit of the '705 Patent.⁴ Ex. 2006 ¶ 58.

⁴ See also arguments for claim 10 *infra*.

C. Johnson Does Not Disclose “wherein each LED of the first plurality of LEDs and second plurality of LEDs is adapted to output substantially the same wavelength.” of Claim 9.

As discussed above in section III(C)(i), “wherein each LED of the first plurality of LEDs and second plurality of LEDs is adapted to output substantially the same wavelength” as understood in view of the '705 Patent means that all LEDs of the first plurality of LEDs (i.e. first strip) and all LEDs of the second plurality of LEDs (i.e. second strip) is adapted to output substantially the same wavelength.

Johnson unambiguously states that “[s]econd LED array 30 includes a plurality of LEDs 32 that, individually and/or collectively, emit light with a chromaticity that is *different* from the chromaticity of light emitted by first LED array 16.” Johnson, 3:17-22. (emphasis added). Petitioner has presented several specious, and bordering on the edge of bad-faith, arguments that a “POSITA would recognize that the defined different in chromaticity is not bound; therefore, chromaticity of the second array could be marginally (i.e., near-white) or grossly (i.e., red, green, purple, etc.) different from the chromaticity of the white of the first LED array... so, a POSITA would understand that each LED in the second LED array 30 may emit light at a wavelength that is near-white and, thus, at substantially the same wavelength as each LED in the first LED array 16.” Petition, at 26.

Contrary to Petitioner's arguments, a POSITA would not recognize or understand the disclosure in Johnson to mean the first and second array would have

the same chromaticity output.⁵ Johnson itself argues against this interpretation stating, “[i]n operation, white light from first LED array 16 enters waveguide 20 through first major surface 22, and colored light from second LED array 20 through edge surface 28. The light from the LED arrays is combined in waveguide 20, thereby altering the chromaticity of the light from the first LED array 16.” Johnson, 3:25-33. Petitioner has offered an improper interpretation and does not offer substantial evidence as to why a POSITA would come to a conclusion that is in complete opposition to the disclosure of Johnson. This combination of two distinct chromaticities of light is key to the inventive concept of Johnson, and simply abandoning it to try and match the claim language of the ‘705 Patent is a clear example of Petitioner’s biased, improper hindsight.

This goes in direct contrast to Johnson which explicitly teaches that the first and second chromaticity are different. It does not matter what light the first LED array emits; a POSITA would understand that Johnson intends for the second LED array to emit a different light. Ex. 2006, ¶¶ 60-61. Further, the second LED array

⁵ The portion relied upon by the Board in the Institution Decision at 18 does not teach that a first LED array and second LED array has the substantially the same wavelength. Johnson at Figs. 1-2, 6:15-7 merely teaches that each LED in the second LED array all have the same chromacity output. It refers only to all of the individual LEDs in the second LED array and is not a comparison between the second LED array and any other LED array.

30 is never disclosed to emit a “near-white” light. In view of Johnson, a POSITA would understand that the second LED array 30 emitting a near-white light would obviate the purpose of that second LED array. Ex. 2006, ¶ 61. Johnson intends for the mixing of light between the LED arrays to create a desired chromaticity. *Id.* Mixing near-white light from the first LED array and near-white light from the second LED array would not adjust or create a desired chromaticity. *Id.* Therefore, the LEDs in the first and second LED arrays of Johnson would not output substantially the same wavelength as required by the '710 Patent. *Id.*

Petitioner also argues that the “plurality of LEDs 32... emitting light into the edge surface 28a of waveguide 20 and the plurality of LEDs 32... emitting light into edge surface 28b may have the same chromaticity output.” Petition at 27. Johnson states that “the second array may be disposed adjacent more than one edge surface of waveguide 20. As shown in FIGS. 1 and 2, a part of second array 30 is adjacent edge surface 28a, and another part of the second array is adjacent edge surface 28b. It may also be possible that second LED array 30 is comprised of LEDs all having the same chromaticity output.” Johnson, 6:9-17. However, this refers to different LEDs in the same array (e.g., different LEDs in the second plurality of LEDs) and does not teach or suggest that each LED in both the “first plurality of LEDs and second plurality of LEDs” would output substantially the same wavelength.

D. Johnson does not disclose [Claim 11] "a common control circuit in electrical communication with each LED of at least one of the first plurality of LEDs and the second plurality of LEDs."

As discussed above regarding Claim 1E, Johnson does not disclose a common control circuit.

E. Johnson does not disclose [Claim 14] "a common control circuit in electrical communication with each of the first plurality of LEDs and the second plurality of LEDs."

As discussed above regarding Claim 1E, Johnson does not disclose a common control circuit.

F. Dependent Claims 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, 31-34 -7 and 9-12 are Also Not Rendered Obvious Because Independent Claim 1 is not Obvious

Just as the Johnson in view of a POSITA does not render independent claim 1 obvious, Petitioner cannot demonstrate that any of the dependent claims challenged in Ground 1 are rendered obvious.

VI. GROUND 2 - PETITIONER'S SUZUKI IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 1, 2, 5, 11, 13, 14, 16, 17, 32, AND 34.

Petitioner relies on Suzuki as its primary reference for Gound 2. But Petitioner fails to demonstrate that Suzuki in view of a POSITA would render obvious Claims 1, 2, 5, 11, 13, 14, 16, 17, 32, and 34.

As discussed above and repeated here, Claim 1 recites:

Claim 1 recites:

[*Preamble*] A liquid crystal display (LCD) system comprising:

[1A] a LCD panel;
[1B] at least one waveguide element comprising a plurality of light entry regions;
[1C] a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the at least one waveguide element at a first light entry region of the plurality of light entry regions;
[1D] a second light-emitting source comprising a second plurality of LEDs arranged in a second strip and positioned to emit light into the at least one waveguide element at a second light entry region of the plurality of light entry regions; and
[1E] a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.

'705 Patent, Claim 1.

Even with the knowledge of a POSITA, Suzuki does not teach or render obvious at least element *1E* as understood in view of the specification of the '708 Patent.

A. Suzuki Fails to Disclose [Claim 1E] “a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.”

Petitioner argues that “Suzuki discloses a control circuit, LED driving circuit, in electrical communication with at least LEDs 7R and 8R which can vary the current supplied to the LEDs...‘As a general LED driving circuit (not shown), the end light source LEDs 8R may be made to emit light in a quantity smaller than that emitted by the other LEDs 7R by a predetermined amount by supplying the end light source LEDs 8R with a current smaller than a current supplied to the LEDs 7R by a predetermined amount.’” Petition, 46-47 *quoting* Suzuki, [0044]. However,

Petitioner is engaging in selective quotation and distorting the disclosure of Suzuki.

The full section of Suzuki on which Petition relies is reproduced below:

FIG. 4 shows a positional relationship between a light exit surface 16 of a light guide 11 of the backlight unit 6 and LED light sources 15 in the present embodiment in a view of the unit taken in a direction normal to the light exit surface 16. The present embodiment is different from the first embodiment in that it is characterized by R (red) emission LEDs 8R provided as end light sources at side ends of reflective surfaces 13L and 13R for arrays of discrete light sources instead of the LEDs 7R at both ends of the light entrance surfaces 12T and 12B of the light guide 11, the LEDs 8R emitting light in a smaller quantity than other LEDs 7R toward the light guide region. ***More specifically, the end light source LEDs 8R emits a quantity of light that is substantially one half of that emitted from other light source LEDs 7R of the same type.*** As a general LED driving circuit (not shown), the end light source LEDs 8R may be made to emit light in a quantity smaller than that emitted by the other LEDs 7R by a ***predetermined amount*** by supplying the end light source LEDs 8R with a current smaller than a current supplied to the LEDs 7R by a ***predetermined amount***. Alternatively, ***R (red) emission LEDs having low emission efficiency may be used as the end light source LEDs 8R.***

Suzuki, [0044] (emphasis added)

This is the only section of Suzuki which mentions the purported “LED driving circuit,” relied upon by Petitioner. Suzuki does not disclose, as petitioner contends, a driving circuit which can “vary the current supplied to the LEDs.” Petition at 46. Rather in Suzuki, the LEDs in question (8R) are supplied a “predetermined amount” of current. Suzuki does not disclose a common control circuit or even an LED driver as would be understood by a POSITA. Ex. 2006, ¶¶ 63-646. Rather, Suzuki discloses a means for modulating the amount of light that is reflected off of reflective surfaces 13L and 13R shown in Figure 4. Suzuki, [0046] and [0047]. Ex. 2006, ¶64.

This means for modulating includes reducing the emission of light from the 8R LEDs in that figure. Suzuki, [0044] - [0047]. Ex. 2006, ¶64. In this way, less light is bounced off of the reflective surfaces, thereby improving the uniformity of the light emission through the lightguide of Suzuki. Ex. 2006, ¶ 64. This system, again, uses a **predetermined** reduction in light emission, it is not regulated by a control circuit. The language from Suzuki quoted above makes it clear that Suzuki did not intend to vary the intensity of the emission of light from the light sources, going so far as to recommend the use of low emission efficiency LEDs to cap the amount of light produced thereby. *Id.*

As discussed *supra*, the '075 patent describes the common control circuit as follows:

“A light source in a LCD system of the invention may include a LED that emits any of white light, blue light, red light, green light, or light of any desirable wavelength...Such ***clusters may be independently controlled.*** In another embodiment, a light source includes a blue LED coated or otherwise covered with phosphors to upconvert blue light to white light.”

'075 Patent, 11:19-26 (emphasis added).

“Such components may include one or more ***common control circuits*** (e.g., integrated circuits or processors) ***to regulate, for example, power to the LEDs, intensity of the emitted light, wavelength of the emitted light, and/or other parameters...*** Moreover, multiple strips may be subject to control from a single master control circuit or CPU.”

'075 Patent, 12:6-15 (emphasis added).

Thus, unlike Suzuki, the '075 patent contemplates that the common control circuit will be employed to “regulate...power to the LEDs, intensity of the emitted

light, wavelength of the emitted light, and/or other parameters.” *Id.* Suzuki discloses nothing similar to the common control circuit of the '075 patent. Ex. 2006, ¶ 66.

B. Suzuki does not disclose a “wherein any of the first light emitting source and the second light emitting source comprises a plurality of LEDs adapted to emit any of white light and single color light” of Claim 5.

Petitioner states that “Suzuki discusses the possibility ‘to provide a surface illuminator having a high color uniformity...The generation of mixed white suffering from an extreme shortage of red components can be suppressed at an arbitrary point in the neighborhood of a light entrance surface 12T...Suzuki discusses achieving a desired color by mixing red, blue and green LED emission...inside the light exit surface 116, four beams of light...can be mixed to generate a beam of light in a desired color.’” Petition at 48, 49 *quoting* Suzuki.

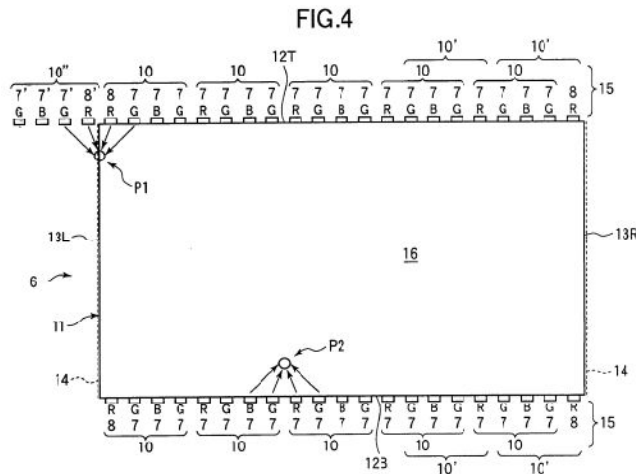
Claim 5 of the '075 patent does not say “a light emitting source adapted to emit light which may be perceived as white light and single color light when mixed and then emitted from a lightguide” as Petitioner would have it. Rather, claim 5 recites “the first light emitting source and the second light emitting source comprises a plurality of LEDs adapted to emit any of white light and single color light.” The light emitted from red, green, and blue LEDs is not white. Ex. 2006, ¶67. Such light may be mixed to create a light that is perceived as white but claim 5 is explicit that white light is emitted. The '705 Patent is explicit in distinguishing between “white light, blue light, red light, green light.” '705 Patent, 11:19-21.

With respect to the “single color light” limitation of this claim, Petitioner argues that “the 7R LEDs on the 12T light entrance surfaces may be considered a plurality of LEDs that emits one color, red.” However, this is contradictory to the argument that the RGB LEDs are mixed. If the light sources of Suzuki are operable to emit a near white light, then it must be through color mixing in the light guide and would require light from all three sources (RGB) Ex. 2006, ¶ 67. However, as Petitioner previously pointed out “Suzuki discloses second emitting light sources, LED light sources 15...arranged in series by pluralities of sets.” Petition, at 44-45. Since the lights sources are in series, if the light sources of Suzuki are adapted to emit a single color light, then the light source must be a set of LEDs of a single color which would obviate their ability to emit a perceived white light. Ex. 2006, ¶ 67.

C. Suzuki Fails to Disclose “a common control circuit in electrical communication with each LED of at least one of the first plurality of LEDs and the second plurality of LEDs” of Claim 11.

As discussed above regarding [1E], Suzuki does not disclose a common control circuit. Petitioner states that a “POSITA would understand that the common control circuit (the LED driving circuit) of Suzuki is in communication with each LED (8R, 7R) at least to run the LED on/off.” Petition, at 49. However, this is insufficient to teach Claim 11. The passage cited shows that the LED driving circuit is only directed to a portion of the LEDs, not “*each LED* of at least one of the first

LEDs 8R and 7R are not all of the LEDs in each of the plurality of LEDs.⁶



communication with **each LED** of at least one of the first plurality of LEDs and the second plurality of LEDs. Ex. 2006, ¶ 70.

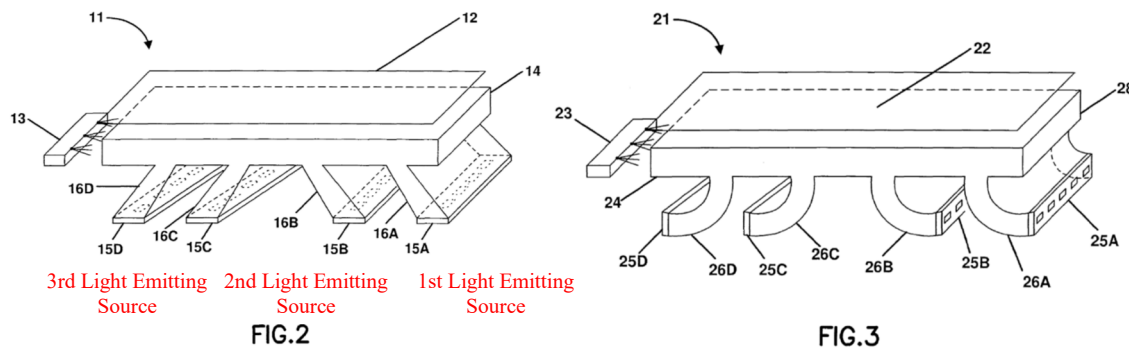
D. Epstein Fails to Disclose “wherein the common control circuit is in electrical communication with each of the first plurality of LEDs and the second plurality of LEDs” of Claim 14

control circuit in electrical communication with either or both of the first or second plurality of LEDs.

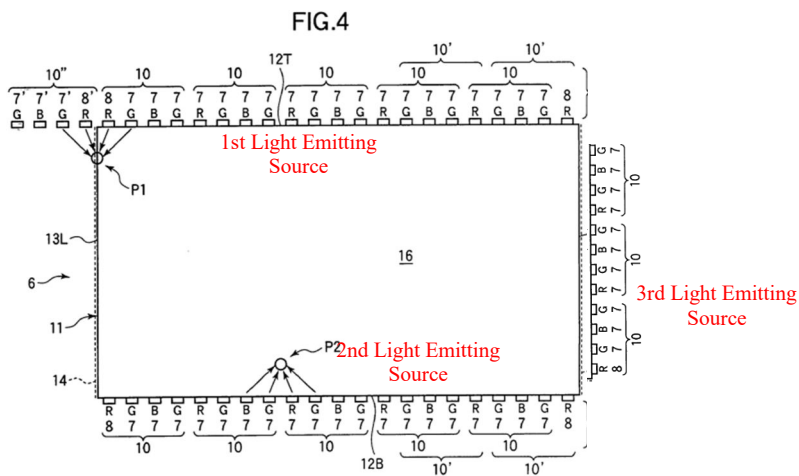
⁶ Petitioner contended elements *[IC]* and *[ID]* (“Suzuki discloses first emitting light sources, LED light sources 15” [top row] and “Suzuki discloses second emitting light sources, LED light sources 15 [bottom row]...arranged in series by pluralities of sets.” Petition, at 44-45.

E. Suzuki Fails to Disclose “a third light emitting source positioned to emit light into the at least one waveguide element” of Claim 34

Petitioner argues that this is met by each set 10 of LEDs in Suzuki. Patent Owner disagrees. In the '705 Patent, this refers to a third light emitting source emitting light as shown below.



Suzuki does not disclose this. Adding a third light emitting source would result in the following:



But a POSITA would not be motivated to construct this structure as it would create ununiform light by having unbalanced light emitting sources. Ex. 2006, ¶¶ 71-72. As such, Suzuki in view of a POSITA fails to teach or suggest this element.

F. Dependent Claims 2, 5, 11, 13, 14, 16, 17, 32, and 34 are Also Not Rendered Obvious Because Independent Claim 1 is not Obvious based on Suzuki

Just as Suzuki in view of a POSITA does not render independent claim 1 obvious, Petitioner cannot demonstrate that any of the dependent claims 2, 5, 11, 13, 13, 14, 16, 17, 32, and 34 are rendered obvious.

VII. GROUND 3 – BECAUSE JOHNSON IN VIEW OF A POSITA DOES NOT RENDER INDEPENDENT CLAIM 1 OBVIOUS, THE ADDITION OF FINE DOES NOT RENDER DEPENDENT CLAIMS 32 AND 33 OBVIOUS.

Dependent claims 32 and 33 are embodiments of Claim 1 in a television and a computer monitor, respectively. '705 Patent, Claims. Petitioner states that Fine discloses embodiments including a computer monitor and a television system. Petition at 59 citing Fine, 5:41-48.

Assuming that a POSITA would combine Johnson and Fine, because Johnson itself does not render obvious independent claim 1, the combination of Johnson and Fine is insufficient to render obvious claims 32 and 33 as they include all of the base limitations of independent claim 1.

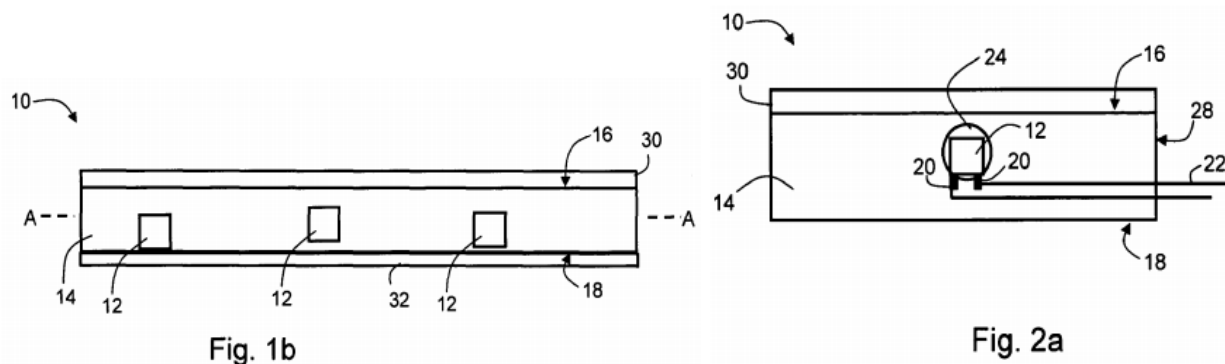
VIII. GROUND 4 – A POSITA WOULD NOT BE MOTIVATED TO COMBINE SUZUKI AND FINE TO RENDER CLAIMS 6, 22, 28, 29, 32, AND 34 OBVIOUS.

A. A POSITA Would Not Be Motivated to Combine Suzuki and Fine.

Petitioner states that "Suzuki and Fine are in the same field of endeavor, i.e., Light Emitting Diode (LED) based backlighting for a Liquid Crystal Display (LCD)"

[Petition at 61]. This is a misrepresentation of Suzuki. As would be understood by a POSITA, Suzuki relates to edge lighting which is generally seen as a separate method for illuminating an LCD panel. In an edge lighting arrangement, LEDs are positioned such that the emission of light is *perpendicular* to the viewing plane of the LCD panel. In a backlighting arrangement, LEDs are positioned such that the emission of light is *parallel* to the viewing plane of the LCD panel. Ex. 2006, ¶ 74.

Fine discloses a system for illuminating an LCD panel in which LEDs are positioned both around the periphery of a waveguide and embedded in the waveguide. It is important to restate that the LEDs of Fine are *embedded in* the waveguide, not disposed along an outer surface of the waveguide. Ex. 2006, ¶75. Figures 1b and 2a illustrate this arrangement.



Referring to these figures, Fine states that:

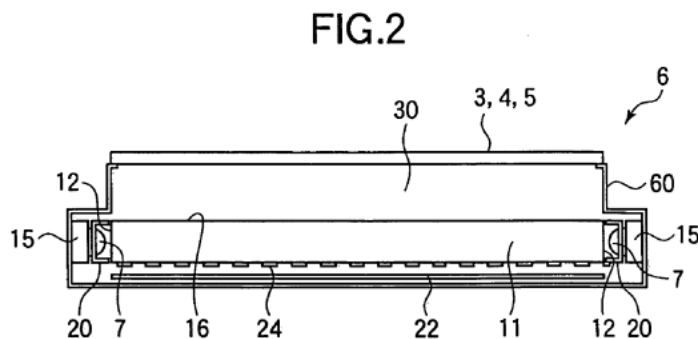
“[Illumination] Apparatus 10 comprises one or more **light emitting sources 12 embedded in a waveguide material 14** having a first surface 16 and a second surface 18. Waveguide material 14 is capable of propagating light generated by light source 12, such that at least a portion of the light is diffused within waveguide material 14 and exits through at least a portion of first surface 16.”

Fine, 11: 50-55 (emphasis added)

“Referring to FIG. 2 a, when light source 12 is embedded in the bulk of the waveguide material, the electrical contacts 20 remain with material 14. In this embodiment, the forward bias can be supplied to light source 12 by electrical lines 22, such as flexible conductive wires, which are also embedded in material 14. Thus, lines 22 extend from contacts 20 to one or more ends 28 of waveguide material 14. Light source 12 including the electrical lines 22 can be embedded in material 14 during the manufacturing process of the waveguide material.”

Fine, 14:10-19.

Contrast this arrangement with that of Suzuki which is illustrated in Figure 2.



Suzuki states that:

“As shown in FIG. 2, beams of light emitted by the LED light sources 15 to enter the light entrance surfaces 12 of the light guide 11 are guided through the light guide region and scattered by the scattering dots 24. Some of the beams exit the light exit surface 16 into the gas space 30, and the rest of the beams are reflected by the reflective sheet 22 to return to the light guide region of the light guide 11 and are reflected again by the scattering dots 24 to finally exit the light exit surface 16 into the gas space 30.” Suzuki, [0030].

Embedding light emitting elements in the light guide 11 of Suzuki would interfere with the operation of dots 24 which act to scatter light. Ex. 2006, ¶ 76. The embedded light emitting elements would be between the dots 24 and the exit surface 16. Further, it is unclear from the Petition how such electrical connections would be made if light emitting elements were to be embedded in the light guide of Suzuki as the electrical lines would have to run through the reflectors 20 of Suzuki. Fine does not include a reflector on the sides of the light guide such as the one described in Suzuki, nor does it include light scattering dots. Therefore, a system such as the one proposed by Petitioner would function less well than either of the two as they are described in their respective specifications. Thus, a POSITA would not be motivated to combine Suzuki and Fine. Ex. 2006, ¶¶ 74-76.

**B. The combination of Suzuki and Fine does not disclose [Claim 6]
“wherein any of the first light emitting source and the second light
emitting source comprises a plurality of direct LEDs.”**

Petitioner states that modifying “Suzuki's device to account for Fine's embedded light sources would allow for more light to be emitted into the waveguide.” Petition, at 62-63.

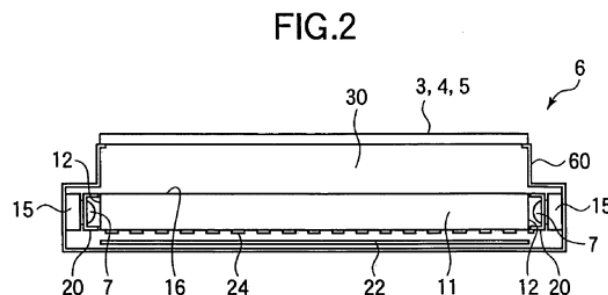
Petitioner's logic is incorrect. Because Suzuki's device uses edge lighting, a POSITA would not be motivated to then add direct LEDs embedded in the waveguide taught in Fine to the teachings of Suzuki. Ex. 2006, ¶ 77. This would be

redundant and create unnecessary expense. *Id.* If Direct LEDs were used, then edge lighting would be unnecessary as direct LEDs can cover the entire screen. *Id.*

A POSITA would not have considered combining Direct LEDs with a device which already included edge lighting sources which operates with a light guide to disperse the edge lighting throughout the display as it would add unnecessary cost to a display by adding extraneous LEDs and would not have been a suitable consideration. Ex. 2006, ¶ 78.

Furthermore, Petitioner does not explain how either Suzuki or Fine teach how to design a common controller system to control both the edge lighting sources of Suzuki with the direct LEDs of Fine. Ex. 2006, ¶ 79.

Second, Petitioner's claim that it would be obvious to add an LED to the "gas space between the lightguide and other optical elements," is incorrect. Petition at 63; Ex. 2006, ¶ 80-81. Evidence of this flaw can be seen from Figure 2 of Suzuki below:



In Figure 2 of Suzuki, the gas space to which Petitioner is referring is labelled 30. The gas space is *above* the light guide 11 of Suzuki. Petitioner does not elaborate

as to how a POSITA would accomplish this arrangement. Petitioner seems to be implying that a light source placed in the gas space *above the light guide* would still be both embedded in the light guide (per Fine) so as to pass light through the light guide and constitute a direct light. This is clearly absurd. Regardless of Petitioner's nonsensical suppositions, placing light sources in the gas space of Suzuki would not be within the teachings of Fine as the light sources would not be embedded in the light guide. Ex. 2006, ¶ 82. Therefore, the combination of Suzuki and Fine does not disclose a light source comprising a plurality of direct LEDs.

Petitioner also argues that Suzuki's gas space 30 between the lightguide and other optical elements would work well for an LED array such as Fine. Petition at 63. This is incorrect. The gas space is a necessary space to mix the light sources of Suzuki and is designed to be between 9 to 18mm. Suzuki [0028, 0031] Fine says that the thickness of each layer (which 3 layers are required) is 3mm, totaling 9mms. Inserting the direct LEDs embedded in a waveguide of Fine would eliminate or significantly reduce the gas space and as such is an unsuitable option. Ex. 2006, ¶ 83.

C. The combination of Suzuki and Fine does not disclose [Claim 22] “wherein any of the first light-emitting source and the second light-emitting source is optically coupled to a back portion of the at least one waveguide element.”

Fine does not disclose light emitting sources optically coupled to the back portion of a waveguide element within the meaning of the '705 patent. The '705

patent uses the term “optically coupled” as follows: a front portion of a waveguide is optically coupled to transmit light to a LCD panel or screen...” ’705, 6:57-59. This language shows that the ’705 Patent does not include “embedded” within the definition of “optically coupled” as it would be absurd and unproductive to embed a waveguide into an LCD panel. Ex. 2006, ¶ 84. Petitioner’s argument improperly broadens the term “optically coupled” beyond what a POSITA would understand based on the state of the art and the ’705 patent. *Id.*

Even to the extent that Fine discloses light-emitting sources "optically coupled to a back portion of a waveguide element," a POSITA would not be motivated to move the edge lighting LEDs to a back portion of the light guide thereby removing the edge lighting LEDs from the side of the light guide that was directing the light. This would change the entire system of Suzuki and would require a completely distinct light guide not disclosed of in either Suzuki or Fine. Ex. 2006, ¶85.

D. The combination of Suzuki and Fine does not disclose [Claim 28] “wherein any of the first light emitting source and the second light emitting source is disposed along a center region of the LCD system behind the LCD panel is positioned to emit light into a back side of the at least one waveguide element.”

Likewise here, as Fine teaches “[l]ight source 12 can be embedded in the bulk of waveguide material 14 or near surface 18,” it does not teach that the light emitting source ... s positioned to emit light into a back side of the at least one waveguide element.

In viewing Figure 1c it is apparent that the light sources are not provided outside of the back surface of the light guide, but rather embedded in the lightguide which is apparent in Figures 2a and 2b, provided below:

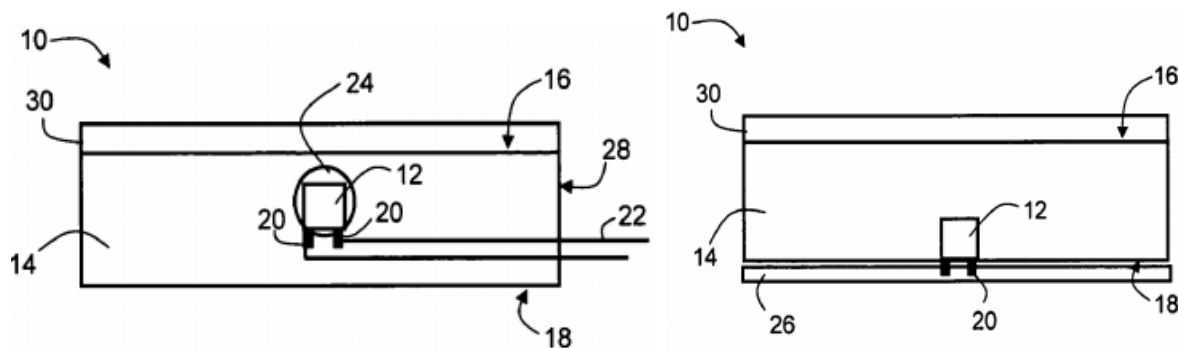


Fig. 2a

Fig. 2b

The light source cannot emit light into a surface that it is mounted above.

Petitioner goes on to state that “a POSITA would understand that the Suzuki[-Fine] assembly includes light emitted from LEDs 12 *on* the back side of waveguide element 14.” Petition, at 67 (emphasis added). Whether or not this is true is irrelevant. That is not what claim 28 of the '705 Patent recites. The claim does not say that the LEDs are on the back side of the waveguide element, it says that the LEDs are positioned to emit light *into* the back side of the waveguide element. Petitioner's language is deceptive. As such, even assuming a POSITA would combine the references, Fine and Suzuki do not disclose this claim limitation.

See also argument for claim 22 above. Additionally, to the extent Petitioner argues that the LEDs embedded in the light guide of Fine could be combined to meet this element, see argument for Claim 6.

E. Also, Because Suzuki in View of a POSITA Does Not Render Independent Claim 1 Obvious, the Addition of Fine Does not Render Dependent Claims 6, 22, 28, 29, 32, and 34 Obvious.

Even assuming arguendo that a POSITA would combine Suzuki and Fine because Suzuki itself does not render obvious independent claim 1, the combination of Suzuki and Fine is insufficient to render obvious the dependent claims as they include all of the base limitations of independent claim 1.

IX. CONCLUSION

Accordingly, Patent Owner respectfully requests the Board find that the Challenged Claims are not rendered obvious under Grounds 1-4.

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 7644 words as counted by the word-processing program used to prepare it.

Dated: July 25, 2024,

Respectfully submitted,

/s/ Hao Ni

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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: July 25, 2024,

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