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 IPR2023-01168

U.S. Patent No. 9,605,835

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 '835 Patent.

I. INTRODUCTION

Brightplus Ventures LLC ("Patent Owner") submits this response showing that each of the 3 grounds set forth by Hisense USA Corporation ("Petitioner") fail to render obvious challenged claims 1-5 and 7-14 ("Challenged Claims") of U.S. Patent No. 9,605,835 ("the '835 Patent")

The Board should affirm the validity of the Challenged Claims because Petition has failed to show that the references cited render the Challenged Claims obvious.

As to Ground 1, a POSITA would not be motivated to combine Mok and/or Holman with Lamb in general. A POSITA would also not be motivated to combine specific elements of Holman and/or Lamb with Mok due to the disadvantages when combined. Furthermore, even if a POSITA somehow combined Mok with Holman and Lamb, the combination fails to disclose various elements of independent claim 1 and dependent claims 11 and 14.

As to Ground 2, a POSITA would not be motivated to combine Epstein and/or Holman with Lamb in general. A POSITA would also not be motivated to combine specific elements of Holman and/or Lamb with Epstein due to the disadvantages when combined. Furthermore, even if a POSITA somehow combined Epstein with Holman and Lamb, the combination fails to disclose various elements of independent claim 1 and dependent claims 10 and 11.

As to Ground 3, a POSITA would not be motivated to combine Epstein with Ko and/or Kretman in general. Furthermore, even if a POSITA combined Ko, Kretman and Epstein, the combination fails to disclose various elements of independent claim 1.

Accordingly, Patent Owner respectfully requests that the Board affirm the validity of claims 1-5 and 7-14 of the '835 Patent.

II. THE '835 PATENT DISCLOSES AN IMPROVED LIGHTING SOURCE FOR GENERAL ILLUMINATION.

The '835 Patent is directed to solid state lighting systems, and more particularly to adjusting the light output of solid state lighting (e.g., backlighting). Ex, 1001 - '835 Patent, col. 1:21-23. Generally, the field relates to employing solid state lighting devices (e.g., LEDs) to illuminate a liquid crystal display (LCD) panel. *Id.* col. 1:27-30. This may be accomplished through the employment of several structures and layers incident upon the surface on which the LEDs are mounted as well as between the LEDs and the LCD panel. Ex. 2006 at ¶ 25. These structures may include reflective surfaces, polarizers of varying type and function, diffusers, lenses, brightness enhancement layers and others. *Id.* The purpose and alignment of these structures is intended to maximize the amount of light that is directed through the LCD panel at an angle and intensity that is appropriate for viewing the images displayed on the LCD panel. *Id.*

Specifically, the '835 patent describes the use of LEDs to illuminate an LCD panel by orienting the LEDs on a substrate to face in the direction normal to the plane of the LCD panel. '835 Patent, col. 3:55-59. The light emitted by the LEDs passes through a diffuser and into a specific type of brightness enhancement film (BEF). Ex. 2006 at ¶ 26. The BEF of the '835 patent is designed to allow light having a first orientation (i.e., entering at an incident angle below a certain threshold) to pass through the BEF and reflecting light having a second orientation (i.e., entering at an incident angle outside of a certain threshold) back towards the LED substrate. '835 Patent, Claim 1; *see also* Ex. 2006 at ¶ 26. The LED substrate includes a reflector constituting a sheet or covering thereon. The reflector reflects light back into the diffuser and the BEF in a process referred to as "recycling". '835 Patent, col. 3:60-64. The purpose of recycling light is to ensure that the light reaching the BEF is of the first orientation so that as the light passes through the LCD panel it is of an appropriate angle and intensity for adequately illuminating the panel for a viewer. Ex. 2006 at ¶ 26.

The term brightness enhancement film ("BEF") is not a standardized term understood the same way by everyone but is merely a way of referring to a class of films with different characteristics.

III. PETITIONER IGNORES ITS OWN PROPOSED CLAIM CONSTRUCTION IN THE DISTRICT COURT.

Although Petitioner asserts that no terms in the '835 Patent need construction, it has proposed a construction for a term in the '835 Patent in the parallel litigation. Ex. 2008 at 4. This term is discussed below.

A. "on"

Brightplus's Proposed Construction 1:22-cv-02774	Hisense's Construction 1:22-cv-02774
directly on, or on with intervening elements present"	directly on the other element or intervening elements may be present

The parties seem to agree that the specification of the '835 Patent provides the definition of the term "on": Ex. 2008 at 9

> It will be understood that when an element such as a layer, region or substrate is referred to as being "on" or extending "onto" another element, it can be directly on or extend directly onto the other element or intervening elements may also be present.

'835 Pat., col. 6:47-51. The disagreement between the parties appears to be of form, rather than substance.

Brightplus's construction is consistent with the claim language. *Id.* at 9. Hisense' proposed construction results in inconsistent and confusing verbiage. Consider for example the following limitation from claim 1 of the '835 Patent:

"a reflector sheet on the first side of the at least one substrate"

Substituting Hisense's proposed construction results in the following:

> "a reflector sheet directly on the other element or intervening elements may be present the first side of the at least one substrate.

This substitution demonstrates the problem with Hisense's formulation. First, when Hisense's proposed construction is substituted into the claim, the claim no longer makes sense. Second, the phrase "the other element" does not have an antecedent basis, leaving the jury guessing whether "a reflector sheet" should be on some unknown "other element" or on . . . "the first side of the at least one substrate." Third, "or intervening elements may be present" is not tied to the word "on" in the construction, making it imprecise as to whether intervening elements may be present, but removed from the two elements, one being on the other one— in this case "a reflector sheet" and "the first side of the at least one substrate."

Brightplus's proposed construction, on the other hand, does not suffer from these deficiencies. Carrying out the substitution of Brightplus's proposed construction into the same claim element results in the following:

> a reflector sheet directly on, or on with intervening elements present the first side of the at least one substrate

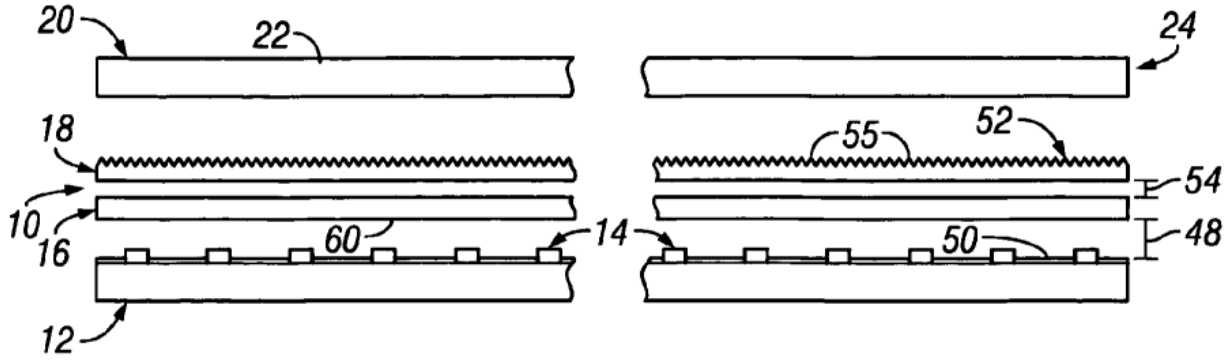
The substitution results in a grammatically sound phrase. Moreover, the substitution of Brightplus's construction does not result in any words lacking antecedent basis. Finally, Brightplus's construction still makes clear that "a reflector sheet" is on "the first side of the at least one substrate," (directly or with intervening elements present)

IV. PRIOR ART CITED BY PETITIONER.

A. Mok

U.S. Patent Publication No. 2006/0227545 ("Mok") was filed on April 11, 2010, and Petitioner relies on Mok as the primary reference for Ground 1.

Mok describes light emitting panel with a base panel having a plurality of light emitting elements mounted thereon. Specifically, Mok describes using a diffuser to accomplish light recycling. Ex. 1005 ("Mok") at [0021]. "A reflective surface 50 may be provided on the base panel 12 to 'recycle' (i.e., reflect) light which may be reflected by the back surface 60 of the diffuser 16 (i.e., light incident on back surface 60 of the diffuser 16 at an angle that exceeds the critical angle for the particular diffuser 16)." *Id.* The light emitting panel of Mok includes base panel 12, diffuser 16 and brightness enhancer 18 spaced apart by distances 48 and 54, respectively. These elements are arranged in linear stacks.



MOK ***FIG. 1***

As disclosed in Mok, the diffuser 16, is spaced at distance 48 from reflective surface 50. *Id.* at [0032]

As discussed in detail below, Mok fails to disclose a "brightness enhancement film" as claimed. Even assuming arguendo that the diffuser can be considered a "brightness enhancement film," Mok does not disclose that the "brightness enhancement film" is "**on** the reflector" as claimed.

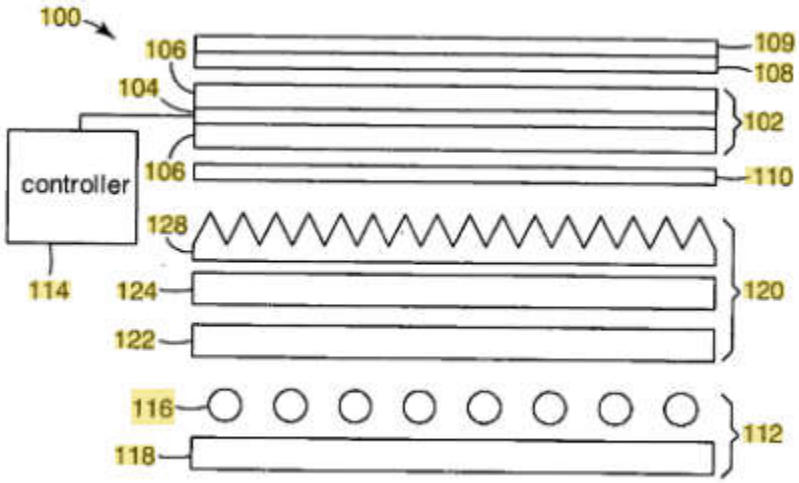
B. Epstein

Petitioner's primary reference for Ground 2 is U.S. Patent Publication No. 2010/0265029 (Ex. 1008 - "Epstein") filed on June 1, 2009. Petitioner further relies on Epstein as one of two secondary references for Ground 3. Epstein describes an array of LEDs on a substrate over which an intermediate layer and a guiding layer are arranged. Epstein at [0005]. The LEDs of Epstein function to emit light upwards. *Id.*

C. Ko

Petitioner's primary reference for Ground 3 is U.S. Patent Publication No. 2006/0082698 (Ex. 1009 - "Ko") filed on October 15, 2009. Ko describes an LCD directly illuminated from behind employing cold cathode fluorescent lamps (CCFLs) as a light source mounted above, as opposed to on, the substrate on which a reflector is mounted. The light produced by the CCFLs 16 that propagates downwards is reflected by the reflector towards several layers including a diffuser

plate, a reflecting polarizer, a brightness enhancing layer, and two layers of absorbing polarizers. Ko employs its reflecting polarizer to manage light reflection and recycling.



KO ***FIG. 1***

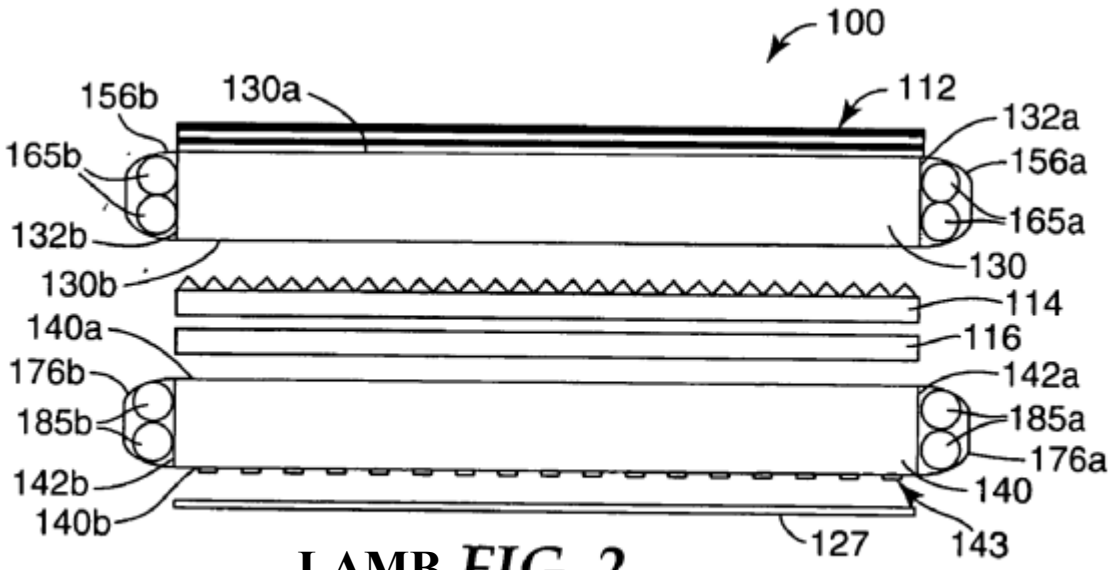
D. Holman

Petitioner relies on WO 03/056876 (Ex. 1006 - "Holman") as one of two secondary references for both Grounds 1 and 2. Holman was filed December 13, 2007, and claims priority to a US filing dated December 14, 2006. Holman describes a multi-layered LED light source array that employs reflectors, elevated prismatic films, and polarization converting films to collimate light for optimal illumination of and LCD panel.

E. Lamb

Petitioner relies on U.S. Patent Publication No. 2010/0135115 (Ex. 1007 - "Lamb") as one of two secondary references for both Grounds 1 and 2. Lamb was filed December 23, 2008.

Lamb is directed to a side lighting or edge lighting system using cold cathode fluorescent lamps (CCFLs). Lamb, [0034] Specifically, Lamb teaches a back lighting system 100 which includes a double pair of CCFL light sources 165a and 165b placed at the opposing edges 132a and 132b of the first lightguide 130. *Id.,* at [0036] Furthermore, a second, double pair of light sources 185a and 185b are placed at the opposing edges 142a and 142b of the second lightguide 140. *Id.,* at [0037]



LAMB *FIG. 2*

As disclosed in Lamb, the cold cathode fluorescent lamp light sources 165a and 165b include "lamp cavity reflectors 156a, 156b" and the cold cathode

fluorescent lamp light sources 185a, 185b include "lamp cavity reflectors 176a, 176b." *Id.,* [0036-0037]

F. Kretman

Petitioner relies on U.S. Patent Publication No. 2008/0118805 (Ex. 1010 - "Kretman") as one of two secondary references for Ground 3. Kretman describes a diffuse reflective article employed in a CCFL side lighting, edge lighting or light back scattering arrangement to optimize the incident angle of light on a display for improved illumination.

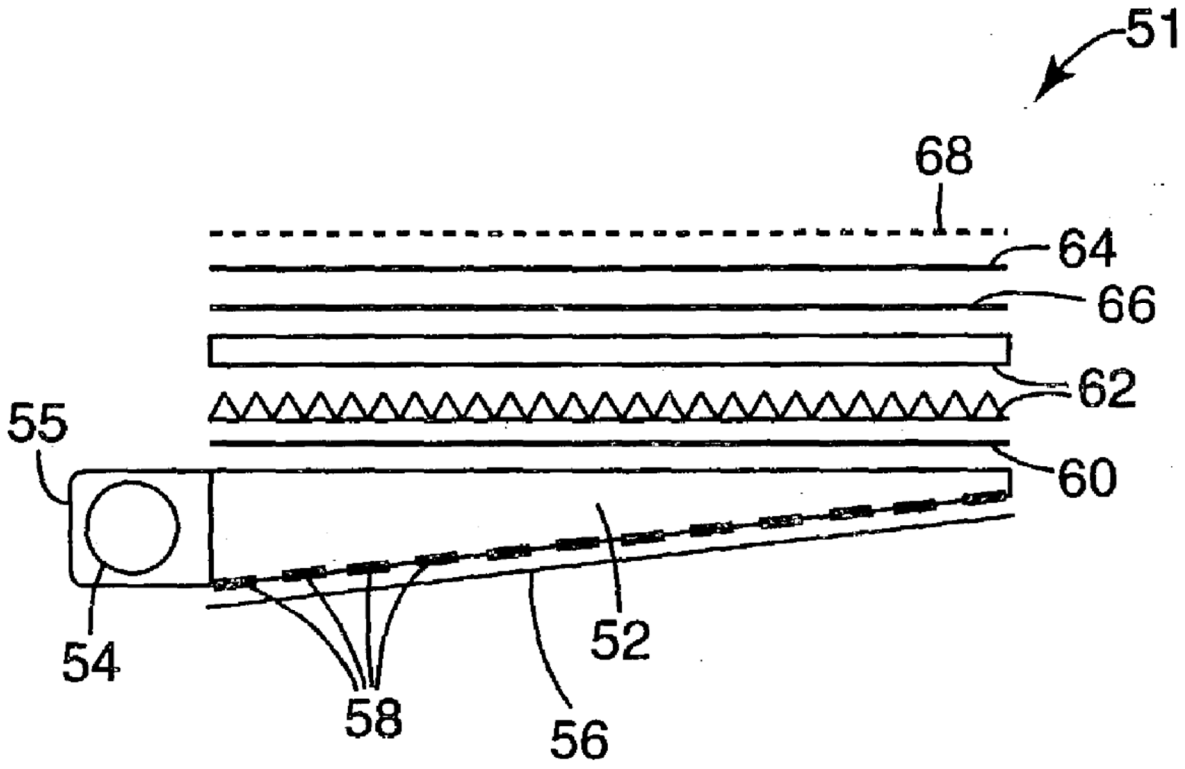


Fig. 9E

V. GROUND 1 - PETITIONER'S MOK, HOLMAN AND LAMB COMBINATION FAILS TO RENDER OBVIOUS INDEPENDENT CLAIM 1.

Petitioner relies on Mok as its primary reference for Gound 1. But Petitioner fails to demonstrate that a POSITA would be motivated to combined Lamb with Mok and/or Holman in general or that a POSITA would be motivated to combine specific elements of the references. Furthermore, even assuming arguendo that a POSITA combined portions of the references , the combination of Mok, Holman and Lamb fail to teach or render obvious claim 1.

A. Mok Fails to Disclose [Claim 1D] "a brightness enhancement film on the reflector."

Claim 1 recites:[1]

[*Preamble*] A lighting panel, comprising:
[*1A*] at least one substrate having a first side parallel to a principal plane of the lighting panel;
[*1B*] a plurality of solid state lighting devices arranged on the first side of the at least one substrate and configured to emit light;
[*1C*] a reflector on the first side of the at least one substrate;
[*1D*] a brightness enhancement film on the reflector, [*1E*] wherein the reflector is arranged between the at least one substrate and the brightness enhancement film and [*1F*] the brightness enhancement film is configured to preferentially emit light having a first orientation from the lighting panel and to preferentially reflect light having a second orientation, different from the first orientation, back into the lighting panel, and
[*1G*] a generally planar diffuser sheet between the reflector and the brightness enhancement film, wherein the light having the second orientation that is reflected back into the lighting panel is recycled within at least the diffuser sheet.

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

'835 Patent, Claim 1.

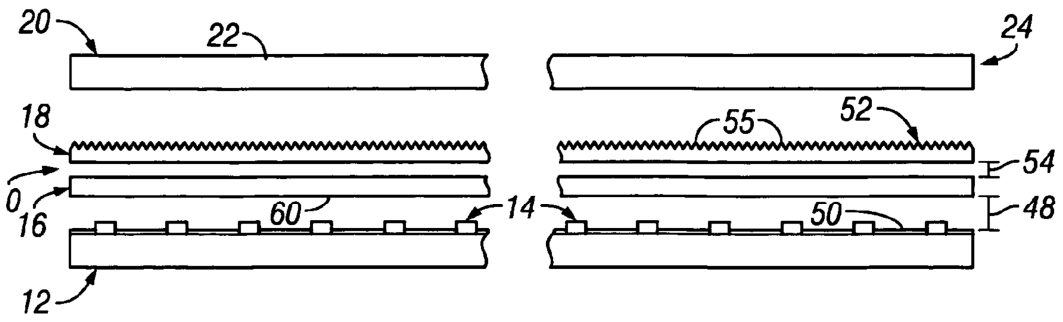


FIG. 1

Mok discloses a brightness enhancer 18 located above a diffuser 16 wherein the diffuser is further located above the reflective surface 50. Ex. 2006 at ¶ 46. Mok does not teach a "a brightness enhancement film **on** the reflector." As shown in FIG. 1 above, the brightness enhancer 18 is above or adjacent to diffuser 16. *See* Mok, [0015]. In describing FIG. 1, Mok states "a brightness enhancer 18 that is positioned adjacent the diffuser 16." *Id.* The term adjacent means close to or near something and may include touching, but in the context of Mok, Mok merely depicts a brightness enhancer 18 above the diffuser 16 and does not use the term "adjacent" to refer to direct contact with the diffuser.[2] The diffuser 16 is depicted in Fig. 1 as

[2] Adjacent means close to or near something. You may consider the people up and down your street to be neighbors, but your next-door neighbor is the person who lives in the house or apartment adjacent to yours. Adjacent can refer to two things that touch each other or have the same wall or border. https://www.vocabulary.com/dictionary/adjacent

above the reflective surface 50, which is separated by distance 48 from the diffuser 16. Likewise, Mok depicts the diffuser 16 as above the base panel 12 (having the reflective surface 50) and does not use the term "adjacent" to refer to direct contact with the reflective surface 50. Furthermore, even if Mok taught that the diffuser was in direct contact with the base panel 12, the diffuser would not be in contact with the reflective surface 50, as the protrusions from the light emitting elements 14 would still prevent direct contact between the diffuser 16 and the reflective surface 50.

This is not akin to the claim element in where the term "on" requires that the BEF be "directly on" the diffuser or with intervening elements present. Mok's placement of the brightness enhancer 18 above the diffuser 16 which is then further above the reflective surface 50 does not teach or disclose this element. *Id.* at 46.

Because Mok prefers a separated distance of 48 between the diffuser 16 and the base 12 (which includes the reflective surface 50), and Mok prefers a separated distance of 54 between the brightness enhancer 18 and the diffuser 16, it is a far stretch to suggest that Mok is teaching a "brightness enhancer **on** the reflective surface." *See* Mok [0016, 0023-0024], *See* Ex. 2006, ¶ 47. Rather Mok is teaching a brightness enhancer 18 above and close to (e.g., adjacent) the diffuser 16 and also teaching a diffuser 16 above and close to (e.g. adjacent) the base panel 12 (having a reflective surface), two steps removed from the claim element. *See* Ex. 2006, ¶ 47.

B. A POSITA Would not Be Motivated to Combine Mok with the Teachings of Holman for this Element.

In fact, Petitioner concedes that Mok does not disclose an intervening layer. Petition, at 18. [3] In a fallback, Petitioner then relies on Prism sheets 58 and 60 of Holman to disclose this element. *Id.* However, the prism sheets 58 and 60 are not BEFs as used in the '835 Patent. Ex. 2011 at 47 For example, Holman differentiates between prisms sheets and BEFs:

> "One unique aspect of elevated prism sheets 58 and 60 as used in all previous illumination examples, is that they do not have to exhibit the extreme standards in cosmetic perfection that have associated with 3M's BEF in direct view brightness enhancement applications […] Preventative measures include discarding all damaged BEF sheets. No such costly measures are needed with present prism sheets 58 and 60. Cosmetic defects in prism sheets 58 and 60 cannot be directly viewed."
>
> Holman at 121, section 8.2.1

Recognizing the fallacy of this argument, Petitioner then claims that "Holman discloses a BEF 131 that rests on a transparent dielectric material 144." Petition, at 19. Petition then claims it would've been obvious to modify Mok's layer arrangement using Holman's teachings because ***there is a general pressure in the art to reduce the thickness of panels***. Petition, at 20 (emphasis added) However,

[3] Petitioner uses the term "air gap" for the space between the elements in Mok (48, 54). This term appears to be a thinly veiled attempt to force a definition to create an "element" between the layers. 48 and 54 are referred to in Mok as "spaced-distance" and in fact is a lack of any element.

Mok specifically teaches away from this reasoning as Mok states "Generally speaking, ***larger spaced-distances 48 will improve the uniformity of the light produced by the panel, but at the expense of panel thickness and some loss of efficiency***. By way of example, in one embodiment, the diffuser 16 is separated from the base panel 12 by a distance 48 of about 50 millimeters (mm) or less." Mok, [0023](emphasis added)

In the Institution Decision (Paper 7), the PTAB stated, "[a]lthough a larger distance between the diffuser and the reflective surface of the base panel may improve light uniformity, Patent Owner essentially alleges there would be tradeoffs in combining Mok and Holman to reduce panel thickness. Our reviewing court, however, has explained that "[t]he fact that [a] motivating benefit comes at the expense of another benefit . . . should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another." *See Winner Int'l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 n.8 (Fed. Cir. 2000). The relative advantages (e.g., reduced panel thickness) and disadvantages (e.g., reduced light uniformity) of modifying Mok's lighting panel to include Holman's stacking arrangement amount to a tradeoff, a decision well within the level of an ordinarily skilled artisan. Indeed, Mok acknowledges this tradeoff. See Ex. 1005 ¶ 23 ("Generally speaking, larger spaced-distances 48 will improve the uniformity of the light produced by the panel, but at the expense of panel thickness and some loss of efficiency.")."

However, *Winner Int'l Royalty Corp* also provides limitations on this reason to combine. "The fact that the motivating benefit comes at the expense of another benefit, however, should not nullify its use as a basis to modify the disclosure of one reference with the teachings of another. ***Instead, the benefits, both lost and gained, should be weighed against one another***." *Winner Int'l Royalty Corp,* 202 F.3d 1340, 1349 n.8 (emphasis added)

If a POSITA combined Mok and Holman for this element, the reduced light uniformity of the combination outweighs the reduced panel thickness of the combination so much so that a POSITA would not see the combination as desirable due to the large loss in efficiency, i.e., the disadvantages outweigh the advantages to hinder the desirability of the combination. Ex. 2006, ¶ 48. *See Winner Int'l Royalty Corp,* 202 F.3d 1340, 1349 ("Trade-offs often concern what is feasible, not what is, on balance, desirable. Motivation to combine requires the latter.")

This Court correctly applied the reasoning of *Winner* in a prior proceeding. (IPR2022-01544, Paper 37) In that case, the PTAB stated: "[h]ere, analogous to the situation in Winner, 'one of ordinary skill in the art would not have reasonably elected trading the benefit' of relative inaudibility in Srinivasan's data hiding scheme for that of robustness, security, or a limited low frequency speech channel." 2024 Pat. App. LEXIS 1371, *58 This Court further stated, "[l]ike trading away the purpose of Winner's dead-bolt, security, trading away the purpose of Srinivasan's

data hiding technique, relative inaudibility of the hidden data, would not have been feasible, because here, Srinivasan's purpose is to hide embedded phase data, and Petitioner fails to show a sufficient reason to embed relative phase data into harmonics and also fails to show that the resulting noise in Srinivasan's modified watermarks at lower harmonic frequencies would have been expected to be relatively inaudible." *Id.* *58-59.

The '835 Patent emphasizes the need for "improved lighting sources for general illumination" and specifically criticized prior art sources that "may appear…washed out" and brightnesses that appear non-uniformly. '835 Patent, col. 2:32-42; 3:18-24. The '835 Patent repeatedly and expressly cited improving uniformity as benefits of the invention. *See* Ex. 2007, ¶ 46. Indeed, Mok further emphasized uniformity as crucial including in the Summary of the Invention and elsewhere. *See* Mok [0007, 0012, 0014-17, 0026, 0029-32, claims]

[**0012**] **FIG. 3 a** sectional view in elevation of one embodiment of a light emitting diode producing an illumination pattern comprising a region of substantially uniform intensity;

[**0014**] **FIG. 5** is a sectional view in elevation of another embodiment of a light emitting diode producing an illumination pattern comprising a region of substantially uniform intensity.

In short, a POSITA in view of Mok would not trade the desirability of uniformity for the reduced panel thickness provided by Holman to combine these elements. *See* Ex. 2006,¶ 46-47.

Furthermore, as discussed in detail below, the combination of Mok and Holman would not result in a brightness enhancer on the reflector as recited in the claims as the combination would still result in an empty space without intervening elements. Holman (pg. 8) states that the gaps "G1, G2, G3" are needed to make uniform illumination (which is therefore not compact). Holman discloses that G1 (not G2 and G3) can be reduced if the prisms can be designed to that end. *See* Holman, at 9, 16, 142

C. Holman Also Fails to Teach "a brightness enhancement film on the reflector."

Petitioner relies on Holman to argue the following:

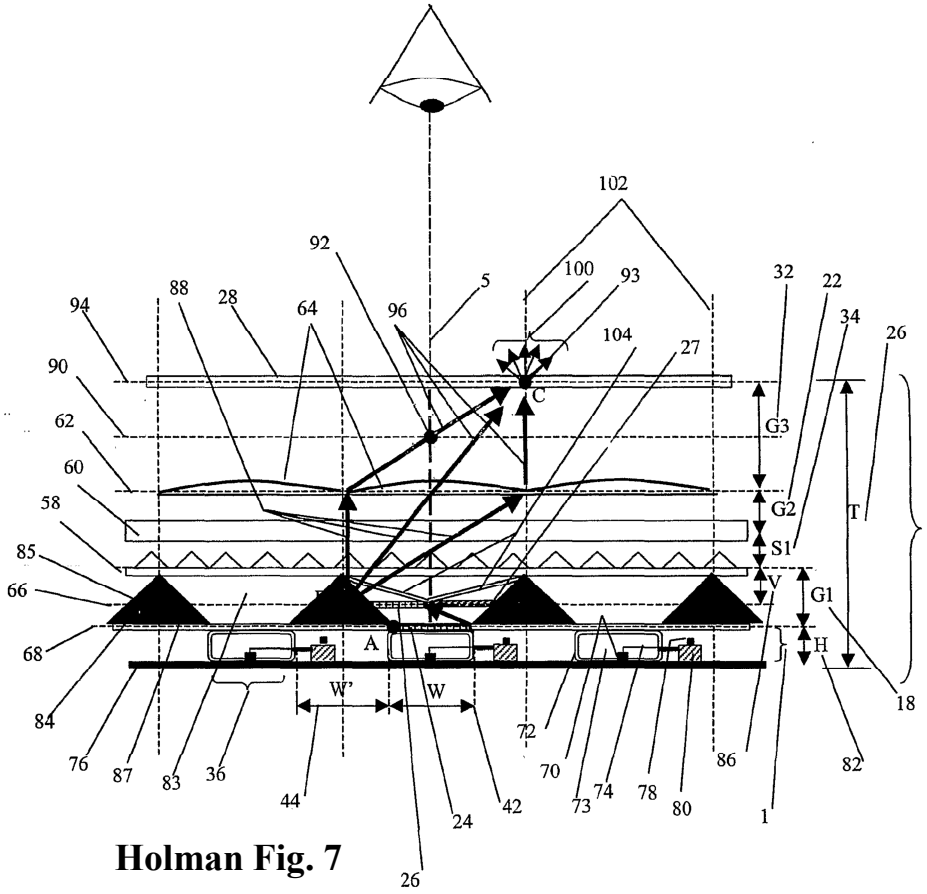
> prism sheets 58 and 60 are on the reflector (i.e., "reflecting layer 76") via intervening elements that include "confining structure 72" (see id., pp. 37-38), "diffusely scattering layer 68" (id., p. 44), "compartmentalized spacer layer 84" and "sidewalls 85" (id., p. 16). See also id., FIG. 7 showing a "stacked" arrangement where the BEF (58) is "on" the reflector (76):

Petition at 18-19.

However, Petitioner glosses over the fact that "confining structure 72" is not an intervening layer, but instead a lighting element (e.g., controlled emitting entities 72). Ex. 2006, ¶ 41.

> pixels) that result from the system's manipulation of light from, in this case its two-dimensional array of individually controlled emitting entities **72** whose square (or rectangular) emitting apertures **24** form the base layer of light source **1**. Two prism sheets, **58** and **60**, are used in tandem, both sets

Ex. 1006 - Holman at 11. As such, Holman does not disclose this claim element.



Holman Fig. 7

Similarly, no other figures or description in Holman describes a BEF directly on the reflector or on with intervening layers.

D. The "Brightness Enhancer 18 " of Mok Does Not Recycle Light and Thus is Not "a brightness enhancement film" as claimed in the '835 Patent.

A POSITA understands that there is no standard brightness enhancement film. Ex. 2006 at 50. For example, Mok explicitly states "the brightness enhancer 18 comprises a brightness enhance film (BEF) available from 3M and sold under the registered trademark Vikuiti®. Mok, [0024]. However, the 3M product is not a brightness enhancement film because it does not recycle light as required of a

"brightness enhancement film" as claimed in the '835 Patent. Ex. 2006 at 49. The "brightness enhancement film" as taught in the '835 Patent has 2 angles, one that emits (e.g., passes) light and one that reflects light to be recycled. *Id.* This is explicitly recited in Claim 1. Mok does not disclose or teach light recycling. *Id.*

E. Limitation 1F: "wherein the reflector is arranged between the at least one Substrate and the brightness enhancement film and the brightness enhancement film is configured to preferentially emit light having a first orientation from the lighting panel and to preferentially reflect light having a second orientation, different from the first orientation, back into the lighting panel"

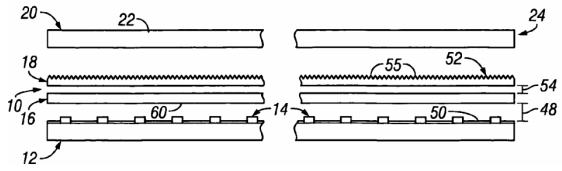
In the Institution Decision (Paper 7, pg. 27), the PTAB stated, "[b]y focusing on whether Lamb's system is compatible with a backlighting system, Patent Owner disregards Lamb's broader teaching that the 3M product already described in Mok emits light having a first orientation from the lighting panel and reflects light having a second orientation back into the lighting panel. Our reviewing court has explained that "[t]he test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference," but, "[r]ather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art." *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981). That Mok describes using the 3M product as its brightness enhancer and that Lamb describes using the same 3M product as its enhancement film is sufficient reason for combining Mok and Lamb. See Ex. 1005 ¶ 24; Ex. 1007 ¶ 35. Petitioner need only show that Lamb's enhancement film would have been a

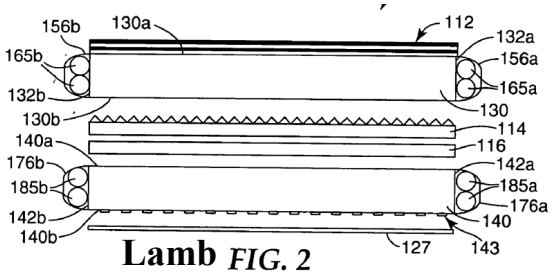
"suitable option" for implementation in Mok's lighting panel. *See Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1381 (Fed. Cir. 2023).

However, the argument that Lamb and Mok use the same 3M product for a brightness enhancement film fails to motivate a POSITA to combine the references and is an unsuitable option. Mok equally describes the 3M product to enable the invention. A POSITA would not be motivated to then redefine the same 3M product using Lamb's description. Given that they are purportedly using the same 3M product, why would a POSITA then adopt the structure of Lamb over Mok?

Furthermore, Lamb's description of the 3M BEF is only accurate because of the distant position from the reflector in the blacklight in Lamb (*see* Lamb FIG. 2) (e.g., the reflective properties of the 3M BEF (Lamb 112) is because of the distance from the backlight). Ex. 2006, ¶ 42. However, this 3M product would not operate properly if it was placed at the position on Mok (16) as this 3M product would not be described to properly reflect and thereby recycle. *Id.*

Mok Fig. 7





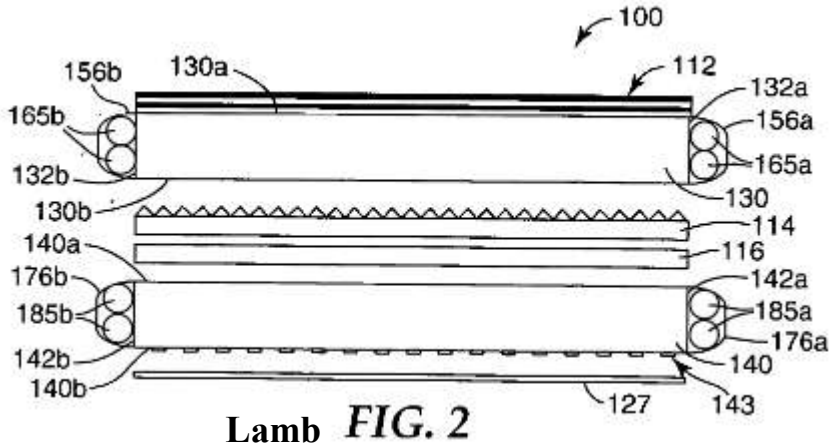
Lamb *FIG. 2*

Further, as discussed in detail below, this conclusion and the prevailing case law requires some additional showing to motivate a POSITA to combine Mok and Lamb here.

F. A POSITA Would Not Be Motivated to Combine Lamb with Mok and/or Holman.

Mok and Holman are directed to solving problems using a compact and efficient backlight. Tellingly, while Petitioner includes figures from Mok and Holman in the petition, it intentionally excludes figures from Lamb. This is because the figures would immediately demonstrate why a POSITA would not be motivated to combine Lamb, as it discloses a system for illuminating a display that would now be commonly known as "edge lighting." Ex. 2006 at 51.

Edge lighting uses light sources arranged around the edge of a light guide behind and emitting perpendicular to the surface of a display. *Id.* The light from the light sources propagates through the light guide after making a 90 degree turn before interacting with the diffuser layer and BEF. *Id.* Thus, far less light is incident on the BEF at an angle that would allow for emission until it has been turned around again and again and then recycled repeatedly to allow for correction. *Id.*



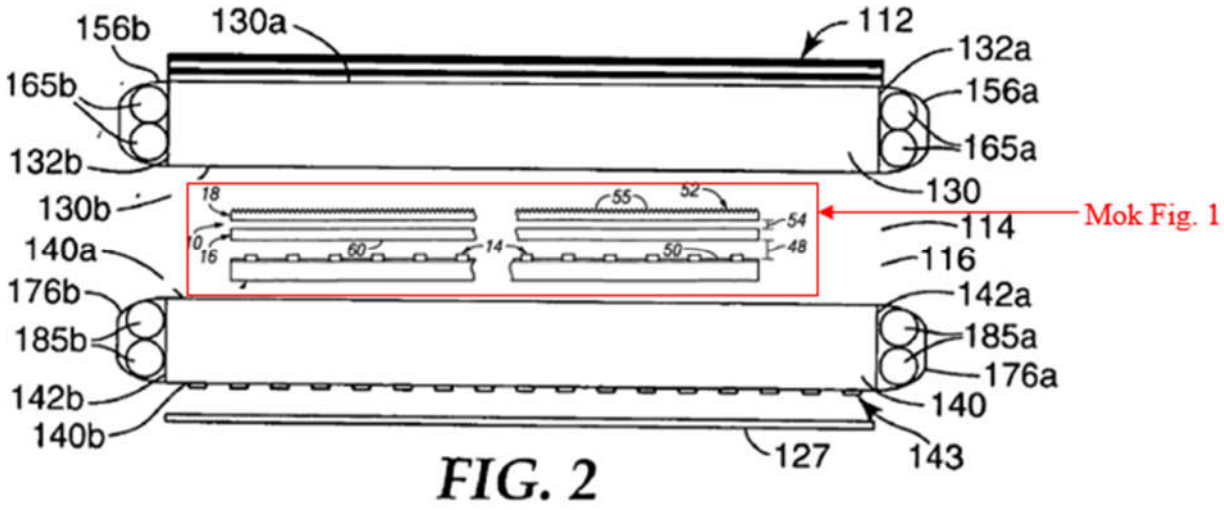
Lamb ***FIG. 2***

As shown above in Fig. 2[4], as with all figures of Lamb, Lamb employs, in order, a first set of CFFL light sources coupled to a light guide 140, a diffuser sheet 116, a BEF 114, a second set of light sources coupled to a second light guide 130, and a recycling enhancement structure 112 disposed at the surface 130a which comprises a reflective polarizer. Ex. 2006 at 52. Lamb attempts accomplish with edge lighting, light guides, ***and*** two layers of light recycling features what the '835 Patent accomplishes with a far simpler arrangement. *Id.* The system described in the '835 patent employs the BEF "preferentially emit[s] light having a first orientation from the lighting panel and preferentially reflect[s] light having a second orientation…back into the lighting panel." '835 Patent, col. 3:35-41. This is distinct from the combination of Mok and Lamb which would require multiple structures to

[4] Also, in Fig. 2 – the circles used for the edge lighting on the edges are cold cathode fluorescent lamps or CCFL tubes and not a compact LED system.

accomplish the preferential emission/reflection (e.g., reflective polarizer, diffuser, BEF). Ex. 2006 at 52.

To further illustrate this incompatibility, the combined figure below shows Lamb's multi-stage lighting system combined with a back lighting system such as that of Mok. As shown below, the light guides in Lamb (130, 140) are designed for edge lighting and force the light through a 90 degree turn – from the lamp lit edge to the emitting surface. *Id.* at 53. The '835's invention requires no such light guide or turn. *Id.* If Mok's LED substrate is mounted on top of Lamb's light guide 140, it will block all of that section's light as shown below. *Id.*



MOK FIG. 1 Combined with LAMB FIG. 2

As discussed, edge lighting and backlighting are two distinct lighting techs that operate in different ways to solve different problems. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) ("[I]t can be important to identify a reason

that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does."); *Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) ("Obviousness concerns whether a skilled artisan not only could have made but would have been motivated to make the combinations or modifications of prior art to arrive at the claimed invention.")

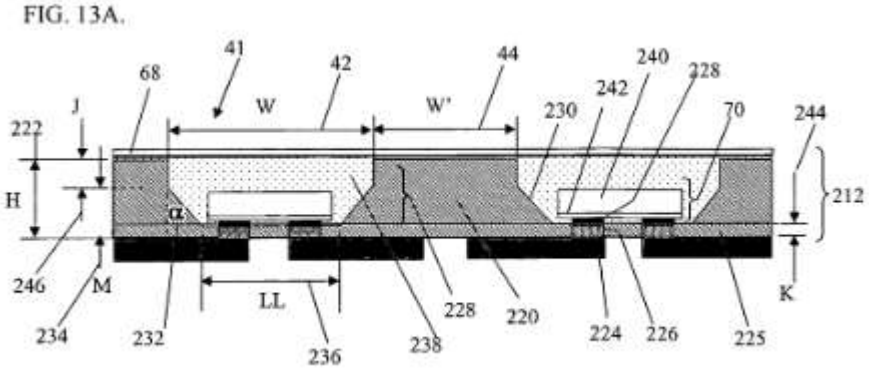
G. The Combination of Mok, Holman, and Lamb Also Does Not Disclose Limiting "direct emissions from the lighting panel…to thereby encourage light recycling/diffusion in the lighting panel" of Claim 11

Petitioner relies on the combination of Mok and Lamb to allege that dependent claim 11 is met. However, this is not the case. To summarize previous arguments, Mok does not describe a BEF that preferentially emits light having a certain incident angle. Ex. 2006 at 54. Rather it describes a BEF that "comprises a plurality of optical elements, such as prisms 55 defined by the front surface 52 of the brightness enhancer 18, that collect light from the diffuser 16 and direct it out the front surface 52 of the brightness enhancer 18. The brightness enhancer 18 thereby maximizes the on-axis brightness of the panel 10." Mok, [0024] This is merely describing re-orientation of the light to be more normal to the surface of the display, not recycling the light. Ex. 2006 at 54.

H. The Combination of Mok, Holman, and Lamb Also Does Not Disclose "a heatsink panel on a second side of the at least one substrate" of Claim 14.

Petitioner first argues that the printed circuit board of Mok is a heatsink, but this is just plain incorrect. Ex. 2006 at 55. A printed circuit board does not penetrate the substrate. It is not designed, intended or functional to draw heat away from the LEDs without substantially more than being simply a printed circuit board. *Id.*

As a backup, Petitioner relies on Holman and contends that the "Holman describes a base layer 220 that functions as part of a heat sink." Petition, at 34. However, the actual text of Holman states that "Not only must the base layer material be thermally stable, it must be counted on to service as part of the collective heat sink." Holman, pg. 40, Sec. 4.1.4.1. Holman does not teach or suggest that the base layer is considered by itself a heatsink panel on a second side of the at least one substrate. Instead, as shown in FIG. 13A in Holman below:



the base layer 220 is the intervening space between the two flip chip mounted LEDs. It is well known in the art that this component of an LED package would be

composed of an electrically insulating material. Ex. 2006, at 57. Holman confirms this "The individual LEDs 70 are mounted flip-chip…on composite, electrically-insulating, reflective base layers 220 and 225..." Holman. Pg. 37, Sec 4.1.41. Electrically insulating materials are generally not advantageous for heat sinking because they do not conduct heat any better than they conduct electricity. Ex. 2006 at 57. Even granting Petitioner the most favorable interpretation of Holman, that the base layers 220 and 225 would function as heat sinks, the base layer of the LED package is not a heat sink within the meaning ascribed to it in the '835 patent. *Id.* The heatsink of the '835 patent is configured to draw heat away from the substrate in a direction opposite to a direction of light emission. *Id.* Petitioner has shown an LED package, which is mounted on the substrate of the lighting panel. *Id.* Petitioner has merely demonstrated is that Holman discloses moving heat from the LEDs to the substrate, not away from the substrate or the sensitive display components which they light.

VI. GROUND 2 – PETITIONER'S EPSTEIN, HOLMAN AND LAMB COMBINATION FAILS TO RENDER OBVIOUS INDEPENDENT CLAIM 1.

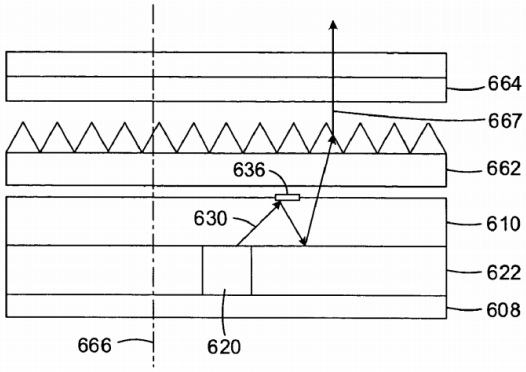
Petitioner relies on Epstein as its primary reference for Ground 1. But Petitioner fails to demonstrate that a POSITA would be motivated to combine Lamb with Epstein and Holman, nor demonstrate that the combination of Epstein, Holman and Lamb teach or render obvious claim 1..

A. A POSITA Would Not be Motivated to Combine Lamb with Epstein and Holman in General Due to Differing Technologies.

Like Ground 1 above, Lamb relies on a clumsy, double stack of edge lit backlights with CCFLs instead of rear mounted LEDs like those used in Epstein and Holman. Lamb's CCFL arrangement would not even be considered by a POSITA seeking to improve a LED based system. Ex. 2006 at 59.

B. Epstein Fails to Disclose Claim Element 1D, "a brightness enhancement film ***on*** the reflector."

Epstein does not disclose a BEF directly on the reflector as described in the '835 Patent. Ex. 2006 at ¶ 60. As shown in Epstein Fig. 11, the BEF 662 is merely disclosed as being above the guiding layer 610. The BEF is not directly on or on with intervening layers with respect to the guiding layer 610 but instead Epstein discloses an empty space between the layers. *Id.* For a brightness enhancement film to be on the reflector, it must be on or on with intervening layers present – Epstein teaches only a BEF 662 above the guiding layer 610 with space between the two layers. This is not akin to being on the reflector. An empty space is not an intervening layer as claimed and agreed to.



Epstein *FIG. 11*

Furthermore, Petitioner concedes that this element is not met as there is no intervening layer between the BEF 662 and guiding layer 610. Petition, at 40. Similar to Ground 1 above, Petitioner relies on Holman to meet this element. However, the prism sheets 58 and 60 of Holman are not BEFs as used in the '835 Patent. Ex. 2011 at 47 *See supra* Section V.A.

C. A POSITA Would not Be Motivated to Combine Epstein with the Teachings of Holman for this Element.

In the Petition, the Petitioner argues that "[o]ne of skill in the art would have been motivated to use Holman's stacked arrangement of layers in Epstein's embodiments for the reasons discussed above, including that efficient lighting panels having thin dimensions was a desirable feature." Petition at 40. The PTAB relies on *In re Kahn* as reason to accept Petitioner's proffered reasoning "to reduce overall thickness. Institution Decision at 43 citing, *In re Kahn,* 441 F.3d 977, 988 (Fed. Cir. 2006). Patent Owner disagrees.

As discussed earlier, motivation to combine requires weighing the trade-offs *Winner,* 202 F.3d at 1349. Here, Epstein continuously stresses the need for uniformity. Epstein, [0084, 0088-09] Like, the Court in *Srinivasan* (IPR2022-01544, Paper 37), the loss of uniformity by combining Epstein with Holman should be weighed by the POSITA as to whether there exists a proper motivation combine. Patent Owner submits any benefits is outweighed by the loss of the uniformity and would not motivate a POSITA to combine the elements. Ex. 2006, ¶61.

The '835 Patent emphasizes the need for "improved lighting sources for general illumination" and specifically criticized prior art sources that "may appear…washed out" and brightnesses that appear non-uniformly. '835 Patent, col. 2:32-42; 3:18-24. The '835 Patent repeatedly and expressly cited improving uniformity as benefits of the invention. *See* Ex. 2006, ¶ 46-47, 61.

Furthermore, as discussed above in Ground 1, the combination of Epstein and Holman would not resolve result in a brightness enhancer on the reflector as recited in the claims as the combination would still result in an empty space without intervening elements. Holman (pg. 8) states that the gaps "G1, G2, G3" are needed to make uniform illumination (which is therefore not compact). Holman discloses that G1 (not G2 and G3) can be reduced if the prisms can be designed to that end. *See* Holman, at 9, 16, 142

Furthermore, as discussed above in Ground 1, Holman does not disclose "a brightness enhancement film on the reflector" as intervening layers are missing due to the lighting element (e.g., controlled emitting entities 72). Ex. 2006, ¶ 41. *See Supra* V.C.

D. Epstein Fails to Disclose Claim Element 1F, "the brightness enhancement film is configured to …preferentially reflect light having a second orientation, different from the first orientation, ***back into the lighting panel***."

Epstein does not disclose a BEF reflecting light back into the lighting panel. As stated in the Petition, the BEF of Epstein **refracts** light 667 in a second direction that is closer to axis 666. Petition, at 42. (emphasis added). However, as shown in Fig. 11, Epstein discloses only that the BEF **emits** light. Ex. 2006 at 62. There is no teaching of the BEF reflecting light 667 back into the lighting panel. *Id.* Therefore, Epstein does not disclose a BEF that emits light having a first orientation and preferentially reflecting light having a second orientation different from the first orientation, back into the lighting panel for recycling as claimed.

Similar to Ground 1 above, Lamb's description of the 3M BEF is only accurate because of the distant position from the reflector in the blacklight in Lamb (*see* Lamb FIG. 2) (e.g. the reflective properties of the 3M BEF (Lamb 112) function because of the distance from the backlight). Ex. 2006, ¶ 42 However, this 3M product would not operate properly if it was placed at a closer position such as intended by the '835 Patent where the BEF is on the reflector (or a more compact

Epstein system) as this 3M product would not be described to properly reflect and thereby recycle as the light emitter. *Id.*

E. Similarly, Epstein Fails to Disclose Claim Element 1G, "wherein the light having the second orientation is reflected back into the lighting panel is recycled within at least the diffuser sheet."

Similar to the discussion of Claim 1F above, Epstein does not disclose a BEF which reflects light back nor recycles such light within the diffuser sheet.

Petitioner appears to concede this and relies on Lamb. Petition, at 44. Even assuming arguendo that a POSITA would even try to combine Lamb's edge lit system, Lamb fails to teach or disclose this element. Ex. 2006 at 64. Instead, Lamb states "… One function of the diffuser is the randomization of the polarization and direction of the light reflected by the reflective polarizer back into the backlighting system 100." Lamb at [0042]. Lamb further states "diffuser sheet primarily serves to increase spatial uniformity of the light exiting the second lightguide 140, as well as to aid in randomizing polarization of the light reflected back into the backlight 100." *Id.* at [0048]. The teachings of Lamb do not show that light is reflected into the lighting panel and recycled within the diffuser sheet. Ex. 2006 at 64-65.

Therefore, Lamb, nor the combination of Lamb and Epstein disclose all elements within Claim 1G.

F. Epstein Fails to Disclose "the light extraction features are random features" of Claim 10

Petitioner concedes that Epstein does not disclose this element of Claim 10. Petition, at 49. Petitioner instead argues that "it would've been obvious to a POSITA to modify the exemplary embodiments shown to include other light extraction features, including ones that randomize light." *Id.*

However, it would not be obvious to a POSITA to include other light extraction features, including ones "that randomize light" to the undesirable combination of Lamb and Epstein because adding additional light extraction components to that combination would only add further inefficiencies. Ex. 2006 at 67.

G. Epstein Fails to Disclose that the BEF is "configured to limit direct emission…to thereby encourage light recycling/diffusion in the lighting panel" of Claim 11

Again, Petitioner concedes that Epstein does not actually disclose the elements of Claim 11. Petition, at 50-51. The only function of the Epstein BEF is to orient light in a direction more parallel to axis 666 and is simply a re-orientation of the light to be more normal to the surface of the display. Ex. 2006 at 68. Epstein does not mention the BEF reflecting or limiting direct emissions. *Id.* And the reflector polarizer described by Petitioner is not a BEF in Epstein but rather a layer above the light emitting components, namely either the guiding layer or the intermediate layer, and not the BEF. *Id.* It is not obvious to POSITA to include

features of Lamb's brightness enhancement components in a system with Epstein since Lamb's light guides are edge lit and therefore entirely different in operation than any optical design based around Epstein's back lit LED system. *Id.*

Furthermore, a POSITA would not be motivated to combine Lamb with Epstein. Lamb employs several more elements than the inventions of the '835 Patent to accomplish recycling/diffusion in the lighting panel. Ex. 2006 at 69. The system described in Lamb is, again, an edge lighting system, not a back lighting system. Because of this, Petitioner again avoids referencing the figures of Lamb as this distinction would be otherwise readily apparent. Lamb's multi-stage lighting system is not readily combinable with a back lighting system of Epstein because a POSITA could not make a functional system from two incompatible systems as shown below. *Id.*

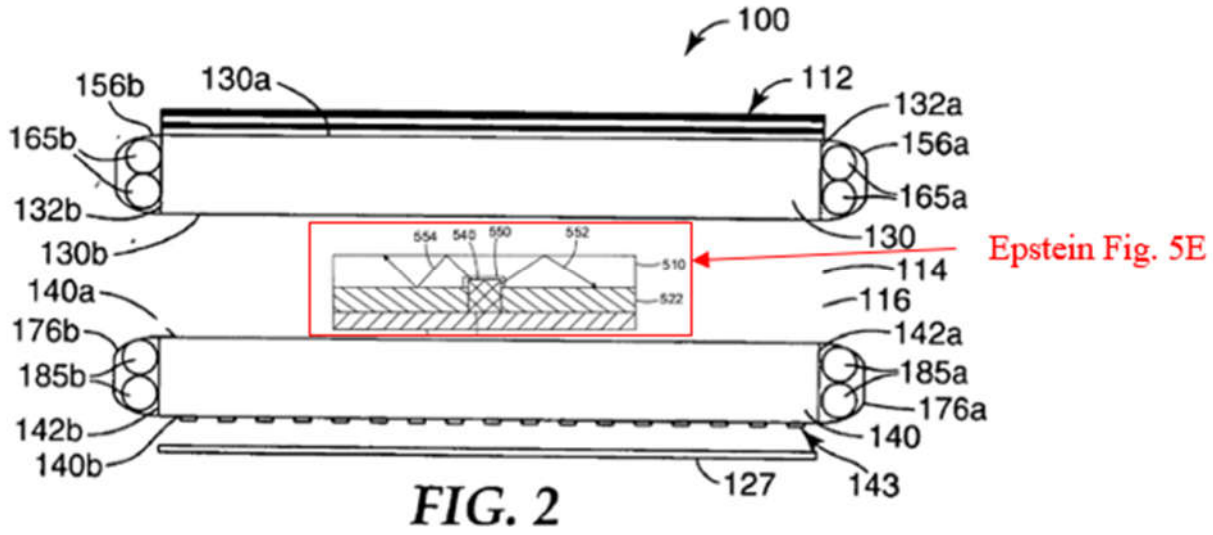


FIG. 2 of Lamb combined with Fig. 5E of Epstein

VII. GROUND 3 - PETITIONER'S KO, KRETMAN, AND EPSTEIN COMBINATION FAILS TO RENDER OBVIOUS INDEPENDENT CLAIM 1.

Petitioner relies on Ko as its primary reference for Gound 3. But Petitioner fails to demonstrate that a POSITA would be motivated to combine Epstein with Ko and Kretman, nor demonstrate that the combination of Ko, Kretman and Epstein teach or render obvious claim 1.

A. Ko Fails to Disclose Claim Elements 1B & 1C "solid state lighting devices arranged…" and "a reflector on the first side of a substrate"

Petitioner first relies on Ko to allege that the arrangement of a reflector on the first side of a substrate would be obvious at the time of the priority date of the '835 patent. Figure 1 of Ko is the only figure that describes a reflector. Ko describes its reflector as follows:

> The backlight 112 may also include a reflector 118 for reflecting light propagating downwards from the light sources 116, in a direction away from the LCD panel 102. The reflector 118 may also be useful for recycling light within the display device 100, as is explained below. The reflector 118 may be a specular reflector or may be a diffuse reflector. One example of a specular reflector that may be used as the reflector 118 is Vikuiti™ Enhanced Specular Reflection (ESR) film available from 3M Company, St. Paul, Minn. Examples of suitable diffuse reflectors include polymers, such as polyethylene terephthalate (PET), polycarbonate (PC), polypropylene, polystyrene and the like, loaded with diffusely reflective particles, such as titanium dioxide, barium sulphate, calcium carbonate and the like. Ko at [0043]

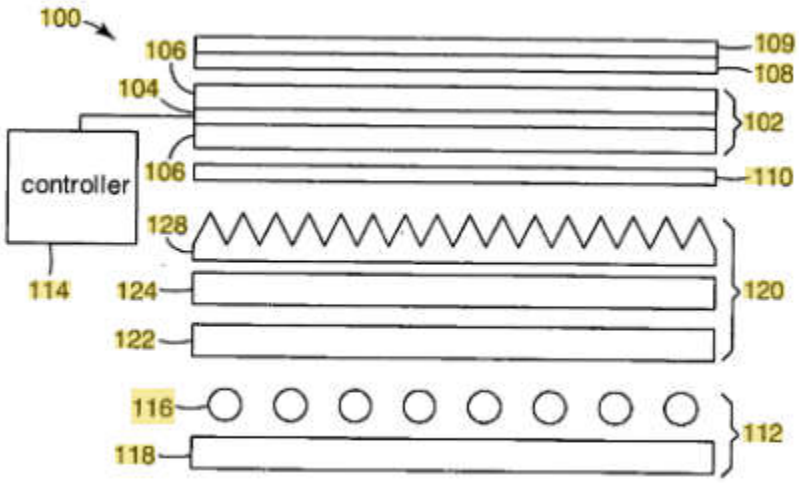


FIG. 1

The reflector as described in Ko is not disposed on a substrate as required by the '835 Patent Claims. Ex. 2006 at 71.

Ko specifically describes the purpose of the reflector as being for "reflecting light propagating downwards from the light sources" Ko at [0043]. In order for the light to propagate downwards, the light sources must either, in the case of a limited emission angle light source, be directed downwards or, in the case of a 360 degree angle CCFL light source as shown in Ko's Fig 1 above, be suspended above the reflector. Ex. 2006 at 72.

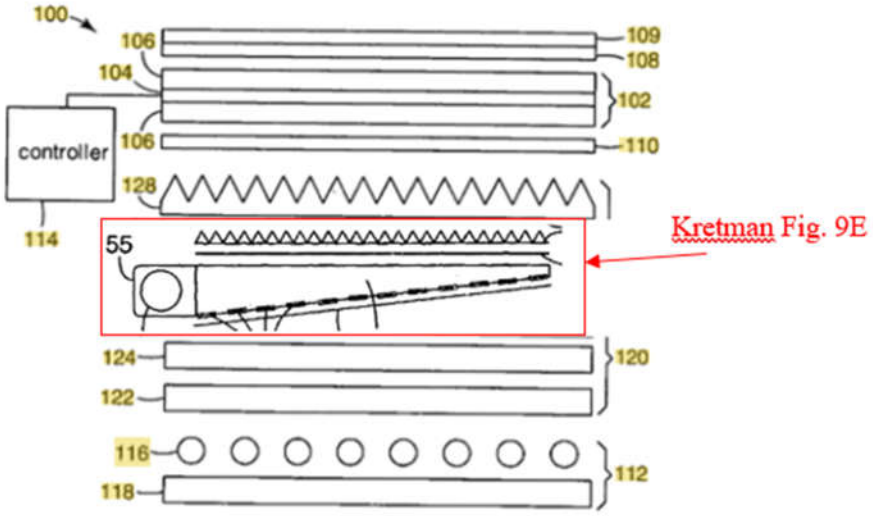
In Ko, the arrangement of the light sources with respect to the reflector teaches away from an arrangement wherein the light sources and the reflector are both mounted to a substrate that is "parallel to a principal plane of the lighting panel" as recited in Claim 1 of the '835 Patent. *Id.* at 73.

Petitioner appears to concede that Ko does not include these elements an relies on Kretman. Petition, at 56-57. Kretman, alone or in combination with Ko do not teach the relevant features of the reflector described in the '835 patent. Ex. 2006 at 74. The figures of Kretman relevant to the reflector arrangement on the substrate are Figures 9A-F.

Figures 9A and 9E below depict a side lighting or edge lighting arrangement with CCFLs similar to that described in Ground 1 by Lamb. *See* Kretman, Figures. As with Lamb, a POSITA would not be motivated to combine a non-analogous CCFL based edge lighting arrangement of Kretman with a direct back lighting arrangement like Ko because it makes no sense, adds inefficiencies, and wouldn't work with the two different optical systems and light guides. Ex. 2011 at 75. A POSITA would know that there is no advantage in this kind of combination. A POSITA would know that you can't combine edge lit with direct lit because edge lit needs to make a 90 degree turn in its light guide (52 below) and direct or back lit devices don't need a light guide. *Id.*

Kretman is an edge lit device with fluorescent tubes (CCFL), therefore there is no place that you can mount LEDs in a way that would function. Ex. 2006 at 76. Ko's CCFL are mounted above the reflector where they will block Epstein's LEDs. *Id.* Additionally, CCFLs are much larger and clumsier than LEDs and CCFLs require a separate, high voltage power supply incompatible with LEDs. *Id.* For further

illustration, inserting Kretman's light guide anywhere into Ko would just block Ko's light as shown in a combination figure below. *Id.*



Ko Fig. 1 Combined with Kreman Fig. 9E

Petitioner further cites Fig. 9C of Kretman in its petition. Petition, at 58 However, this figure further demonstrates teaching away from the claimed invention of the '835 Patent as Fig. 9C illustrates light emitting diodes 24 mounted to emit light downwards towards a reflector that will scatter the light into a brightness enhancing film 10. Ex. 2006 at 76.

B. A POSITA Would Not Be Motivated to Combine Epstein with Ko and/or Kretman to meet Claim Elements 1B & 1C "solid state lighting devices arranged…" and "a reflector on the first side of a substrate"

Petitioner apparently concedes that neither Ko nor Kretman sufficiently disclose claim elements 1B & 1C. Petition, at 58 and instead turn to Epstein. However, Epstein is not combinable with Kretman and/or Ko.

Epstein describes an array of LEDs on a substrate over which an intermediate layer and a guiding layer are arranged. The LEDs of Epstein function to emit light upwards, in such an arrangement the features of Ko and Kretman would be non-operative. *Id.* at 79 The way in which the CCFL light sources of Kretman and Ko would have to receive power would be non-functional if applied to Epstein and the reflective features of Epstein would be nonfunctional if the LEDs were arranged as described in Ko and Kretman who only show CCFLs and not LEDs. *Id.*

Furthermore, Petitioner's argument for this combination does not in any way describe how such a combination would function. The combination would, in fact, require a complete re-engineering of the backlighting panel in a way that is non-obvious to a POSITA who knows that you can't combine edge lit with direct lit because edge lit needs 90 degree turn in its optics and direct lit doesn't. Ex. 2006 at 80.

C. The Combination of Ko, Kretman and Epstein Fail to Disclose Claim 1D "a brightness enhancement film on the reflector."

Even assuming arguendo that Epstein was combined with Ko and Kretman, the combination fails to disclose an arrangement of a "brightness enhancement film" on the reflector.

From the combination, Figure 1 of Ko is the only figure that includes a reflector, the reflector 118 is not in contact with the diffuser. The relevant figure of Kretman, figure 9C does not include a diffuser but the arrangement of elements in

the referenced figure 9E prevents a diffuser from being mounted in contact with the reflector.

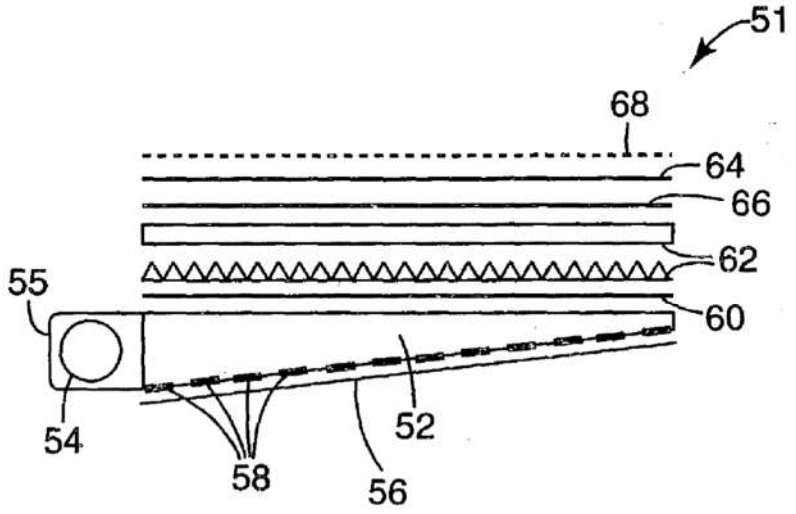


Fig. 9E

Neither Kretman nor Ko could meet this element.

With respect to Epstein, the element that could be construed as a reflector - , the intermediate layer - is separated from the other layers by a guiding layer. All of the figures in Epstein that reference what could be construed as a diffuser (diffusely reflecting material) show that element separated from the reflector by some distance. Ex. 2006 at 83.

D. The Combination of Ko, Kretman and Epstein Fail to Disclose Claim 1F "…preferentially emit light having a first orientation from the lighting panel and preferentially reflect light having a second orientation back into the lighting panel."

Petitioner references Ko's brightness enhancing layer "which has a number of prismatic ridges that redirect the illumination light, through refraction and

reflection." Petition, at 61. Petitioner selectively quotes Ko to omit the previous sentence which contextualizes this statement. The description in context is as follows:

> "A brightness enhancing layer is one that includes a surface structure that redirects off-axis light in a direction closer to the axis of the display. This increases the amount of light propagating on-axis through the LC layer 104, thus increasing the brightness of the image seen by the viewer. One example is a prismatic brightness enhancing layer, which has a number of prismatic ridges that redirect the illumination light, through refraction and reflection."

Ko at [0051]. This section describes redirecting/collimating the emitted light towards the liquid crystal layer and not reflecting light back towards diffuser, reflector and light sources which becomes apparent on a more fulsome reading of Ko. Ex. 2006 at 85. Ko employs a reflecting polarizer to accomplish the described light reflecting, not a BEF as described in the '835 patent. *Id.*

> "***The reflecting polarizer*** *124, however, may be used to reflect the light that would otherwise be absorbed in the lower absorbing polarizer*, and so this light may be recycled by reflection between the reflecting polarizer 124 and the reflector 118. At least some of the light reflected by the reflecting polarizer 124 may be depolarized, and subsequently returned to the reflecting polarizer 124 in a polarization state that is transmitted through the reflecting polarizer 124 and the lower absorbing polarizer 110 to the LC layer 104. In this manner, ***the reflecting polarizer*** *124 may be used to increase the fraction of light emitted by the light sources 116 that reaches the LC layer 104*, and so the image produced by the display device 100 is brighter."
>
> Ko at [0045] (emphasis added)

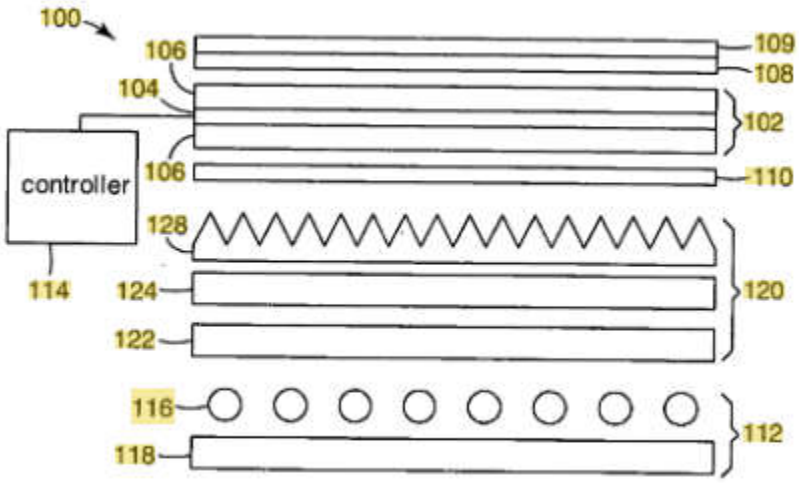


FIG. 1

Unlike the '835 Patent, Ko employs several polarizers (e.g. a reflecting polarizer and a lower absorbing polarizer) to accomplish what the BEF of the '835 Patent does. Ex. 2006 at 86. As such, this does not render the recycling function of the BEF of the '835 patent obvious.

Petitioner advances Kretman as an alternative to render these features obvious. Petition, at 61. Petitioner relies on Figure 9A of Kretman for this assertion. *Id.* As discussed earlier, the edge lighting CCFL arrangement of Kretman figure 9A is not combinable with a back lighting LED or CCFL apparatus. Ex. 2006 at 87. Kretman is non-analogous to the '835 Patent and a POSITA would not use this combination due to at least the basic incompatibility of edge lit versus back lit devices. *Id.*

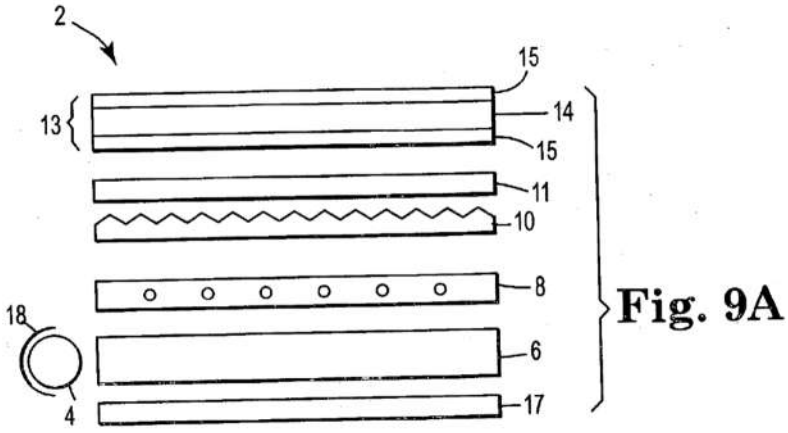


Fig. 9A

E. Ko fails to disclose Claim 1G "a generally planar diffuser sheet between the reflector and the brightness enhancement film, wherein the light having the second orientation that is reflected back into the lighting panel is reflected within at least the diffuser sheet."

As discussed in Claim 1F, Ko accomplishes light recycling through a series of polarizers, not the BEF. The arrangement detailed in Ko employs a reflecting polarizer to either emit or reflect light depending on its state of polarization. This is an entirely different arrangement than that described in the '835 patent which reflects and recycles light at the BEF. Ex. 2006 at 87. Again, Ko uses several polarizers to accomplish what the '835 patent discloses with solely the BEF. *Id.*

F. Ko and Kretman alone or in combination fail to disclose Claim 11 "The lighting panel of claim 9, wherein the brightness enhancement film is configured to limit direct emission from the lighting panel of light emitted by the plurality of solid state light emitting devices to thereby encourage light recycling/diffusion in the lighting panel."

Petitioner relies on the combination of Ko and Kretman to allege that a brightness enhancement film configured to limit direct emission from the lighting panel of light emitted by the plurality of solid state light emitting devices to thereby

encourage light recycling/diffusion in the lighting panel would have been obvious at the time of the priority date of the '835 patent.

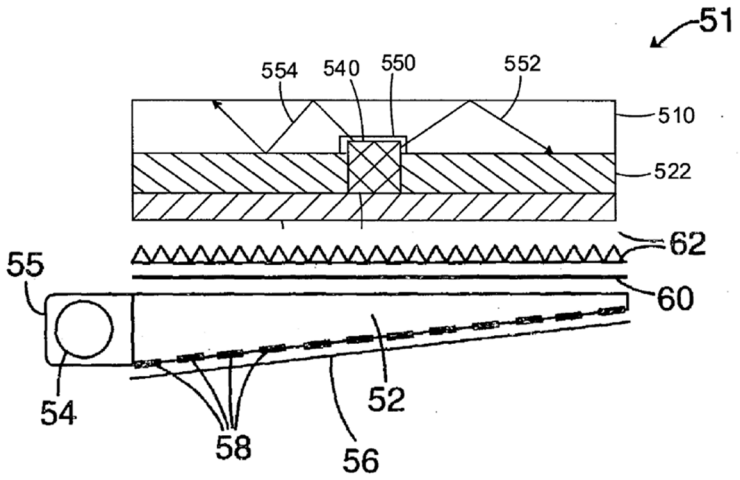
As stated above, Ko does not describe a BEF that preferentially emits light having a certain incident angle. Rather, Ko describes a brightness enhancing layer as "one that includes a surface structure that redirects off-axis light in a direction closer to the axis of the display. Ex. 2006, at 90. This increases the amount of light propagating on-axis through the LC layer 104, thus increasing the brightness of the image seen by the viewer. *Id.* One example is a prismatic brightness enhancing layer, which has a number of prismatic ridges that redirect the illumination light, through refraction and reflection."

What's being discussed in Ko is merely describing re-orientation or collimating of the light to be more normal to the surface of the display – but does not discuss recycling the light. Ex. 2006 at 91. Claim 1 does not claim collimating light. Likewise, claim 11 which depends from claim 9 which depends from claim 1 does not claim collimating light. Indeed, claim 4 recites "comprising at least ***one additional layer*** on the brightness enhancement film configured to…***collimate*** and/or reflect light." '835 Patent, claim 1 (emphasis added). As such, the disclosure in Ko is distinguishable from claim 11.

Petitioner also again relies on Ko's implementation of a reflective polarizer, as stated above, this is inappropriate and does not render obvious claim 11 of the

'835 patent. Petitioner attempts to ameliorate this shortcoming by citing the claim language of Ko which intimate that the diffuser plate and reflective polarizer elements may be attached to the brightness enhancing layer. This is irrelevant as they are separate elements. Ex. 2006 at 92. Attaching them together does not create the system of the '835 patent which accomplishes light recycling via its BEF not a combination of disparate elements as in Ko. *Id.*

Petitioner's reliance on Kretman is similarly misplaced. Again, Kretman describes a system that is entirely different than the one disclosed in the '835 patent. Petitioner chooses to avoid referencing the figures of Kretman as this distinction would be immediately apparent if it had. Kretman's edge lighting and back scattering systems are not readily combinable with a back lighting system. This is because Kretman's optical design and its associated light guide would block the back mounted LED's light or if the LED is mounted first the LED's substrate blocks CCFL light. Thus neither combination works and is incompatible with LED backlights. The potential combination of Epstein and Kretman below illustrates this problem.



G. Kretman and Epstein alone or in combination fail to disclose claim 14 "The lighting panel of claim 1, further comprising a heatsink panel on a second side of the at least one substrate opposite to the first side and configured to draw heat away from the at least one substrate in a direction opposite to a direction of light emission from the at least one substrate.

Petitioner relies on the combination of Kretman and Epstein to allege this element is disclosed. Petition at 71-72

However, Kretman's CCFLs do not use heat sinks nor does Kretman disclose or describe a heat sink apparatus as detailed in the '835 patent:

> "[T]he lighting panel 40 may further include a heatsink panel 80 provided on a side of the tiles 10 opposite to the lighting elements 12. Thus, heat may be extracted from the lighting panel 40 in a direction opposite to the direction of light emission…The heatsink features 82 may be positioned opposite the lighting elements 12." '835 Patent, col.12:54-56.

Kretman in the relevant section cited by Petitioner, reads as follows:

> "One embodiment of the present invention, a sign cabinet, is shown in FIG. 10. The sign cabinet 30 includes an image on film 32 (such as

> PANAFLEX™ available from 3M) attached as the front panel of a box 33 having the other sides 34 made of an inexpensive and heat resistant material such as aluminum. The box 30 contains a light source 36 able to provide sufficient light to illuminate the imaged film over a prolonged period of time." Kretman, [0094]

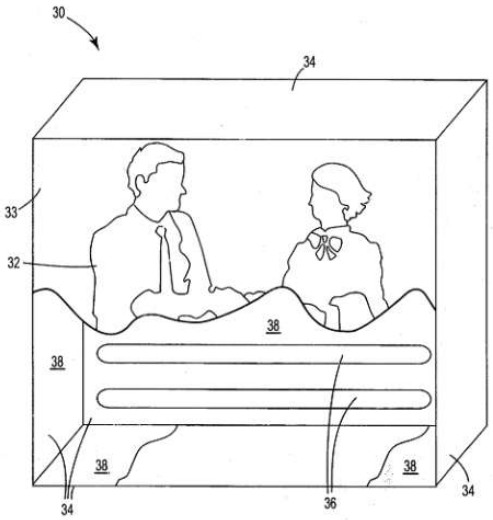


Fig. 10

Fig. 10 of Kretman describes a sign for outdoor usage where the external metal box is merely a housing which protects against the elements not used as a heat sink for internal electronics. Ex. 2006 at 97. Petitioner's argument that building the sides of a box out of metal is equivalent to employing a heatsink should be rejected. *Id.* at 98.

A heat sink only works to cool an IC or LED chip when there is a low heat resistance path from the LED's die substrate to the so-called heat sink which is then configured to be cooled by air flow or by some other coolant. *Id.* Merely having a die to be cooled near something metal does not work. *Id.* The panel sides of Kretman are not disposed on the side of the substrate opposite the lighting elements, there is

no indication that they are even attached to the substrate. *Id.* A POSITA would know that having a metallic layer on the opposite side of an LED's insulating substrate 408 as shown in Fig. 4E of Epstein could not act as a heat sink because there is no low heat resistance path from the LED's die to that metal layer. *Id.* at 99. All of Kretman's figures show CCFLs (54 below) which cannot be cooled with any kind of heat sink, but instead relying solely on air flow around the glass tube 54. *Id.*

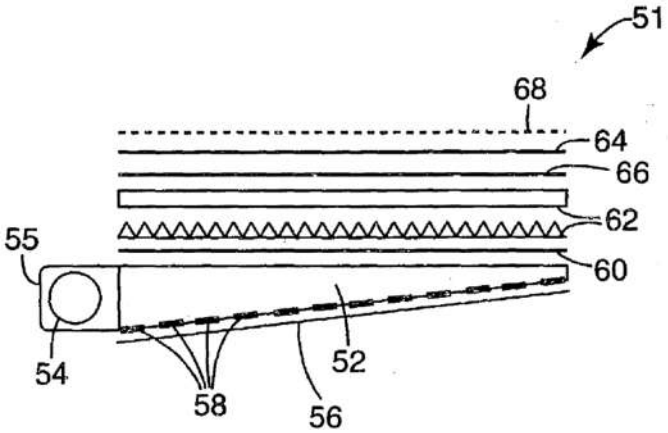


Fig. 9E

VIII. CONCLUSION

For at least the above reasons, the Patentability of the Challenged Claims should be affirmed.

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 9,854 words as counted by the word-processing program used to prepare it.

Dated: April 23, 2024

Respectfully submitted,

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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: April 23, 2024

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