

Petition for *Inter Partes* Review
U.S. Patent No. 7,872,705

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hisense USA Corporation
Petitioner

v.

Brightplus Ventures LLC
Patent Owner

Patent No. 7,872,705
Filing Date: July 29, 2007
Issue Date: January 18, 2011
Title: LED Backlight System for LCD Displays

Inter Partes Review No. IPR2023-01411

PETITION FOR *INTER PARTES* REVIEW

TABLE OF CONTENTS

I.	Mandatory Notices (37 C.F.R. § 42.8(b))	1
A.	Real Party-in-Interest (37 C.F.R. § 42.8(b)(1)).....	1
B.	Related Matters (37 C.F.R. § 42.8(b)(2)).....	1
C.	Designation of Lead and Backup Counsel (37 C.F.R. § 42.8(b)(3)) and Service Information (37 C.F.R. § 42.8(b)(4)).	2
II.	Introduction.....	3
III.	IPR Requirements.....	3
B.	Fees (37 C.F.R. § 42.103)	4
C.	Challenge Under 37 C.F.R. § 42.104(b)	4
IV.	Background.....	5
A.	The '705 Patent	5
B.	Prosecution of the '705 Patent.	7
V.	Expert Testimony, Level of Skill in the Art, and Claim Construction.....	8
A.	Declaration Evidence	8
B.	Person of Ordinary Skill in the Art	8
C.	Claim Construction	9
VI.	Prior Art.....	9
A.	Johnson.....	9
B.	Suzuki.....	11
C.	Fine.....	14
VII.	Full Statement of the Reasons for the Relief Requested.....	15

A.	Ground 1: Claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, 31, 32, 33, and 34 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Johnson in view of the Knowledge of a POSITA.	15
1.	Independent Claim 1.	15
2.	Dependent Claim 2.	20
3.	Dependent Claim 5.	22
4.	Dependent Claim 6.	22
5.	Dependent Claim 9.	25
6.	Dependent Claim 11.	28
7.	Dependent Claim 13.	31
8.	Dependent Claim 14.	32
9.	Dependent Claim 16.	32
10.	Dependent Claim 17.	33
11.	Dependent Claim 22.	34
12.	Dependent Claim 28.	34
13.	Dependent Claim 29.	36
14.	Dependent Claims 31 and 34.	38
15.	Dependent Claims 32 and 33.	40
B.	Ground 2: Claims 1, 2, 5, 11, 13, 14, 16, 17, 32, and 34 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Suzuki in view of the Knowledge of a POSITA.	41
1.	Independent Claim 1.	41
2.	Dependent Claim 2.	47
3.	Dependent Claim 5.	48
4.	Dependent Claim 11.	49
5.	Dependent Claim 13.	50
6.	Dependent Claim 14.	51
7.	Dependent Claim 16.	52
8.	Dependent Claim 17.	52
9.	Dependent Claim 32.	54
10.	Dependent Claim 34.	55

C.	Ground 3: Claim 32 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Johnson in view of Fine and the Knowledge of a POSITA.	56
1.	Motivation to Combine Johnson and Fine.	56
2.	Dependent Claims 32 and 33.	59
D.	Ground 4: Claims 6, 22, 28, 29, 32, and 34 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Suzuki in view of Fine and the Knowledge of a POSITA.	60
1.	Motivation to Combine Suzuki and Fine.	60
2.	Dependent Claim 6.	62
3.	Dependent Claim 22.	64
4.	Dependent Claim 28.	66
5.	Dependent Claim 29.	67
6.	Dependent Claim 32.	68
7.	Dependent Claim 34.	69
VIII.	Any Secondary Considerations Cannot Overcome the Clear Evidence of Obviousness.	71
IX.	Discretionary Denial is Inappropriate.	71
X.	Denial Under Section 325(d) is Inappropriate.	74
XI.	Conclusion.	74

LIST OF EXHIBITS

EXHIBIT	DESCRIPTION
1001	U.S. Patent No. 7,872,705 (“the ’705 Patent”)
1002	Prosecution History of U.S. Patent No. 7,872,705
1003	Declaration of Morgan Pattison, Ph.D.
1004	Curriculum Vitae of Morgan Pattison, Ph.D.
1005	US 6,608,614 to Johnson (“Johnson”)
1006	US 2006/0220040 to Suzuki (“Suzuki”)
1007	US 8,128,272 to Fine (“Fine”)
1008	Counterclaim filed by Patent Owner in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 9 (N.D. Ga. Sep. 16, 2022)
1009	Scheduling Order in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774, Dkt. 35 (N.D. Ga.)
1010	Judicial Caseload Profile for the Northern District of Georgia
1011	Cover Pleading to Patent Owner’s Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.)
1012	Cover Pleading to Patent Owner’s Supplemental Infringement Contentions in <i>Hisense USA Corp. v. Brightplus Ventures LLC</i> , No. 1:22-cv-02774 (N.D. Ga.) served June 21, 2023

I. Mandatory Notices (37 C.F.R. § 42.8(b))

A. Real Party-in-Interest (37 C.F.R. § 42.8(b)(1))

The petitioner Hisense USA Corporation, is a Georgia corporation with a principal place of business at 7310 McGinnis Ferry Road, Suwanee, GA, 30024. Petitioner is a subsidiary of Hisense Group, which is organized under the laws of China. Other privies or real parties in interest include companies within the Hisense Group, including Hisense International (Hong Kong) America Investment Co., Ltd.; Hisense Group Holdings Co., Ltd.; Hisense Visual Technology Co., Ltd.; Hisense International (HK) Co., Ltd.; Hisense International Co., Ltd.; TVS REGZA Corporation.

B. Related Matters (37 C.F.R. § 42.8(b)(2))

The '705 Patent is asserted against Petitioner in a Counterclaim in *Hisense USA Corp. v. Brightplus Ventures LLC*, No. 1:22-cv-02774 (N.D. Ga.) (the "Underlying Litigation"). The Underlying Litigation was initially filed by Petitioner on July 14, 2022, and the '705 Patent was first asserted in a Counterclaim filed in the Underlying Litigation on September 16, 2022. *See* Ex. 1008. The current schedule in the Underlying Litigation is attached as Exhibit 1009. In addition to Petitioner, the following entities are Counterclaim defendants in the Underlying Litigation: Hisense Co., Ltd. Hisense International (HK) Co. Ltd., Hisense Visual Technology Co. Ltd., and TVS Regza Corp.

On July 14, 2023, Petitioner filed a petition for IPR challenging certain claims of U.S. 9,605,835, which is also asserted in the Underlying Litigation. That petition has been assigned proceeding no. IPR2023-01168. On August 11, 2023 Petitioner filed a petition for IPR challenging certain claims of U.S. 8,177,382, which is also asserted in the Underlying Litigation. That petition has been assigned proceeding no. IPR2023-01311. On September 6, 2023, Petitioner filed a petition for IPR challenging certain claims of U.S. 7,690,812, which has been assigned proceeding no. IPR2023-01385. On September 14, 2023, Petitioner filed a petition for IPR challenging certain claims of U.S. 8,941,331, which has been assigned proceeding no. IPR2023-01401. On or around the time Petitioner files this Petition, it will also file Petitions challenging other patents asserted in the Underlying Litigation, including U.S. 8,294,075 and U.S. 8,330,710.

**C. Designation of Lead and Backup Counsel (37 C.F.R. § 42.8(b)(3))
and Service Information (37 C.F.R. § 42.8(b)(4)).**

<u>Lead Counsel</u>	<u>Backup Counsel</u>
Matias Ferrario Reg. No. 51,082 1001 W. 4 th Street Winston-Salem, NC 27101 Office: 336.607.7475 Fax: 336.734.2651 MFerrario@kilpatricktownsend.com	Michael J. Turton Reg. No. 40,852 1100 Peachtree St. NE, Suite 2800 Atlanta, GA 30309-4528 Office: 404.815.6061 Fax: 404.541.3250 MTurton@kilpatricktownsend.com

Petitioner may be served via email to its lead and backup counsel at the email addresses above.

II. Introduction

The '705 Patent is invalid. Independent claim 1 recites little more than a LCD system with a waveguide element having a plurality of light entry regions and a first light emitting source positioned to emit light into a first light entry region and a second light emitting source positioned to emit light into a second light entry region. The claimed light emitting sources are a plurality of LEDs arranged in a strip with a control circuit in electrical communication with at least one of the first and second LEDs. Each of these elements was well-known in the art, and each of these elements had been used in combination for exactly the same purpose—LCD panels utilizing a waveguide with LED light sources—for years prior to the earliest claimed priority date. The combination of these known elements would have been obvious to a Person of Ordinary Skill in the Art as of the earliest claimed priority date of the '705 Patent, July 29, 2007. The challenged claims should be cancelled as obvious.

III. IPR Requirements

A. Standing (37 C.F.R. § 42.104(a))

Petitioner certifies that the '705 Patent is available for IPR and that Petitioner is not barred or estopped from requesting IPR. The '705 Patent issued on January 18, 2011, and this Petition is filed within one year of service of the

Complaint against Petitioner alleging infringement of the '705 Patent (*see* Ex. 1008) and is not barred under 35 U.S.C. §315(b).

B. Fees (37 C.F.R. § 42.103)

This Petition requests review of seventeen (17) claims of the '705 Patent and is accompanied by a payment of \$41,500, which includes the \$19,000 IPR request fee, and the \$22,500 post-institution fee. This Petition meets the fee requirements under 35 U.S.C. § 312(a)(1). The Board is hereby authorized to charge any additional fees required by this action to Deposit Account No. 20-1430.

C. Challenge Under 37 C.F.R. § 42.104(b)

This petition requests cancellation of claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, 31, 32, 33, and 34 as rendered obvious under 35 U.S.C. § 103 based on the following prior art references:

- US 6,608,614 to Johnson (“Johnson”) (Ex. 1005);
- US 2006/0220040 to Suzuki (“Suzuki”) (Ex. 1006);
- US 8,128,272 (“Fine”) (Ex. 1007); and

The statutory grounds for the challenge of each claim are set forth below:

Ground	35 U.S.C.	Claims	References
1	103	1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, 31, 32, 33, 34	Johnson in view of the Knowledge of a POSITA
2	103	1, 2, 5, 11, 13, 14, 16, 17, 32, 34	Suzuki in view of the Knowledge of a POSITA
3	103	32, 33	Combination of

			Johnson and Fine in view of the Knowledge of a POSITA
4	103	6, 22, 28, 29, 32, 34	Combination of Suzuki and Fine in view of the Knowledge of a POSITA

The record establishes a reasonable likelihood of prevailing as to each ground of invalidity with respect to the Challenged Claims. Throughout this Petition, unless stated otherwise, all emphasis is added and all colored annotations in the Figures are added.

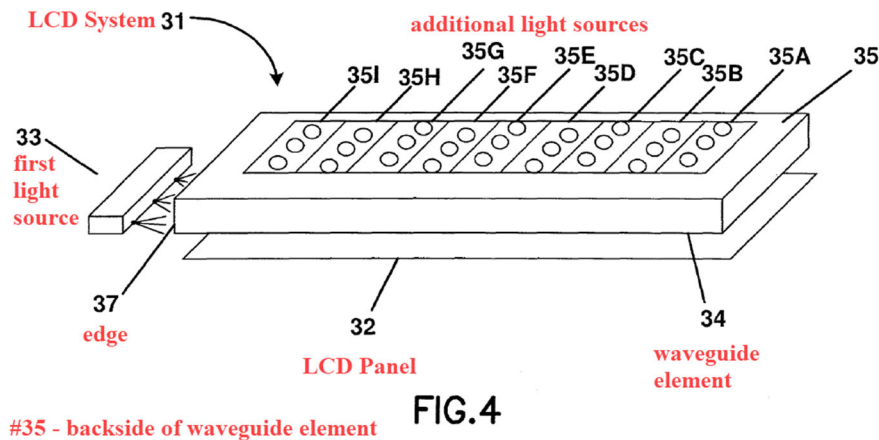
IV. Background

A. The '705 Patent

The '705 Patent was filed on July 29, 2007 and issued as a patent on January 18, 2011. The '705 Patent describes LED-based backlit liquid crystal display (LCD) systems. These LCD systems include an LCD panel, at least one waveguide element, and first and second light-emitting sources. '705 Patent, 4:52-56. The waveguide element is used “to guide optical waves from a light entry region to a transmissive surface or exit region of the waveguide element” and then to the LCD panel, helping to ensure that the entire panel is lit consistently. *Id.*, 4:56-59; 5:48-51. The waveguide element has multiple light entry regions, and the light sources are optically coupled to the light entry regions “to emit light into the light entry

regions of the waveguide element.” *Id.*, 9:52-53. Each light source contains a plurality of LEDs and the LEDs are “arranged in strip.” *Id.*, 11:46-53. Additionally, “[w]here multiple strips [of LEDs] are utilized, each strip may be adapted to emit light of substantially the same wavelength as other strips, or may be adapted to emit wavelengths different from light [of] other strips.” *Id.*, 11:63-67. The LEDs may be connected to a control circuit “to regulate, for example, power to the LEDs, intensity of the emitted light, wavelength of the emitted light, and/or other parameters.” *Id.*, 12:1-11.

Fig. 4 below illustrates one embodiment of the invention.



'705 Patent, Fig. 4. As shown in Fig. 4, the LCD system 31 includes an LCD panel 32, a waveguide element 34, a first light source 33, and additional light sources 35A-35I. *Id.*, Fig. 4; 12:10-16. The waveguide element 34 has multiple light entry regions, *i.e.*, the backside 35 and the edge 37 of the waveguide element.

Id., Fig. 4; 12:12-16. The first light source 33 is optically coupled to the edge 37 and the additional light sources 35A-35I are optically coupled to the backside 35.

Id.

B. Prosecution of the '705 Patent.

The Application that led to the '705 Patent was originally filed with claims 1-52. Examiner noted that claims 1-52 were subject to restriction and/or election on June 12, 2009. Ex. 1002 at 229-35. Further, Examiner noted that the application contained claims directed to six distinct species and directed Applicant to elect a single disclosed species for prosecution. Ex. 1002 at 231-32. On July 10, 2009, Applicant elected the Group with claims 1-44 and 47-52 and provisionally elected the Species covering claims 1-38. Ex. 1002 at 239, 242. On October 29, 2009 Examiner further noted seven distinct species (claims 2-3; claim 4; claims 8-19; claims 20-26; and, claims 17-31; claim 35; claim 36) in claims 1-38. *Id.* at 272-73. On November 24, 2009 Applicant provisionally elected claims 8-19. *Id.* at 280. The Examiner rejected claims 1, 5-16, 18, 32-34 and 37-38 as obvious under US 6,288,700 to Mori in a Non-Final Office Action dated March 25, 2010. *Id.* at 295. Applicant responded by substantively amending claims 1, 13-15, 17, and 18 and by cancelling claims 8, 12, 16, 30, and 31. *Id.* at 342-50. The amendment to claim 1 added the “plurality of LEDs arranged in a first strip” to both the first light source and the second light source limitations. *Id.* at 342.

Further, the amendment added the “common control circuit” and specifically recited “a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.” *Id.* at 342.

On September 14, 2010, Examiner noted that the claims were allowed because “the prior art of record, taken alone or in combination, fails to disclose or render obvious a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs...in combination with the rest of the limitations of the base claim.” *Id.* at 424.

V. Expert Testimony, Level of Skill in the Art, and Claim Construction

A. Declaration Evidence

This petition is supported by the declaration of P. Morgan Pattison, Ph.D, an expert with extensive experience in the relevant industry. Ex. 1003. Dr. Pattison has over (25) years of experience in the areas of light emitting diodes LEDs), organic light emitting diodes (OLEDs), lighting, solid state lighting (SSL), displays, lasers, and optoelectronic materials and devices. Ex. 1003, ¶7.

B. Person of Ordinary Skill in the Art

A person of ordinary skill in the art of the '705 Patent would have had at least a graduate degree in mechanical engineering, physics, materials science, electrical engineering, or a related discipline, coupled with at least four years' experience in designing backlighting systems for displays; the level of ordinary

skill in the art is approximate and additional education could make up for a lack of experience or vice-versa. In the Underlying Litigation Patent Owner asserted a slightly different level of skill in the art. As Dr. Pattison testifies, '705 Patent would be obvious under either level of skill. *See* Ex. 1003, ¶¶26-28.

C. Claim Construction

Nothing in the specification or prosecution history of the '705 Patent expressly defines any term appearing in any claim of the '705 Patent that is of consequence to the prior art in this Petition. Petitioner and Patent Owner proposed competing constructions for “Waveguide Element” and “Light Entry Regions” in the Underlying Litigation. However, the Board does not need to construe any claim term, including Waveguide Element or Light Entry Regions, for purposes of evaluating the prior art in this Petition, and thus for purposes of this proceeding only, Petitioner believes that no claim term requires construction.

VI. Prior Art

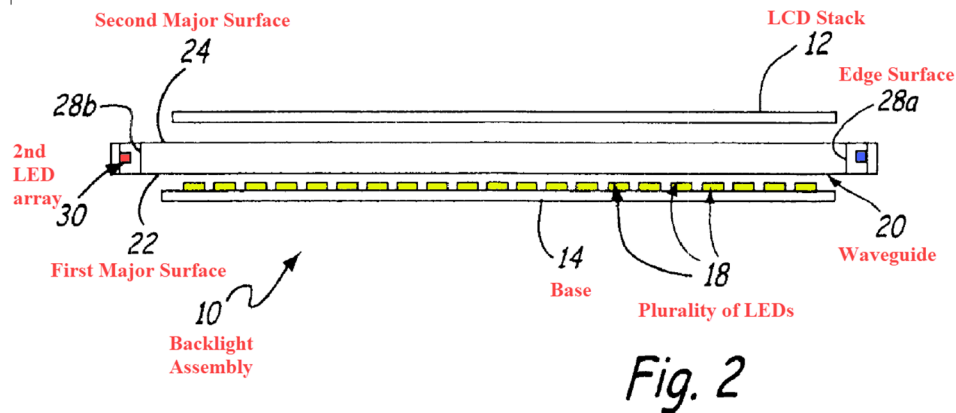
A. Johnson

Johnson was filed on June 22, 2000, and issued on August 19, 2003, and thus is prior art to the '705 Patent under at least 35 U.S.C. § 102(b).

Johnson “relates to displays, and more particularly, to an LED-based backlight for a liquid-crystal display (LCD).” Johnson, 1:7-9. Johnson proposes using LEDs as a backlight source for LCDs, offering advantages such as lower cost

(using available light sources, not specialty light sources), longer lifespan, increased durability, and higher brightness. *Id.*; Johnson, 1:50-63.

Johnson discloses adjusting the brightness of different sets of LEDs to control the chromaticity of the combined light. Johnson, 1:56-59 (“A feature of the invention is the varying of the brightness of a first set of LEDs relative to the brightness of a second set of LEDs to adjust the chromaticity of the combined light from the first and second sets of LEDs.”). Further, Johnson broadly discusses geometry and operation of a backlight assembly that includes LED arrays and a waveguide. *See e.g.* Johnson, 1:66-2:31; 2:49-3:33; 3:59-4:12; Figs. 1-2.



Johnson, Fig. 2. Finally, Johnson discloses a control system that adjusts the backlight color by varying the power supplied to the LEDs in the LED arrays. *See e.g.* Johnson 2:5-8 (“A control system 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.”); 2:9-18;
3:40-5:43; Figs. 3-5.

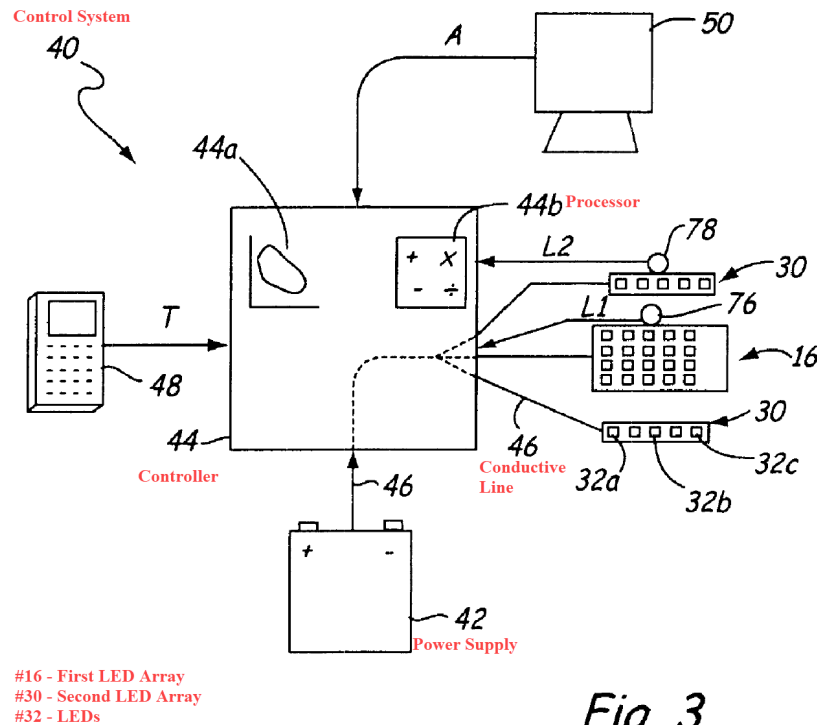


Fig. 3

Johnson, Fig. 3.

B. Suzuki

Suzuki was filed on February 28, 2006 claiming priority to Japanese application JP 2005-053977 filed February 28, 2005, and Suzuki published on October 5, 2006. Thus, Suzuki is prior art to the '705 Patent under at least 35 U.S.C. § 102(a).

Suzuki discloses a surface illuminator for a liquid crystal display comprising a liquid crystal display panel, a light guide, an array of discrete LED light sources,

and a LED driving circuit. Suzuki, ¶0004 (“A liquid crystal display is provided with a surface illuminator on a front side or back side of a liquid crystal display panel thereof. Backlight units which are surface illuminators disposed on the back side of a panel include side light (edge light) types including a light source disposed along a side edge of a light guide for guiding light and direct types including a light source disposed directly under a liquid crystal display panel.... LEDs (light-emitting diodes) have been developed as light sources to replace cold-cathode tubes, and LEDs are regarded as promising next generation light sources.”).

Suzuki also depicts a backlight unit in which the light sources (15) are located at two different light entry regions (12T, 12B) of the light guide (11). *See e.g.* Suzuki, Figs. 1, 2, 4 and associated discussion. Further, Suzuki broadly discusses the LED driving circuit that is controlling the emission of end light sources (8R) from the array of two light sources, which suggests that the driving circuit is controlling both the first and second light sources. Suzuki, ¶0044 (“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. ... 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.”).

FIG.1

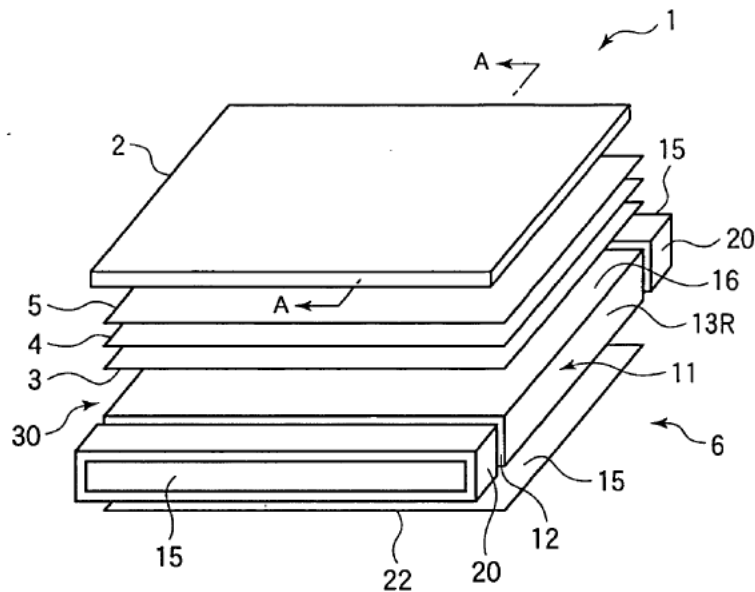


FIG.2

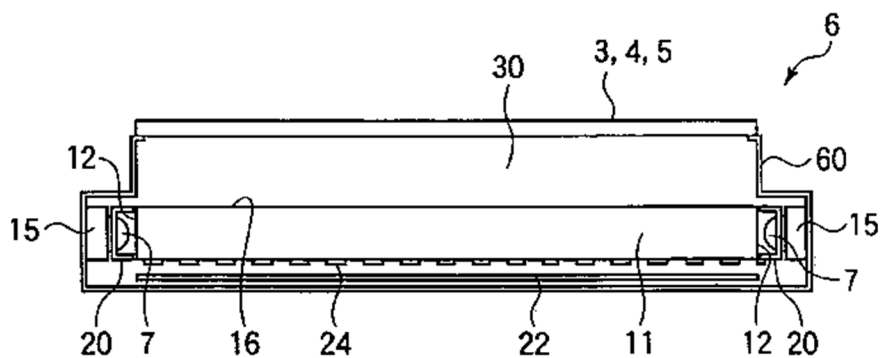
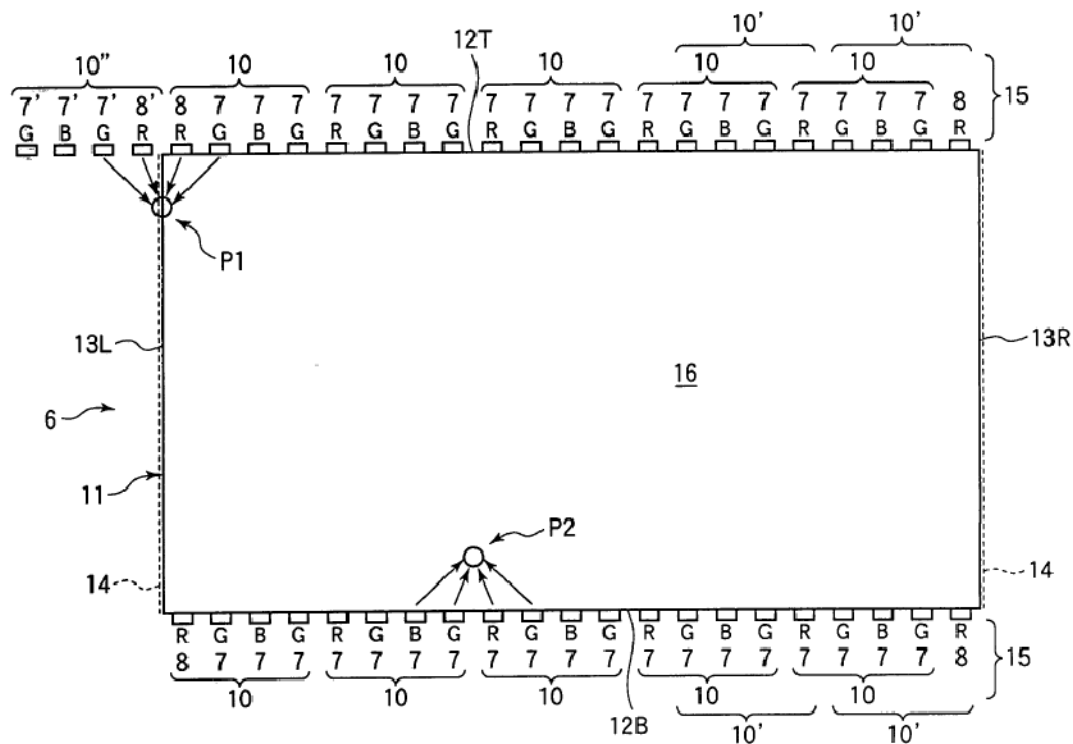


FIG.4



C. Fine

Fine was filed on June 7, 2006 claiming priority to Provisional application No. 60/687,865 filed June 7, 2005, and published on May 21, 2009. Thus, Fine is prior art to the '705 Patent under at least 35 U.S.C. § 102(e).

Fine discloses “an illumination apparatus capable of providing light at any intensity profile and any color profile, including, without limitation, uniform white light.” Fine, 1:16-20. Fine’s device “comprises one or more light emitting sources [*i.e.* LEDs] embedded in a waveguide material.” Fine, 5:14-15. Further, Fine’s

device can serve “as a component in a liquid crystal display device.” Fine, 5:25-27.

Finally, Fine discloses “a method of providing illumination, comprising applying forward bias on one or more light emitting sources embedded in a waveguide material to effect emission of light from the light emitting source(s). The waveguide material is capable of propagating the light such that at least a portion of the light is diffused within the waveguide material and exits through at least a portion of its surface, thereby providing the illumination.” Fine, 5:29-36.

VII. Full Statement of the Reasons for the Relief Requested

A. Ground 1: Claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, 31, 32, 33, and 34 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Johnson in view of the Knowledge of a POSITA.

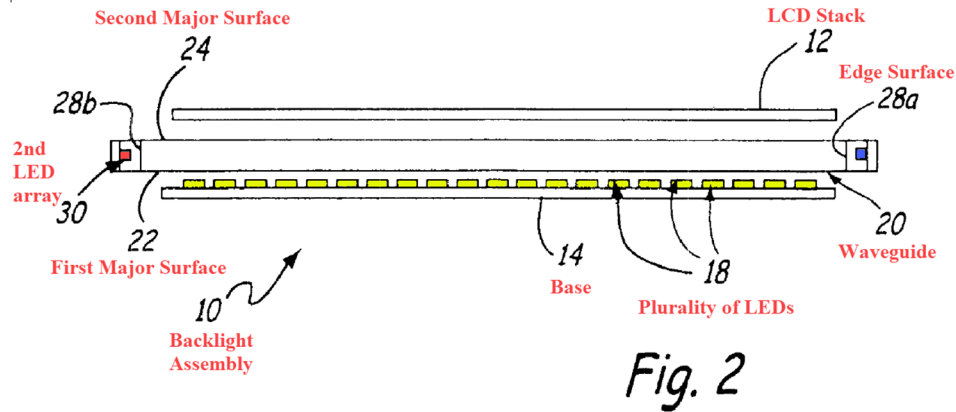
1. Independent Claim 1.

[1 preamble] A liquid crystal display (LCD) system comprising:

Johnson discloses LCD systems and specifically describes that “[t]he present invention relates to displays, and more particularly, to an LED-based backlight for a liquid-crystal display (LCD).” Johnson, 1:7-9; *see also id.* at 1:66-67.

[1A] a LCD panel;

Johnson describes Fig. 2 stating that “[b]acklight assembly 10 provides light to an LCD stack, shown schematically at 12.” Johnson, 2:49-52; Fig. 2.



Johnson, Fig. 2. A POSITA would understand that an LCD stack is an LCD panel.

Ex. 1003, ¶40. For example, Johnson describes its Backlight Assembly 10 as used for backlighting an LCD. Johnson, 1:66-67. As one of skill in the art would understand, Liquid Crystal Displays used backlighting systems with LCD panels or stacks. The LCD panel or stack refers to the layer of filters, diffusers, brightness enhancement layers or other optical components that are used in traditional LCD.

Ex. 1003, ¶40. The '705 Patent recognizes these well-known components and arrangements as existing in the prior art as well. See '705 Patent, 2:22-25. Johnson similarly recognizes the well-known arrangement and existence of these layers and arrangements. Johnson, 1:5-2:24. Further, to the extent that it is alleged that an LCD stack is different from an LCD panel, it would have been obvious to a POSITA to use an LCD panel in the place of an LCD stack as both are used for LCD displays, which is precisely what both the '705 Patent and Johnson are directed to. Ex. 1003, ¶40.

[1B] at least one waveguide element comprising a plurality of light entry regions;

Johnson describes a waveguide element. Johnson, Fig. 2; 2:64-67 (“A waveguide 20 is disposed between base 14 and LCD stack 12. Waveguide 20 is made of a generally planar material that is designed to accept light from one or more light sources and uniformly deliver the light to LCD stack 12”). Johnson describes that the waveguide comprises a plurality of light entry regions, including an edge surface 28a as well as a first major surface 22. *See id*; 3:24-27 (“In operation, white light from first LED array 16 enters waveguide 20 through first major surface 22, and colored light from second LED array 30 enters waveguide 20 through edge surface 28.”)

[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;

Johnson discloses a plurality of LEDS 18 in an LED array 16 (a first light-emitting source comprising a plurality of LEDs). As depicted in Figs. 1-2 of Johnson shown below, a POSITA would understand that the LEDS 18 (in yellow) are arranged in a strip.

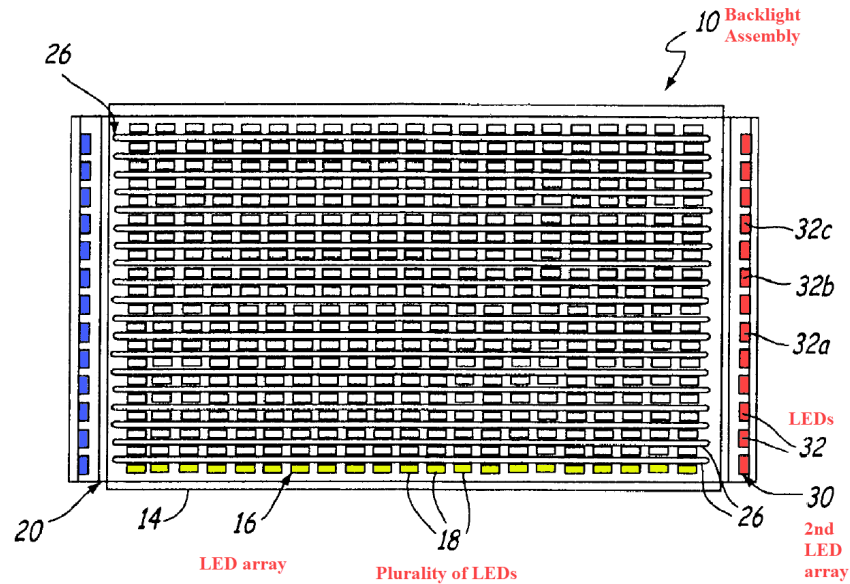


Fig. 1

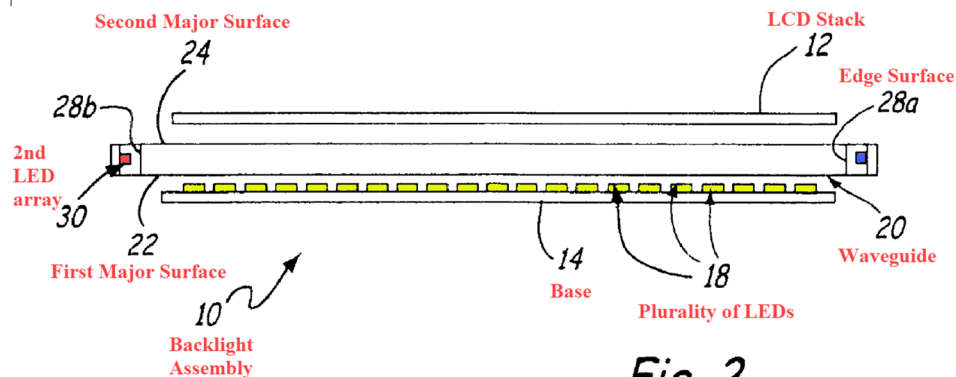


Fig. 2

Johnson, Figs. 1-2. Further, LED array 16 is positioned to emit light into waveguide 20 through a first light entry region (first major surface 22). *Id.*, 3:25-26 (“white light from first LED array 16 enters waveguide 20 through first major surface 22”).

[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

Similar to as discussed above with respect to the previous element 1[C], Johnson describes a plurality of LEDS 32 in a second array 30 and a POSITA would understand that the LEDS 32 are arranged in a strip, as depicted in Figs. 1-2 of Johnson and as shown in elements 32, 32a, 32b, 32c, etc. Further, LED array 30 is positioned to emit light into waveguide 20 through a second light entry region (edge surface 28). *Id.*, 3:26-29 (“light from second LED array 30 enters waveguide 20 through edge surface 28”); Figs. 1-2.

[1E] a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.

Johnson describes a common control circuit (control system 40), including a processor 44b and controller 44, that is in electrical communication (via conductive lines 46) with the first plurality of LEDs (LEDs 18 in LED array 16) and the second plurality of LEDs (LEDs 32 in second LED array 30). *Id.* at 3:43-47 (“As schematically depicted in FIG. 3, a control system 40 according to the invention includes a power supply 42 that supplies power to the LED arrays. A controller 44 connects power supply 42 with first and second LED arrays 16, 30 through conductive lines 46.”); Fig. 3. Further, the processor driven controller electrically communicates commands to vary the power supplied to the LEDs. *Id.* at 3:66-4:6 (“Processor 44b then refers to the chromaticity data stored in memory

44a to determine how to adjust LEDs 32 in second LED array 30 to correct or compensate for the difference between actual chromaticity A and target chromaticity T. Processor 44b then instructs controller 44 to vary the power to LEDs 32 in second LED array 30, thereby varying the brightness of LEDs 32.”).

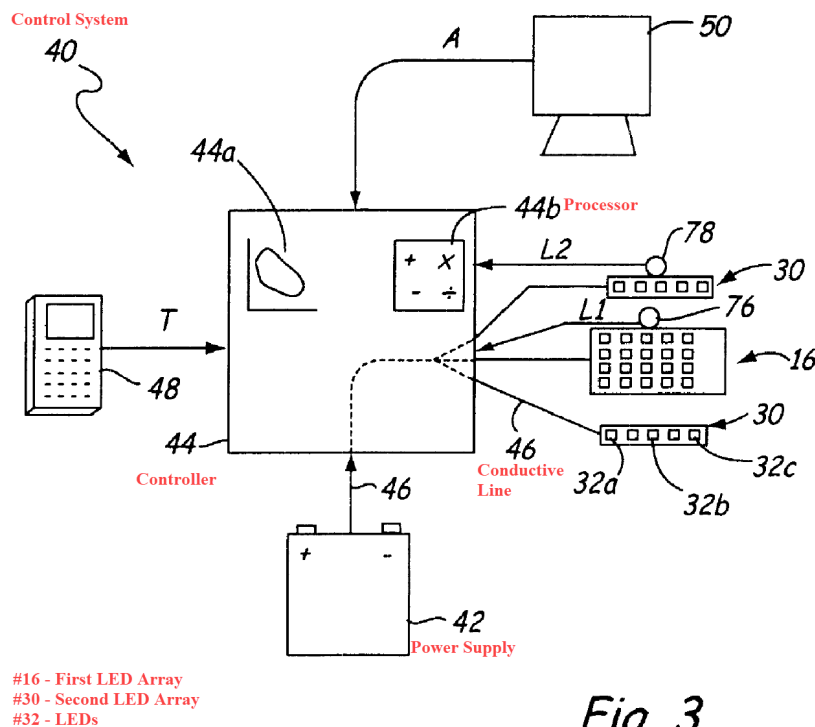


Fig. 3

Johnson, Fig. 3.

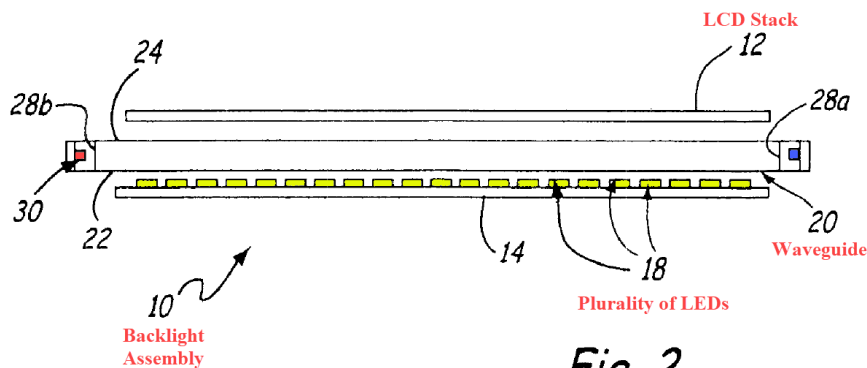
2. Dependent Claim 2.

[2] The LCD system of claim 1, wherein the LCD panel has a viewable surface, the at least one waveguide element has a transmissive surface, and the transmissive surface is approximately the same size as the viewable surface.

As discussed above with respect to claim 1 (1A, 1B), Johnson describes a Liquid Crystal Display system comprising a LCD panel and waveguide element.

Johnson further discloses that the LCD panel, LCD stack 12, has a viewable surface. *See* Johnson, 2:56-59. For example, Johnson discusses displaying select colors via the LCD stack. Johnson, 1:20-26 (“This is important in fields such as avionics, where the colors displayed on a critical-function aircraft display must be exact. A slight difference in chromaticity of the backlight might adversely affect the color of the display.”). Further, the waveguide element has a transmissive surface. *See e.g.* 2:63-3:14 (“A waveguide 20 is disposed between base 14 and LCD stack 12. Waveguide 20 is made of a generally planar material that is designed to accept light from one or more light sources and uniformly deliver the light to LCD stack 12.”).

Finally, as shown in Fig. 2 below, the waveguide’s transmissive surface is “approximately the same size as the viewable surface.” *See e.g.* Johnson, 2:49-54 (“FIGS. 1 and 2 depict a preferred embodiment of a backlight assembly 10 according to the invention. Backlight assembly 10 provides light to an LCD stack, shown schematically at 12. The specific details of the construction of LCD stack 12 do not form part of the invention and therefore will not be further described. Backlight assembly 10 includes a base 14 that has a principal or first LED array 16 disposed thereon.”); *see also* Figs. 1-2 (compare waveguide 20 and LCD stack 12).



3. Dependent Claim 5.

[5] The LCD system of claim 1, 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.

Johnson describes LED array 16 and second LED array 30, where LED array 16 emits white light and LED array 30 emits colored light. Johnson, 3:25-28 (“In operation, white light from first LED array 16 enters waveguide 20 through first major surface 22, and colored light from second LED array 30 enters waveguide 20 through edge surface 28”). *See also* Figs. 1-2. Further, LED array 16 is comprised of a plurality of LEDs 18.

Finally, the colored light from second LED array 30 may be a single color as the chromaticity output of each LED 32 may be the same. *Id.* at 6:15-17 (“It may also be possible that second LED array 30 is comprised of LEDs all having the same chromaticity output.”).

4. Dependent Claim 6.

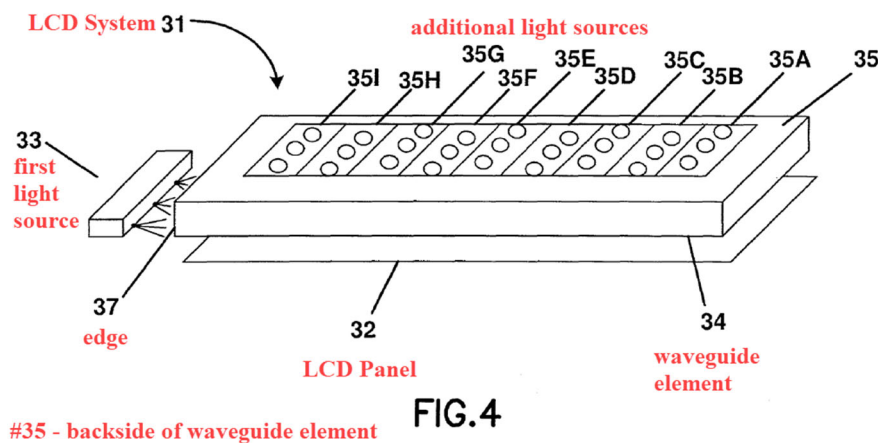
[6] The LCD system of claim 5, wherein any of the first light-

emitting source and the second light-emitting source comprises a plurality of direct LEDs.

As discussed in Claim 5, Johnson describes that the first light source (LED array 16) is comprised of a plurality of LEDs 18 that emit light through the first major surface 22 of the waveguide 20. And, because the second light source (LED array 30) may be positioned physically adjacent to LED array 16, both LED arrays 16 and 30 comprise a plurality of direct LEDs.

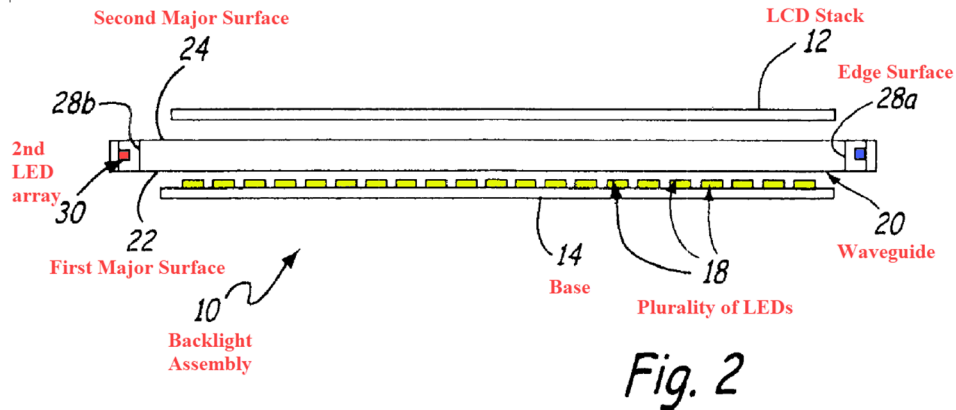
The '705 Patent notes that “Current LED lighting techniques for transmissive LCDs include either **direct backlighting** or backlighting by edge illumination. While a **backlight will light the pixels from the backside**, that **light may come from directly behind the center of the pixels (direct backlighting)** or from behind the sides of the pixels (backlighting by edge illumination). While both techniques are recognized as backlighting, **direct backlighting refers to illumination directed axially (centrally) through the backside of pixels.**” ’705 Patent 1:54-62 (emphasis added). The ’705 Patent further discusses the positioning of waveguide element 34 to the LCD panel 32. *Id.* at 13:10-16 (“FIG. 4 is a schematic perspective view illustration view of an exemplary LCD System 31 according to one embodiment of the invention. The system 31 includes a LCD panel 32, a waveguide element 34, a first light source 33 optically coupled to an edge 37 of the waveguide element 34, and additional light sources [35A-35I] optically coupled to the back side 35 of the waveguide element 34.”). A POSITA

would recognize that light sources 35A-35I positioned on the backside of the waveguide element, i.e., directly behind the center of pixels, are direct LEDs. *See e.g. id.* at 4:11-17; Ex. 1003, ¶68.



'705 Patent, Fig. 4.

As shown in Fig. 2 below, Johnson describes a generally planar waveguide where the first major surface 22 faces away from LCD stack 12 and towards base 14. Further, the second major surface, which faces LCD stack 12, is parallel to the first major surface. Johnson, 2:64-3:2 (“Waveguide 20 is made of a generally planar material that is designed to accept light from one or more light sources and uniformly deliver the light to LCD stack 12. Waveguide 20 has a first major surface 22 that faces base 14. Waveguide 20 has a second major surface 24, generally parallel to first major surface 22, that faces LCD stack 12.”); Fig. 2.



Johnson, Fig. 2. Further LEDs 18 emit light into the back side of waveguide 20 providing direct backlighting; thus, LEDs 18 are direct LEDs. Ex. 1003, ¶69. Specifically, “[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 30 enters waveguide 20 through edge surface 28”). Johnson, 3:25-28. Finally, LEDs in the second LED array may also be positioned along the base such that they emit light into the first major surface 22 of the waveguide 20 providing direct backlighting. Thus, in this embodiment the second LED array would also consist of direct LEDs. Johnson, 5:48-52 (“the embodiment shown in FIGS. 1 and 2 may be modified such that LEDs 32 from second LED array 30 and LEDs 18 from first LED array 16 are intermingled along base 14 and along the edge surfaces 28a, 28b”).

5. Dependent Claim 9.

[9] The LCD system of claim 1, wherein each LED of the first plurality of LEDs and second plurality of LEDs is adapted to

output substantially the same wavelength.

Johnson describes a first plurality of LEDs, “[f]irst LED array 16 [] designed to provide the substantial majority of the light required for LCD stack 12. Together, LEDs 18 provide light with a first chromaticity, which in the present embodiment is white or near-white.” Johnson, 2:59-62. Johnson further discusses 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, 3:18-28.

A POSITA would recognize that the defined difference 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. Further, a POSITA would understand that for a set of LEDs, i.e. first LED array 16, to emit white light, either each LED in that set would either emit white light or have the appropriate relative wavelength and relative orientation/spacing for the set to emit white light. Ex. 1003, ¶65.

Finally, “[i]t may also be possible that second LED array 30 is comprised of LEDs all having the same chromaticity output.” Johnson, 6:15-17. 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. Ex. 1003, ¶66.

Similarly, Fig. 1, shown below, illustrates numerous linear arrangements (rows) of LEDs 18 in a first LED array 16 (one of many depicted in yellow) that emits white or near-white light. Ex. 1003 ¶53. A POSITA would understand that each row of LED array 16 is a plurality of LEDs. It would have been obvious to a POSITA that each LED in the first and n^{th} rows of Johnson's LED array 16 (first and n^{th} plurality of LEDs) could be adapted to have substantially the same wavelength. Ex. 1003, ¶65.

Alternatively, as shown below in Figs 1, 2 of Johnson, the plurality of LEDs 32 ("blue plurality" - in blue) emitting light into the edge surface 28a of waveguide 20 and the plurality of LEDs 32 ("red plurality" - in red) emitting light into edge surface 28b may have the same chromaticity output, hence color. Johnson, 6:15-17 ("It may also be possible that second LED array 30 is comprised of LEDs all having the same chromaticity output."). It would have been obvious to a POSITA that each LED in the "red plurality" and each LED in the "blue plurality" can be adapted to have substantially the same wavelength. Ex. 1003, ¶67.

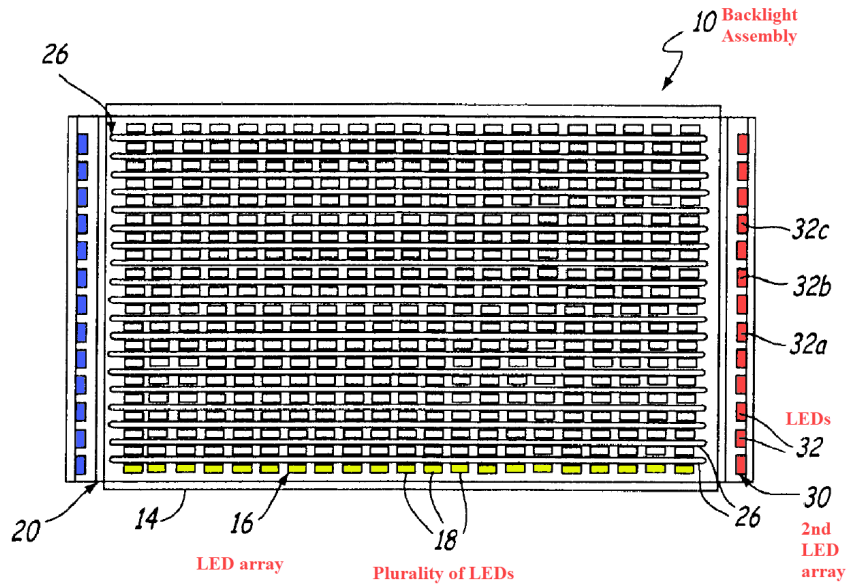


Fig. 1

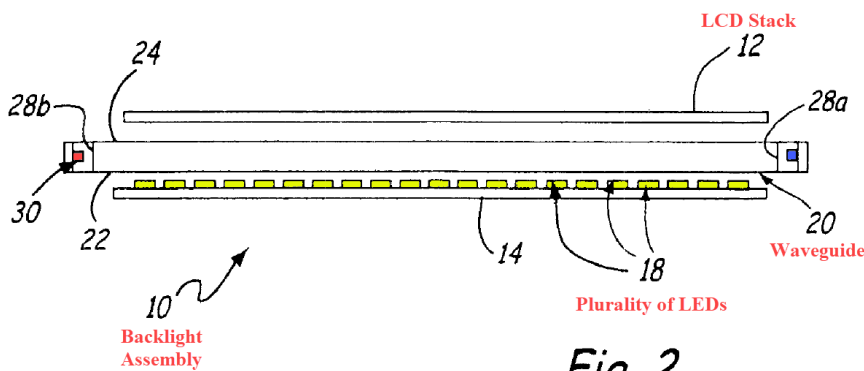


Fig. 2

Johnson, Figs. 1-2.

6. Dependent Claim 11.

[11] The LCD system of claim 1, further comprising 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.

Johnson illustrates a common control circuit, including a processor and a power circuit, that is in electrical communication with the first LED array and the second LED array. Specifically, “a control system 40 according to the invention

includes a power supply 42 that supplies power to the LED arrays. A controller 44 connects power supply 42 with first and second LED arrays 16, 30 through conductive lines 46.” Johnson, 3:43-47; *see also* Fig. 3.

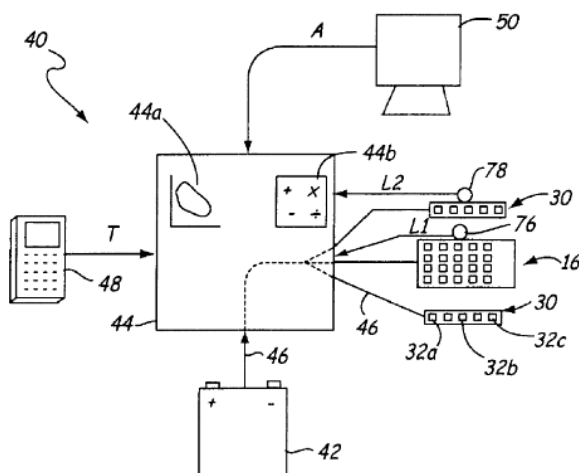


Fig. 3

Johnson, Fig. 3. Further, the common control circuit is in electric communication with each LED 32 in the plurality of LEDs that is the second LED array 30. Specifically, “[p]rocessor 44b [of the common control circuit] then refers to the chromaticity data stored in memory 44a to determine how to adjust LEDs 32 in second LED array 30 to correct or compensate for the difference between actual chromaticity A and target chromaticity T. Processor 44b then instructs controller 44 to vary the power to LEDs 32 in second LED array 30, thereby varying the brightness of LEDs 32.” Johnson, 3:66-4:6.

The common control circuit is also in electric communication with each LED 18 in the plurality of LEDs that is the first LED array 16. For example, Fig. 5

depicts “decision logic 80 that may be used by controller 44 to adjust the chromaticity of the backlight assembly based on changes in relative brightness of the LED arrays.” Johnson, 5:8-11.

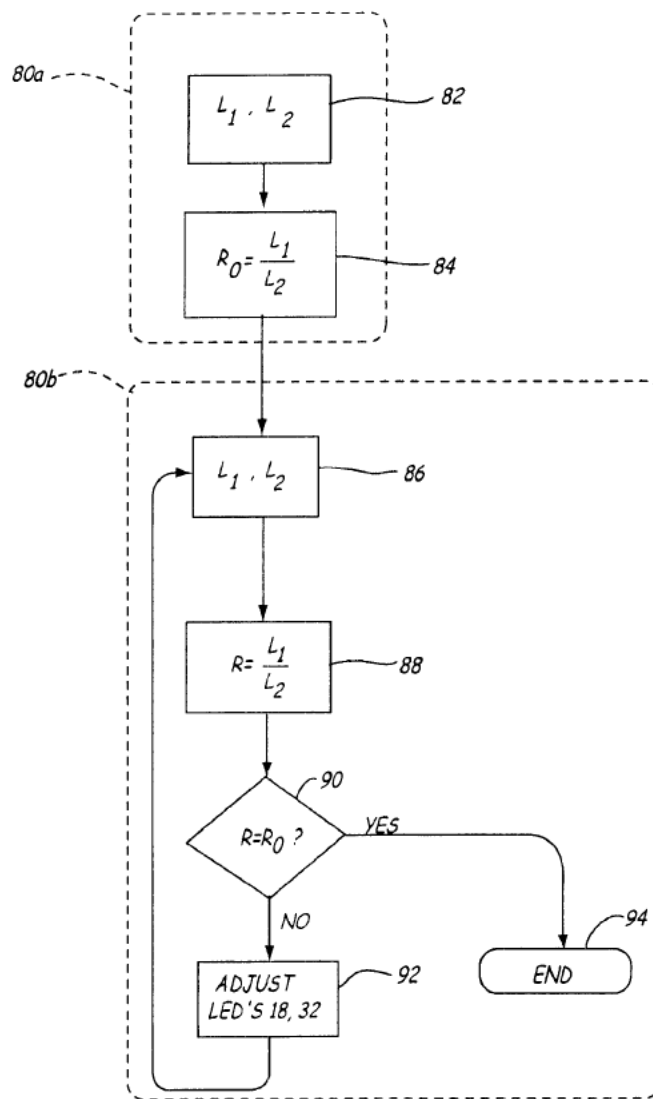


Fig. 5

Johnson, Fig. 5. As shown in Fig. 5, in Step 82 the luminance is measured for LED arrays 16, 30. Johnson, 5:8-17. Step 84 then determines and stores the

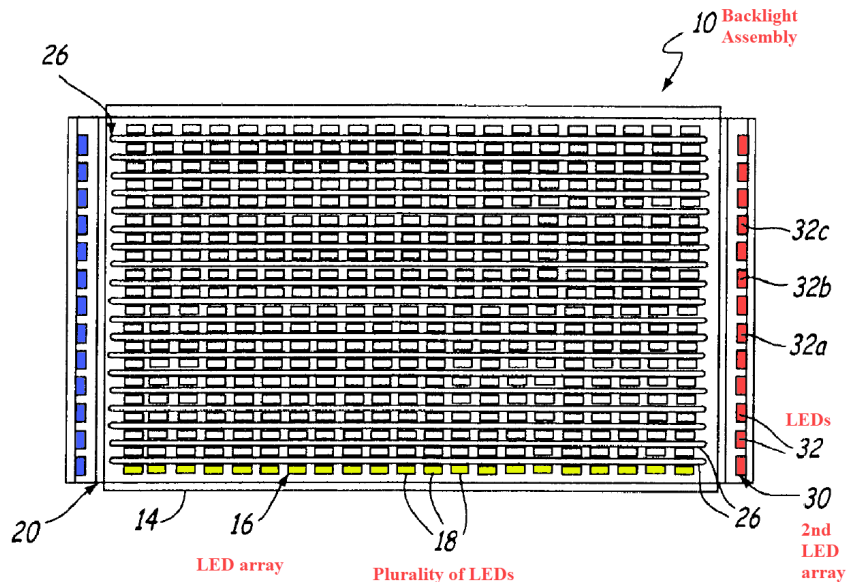
relative luminance, R_o , of the first LED array to the second LED array. Johnson, 5:17-22. Step 88 occurs after a time of use where the processor calculates new ratio, R , and compares this value to the baseline ratio. Johnson, 5:22-31. Finally, if there is a difference between the newly calculated ratio, R , and the initial relative luminance, R_o , then “in step 92 the brightness of first and/or second LED arrays are adjusted to correct the difference.” Johnson, 5:32-34.

7. Dependent Claim 13.

[13] The LCD system of claim 1, wherein each LED of at least one of the first plurality of LEDs and the second plurality of LEDs is linearly arranged.

Johnson discusses both a first 16 and second 30 plurality of LEDs described in LED arrays. A POSITA would understand that the LED arrays disclosed in Johnson are linear arrangements of LEDs. 1003, ¶53. Shown below, FIG. 1 shows “a top plan view of an LCD backlight assembly,” Johnson 2:34, and illustrates numerous linear arrangements (rows) of LEDs 18 in a first LED array 16 (one of many depicted in yellow), LEDs 32 in second LED array 30 (in red), and a third LED array (in blue). The first LED array 16, in yellow, is part of two dimensional array located behind the LED stack 12, shown in Fig. 2. The first LED array from Johnson is composed of multiple linear arrangements of LEDs deployed under “light scattering strips” 26. A POSITA would understand that the nomenclature first, second, and third could apply to any of the arrays, i.e. each linear

arrangement of LED array 16 and each edge array 30, as long as it is used consistently. 1003, ¶53; Johnson 6:57-60.



8. Dependent Claim 14.

[14] The LCD system of claim 1, wherein the common control circuit is in electrical communication with each of the first plurality of LEDs and the second plurality of LEDs.

As discussed with respect to claim 11 above, Johnson describes a common control circuit in electrical communication with both the first plurality of LEDs (LED array 16 comprised of LEDs 18) and the second plurality of LEDs (second LED array 30 comprised of LEDs 32). *See also* Johnson, Fig. 3; 3:34-58; 3:59-4:12.

9. Dependent Claim 16.

[16] The LCD system of claim 1, wherein each of the first plurality of LEDs and the second plurality of LEDs is linearly

arranged.

As discussed with respect to claim 13 above, Johnson teaches first plurality of LEDs (LEDs 18 in LED array 16) and second plurality of LEDs (LEDs 32 in second LED array 30) are linearly arranged.

10. Dependent Claim 17.

[17] The LCD system of claim 1, wherein any of the first light-emitting source and the a second light-emitting source is optically coupled to the at least one waveguide element.

As discussed in claim 1 above, Johnson discloses the first LED array 16 (first light-emitting source) emitting light into the waveguide 20 via at least the first major surface 22 (light entry region), and the second LED array 30 (second light-emitting source) emitting light into the waveguide 20 via at least the edge surface 28 (another light entry region). Johnson, 3:24-27 (“In operation, white light from first LED array 16 enters waveguide 20 through first major surface 22, and colored light from second LED array 30 enters waveguide 20 through edge surface 28.”); *see e.g.* Johnson, 3:25-33; 5:66-6:2; *see also* FIGS. 1-2. A POSITA would understand that as LED array 16 emits light into the first major surface 22 of the waveguide 20, LED array 16 is optically coupled to waveguide 20. ’705 Patent, 9:53-54 (“light sources are optically coupled to emit light into the light entry regions of the waveguide element.”). Similarly, a POSITA would understand that second LED array 30 is optically coupled to the waveguide 20 via emitting light into edge surface 28. As Johnson describes, a “waveguide (20) is made of a

generally planar material that is designed to accept light from one or more light sources and uniformly deliver the light to LCD stack 12”, Johnson 2:63-65. So the LED light entering or being accepted into the waveguide, is synonymous with coupling LED light into the waveguide, since the same effect is being described. Ex. 1003, ¶71. Thus, a POSITA would understand that the LED arrays of Johnson are optically coupled to the waveguide element, because they are emitting light into the waveguide element. Ex. 1003, ¶71.

11. Dependent Claim 22.

[22] The LCD system of claim 1, 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.

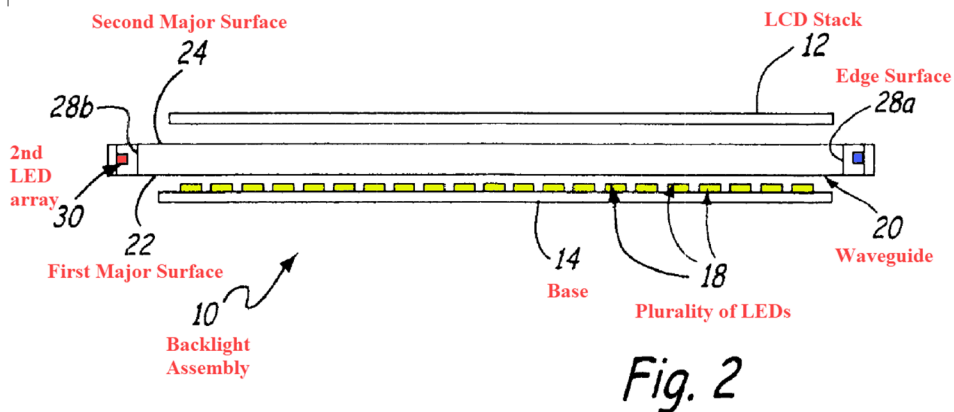
As discussed with respect to claim 17 above, Johnson discloses LEDs from the first LED array 16 (first light-emitting source) are optically coupled to waveguide 20 via the first major surface 22, which is the back portion of the waveguide element. Further, Johnson states that “[t]he invention may also be varied such that a mixed arrangement of LEDs from the first and second LED arrays emits light into waveguide 20 only through first major surface 22.” Johnson, 5:66-6:2; *see also* FIGs. 1-2. Thus, Johnson discloses a system where the first and second light-emitting sources are both optically coupled to the back portion of the waveguide element.

12. Dependent Claim 28.

[28] The LCD system of claim 1, 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, and is positioned to emit light into a back side of the at least one waveguide element.

As shown in Fig. 2 below, Johnson discusses light being emitted from a light source (LED array 16 – in yellow) situated at the back side (first major surface 22) of the waveguide 20, then light being emitted from the front side (second major surface 24) of the waveguide 20 to the LCD panel (LCD stack 12).



Johnson, Fig. 2. Further, “[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 30 enters waveguide 20 through edge surface 28. The light from the LED arrays is combined in waveguide 20, thereby altering the chromaticity of the light from first LED array 16. The combined light exits the waveguide through second major surface 24, traveling toward LCD stack 12.” Johnson, 3:25-32; *see also* Fig. 1. Moreover, as shown below in Fig. 1 highlighted in yellow, several of

As discussed with respect to claim 1 above, Johnson discloses LEDs 32 from the second light source, LED array 30, are positioned along an edge region. Specifically, “colored light from second LED array 30 enters waveguide 20 through edge surface 28.” Johnson. 3:26-28. Further, “the embodiment shown in FIGS. 1 and 2 may be modified such that LEDs 32 from second LED array 30 and LEDs 18 from first LED array 16 are intermingled ... along edge surfaces 28a, 28b.” Johnson 5:48-52; *see also* Figs. 1-2.

Additionally, as discussed with respect to claim 28 above, Johnson discloses that LEDs 18,32 from either the first light emitting source, LED array 16, and the second light source, LED array 30, are disposed along a center region of the LCD system behind the LCD stack 12, positioned to emit light into a back side of waveguide 20.

Further, Fig. 2 below illustrates that the first light source 16 (in yellow) is disposed on the back of waveguide 20, while second light source 30 (in red) is disposed on the edge 28b of waveguide 20.

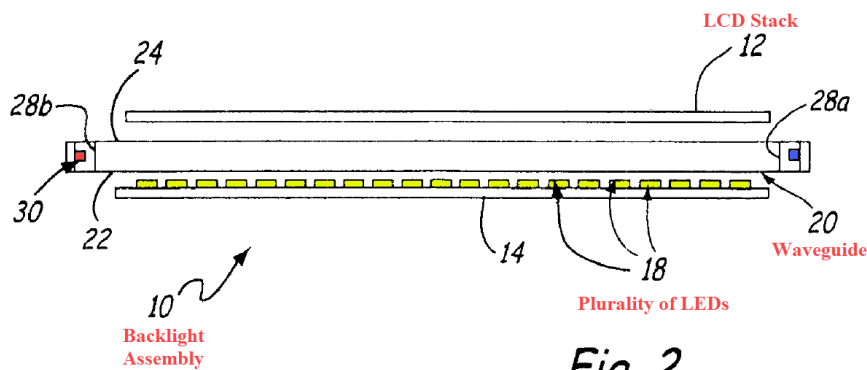


Fig. 2

14. Dependent Claims 31 and 34.

[31] The LCD system of claim 1, further comprising at least a third light-emitting source positioned to emit direct backlighting onto the LCD panel.

[34] The LCD system of claim 1, further comprising a third light-emitting source positioned to emit light into the at least one waveguide element.

As shown below in Figs. 1-2, there are three light emitting sources (shown in blue, red and yellow) and at least three light entry regions into waveguide 20, i.e., edge surface 28a, edge surface 28b, and first major surface 22.

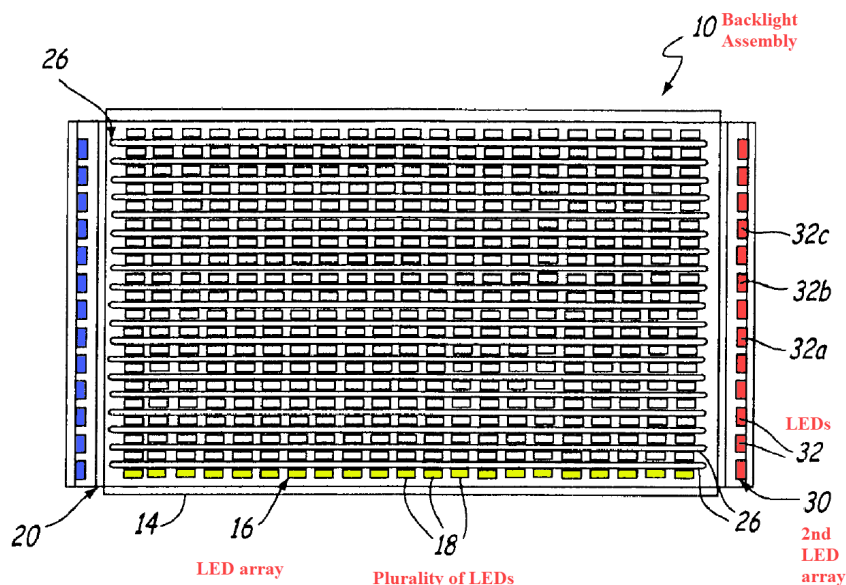
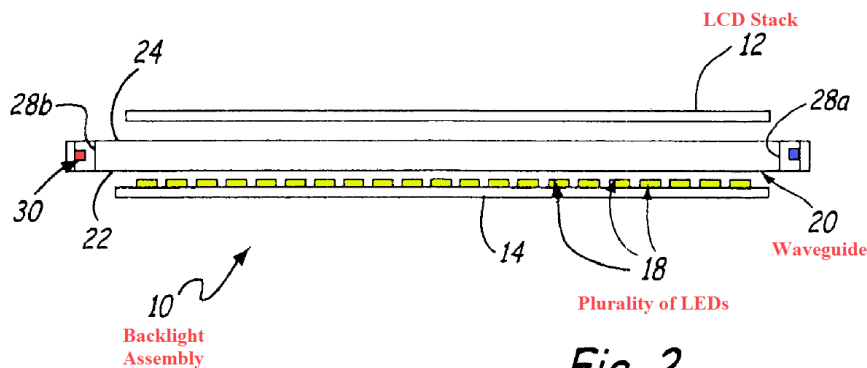


Fig. 1



Johnson, Figs. 1, 2. Figs. 1 and 2 illustrate LEDs positioned to emit light into the light entry regions of the waveguide. As discussed with respect to claim 1 above, Johnson discloses that the first light source (LED array 16) is comprised of a plurality of LEDs 18 (in yellow) that emit light through the first major surface 22 of the waveguide 20. As further discussed with respect to claim 6 above, Johnson discloses that the second light source (LED array 30 – in red) emits light through edge surface 28b. A POSITA would understand from Johnson that the third light source would include LEDs (in blue) emitting light through the third light entry surface 28a of waveguide 20. Ex. 1003, ¶80.

Moreover, as discussed with respect to claim 6 above, Johnson discloses that all of the LED arrays could be direct arrays. *See*, Johnson, 5:48-52 (“the embodiment shown in FIGS. 1 and 2 may be modified such that LEDs 32 from second LED array 30 and LEDs 18 from first LED array 16 are intermingled along base 14 and along the edge surfaces 28a, 28b”). Therefore, a POSITA would

understand from Johnson that the third light-emitting source could be positioned to provide direct backlighting to the LCD panel. Ex. 1003, ¶80.

15. Dependent Claims 32 and 33.

[32] The LCD system of claim 1, embodied in a television.

[33] The LCD system of claim 1, embodied in a computer monitor.

Johnson discloses a general LCD backlight assembly that can be used for various types of LCD devices. Johnson, 6:43-47 (“Yet another advantage is that a regular-production LCD backlight may be **custom-tuned according to the requirements of different applications**. Eliminating multiple LCD backlight production lines provides significant savings to a manufacturer.”) And although Johnson only mentions one particular application specifically, e.g. avionic displays, Johnson repeatedly describes its invention as applicable to LCD displays *generally* and further explains that its invention can be used in a variety of applications. One of skill in the art would have known that at the time of Johnson, LCD displays were used in televisions and computer monitors for decades before Johnson’s filing date and that improving the chromaticity of light in a television and computer monitor is a desirable attribute. Ex. 1003, ¶42.

Accordingly, it would have been obvious for a POSITA to embody Johnson’s LCD system in a television and a computer monitor. Ex. 1003, ¶42.

B. Ground 2: Claims 1, 2, 5, 11, 13, 14, 16, 17, 32, and 34 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Suzuki in view of the Knowledge of a POSITA.

1. Independent Claim 1.

[1 preamble] A liquid crystal display (LCD) system comprising:

Suzuki states that “[t]he present invention relates to a surface illuminator utilizing an array of discrete light sources and a liquid crystal display having the same.” Suzuki, ¶0002.

[1A] a LCD panel;

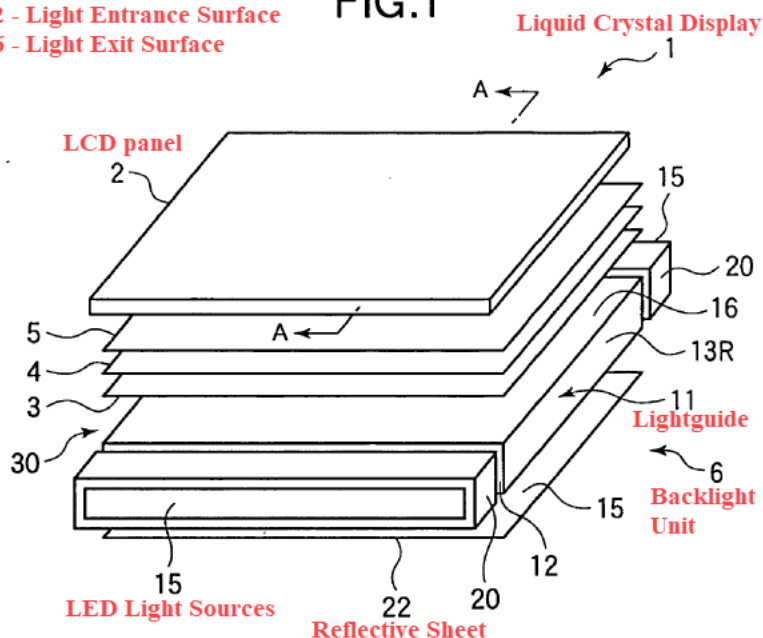
Suzuki discloses a LCD panel and specifically describes Figs. 1-3 stating that “the liquid crystal display 1 of the present embodiment includes a liquid crystal display panel 2 provided by sealing a liquid crystal between a pair of substrates and the backlight unit 6 which is a surface illuminator.” Suzuki, ¶0024; *see also* Suzuki ¶0028.

#3-#5 - Optical Sheets

#12 - Light Entrance Surface

#16 - Light Exit Surface

FIG.1



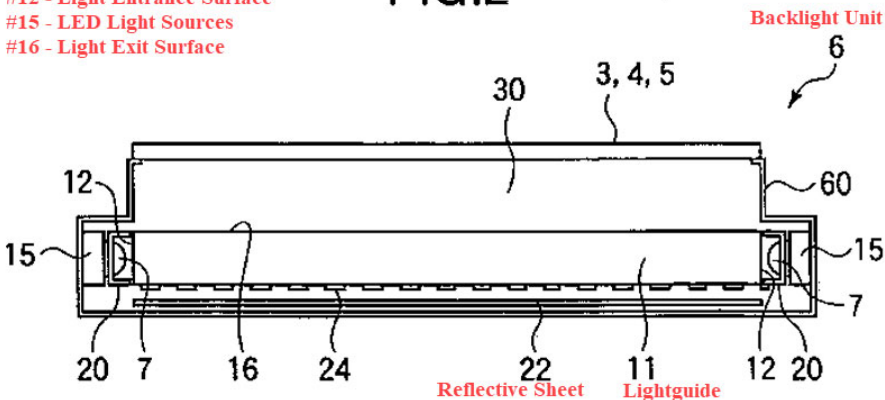
#3-#5 - Optical Sheets

#12 - Light Entrance Surface

#15 - LED Light Sources

#16 - Light Exit Surface

FIG.2



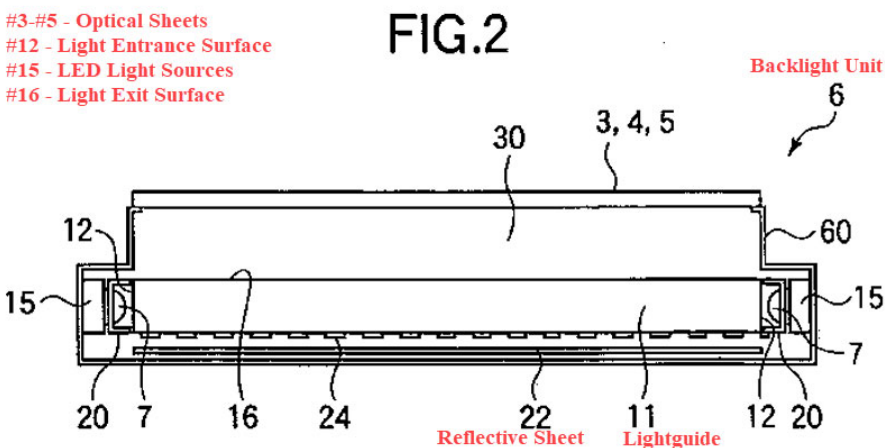
Suzuki, Figs. 1-2.

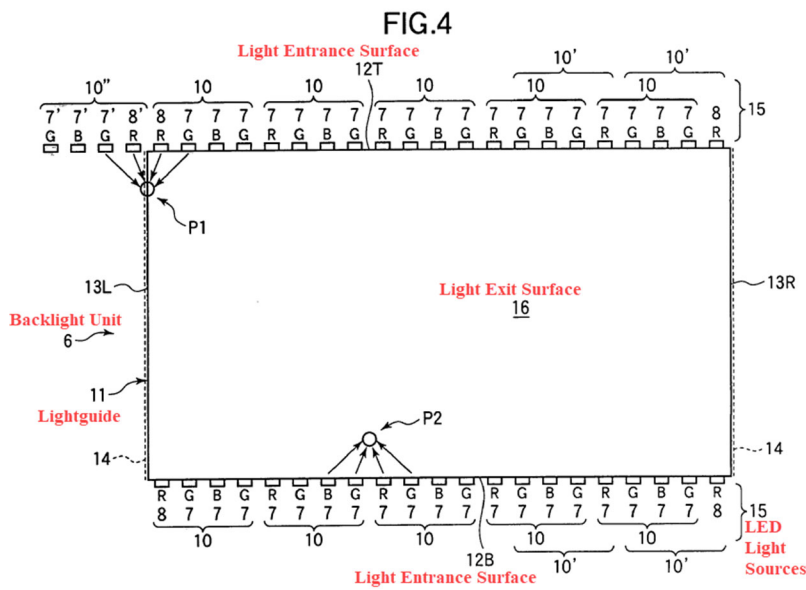
[1B] at least one waveguide element comprising a plurality of light entry regions;

Suzuki discloses a lightguide 11. Suzuki, ¶¶0025; 0026. A POSITA would understand that a lightguide 11 is a waveguide. Ex. 1003 ¶45. Further to the extent that it is alleged that a lightguide is different from a waveguide, it would have been

obvious to a POSITA to use a waveguide in the place of a lightguide as both are used for directing electromagnetic waves toward a particular direction. Ex. 1003, ¶45. Further, directing electromagnetic waves (light) toward a LCD Panel is precisely what both the '705 Patent and Suzuki are directed to. *Id.*

Suzuki discloses that the lightguide 11 has a plurality of light entry regions, *i.e.*, two light entry surfaces 12. Suzuki, ¶¶0025; 0026 (“The region sandwiched by the light exit surface 16 of the light guide 11 and the light scattering surface opposite to the same is a light guide region for guiding light to the light exit surface 16. Among four side portions of the light guide around the peripheries of the light exit surface 16 and the light scattering surface, both side portions along two sides of the light guide opposite to each other, *e.g.*, the longer sides thereof, constitute light entrance surfaces 12 through which light enters the light guide region.”); 0027 (“LED light sources 15, which are arrays of discrete light sources, are provided on the light entrance surfaces 12 of the light guide 11.”); Figs. 2, 4.



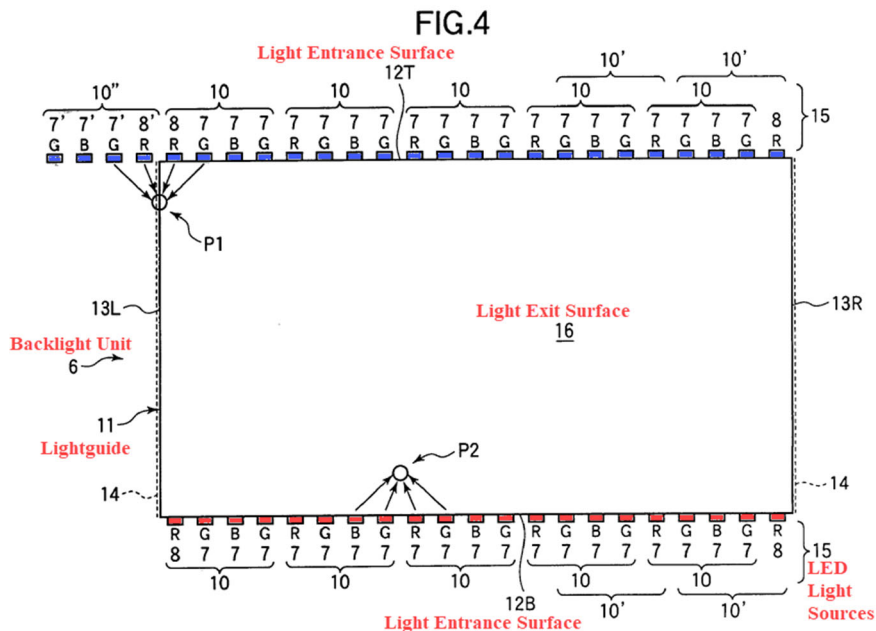


Suzuki, Figs. 2, 4.

[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;

As shown in Fig. 4 below, Suzuki discloses first emitting light sources, LED light sources 15 with LEDs 7 (in red), arranged in series by pluralities of sets 10, arrayed along first light entrance surface 12B, of a waveguide element, lightguide 11. Specifically, Suzuki notes that “LED light sources 15, which are arrays of discrete light sources, are provided on the light entrance surfaces 12 of the light guide 11. The LED light sources 15 are formed by alternately and discretely arranging plural types of LEDs 7 emitting beams of light having different emission wavelength spectra along the light entrance surfaces 12.” Suzuki, ¶ 0027. Further, a “plurality of LED sets (hereinafter also referred to as “RGBG” sets as occasion

demands) 10 are arranged in series along the light entrance surfaces 12T and 12B of the light guide 11 starting in the neighborhood of the left ends of the light entrance surfaces 12T and 12B (for example, five LED sets may be provided as shown).” Suzuki, ¶0034; *see also* Suzuki, ¶0030; Fig. 4.

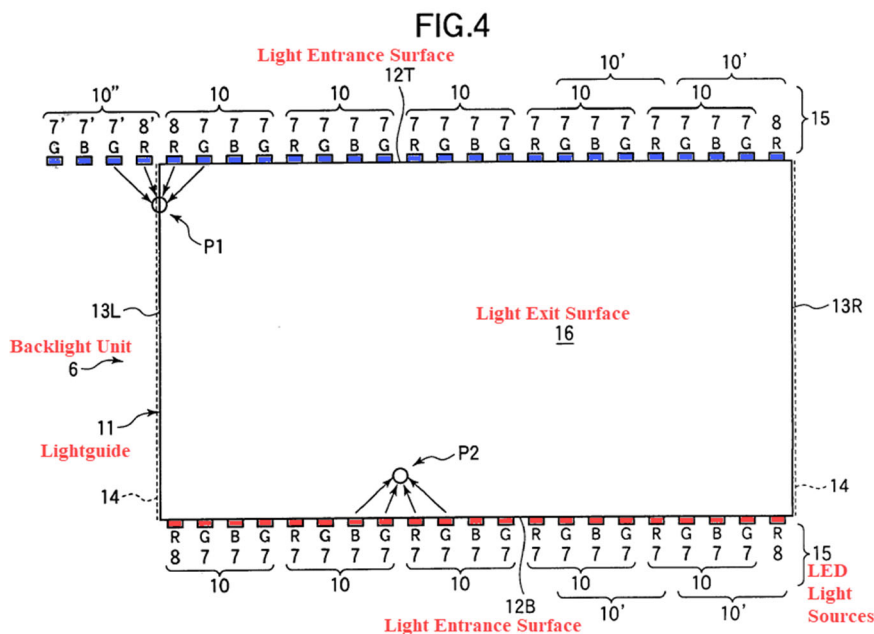


Suzuki, Fig. 4.

[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

Similar to the discussion with the previous claim element, 1[C], as shown in Fig. 4 below, Suzuki discloses second emitting light sources, LED light sources 15 with LEDs 7 (in blue), arranged in series by pluralities of sets 10, arrayed along

second light entrance surface 12T, of a waveguide element, lightguide 11. Fig. 4; Suzuki, ¶ 0027; *see also id.* at Fig. 4.



Suzuki, Fig. 4.

[1E] a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs.

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. For example, 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. ... 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

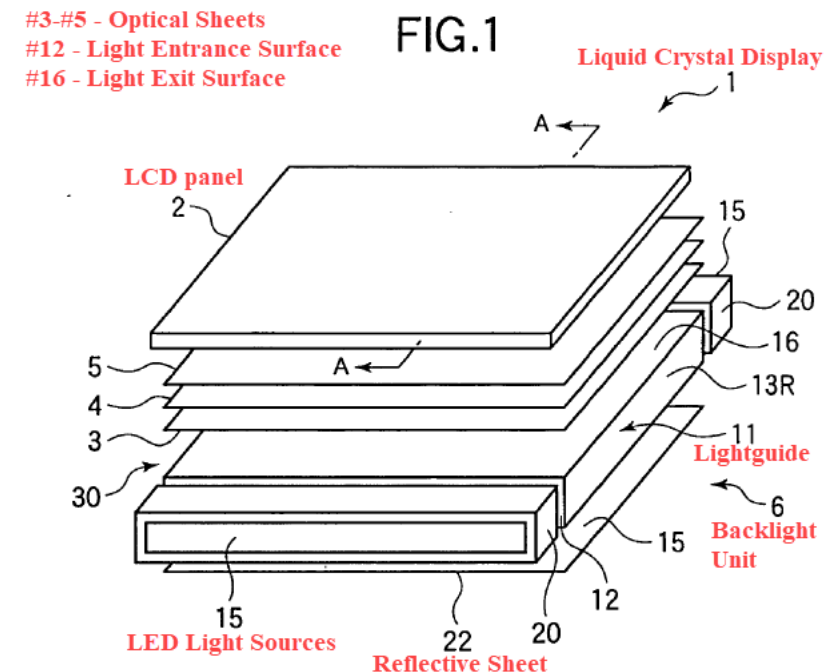
by the other LEDs 7R by a predetermined amount by supplying the end light source LEDs 8R with a current smaller than a current supplied to the LEDs 7R by a predetermined amount.” Suzuki, ¶0044; *see also* Fig. 4.

2. Dependent Claim 2.

[2] The LCD system of claim 1, wherein the LCD panel has a viewable surface, the at least one waveguide element has a transmissive surface, and the transmissive surface is approximately the same size as the viewable surface.

Suzuki discloses a LCD Panel with a viewable surface. For example, Suzuki describes his device as “capable of achieving high display quality[.]” Suzuki, Abstract. Additionally, Suzuki discloses that the “light guide 11 has a light exit region (hereinafter referred to as a light exit surface) 16 which spreads in the form of a plane on a side of the light guide facing the liquid crystal display panel 2 and from which light exits.” Suzuki, ¶0025. A POSITA would understand that in Suzuki’s device, the LCD Panel 2 surface that faces the user has a viewable surface – capable of achieving high display quality. Ex. 1003, ¶49.

Further, as shown below in Fig. 1, the transmissive surface, light exit surface 16, is approximately the same size as the viewable surface, LCD Panel 2.



Suzuki, Fig. 1.

3. Dependent Claim 5.

[5] The LCD system of claim 1, 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.

Suzuki discloses that the first light source and the second light source can emit either white light or a single color. Suzuki discusses the possibility “to provide a surface illuminator having high color uniformity and a liquid crystal display having the same. The generation of mixed white suffering from an extreme shortage of red components can be suppressed at an arbitrary point in the neighborhood of an end of a light entrance surface 12T, and color irregularities can be made unnoticeable.” Suzuki, ¶0040. Further, Suzuki discusses achieving a

desired color by mixing red, blue, and green LED emission. Specifically, “[w]hen such a configuration is employed, at an arbitrary point P2 inside the light exit surface 116, four beams of light from a G emission LED 77G, a B emission LED 77B, another G LED emission 77G, and an R emission LED 77R in the neighborhood of the arbitrary point P2 can be mixed to generate a beam of light in a desired color.” Suzuki, ¶0010; FIG. 6; claim 6.

That is, the 7R LEDs on the 12T light entrance surface may be considered a plurality of LEDs that emits one color, red. Ex. 1003, ¶63. The 77B, 77G, and 77R set may also be considered a plurality of LEDs; which may emit white light. Ex. 1003, ¶63.

4. Dependent Claim 11.

[11] The LCD system of claim 1, further comprising 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.

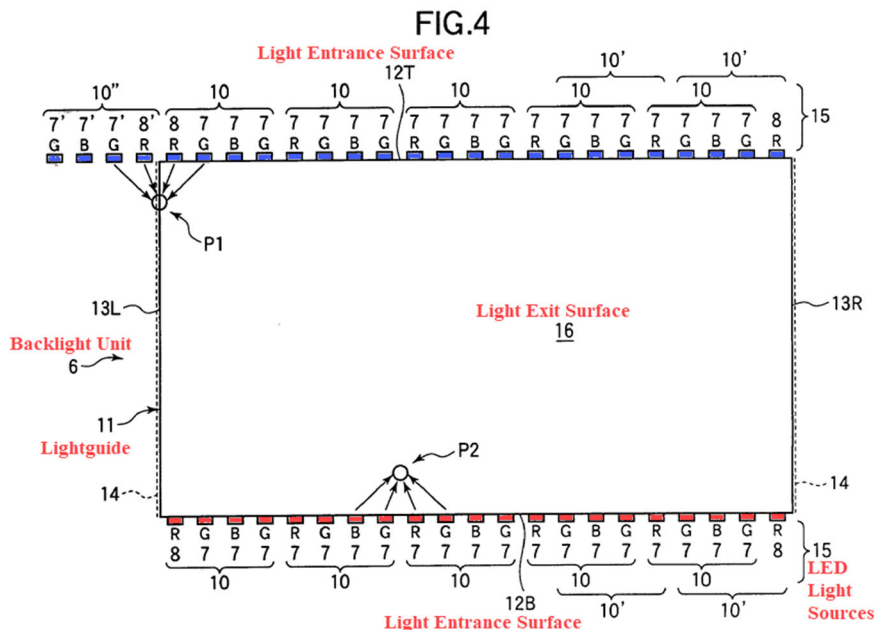
A POSITA would understand that the common control circuit (the LED driving circuit) of Suzuki is in communication with each LED (8R, 7R) at the least to turn the LED on/off. Ex. 1003, ¶60. For example, Suzuki discloses that “a general LED driving circuit (not shown), the end light source LEDs 8R may 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.

5. Dependent Claim 13.

[13] The LCD system of claim 1, wherein each LED of at least one of the first plurality of LEDs and the second plurality of LEDs is linearly arranged.

Suzuki discusses first emitting light sources, LED light sources 7, arranged in series by pluralities of sets 10, arrayed along first light entrance surface 12B, of a waveguide element, lightguide 11 and with a similar positional relationship for LEDs in the second plurality of LEDs and second light entry surface 12T. A POSITA would understand that an array is a linear arrangement. Ex. 1003, ¶55. Shown below, Fig. 4 shows “a positional relationship between a light exit surface 16 of a light guide 11 of a backlight unit 6 and LED light sources 15[.]” Suzuki, ¶0021, and illustrates the linear arrangements of first LED array and second LED array. A POSITA would understand that an array of LEDs for backlighting a LCD through the edge of a waveguide is a linear arrangement due to the basic geometry of the LEDs being deployed along the thin edge of a waveguide. Ex. 1003, ¶55.



Suzuki, Fig. 4.

6. Dependent Claim 14.

[14] The LCD system of claim 1, wherein the common control circuit is in electrical communication with each of the first plurality of LEDs and the second plurality of LEDs.

A POSITA would understand that the common control circuit (LED driving circuit) disclosed by Suzuki is in communication with each LED at the least to turn the LED on/off. Ex. 1003, ¶60. For example, Suzuki discloses that “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. Fig. 4 indicates that LEDs 8R are present in both the first and second plurality of LEDs. As such, the common control circuit is in electrical communication with “each of the first plurality of LEDs and the second plurality of LEDs.”

7. Dependent Claim 16.

[16] The LCD system of claim 1, wherein each of the first plurality of LEDs and the second plurality of LEDs is linearly arranged.

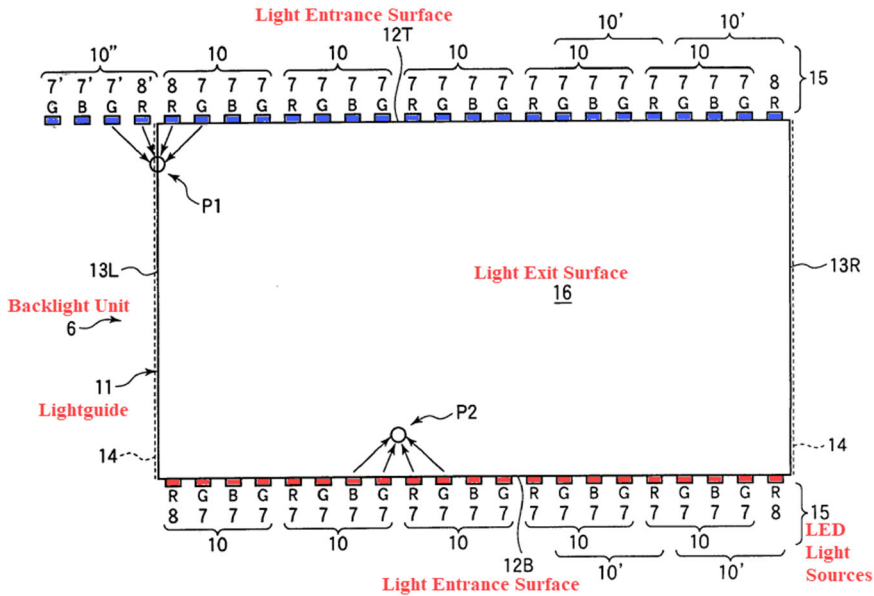
As discussed with respect to claim 13 in this section, Suzuki discloses that the first plurality of LEDs and second plurality of LEDs are linearly arranged.

8. Dependent Claim 17.

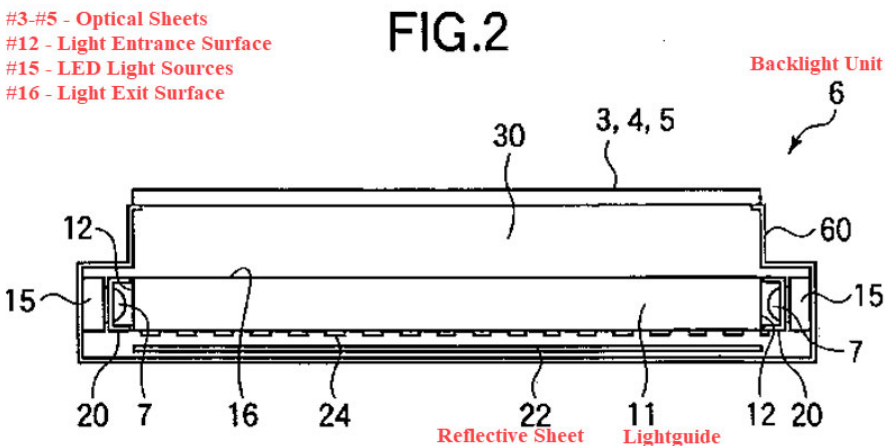
[17] The LCD system of claim 1, wherein any of the first light-emitting source and the a second light-emitting source is optically coupled to the at least one waveguide element.

As discussed with respect to claim elements 1[C] and 1[D] in this section, Suzuki discloses first emitting light sources, LED light sources 15 with LEDs 7 (shown in red), arranged in series by pluralities of sets 10, on first light entrance surface 12B, of a waveguide element, lightguide 11, as well as second emitting light sources, LED light sources 15 with LEDs 7 (shown in blue), arranged in series by pluralities of sets 10, on second light entrance surface 12T, of a waveguide element, lightguide 11. Suzuki, ¶ 0027.

FIG.4



Suzuki, Fig. 4. Further, “[a]s 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 ... Some of the beams exit the light exit surface 16 ... 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 ... to finally exit the light exit surface 16[.]” Suzuki, ¶0030.



Suzuki, Fig. 2. It would be obvious that LEDs 15 are optically coupled to the waveguide 11 because the two devices are interconnected where light emitted from LEDs 15 enters lightguide 11. As discussed with respect to claim 17 in Section VII.A, a POSITA would understand that this connection of light waves optically couples LEDs 15 and lightguide 11.

9. Dependent Claim 32.

[32] The LCD system of claim 1, embodied in a television.

It would have been obvious by the '705 Patent's priority date for a POSITA to embody the LCD system in a television. Ex. 1003, ¶43.

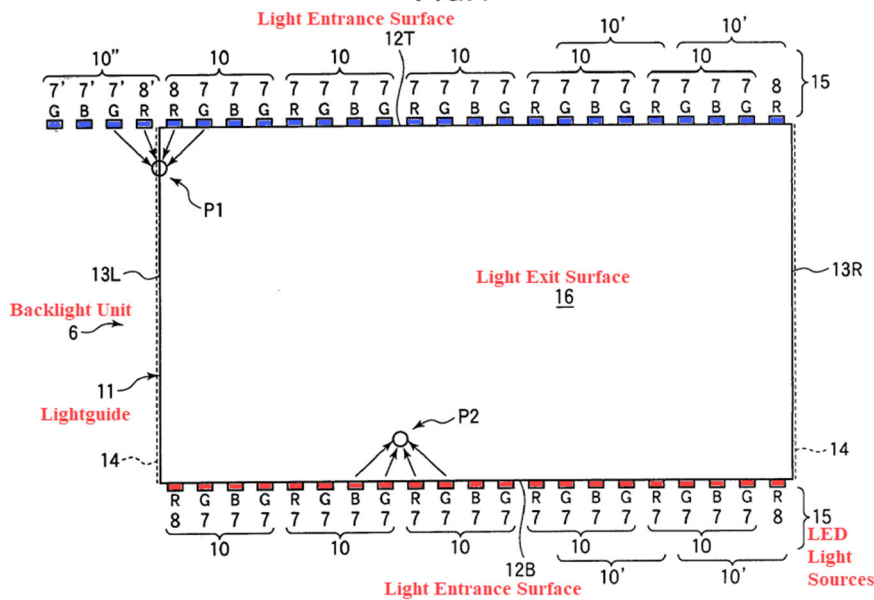
Further, the corresponding address of the applicant is to Sharp Kabushiki. Ex. 1006 at ¶(76). Thus, a POSITA would recognize that Suzuki's disclosures related to LCD technology is applicable to televisions given Sharp was a well-known TV manufacturer. Ex. 1003, ¶43.

10. Dependent Claim 34.

[34] The LCD system of claim 1, further comprising a third light-emitting source positioned to emit light into the at least one waveguide element.

As discussed with respect to claim element 1[C] in this section, Suzuki discloses first emitting light sources, LED light sources 15, arranged in series by pluralities of sets 10, arrayed along first light entrance surface 12B, of a waveguide element, lightguide 11. Specifically, Suzuki notes that “LED light sources 15, which are arrays of discrete light sources, are provided on the light entrance surfaces 12 of the light guide 11. The LED light sources 15 are formed by alternately and discretely arranging plural types of LEDs 7 emitting beams of light having different emission wavelength spectra along the light entrance surfaces 12.” Suzuki, ¶ 0027; *see also* Suzuki, ¶0030; Fig. 4.

FIG.4



Suzuki, Fig. 4. A POSITA could consider each set 10 of LEDs as a light emitting source. Ex. 1003, ¶81. As such, as exemplified in Fig. 4, there are at least 3 light emitting sources positioned to emit light into the light entry surfaces 12B,12T of lightguide 11.

C. Ground 3: Claim 32 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Johnson in view of Fine and the Knowledge of a POSITA.

1. Motivation to Combine Johnson and Fine.

A POSITA would be motivated to combine Johnson and Fine. A combination of familiar elements according to known methods which yields no more than predictable results is likely obvious to one of skill in the art. One rationale to support a conclusion of obviousness is the use of a known technique to improve similar devices (methods, or products) in the same way. MPEP 2143(C). To establish that a combination and/or modification is the use of a known technique to improve similar devices and methods in the same way, it is necessary to establish (1) that the prior art contained a “base” device/method upon which the claimed invention can be seen as an “improvement,” (2) a finding that the prior art contained a “comparable” device/method that is not the same as the base device/method and that has been improved in the same way as the claimed invention, and (3) that the skilled artisan could have applied the known

“improvement” in the same way to the base device/method with predictable results. *See* MPEP 2143(C).

A POSITA would have been motivated to modify the backlighting systems described in Johnson to comprise the illumination apparatus described in Fine.

First, both Johnson and Fine are in the same field of endeavor, i.e., Light Emitting Diode (LED) based backlighting for a Liquid Crystal Display (LCD). Johnson 1:7-9; Fine, 3:65-4:8; 5:37-40. Consequently, a POSITA would have a reasonable expectation of success in combining their various disclosures to produce a LED backlighting system for LCDs. Johnson 2:64-67; Fine, 5:37-40.

Second, a primary motivation of one of ordinary skill in the art would have been to achieve a specific chromaticity from the backlight unit from commercially available LEDs. Johnson, 1:19-26; Fine, 1:16-20. Modifying Johnson to include the illumination apparatus, as disclosed by Fine would meet this goal. *Id.*; Ex. 1003, ¶¶86-89. Both Johnson and Fine recognize that distinct light emitting sources emitting distinct chromacities is a key disclosure. Johnson, 1:66-2:8; Fine 6:18-21. Additionally, Fine details that the specific color profile referenced includes, “without limitation, uniform white light.” Fine, 1:16-20. To achieve a desired color profile, Fine details LEDs that include bare dies (which exclude at least one of encapsulation, reflecting cup, etc.), where when “a forward biased is applied to the p-n junction through electrical contacts connected to the p side and

then side of the p-n junction, the p-n junction emits light at a characteristic spectrum.” Fine, 13:30-33. Further, Fine discusses “the liquid crystal panel compris[ing] an arrangement of color filters operating at a plurality of distinct colors, wherein the at least one photoluminescent layer and the light emitting source(s) are selected such the illumination apparatus provides light at least at the a plurality of distinct colors.” Fine, 6:43-48. In other words, the type of LED (including its encapsulation, reflecting cup, etc.) and associated photoluminescent layer can achieve the desired chromaticity. Further, Fine itself details that the Fine apparatus “can be incorporated in a passive display device [i.e. LCD.]” Fine, 5:22-23.

A POSITA would recognize that each of Johnson and Fine describe known methods for improving the color and brightness uniformity of the lighting system. Ex. 1003, ¶89. A POSITA would have been motivated to use the improvements described within Fine to improve the color and brightness uniformity of the lighting system described in Johnson. *Id.* A POSITA would recognize that the combination would have provided better color and brightness uniformity, and this would have provided motivation to combine known elements from the prior art in a similar field. *Id.*

Thus, combining these two references—Johnson and Fine—that both use the same components to achieve the same goal would have been obvious to a POSITA.

2. Dependent Claims 32 and 33.

[32] The LCD system of claim 1, embodied in a television.

[33] The LCD system of claim 1, embodied in a computer monitor.

As discussed with respect to claims 32 and 33 in Section VII.A, a POSITA would find claims 32 and 33 obvious in view of Johnson alone. However, to the extent there is an argument that claims 32 and 33 are not obvious in view of Johnson alone, a POSITA would find claims 32 and 33 obvious with Johnson in view of Fine.

Fine indicates that the Johnson assembly modified with the Fine illumination device may be embodied in a television and a computer monitor. Specifically, the Fine device “embodiments further comprise a portable computer system comprising the liquid crystal display device, a computer monitor comprising the liquid crystal display device, a personal digital assistant system comprising the liquid crystal display device, a cellular communication system comprising the liquid crystal display device, and a television system comprising the liquid crystal display device.” Fine, 5:41-48; *see also* Fine, 4:21-25; 20:4-9. Thus, in view of Fine, a POSITA would understand that the Johnson assembly modified with the Fine illumination device may be embodied in a television and a computer monitor. Ex. 1003, ¶¶42, 90.

D. Ground 4: Claims 6, 22, 28, 29, 32, and 34 Should Be Cancelled as Obvious Under 35 U.S.C. § 103 Over Suzuki in view of Fine and the Knowledge of a POSITA.

1. Motivation to Combine Suzuki and Fine.

A POSITA would be motivated to combine Suzuki and Fine. A combination of familiar elements according to known methods which yields no more than predictable results is likely obvious to one of skill in the art. One rationale to support a conclusion of obviousness is the use of a known technique to improve similar devices (methods, or products) in the same way. MPEP 2143(C). To establish that a combination and/or modification is the use of a known technique to improve similar devices and methods in the same way, it is necessary to establish (1) that the prior art contained a “base” device/method upon which the claimed invention can be seen as an “improvement,” (2) a finding that the prior art contained a “comparable” device/method that is not the same as the base device/method and that has been improved in the same way as the claimed invention, and (3) that the skilled artisan could have applied the known “improvement” in the same way to the base device/method with predictable results. *See* MPEP 2143(C).

A POSITA would have been motivated to modify the backlighting systems described in Suzuki to comprise the illumination apparatus described in Fine.

First, both Suzuki and Fine are in the same field of endeavor, i.e., Light Emitting Diode (LED) based backlighting for a Liquid Crystal Display (LCD). Suzuki, ¶0004; Fine, 3:65-4:8; 5:37-4. Consequently, a POSITA would have a reasonable expectation of success in combining their various disclosures to produce a LED backlighting system for LCDs. *See e.g.*, Suzuki, ¶¶0018, 0019, 0020, 0044; Fine, 5:37-40.

Second, a primary motivation of one of ordinary skill in the art would have been to “achieve a vast range of color reproducibility.” Suzuki, ¶0005; *see also* Fine, 1:16-20. Modifying Suzuki to include the illumination apparatus, as disclosed by Fine would meet this goal. *Id.*; Ex. 1003, ¶94. Fine details that the specific color profile referenced includes, “without limitation, uniform white light.” Fine, 1:16-20. To achieve a desired color profile, Fine details LEDs that include bare dies (which exclude at least one of encapsulation, reflecting cup, etc.), where when “a forward biased is applied to the p-n junction through electrical contacts connected to the p side and then side of the p-n junction, the p-n junction emits light at a characteristic spectrum.” Fine, 13:30-33. Further, Fine discusses “the liquid crystal panel compris[ing] an arrangement of color filters operating at a plurality of distinct colors, wherein the at least one photoluminescent layer and the light emitting source(s) are selected such the illumination apparatus provides light at least at the a plurality of distinct colors.” Fine, 6:42-46. In other words, the type

of LED (including its encapsulation, reflecting cup, etc.) and associated photoluminescent layer can achieve the desired color. Further, Fine itself details that the Fine apparatus “can be incorporated in a passive display device [i.e. LCD.]” Fine, 5:22-23.

A POSITA would recognize that each of Suzuki and Fine describe known methods for improving the color uniformity of the lighting system. Ex. 1003, ¶95. A POSITA would have been motivated to use the improvements described within Fine to improve the color uniformity of the lighting system described in Suzuki. Ex. 1003, ¶95. A POSITA would recognize that the combination is simply the use of a known solution described in Fine to modify a similar system in Suzuki; and for this reason would expect a successful combination. Ex. 1003, ¶95.

2. Dependent Claim 6.

[6] The LCD system of claim 5, wherein any of the first light-emitting source and the second light-emitting source comprises a plurality of direct LEDs.

As discussed with respect to claim 6 in Section VII.A regarding Johnson, a POSITA would recognize that light sources positioned directly behind the center of pixels (*i.e.* in the LCD Panel) are direct LEDs.

Suzuki teaches that “LED light sources 15, which are arrays of discrete light sources, are provided on the light entrance surfaces 12 of the light guide 11.” Suzuki, ¶0027. Modifying Suzuki’s device to account for Fine’s embedded light

sources would allow for more light to be emitted into the waveguide, hence the LCD panel. Ex. 1003, ¶70. Further, as Suzuki’s device has a gas space between the lightguide and other optical elements, it would be obvious that an LED may work well in this space. Suzuki, ¶0029 (“the backlight unit 6 has a configuration in which a reflective sheet 22, the light guide 11, the gas space 30, and the optical sheets 3, 4, and 5 are provided one over another in the order listed.”); *see also* Ex. 1003 ¶70.

As shown below, Fig. 2b of Fine “schematically illustrat[es] the embodiment in which light source 12 is embedded near surface 18.” Fine, 14:3-4, and illustrates light sources at the bottom the waveguide 14 emitting light toward top surface 16.

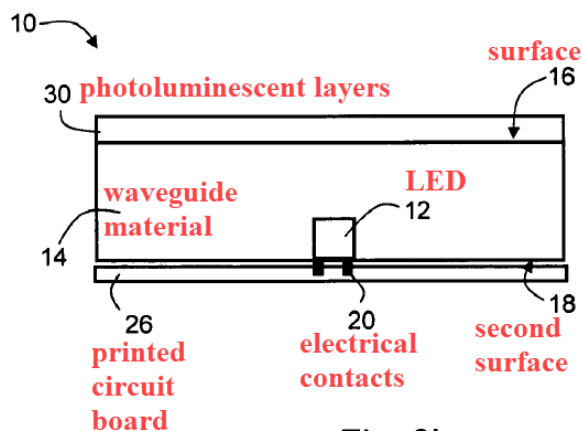


Fig. 2b

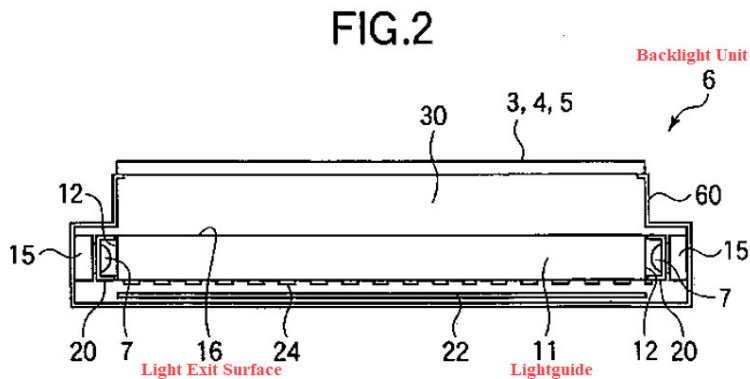
Fine, Fig. 2b. Specifically, Fine defines surface 18 as the bottom surface of waveguide 14. Fine 12:16-17 (“As used herein, “top” refers to furthest away from surface 18, while “bottom” refers to closest to surface 18.”). Fine further specifies the in “light source 12 [may be] embedded near surface 18 of material 14[.]” Fine

14:45-46. As such, a POSITA would understand that Suzuki's device modified by Fine teaches that LEDs 12 (of a light source) that are positioned in the back of a waveguide 14 emit light toward the top surface 16 of the wave guide as well as the LCD Panel; thus, LEDs 12 are direct LEDs. Ex. 1003, ¶70.

3. Dependent Claim 22.

[22] The LCD system of claim 1, 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.

As shown in Fig. 2 below, Suzuki discloses “the light exit surface 16” at the top of lightguide 11.

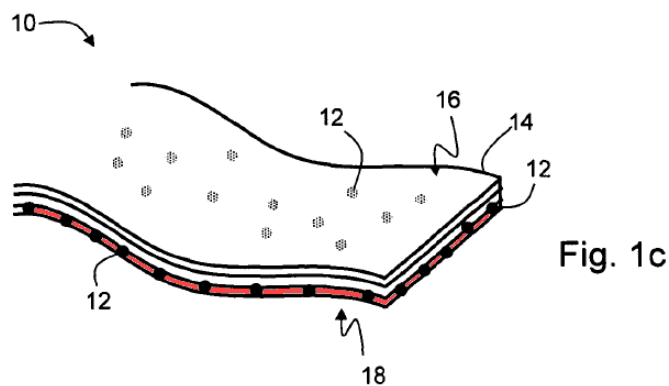


Suzuki, Fig. 2. Fine defines the top 16 and bottom (back portion) 18 surfaces of waveguide 14. Fine 12:16-17 (“As used herein, “top” refers to furthest away from surface 18, while “bottom” refers to closest to surface 18.”). Fine further specifies that “light source 12 [may be] embedded near surface 18 of material 14[.]” Fine 14:45-46. As such, a POSITA would understand that Suzuki's device modified by

Fine teaches that LEDs 12 (of a light source) may be positioned at the back portion 18 of waveguide 14.

Additionally, Fine notes that embedding a light source in a waveguide efficiently (optically) couples the light source to the waveguide. Fine, 12:66-13:6 (“There are several advantages for embedding the light source within the waveguide material. One advantage is that all the light emitted from the light source eventually arrives at the waveguide material. When the light source is externally coupled to the waveguide material, some of the light scatters at wide angle and does not impinge the waveguide material. Thus, the embedding of light source 12 in waveguide material 14 allows to efficiently collect the emitted light.”).

Further, Fig. 1c below, shows LEDs 12 embedded in the back portion (shown in red) of waveguide 14.

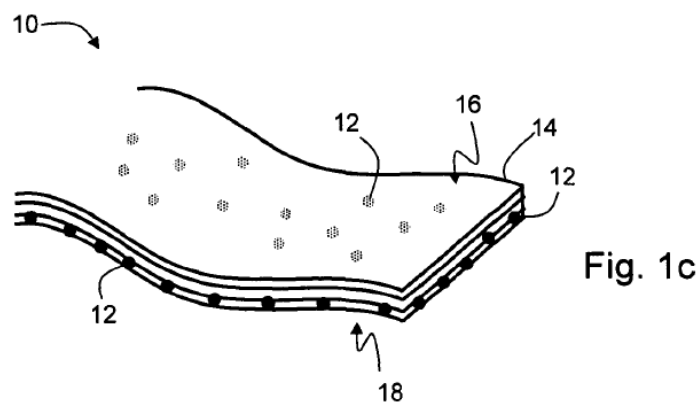


Fine, Fig. 1c. As such, it would have been obvious to a POSITA to optically couple LEDs 12 to the back portion of waveguide 14. Ex. 1003, ¶¶74-76.

4. Dependent Claim 28.

[28] The LCD system of claim 1, 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, and is positioned to emit light into a back side of the at least one waveguide element.

As discussed with respect to claim 1 in Section VII.B, Suzuki discloses a LCD system with LCD Panel 2 and waveguide element 11. Further, as shown below, Fig. 1c of Fine “schematically illustrates a perspective view of apparatus 10 in a preferred embodiment in which waveguide material 14 is non-planar[,]” Fine, 12:50-52, and illustrates light sources throughout the waveguide 14, including the center region, emitting light into the back side of waveguide 14.



Fine, Fig. 1c. Further, Fine states that LEDs 12 “can be embedded in the bulk of waveguide material 14 or near surface 18.” Fine, 1:66-67. As such, Suzuki’s

device modified by Fine's teachings would account for LEDs 12 optically coupled to the back portion 18 of a waveguide element 14.

Further, Fine discusses the “[t]ypical backlight assembly of LCD [which] includes an array of white LEDs for emitting white light, a light guiding plate for guiding the light toward the LCD panel[.]” Fine 3:65-67. Thus, in view of Fine, a POSITA would understand the Suzuki assembly includes that light emitted from LEDs 12 on the back side of waveguide element 14, including LEDs in the center region, is transmitted from the top surface 16 of waveguide element 14 to the LCD Panel.

5. Dependent Claim 29.

[29] The LCD system of claim 1, wherein any of the first light emitting source and the second light-emitting source is disposed at a location selected from: (a) along an edge region of the LCD system, positioned to emit light into an edge of the at least one waveguide element, and (b) along a center region of the LCD system behind the LCD panel, positioned to emit light into a back side of the at least one waveguide element.

As discussed with respect to claim 1 in Section VII.B, Suzuki discloses LED light sources 15 with LEDs 7 are arranged in series by pluralities of sets 10, arrayed along first light entrance surface 12B, on an edge of a waveguide element, lightguide 11. Specifically, Suzuki discloses that “LED light sources 115 are provided on both of side surfaces (light entrance surfaces) 112T and 112B along

the longer sides of a rectangular light-emitting surface 116 of a light guide 110 in the form of a thin plate.” Suzuki, ¶0007. *See also* Suzuki, ¶0026; Figs. 2,4.

Further discussed with respect to claim 28 in this section, a POSITA would understand that in view of Fine, that it would have been obvious to include in the Suzuki assembly light emitted from LEDs 12 on the back side of waveguide element 14, including LEDs in the center region, that is transmitted from the top surface 16 of waveguide element 14 to the LCD Panel.

6. Dependent Claim 32.

[32] The LCD system of claim 1, embodied in a television.

As discussed with respect to claim 32 in Section VII.B, a POSITA would find claim 32 obvious in view of Suzuki alone. However, to the extent there is an argument that claim 32 is not obvious in view of Suzuki alone, a POSITA would find claim 32 obvious with Suzuki in view of Fine.

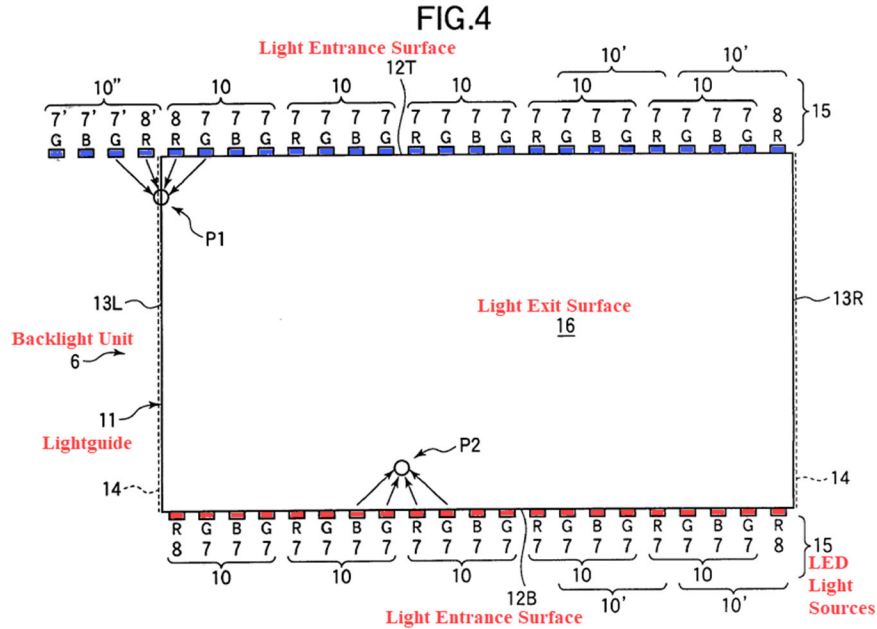
Fine indicates that the Suzuki assembly modified with the Fine illumination device may be embodied in a television. Specifically, the Fine device “embodiments further comprise a portable computer system comprising the liquid crystal display device, a computer monitor comprising the liquid crystal display device, a personal digital assistant system comprising the liquid crystal display device, a cellular communication system comprising the liquid crystal display device, and a television system comprising the liquid crystal display device.” Fine,

5:41-48; *see also* Fine, 4:21-25; 20:4-9. Thus, in view of Fine, a POSITA would understand that the Suzuki assembly modified with the Fine illumination device may be embodied in a television. Ex. 1003, ¶¶95-96.

7. Dependent Claim 34.

[34] The LCD system of claim 1, further comprising a third light-emitting source positioned to emit light into the at least one waveguide element.

As discussed with respect to claim 17 in Section VII.B, as shown in Fig. 4 below, Suzuki discloses first emitting light sources, LED light sources 15 with LEDs 7 (in red), arranged in series by pluralities of sets 10, optically coupled to first light entrance surface 12B, of a waveguide element, lightguide 11, as well as second emitting light sources, LED light sources 15 with LEDs 7 (in blue), arranged in series by pluralities of sets 10, optically coupled to second light entrance surface 12T, of a waveguide element, lightguide 11. Suzuki, ¶ 0027.



Suzuki, Fig. 4. Further, the discussion regarding claim 22 in this section relates how Suzuki in view of Fine illustrates that light sources may be optically coupled to the back portion of waveguide 14. Notably, Fine notes that the “term ‘light source’ as used herein refers to one or more light sources.” Fine, 11:60-61. As such, a POSITA would understand that Fine discloses an indeterminate plurality of LEDs or light sources optically coupled to waveguide 14. Thus, a POSITA would find it obvious in view of Suzuki and Fine to have at least three light emitting sources that are positioned to emit light into at least one waveguide element, 12B, 12T, and opposite light exit surface 16.

VIII. Any Secondary Considerations Cannot Overcome the Clear Evidence of Obviousness.

Evidence of secondary considerations presented by the Patent Owner should be addressed in a trial where the parties may develop, and the Board may consider, a full record. *See, e.g., Tristar Products, Inc. v. Choon's Design, LLC*, IPR2015-01883, Paper No. 6 at 26 (PTAB Mar. 9, 2016).

IX. Discretionary Denial is Inappropriate.

The Underlying Litigation does not warrant discretionary denial under 35 U.S.C. § 314(a). The *Fintiv* framework favors institution of this proceeding. *See Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 6 (PTAB Mar. 20, 2020). As explained below, each of the *Fintiv* factors weighs against discretionary denial or is, at worst, neutral. The Board should institute IPR.

Factor 1 - Whether the Court Granted a Stay or Evidence Exists that One May be Granted if a Proceeding is Instituted. This factor favors institution or is, at worst, neutral. There has been little investment by the parties. The early stage of the litigation and potential simplification (resulting from the Board invalidating all asserted claims of the '705 Patent) weighs against the exercise of discretion.

Factor 2 - Proximity of the Court's Trial Date to the Board's Projected Statutory Deadline for a Final Written Decision. This factor weighs against discretionary denial. This case is at its early stages, the counterclaim asserting the '705 Patent was filed in September 2022. *See* Ex. 1008. Further, Patent Owner

only identified asserted claims and served infringement contentions on January 30, 2023, Ex. 1011, and Patent Owner supplemented these contentions on June 21, 2023. Ex. 1012. The schedule in the Underlying Litigation does not yet include a date for a *Markman* hearing, much less a trial date. *See* Ex. 1009. Further, the current case schedule does not include a date for the close of fact discovery, the beginning of expert discovery, or dispositive motions. Put simply, much more of the Underlying Litigation lies ahead than behind.

Further, according to the latest court management statistics, the average time from complaint to trial in the Northern District of Georgia—where the Underlying Litigation is Pending—is approximately 36 months. *See* Ex. 1010. Thus, conservatively, a jury trial would not occur in the underlying litigation until late 2025. Thus, a Final Written Decision is likely to be issued well before the date of any scheduled trial.

Factor 3 - Investment in the Parallel Proceeding by the Court and the Parties. This factor weighs against discretionary denial. The parties have made only minimal investment in this litigation to date. Plaintiff's infringement contentions identifying the asserted claims were served on January 30, 2023. *See* Ex. 1011. These contentions first identified the asserted claims, and Patent Owner supplemented these contentions on June 21, 2023. Ex. 1012. This fact weighs against the exercise of discretion, as the Board explained in *Fintiv*, where “the

petitioner filed the petition expeditiously, such as promptly after becoming aware of the claims being asserted, this fact has weighed against exercising the authority to deny institution under *NHK*.” *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 1 (PTAB Mar. 20, 2020) (precedential). Further, no substantive orders have been entered. Under these facts discretionary denial is improper. *See, e.g., Nokia of America Corp and Ericsson Inc. v. IPCOM, GMBH & Co. KG*, IPR2021-00533, Paper 10 at (PTAB Aug. 12, 2021).

Factor 4 - Overlap Between Issues Raised in the Petition and in the Parallel Proceeding. Petitioner challenges several claims of the '705 Patent that are not asserted in the Underlying Litigation. Exs. 1011-1012. Thus, there is no overlap with respect to some of the challenged claims.

Factor 5 - Whether the Petitioner and the Defendant in the Parallel Proceeding are the Same Party. This factor is neutral. The parties are the same, but this is common in nearly every Petition filed where there is a co-pending litigation.

Factor 6 - Other Circumstances that Impact the Board's Exercise of Discretion, Including the Merits. Every element of the challenged claims is either expressly shown in the prior art or is obvious in view of well-known art. The strong merits of the grounds presented in this Petition further support institution. *Fintiv*, Paper 11 at 14-15.

X. Denial Under Section 325(d) is Inappropriate.

This Petition does not present “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. §325(d). None of the prior art references used herein were cited in a substantive rejection during prosecution.

XI. Conclusion

In view of the foregoing, there is a reasonable likelihood that Petitioner will prevail with respect to claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, 31, 32, 33 and 34 of the '705 Patent.

Respectfully submitted,

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

CERTIFICATE OF WORD COUNT

The undersigned certifies pursuant to 37 C.F.R. § 42.24(d) that the foregoing **Petition for Inter Partes Review** excluding any table of contents, mandatory notices, certificates of service or word count, or appendix of exhibits or claim listing, contains 13,094 words according to the word-processing program used to prepare this paper (Microsoft Word). Petitioner certifies that this **Petition for Inter Partes Review** does not exceed the applicable type-volume limit of 37 C.F.R. § 42.24(a).

Dated: September 15, 2023

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

CERTIFICATE OF SERVICE

The undersigned hereby certifies that on the date below a copy of this **Petition for *Inter Partes* Review** has been served by Priority Mail Express® upon the following:

MYERS BIGEL, P.A.
P.O. BOX 37428
Raleigh, NC 27627

With a courtesy copy sent via email to litigation counsel in *Hisense USA Corporation v. Brightplus Ventures LLC*, No. 1:22-cv-02774 (N.D. Ga.).

Dated: September 15, 2023

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