

United States Patent and Trademark Office
Before the Patent Trial and Appeal Board

BOE Technology Group Co., Ltd.
(Petitioner)

v.

Optronic Sciences LLC,
(Patent Owner)

Inter Partes Review

No. IPR2024-01130 | **U.S. Patent No. 7,168,842**

Petitioner's Demonstratives

Level of Ordinary Skill in the Art

Level of Ordinary Skill In the Art

- '842 directed to system design of backlight package using known components
- '842 Patent not directed to design of heat dissipating means/LEDs/semiconductors
- PO offers 3 inconsistent POSITA definitions that should be rejected
- Dr. Baker is a POSITA

Level of Ordinary Skill In the Art

'842 directed to system design of backlight package using known components

1. Field of the Invention

The present invention generally relates to the packaging of light-emitting device backlights. In particular, the present invention relates to a light-emitting device backlight package which requires minimal space while producing maximum luminosity.

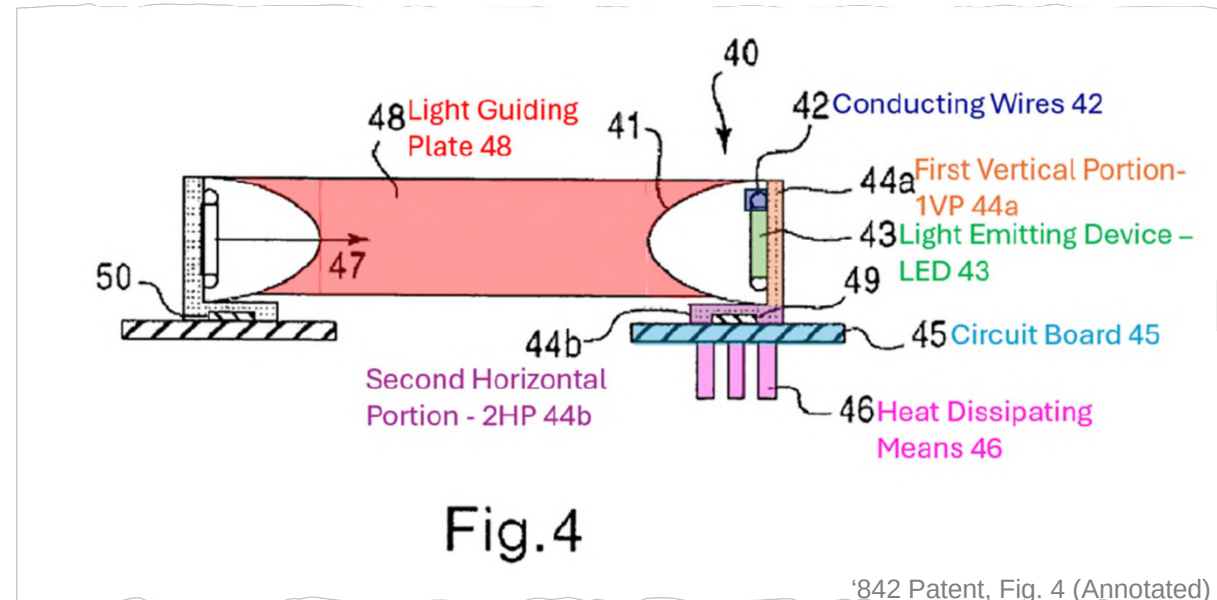
EX1001, 1:07-11

3. A backlight package comprising:

- a light guiding plate having a first side;
- a first fastener having a first portion and a second portion, the first portion disposed adjacent to the first side of the light guiding plate, wherein the first portion and the second portion are arranged in a substantially perpendicular relationship to form a substantially L-shaped structure; and
- a light emitting device disposed on the first portion of the first fastener for emitting a light toward the light guiding plate.

5. The backlight package as claimed in claim 3, further comprising a circuit board and a conducting wire, the circuit board connecting the second portion, and the conducting wire electrically coupling the light emitting device to the circuit board.

EX1001, Claim 3, 5; *Id.* at 7-9



Pet. Reply, 1-8; EX1031 ¶¶ 12-25, 39-40; Pet. 1-2; EX1002 ¶¶ 48-58
Paper 38, Resp. to Mtn. to Exclude, *passim*

Level of Ordinary Skill In the Art

'842 Patent not directed to design of LEDs/heat dissipating means/semiconductors

- ✗ Not directed to LED design
- ✗ Not directed to most efficient heat dissipation
- ✗ Not directed to specific heat dissipation means design
- ✗ Not directed to semiconductor fabrication, discussed nowhere in '842 specification
- ✗ Not directed to flat panel design generally

Pet. Reply, 1-8; EX1031 ¶¶ 12-25, 39-40; Pet. 1-2; EX1002 ¶¶ 48-58, Paper 38, Resp. to Mtn. to Exclude, *passim*

Level of Ordinary Skill In the Art

Petitioner's consistent POSITA definition

Petitioner's POSITA Definition

“Bachelors’ degree in electrical engineering or a comparable field of study, plus approximately one or more years of professional experience with electronic and optoelectronic system design. Additional graduate education could substitute for professional experience, and significant experience in the field substitute for formal education.”

Pet. at 3; EX1002, ¶ 46; Pet. Reply, at 2-8; EX1031 ¶ 9.

Level of Ordinary Skill In the Art

PO's inconsistent POSITA definitions

IPR POSITA 1	Litigation POSITA 2	Litigation POSITA 3
“at least a Bachelor’s degree in a field of engineering or physics and at least one year of practical experience in design of LED packages and one year of practical experience in design of thermal management systems for LEDs. Additional graduate education provided it included relevant semiconductor manufacturing or flat panel display technology could reduce but not eliminate the time requirement for professional experience” EX2020 ¶ 86	“at least a Bachelor’s degree in a field of engineering or physics and at least one year of practical experience in design of LED packages and one year of practical experience in design of LEDs. Additional graduate education provided it included relevant semiconductor manufacturing or flat panel display technology could reduce but not eliminate the time requirement for professional experience” EX1033 ¶ 83	“at least a Bachelors’ degree in a field of engineering and at least two years of professional experience related to the design and manufacture of LCD panels and/or displays. Additional graduate education could reduce or eliminate the time requirement for professional experience.” EX1032 ¶ 22

Level of Ordinary Skill In the Art

Undisputed Dr. Baker qualifies under PO's district court POSITA definition

PO's Litigation POSITA 3	Petitioner's POSITA Definition	
"at least a Bachelors' degree in a field of engineering and at least two years of professional experience related to the design and manufacture of LCD panels and/or displays. Additional graduate education could reduce or eliminate the time requirement for professional experience." EX1032 ¶ 22	"Bachelors' degree in electrical engineering or a comparable field of study, plus approximately one or more years of professional experience with electronic and optoelectronic system design. Additional graduate education could substitute for professional experience, and significant experience in the field substitute for formal education." Pet. at 3; EX1002, ¶ 46; Pet. Reply, at 2-8; EX1031 ¶ 9.	✓ No district court qualification challenge ✓ Dr. Baker is 20-year professor of Electrical Engineering advising over 100 graduate students ✓ Dr. Baker has display design experience

Pet. Reply, 1-8; EX1031 ¶¶ 26-40; EX1021 *passim*

Level of Ordinary Skill In the Art

Dr. Baker is qualified as a POSITA

- ✓ No district court qualification challenge
- ✓ Dr. Baker is 20-year professor of Electrical Engineering advising over 100 graduate students
- ✓ Dr. Baker has display design experience
- ✓ System design using packaged LEDs
- ✓ Heat sinking for high powered light sources

Paper 38, Resp. to Mtn. to Exclude, 9-10; Pet. Reply, 1-8; EX1031 ¶¶ 26-40; EX1021 *passim*

Claim Construction

Agreed Construction of “Fastener” (All Claims)

Dr. Bretschneider applies improper claim constructions

Parties Agreed Construction

“[a] feature that attaches or holds something in place”

Claim Construction Order at 20; 842 Petitioner’s Reply at 10; EX1026, 42:12-43:02; EX1027

Patent Owner’s Dropped Constructions

“one feature whose primary purpose is to
attach something”

EX2020 ¶ 117

“an article whose primary purpose is to attach
or fasten one object to another”

EX1028 at 4

“a feature that attaches something”

EX1029 at 12

Agreed Construction of “Circuit Board Connecting the Second Portion” (Claims 5 and 7)

No “electrical connection” or “attaching” required

Parties Agreed Construction

“circuit board connecting to the second portion”

5. The backlight package as claimed in claim 3, further comprising a circuit board and a conducting wire, the circuit board connecting the second portion, and the conducting wire electrically coupling the light emitting device to the circuit board.

EX1001, Claim 5

Reply at 13-14; EX1031 ¶¶ 50-54

In a light emitting device including a transparent covering, a fastener having a vertical member and a horizontal member, a light-emitting chip disposed on one face of the vertical member and encased by the transparent covering, a circuit board disposed on one face of the horizontal member, at least one conductive means connecting the light-emitting chip to the circuit board, and at least one heat-dissipating plate perpendicularly disposed on the other face of the horizontal member, light may be emitted longitudinally along a light-guiding plate, thus optimizing the travel path of the emitted light, while maintaining a compact shape by enabling placement of the printed circuit board and heat dissipating plates away from a longitudinal axis of the light-guiding plate.

EX1001, Abstract

Agreed Construction of “Circuit Board Connecting the Second Portion” (Claims 5 and 7)

No “electrical connection” or “attaching” required

Parties Agreed Construction

“circuit board connecting to the second portion”

Pet. Reply, 13-14; EX1031 ¶¶ 50-54

or plastic. The chip 43 and the PCB 45 are respectively disposed on the first and second portions 44A, 44B of the fastener 44. The conducting wire 42 runs from the vertically

EX1001, 3:19-21

In a light emitting device including a transparent covering, a fastener having a vertical member and a horizontal member, a light-emitting chip disposed on one face of the vertical member and encased by the transparent covering, a circuit board disposed on one face of the horizontal member, at least one conductive means connecting the light-emitting chip to the circuit board, and at least one heat-dissipating plate perpendicularly disposed on the other face of the horizontal member, light may be emitted longitudinally along a light-guiding plate, thus optimizing the travel path of the emitted light, while maintaining a compact shape by enabling placement of the printed circuit board and heat dissipating plates away from a longitudinal axis of the light-guiding plate.

EX1001, Abstract

Construction of “heat dissipating means...for conducting a heat generated thereon” (Claims 6 and 9)

Consistent construction and application

Petitioner’s Narrow Construction

“plural heat dissipating plates for conducting heat generated on the circuit board”

Pet., 6-7; EX1002, ¶¶ 70-73, 107-109, 185-191; Pet. Reply, 11-13; EX1031 ¶¶ 46-49

 PO’s explicit construction: heat required to be dissipated outside of device POR at 15-16

 PO’s implicit construction: threshold of heat to be dissipated POR at 36-39

 PO’s implicit construction: heat must be dissipated from LEDs POR at 40-42

Construction of “disposed on” (Claims 3 and 7)

Petitioner’s clearly disclosed undisputed constructions

Petitioner’s Narrow Proposed Construction	Petitioner’s Broad Proposed Construction
“Directly disposed on”	“Indirectly disposed on”

Pet. Reply at 24; EX1031 ¶¶ 88-89; Pet. at 14-15, 51-56; EX1002 ¶¶ 91-95, 173-175, 177

POR and Dr. Bretschneider do not address “directly disposed on” requirement.

POR at 50-56; EX2020 ¶¶ 187, 193, 197, 208, 211, 231

Construction of “disposed on” (Claims 6 and 9)

Indirectly disposed on supported by specification

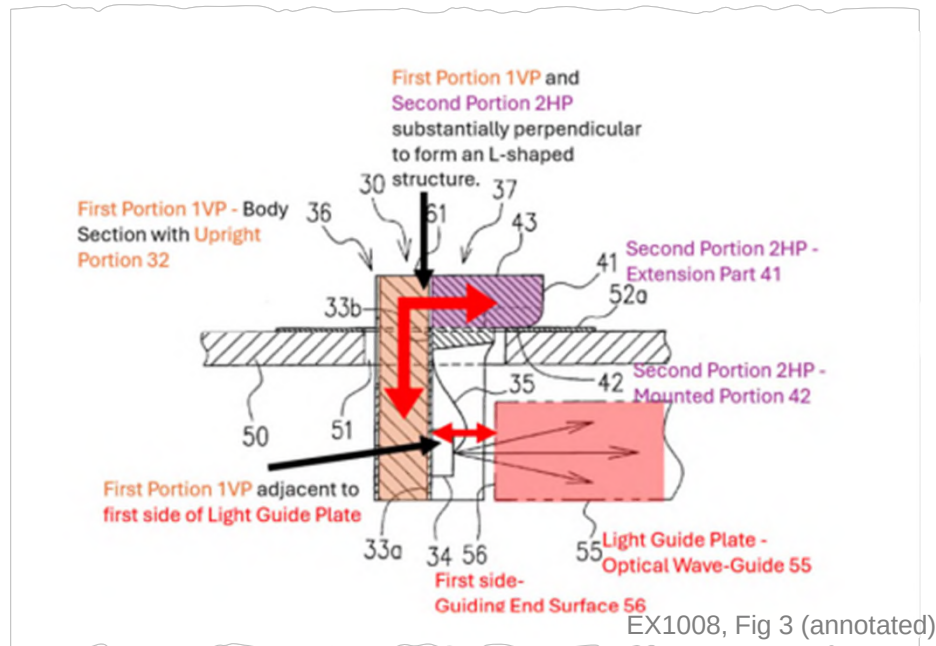
33a. EX1008, Figs. 1-3, 3:54-4:03, 4:28-36, 5:55-65. A broad interpretation is consistent with the ordinary meaning of “disposed on,” which includes both indirectly and directly disposed on, particularly in the context of a “comprising” claim like claim 3. A broad interpretation of “disposed on” is consistent with the specification of the 842 patent, because the specification uses “disposed on” broadly to refer to components that are indirectly disposed on each other. For example, the specification states that the heat-dissipating plates 46 conduct or dissipate heat “produced by electronic components disposed on the PCB 45.” *Id.* the *Id.*, 3:25-31, 3:51-58. Therefore, the specification supports a broad interpretation of “disposed on” which does not require components to be directly disposed on other components. Under a broad interpretation of “disposed on,” this

Pet. Reply at 24; EX1031 ¶¶ 88-89; Pet. 14-15, 51-56; EX1002 ¶¶ 91-95, 173-175, 177

Ground 1: Uekusa

Ground 1: Uekusa Anticipates

Uekusa's fastener "attaches or holds" other structures in place



FIGS. 2 and 3 illustrate a state of mounting the light emitting diode 30 structured as described above on a motherboard 50. The motherboard 50 is provided with a circular hole 51 for mounting the light emitting diode 30 thereon. 65 The upright portion 32 is, first, inserted in the hole 51 and the mounted surfaces 38 of the base portions 31a and 31b are, then, mounted on a peripheral edge of the hole 51 and at the same time, the mounted portion 42 is mounted on the peripheral edge of the hole 51 to support the light emitting diode with three points of the mounted surfaces 38 and mounted portion 42.

EX1008, 4:61-5:04

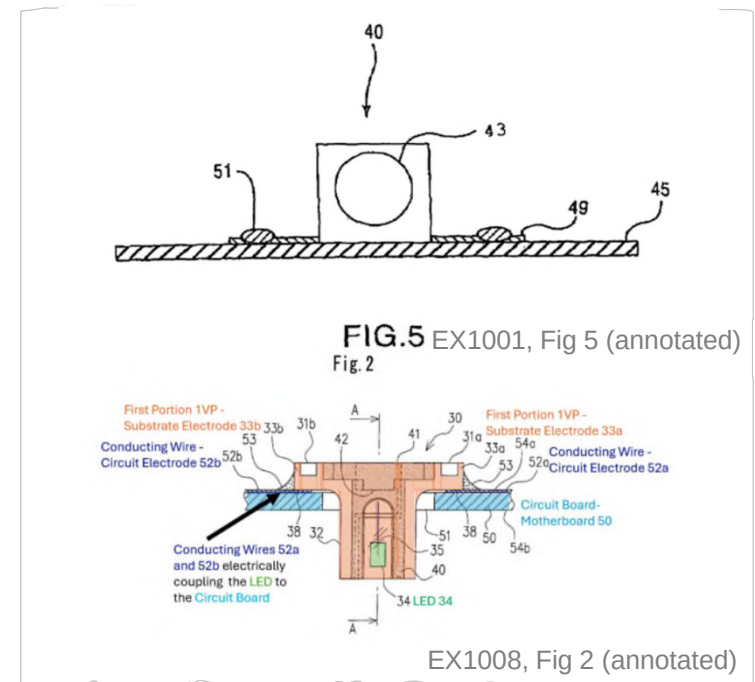
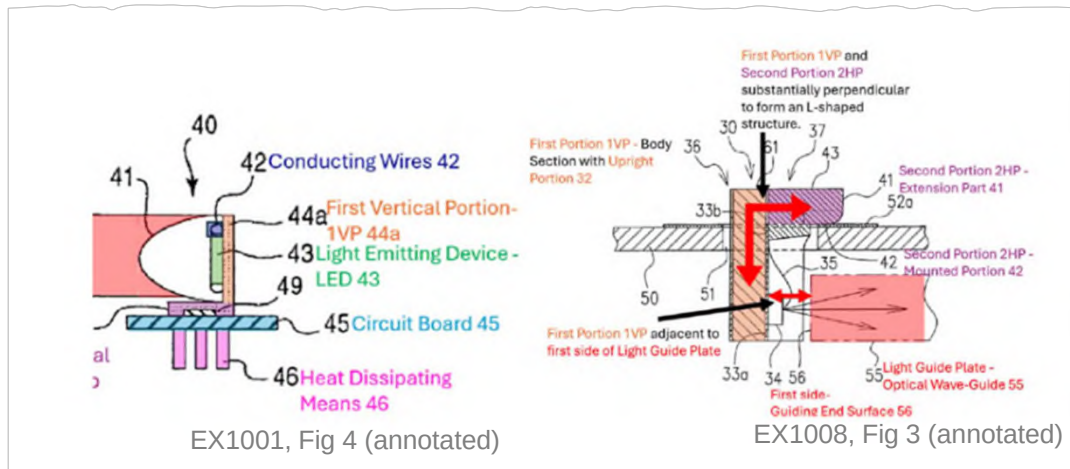
hole provided in a motherboard as described below. A light emitting diode element 34 is fixed on one substrate electrode 33a, for example, in a front surface of the upright section 32. For example, the light emitting diode element 34 has a three-dimensional rectangular shape. An end of a bonding

EX1008, 3:63-65

Petitioner Reply at 14-16; EX1031 ¶¶ 56-60; Pet. at 10-15; EX1002, ¶¶ 85-95, 100-105, 127

Ground 1: Uekusa Anticipates

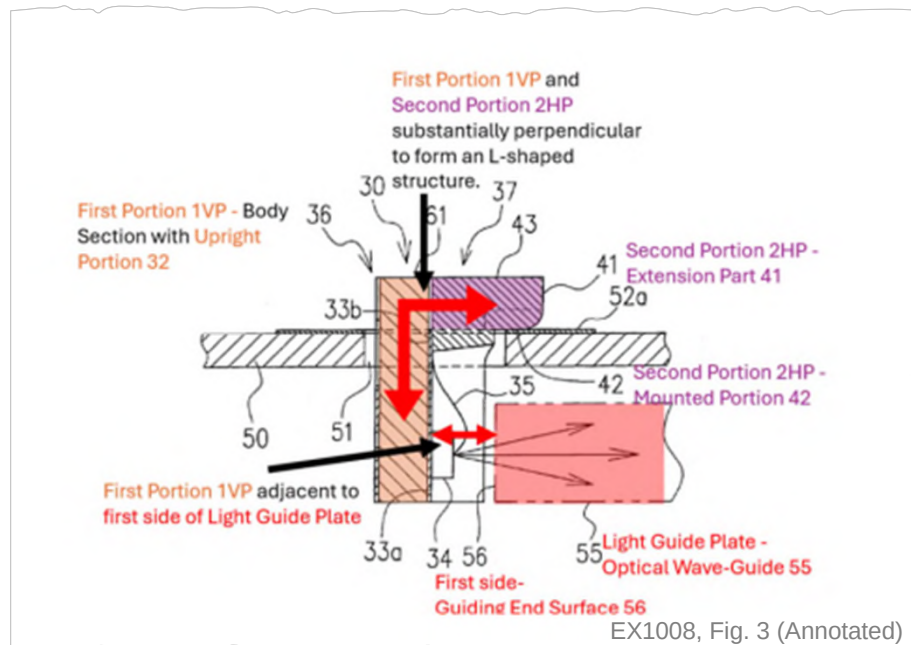
Uekusa's fastener is "L-Shaped"



Pet. Reply, 16-17; EX1031 ¶¶ 60-62; Pet., 10-15; EX1002, ¶¶ 85-89

Ground 1: Uekusa Anticipates

Uekusa's circuit board is "Connecting to the Second Portion"



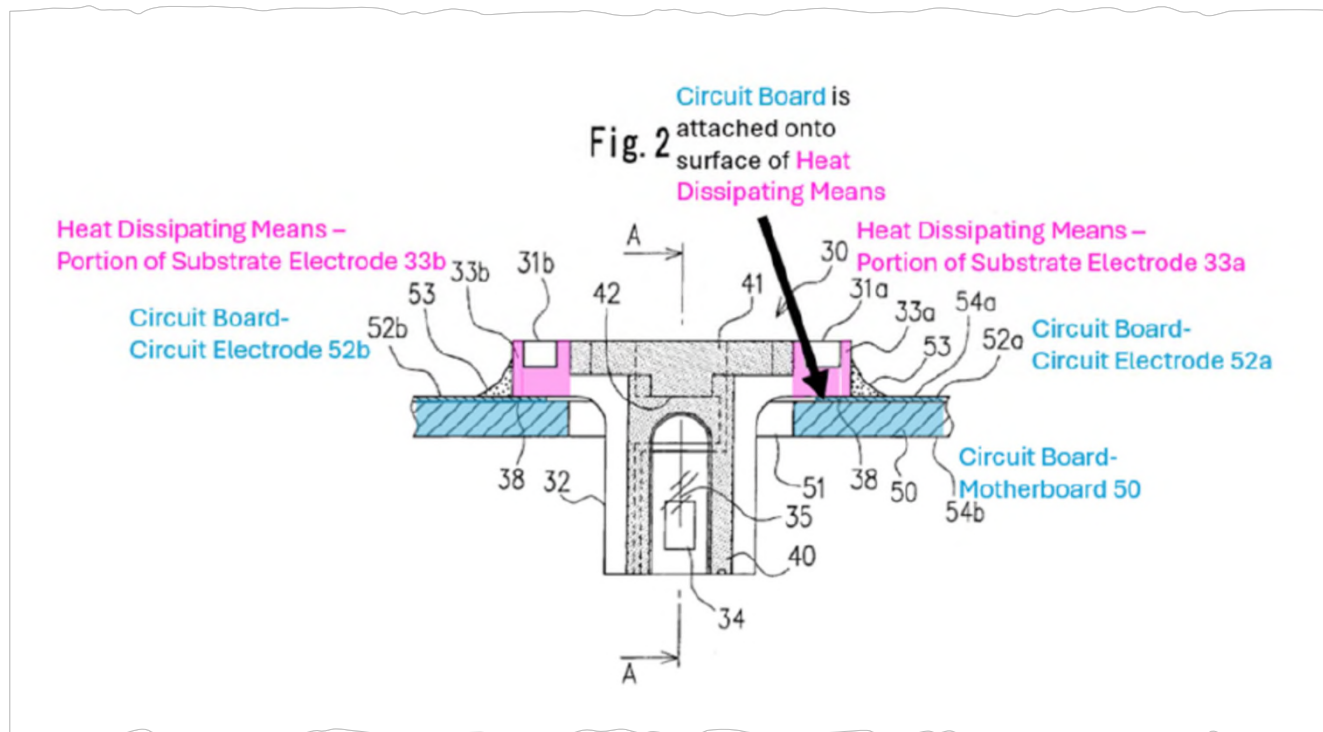
FIGS. 2 and 3 illustrate a state of mounting the light emitting diode 30 structured as described above on a motherboard 50. The motherboard 50 is provided with a circular hole 51 for mounting the light emitting diode 30 thereon. The upright portion 32 is, first, inserted in the hole 51 and the mounted surfaces 38 of the base portions 31a and 31b are, then, mounted on a peripheral edge of the hole 51 and at the same time, the mounted portion 42 is mounted on the peripheral edge of the hole 51 to support the light emitting diode with three points of the mounted surfaces 38 and mounted portion 42.

EX1008, 4:61-5:04

Pet. Reply, 17-18; EX1031 ¶¶ 63-64; Pet., 17-23; EX1002, ¶¶ 85-105

Ground 1: Uekusa Anticipates

Uekusa's electrodes are "heat dissipating means"



Pet. Reply at 18; EX1031 ¶¶ 65-67; Pet. at 23-26; EX1002, ¶¶ 106-109.

Ground 2: Uekusa, Isoda

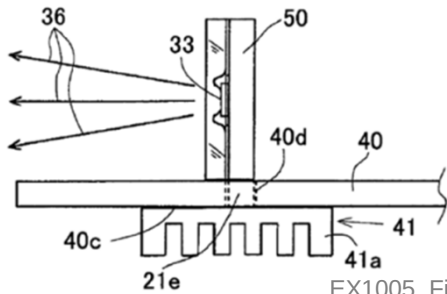
Uekusa in Combination with Isoda Renders All Claims Obvious

A POSITA would have been motivated to combine Uekusa with Isoda

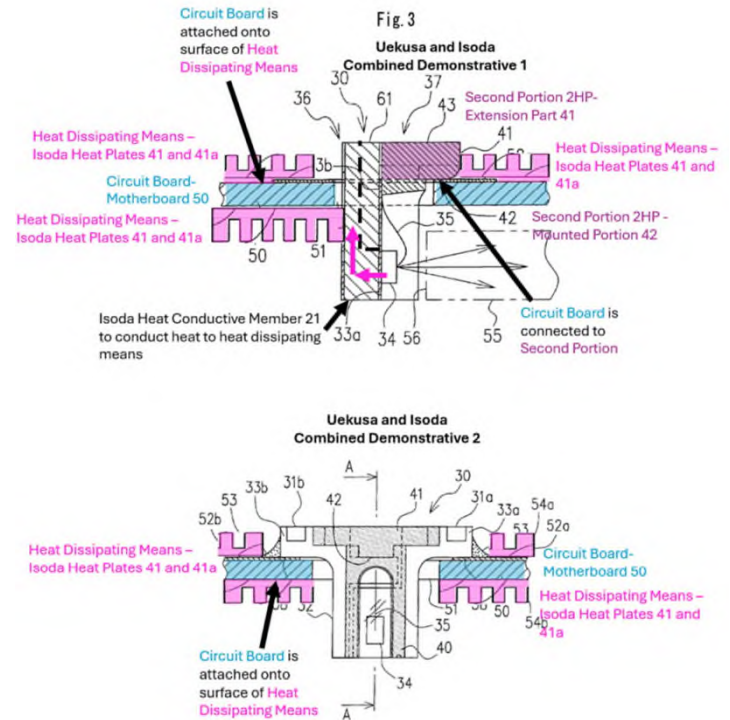
6. The backlight package as claimed in claim 3, further comprising a circuit board and a heat dissipating means, the circuit board connecting the second portion, and the heat dissipating means attached onto the surface of the circuit board for conducting a heat generated thereon.

EX1001, Claim 6

FIG. 8



EX1005, Fig. 8

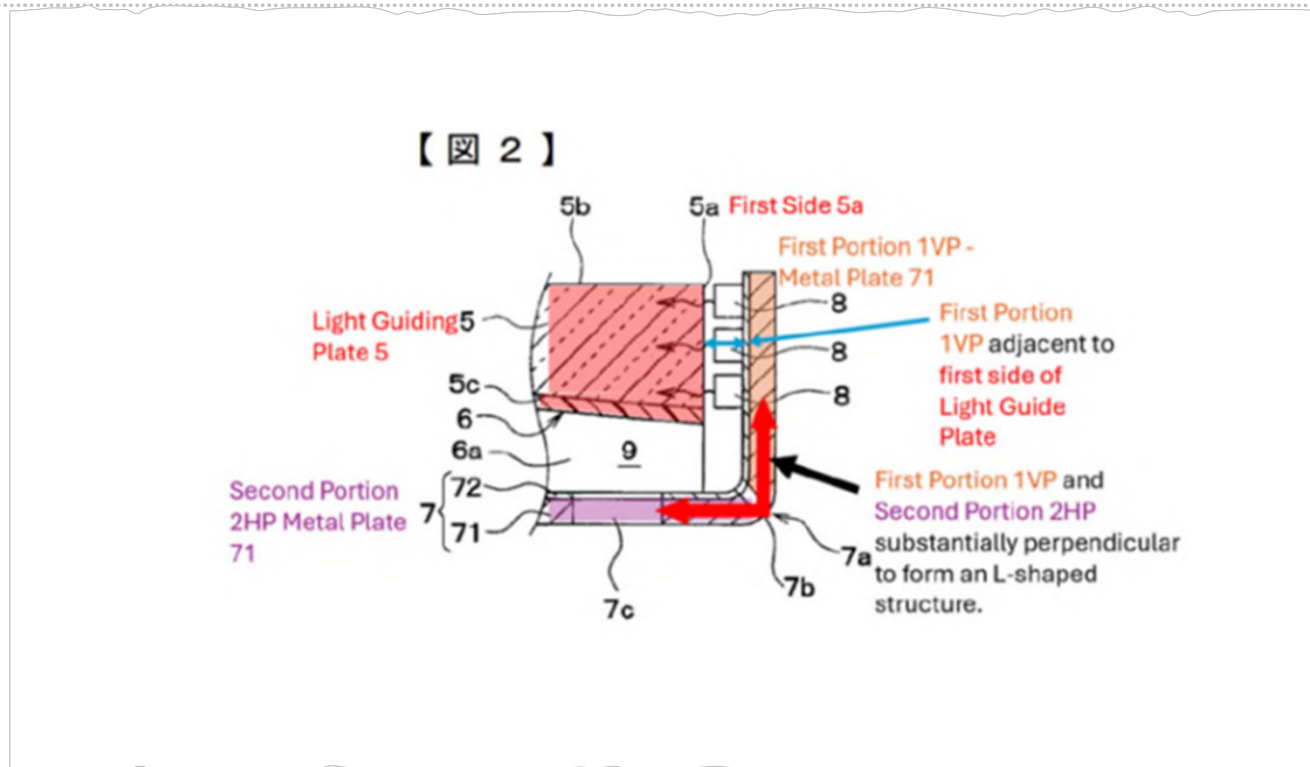


Pet. Reply, 18-22; EX1031 ¶¶ 68-77; Pet., 27-38, 40-46; EX1002, ¶¶ 118-157

Ground 4: Kurokawa

Ground 4: Kurokawa Anticipates

Petition disclosed theory printed wiring board 72 and metal plate 71 are separate components



Pet, 48-56; EX1002, ¶¶ 166-167, 171-175; Pet. Reply, 22-24; EX1031 ¶¶ 79-86

Ground 4: Kurokawa Anticipates

Not bifurcation - Kurokawa clearly discloses that printed wiring board 72 is a separate component from metal plate 71

83. Kurokawa's specification is clear that printed wiring board 72 is a separate component from metal plate 71, and it is appropriate to point to metal plate 71 as the claimed "fastener." Kurokawa discloses that flexible printed wiring board 72 is *bonded* to a metal plate 71, indicating that 71 and 72 are separate components. *See* EX1004 [0021], [0037]-[0040]; Petition, 50-51.

Pet Reply, 22-24; EX1031 ¶ 83

84. Each of metal plate 71 and printed wiring board 72 are comprised of different materials, with metal plate 71 being "aluminum, copper, and iron" and flexible printed wiring board 71 being "for example, an insulating film such as polyimide film or polyester film with a printed conductor pattern." *See* EX1004 Fig. 2, [0037]-[0040].

85. A POSITA would understand that printed wiring board 72 is itself a PCB, because an insulator with a printed conductor pattern on it is a PCB. Further, a POSITA would understand that a metal plate 71 is not a PCB because it is solid metal. Indeed, the metal plate 71 and flexible printed wiring board 72 are different parts because there are embodiments disclosed where a portion of the flexible printed wiring board 72 is eliminated, only leaving metal plate 71. EX1004, [0024]-[0026].

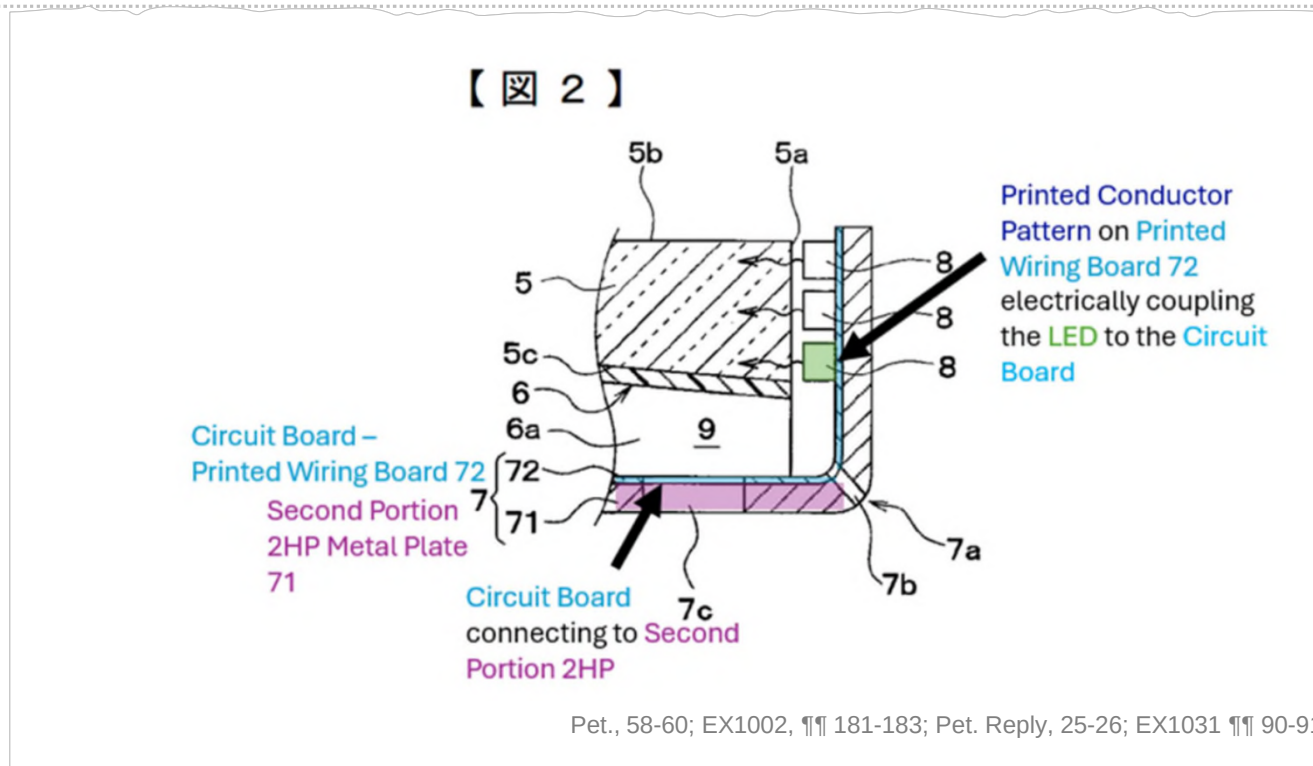
Pet. Reply, 22-24; EX1031 ¶¶ 84-85 26

Kurokawa's LED is "Disposed On" metal plate 71



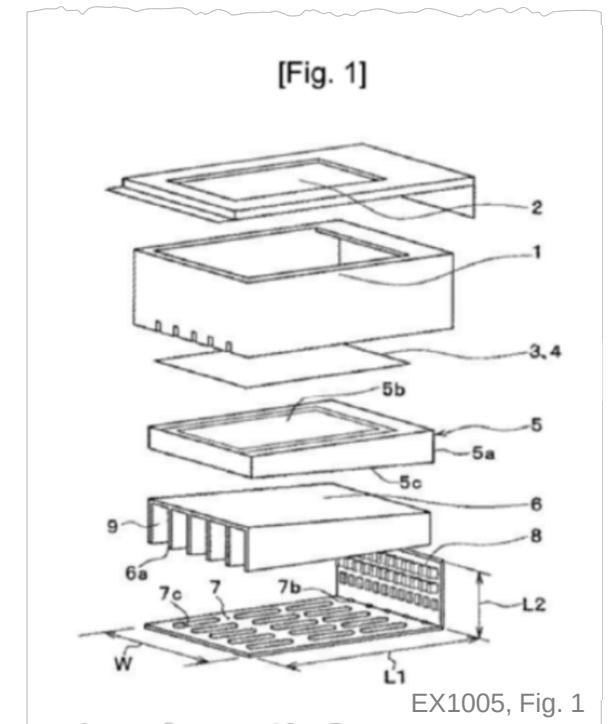
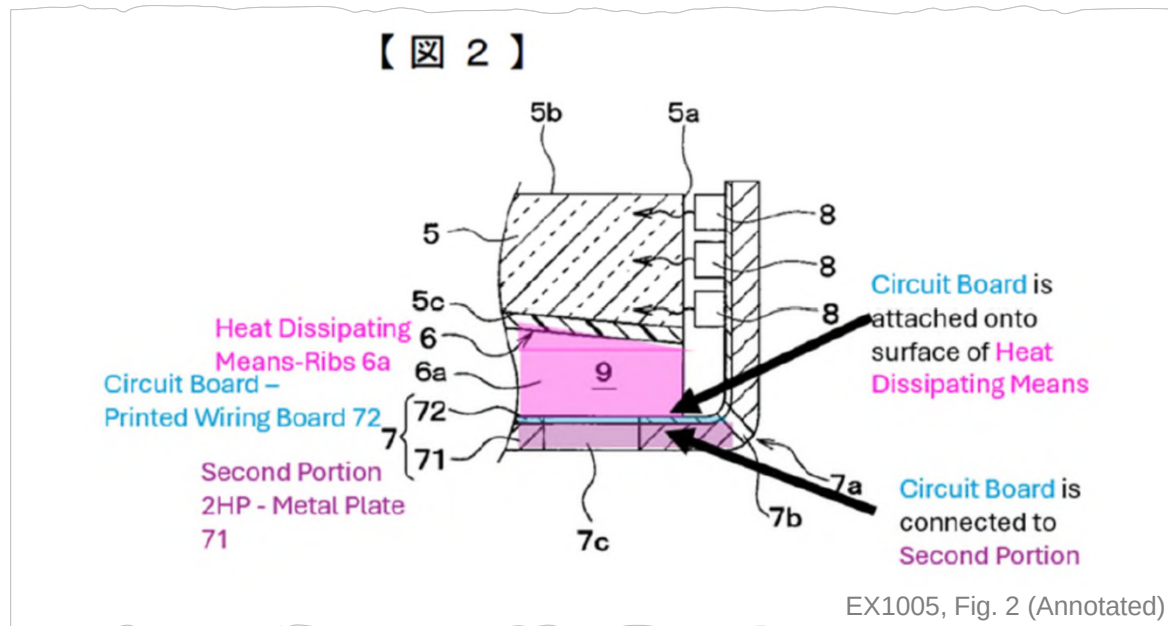
Grounds 4: Kurokawa Anticipates

Kurokawa's flexible printed wiring board 72 is a circuit board



Ground 4: Kurokawa Anticipates

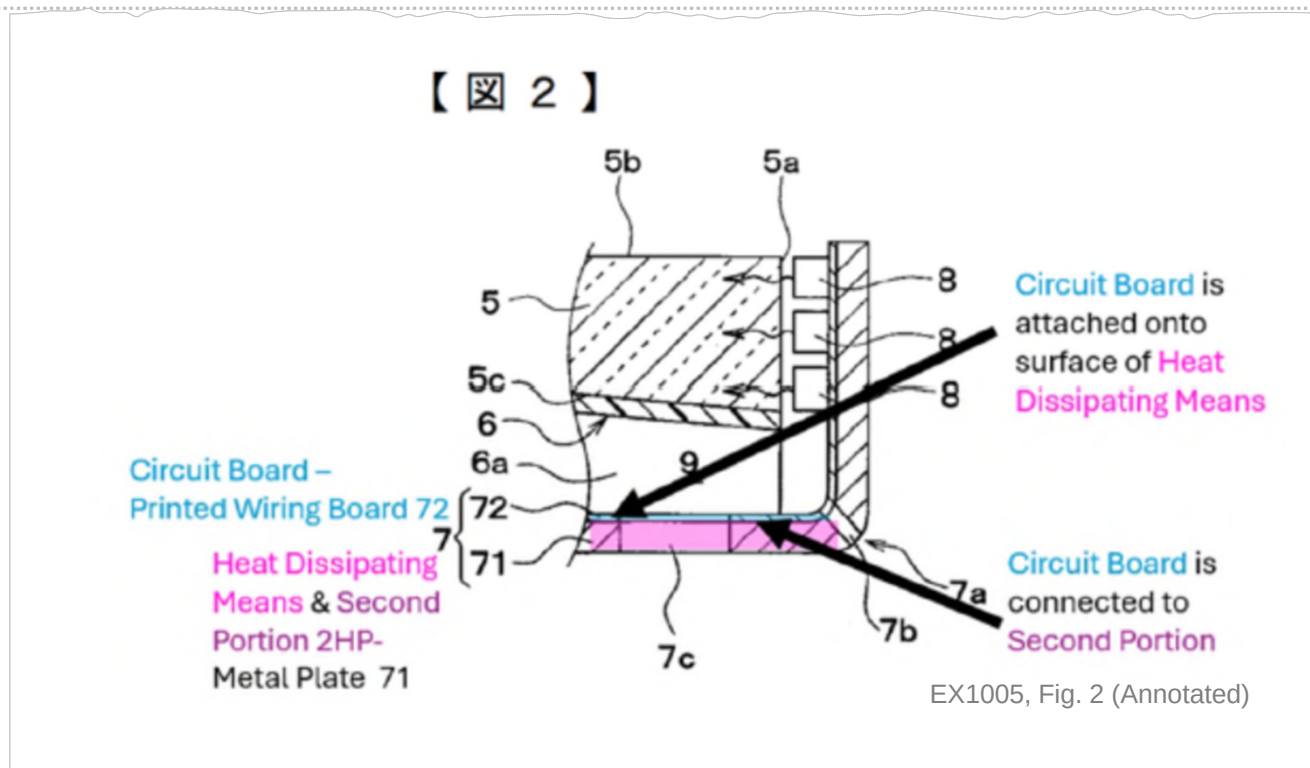
Kurokawa's Ribs 6a are "heat dissipating means"



Pet., 65-66; EX1002, ¶¶ 192-193; Pet. Reply, 26-27; EX1031 ¶¶ 92-98

Ground 4: Kurokawa Anticipates

Kurokawa's metal plate 71 is a “heat dissipating means”

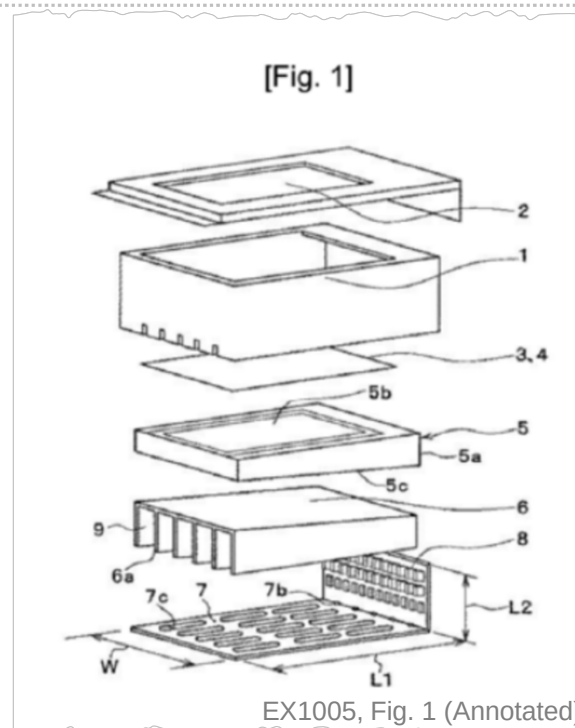
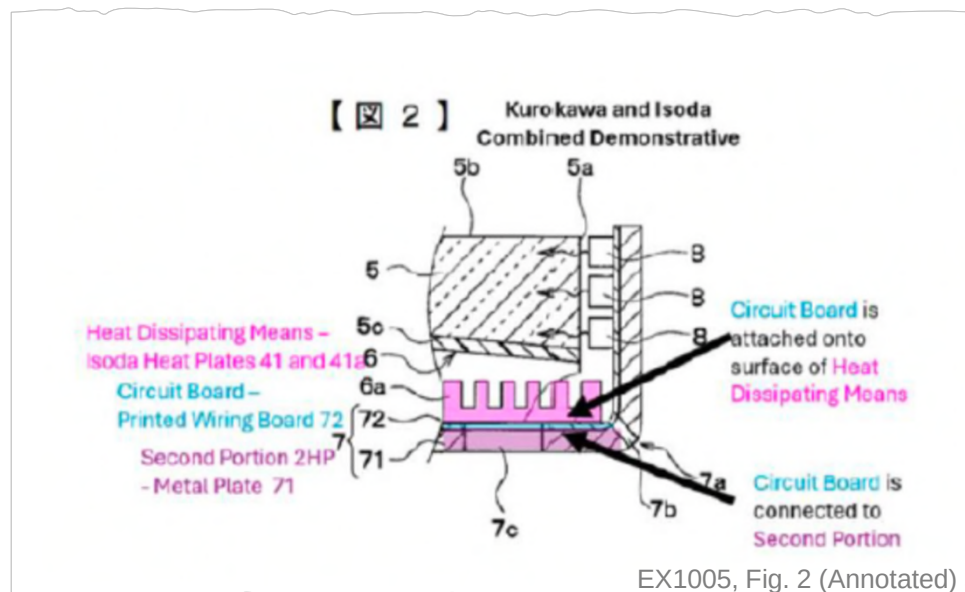


Pet., 60-64; EX1002 ¶¶ 184-191; Pet. Reply, 26-27; EX1031 ¶¶ 92-98

Ground 6: Kurokawa, Isoda

Ground 6: Kurokawa in Combination with Isoda Renders All Claims Obvious

A POSITA would have been motivated to combine Kurokawa with Isoda



Pet., 70-74, 79-84; EX1002, ¶¶ 213-244, 235-241; Pet. Reply, 27-30; EX1031 ¶¶ 100-108