Filed on behalf of: Nichia Corp. Paper ____

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Date filed: March 1, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIZIO, INC.,
Petitioner,

v.

NICHIA CORPORATION,
Patent Owner.

Case IPR2018-00437
Patent 9,537,071 B2

PATENT OWNER'S NOTICE OF SUBMISSION OF DEMONSTRATIVE EXHIBITS FOR MARCH 5, 2019 ORAL HEARING

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent & Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

Pursuant to the Order Granting Oral Hearing, dated February 22, 2019 (Paper No. 48), Patent Owner Nichia Corporation provides notice that it is hereby submitting the attached demonstrative exhibits for use at the oral hearing scheduled for March 5, 2019.

Respectfully submitted,

Date: March 1, 2019 By: */ Martin M. Zoltick /*

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIZIO, INC.,
Petitioner,
v.
NICHIA CORPORATION,
Patent Owner.

Case IPR2018-00386
Patent 9,490,411 B2

Case IPR2018-00437
Patent 9,537,071 B2

PATENT OWNER NICHIA CORPORATION'S DEMONSTRATIVE EXHIBITS FOR MARCH 5, 2019 ORAL HEARING

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIZIO, INC.,

Petitioner,

v.

NICHIA CORPORATION,

Patent Owner.

Case IPR2018-00386

Patent 9,490,411 B2

Dispositive Issue

- The Board's determination of the meaning of "disposed in a region below an upper surface of the metal part" is dispositive

- No dispute that under PO's construction of "disposed in a region below an upper surface of the metal part" neither Loh nor any other prior art reference discloses or suggests claimed feature

POR (Paper No. 20), pp. 1, 8, and 42-55; Patent Owner's Sur-Reply (Paper No. 28), p. 5

"Disposed In A Region Below An Upper Surface Of The Metal Part"

Claim 1

1. A light emitting device comprising:
a resin package comprising a resin part and a metal part including at least two metal plates, said resin package having four outer lateral surfaces and having a concave portion having a bottom surface; and
a light emitting element mounted on the bottom surface of

wherein both a part of the metal part and a part of the resin part are disposed in a region below an upper surface of the metal part, on four outer lateral surfaces of the resin package, and

wherein both a part of the metal part and a part of the resin part are disposed in a region below an upper surface of the metal part, on four outer lateral surfaces of the resin package, and
wherein a notch is formed in the metal part at each of the four outer lateral surfaces of the resin package.

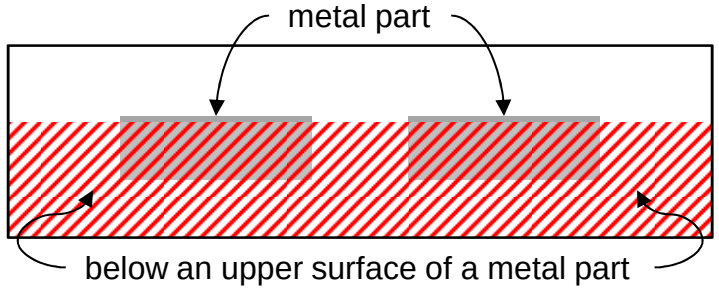
Ex. 1001

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See, e.g., POR (Paper No. 20), pp. 1, 4

Petitioner's Proposed Construction

"region below an upper surface of the metal part" means region "at a lower level than" the upper surface irrespective of the surface's boundaries



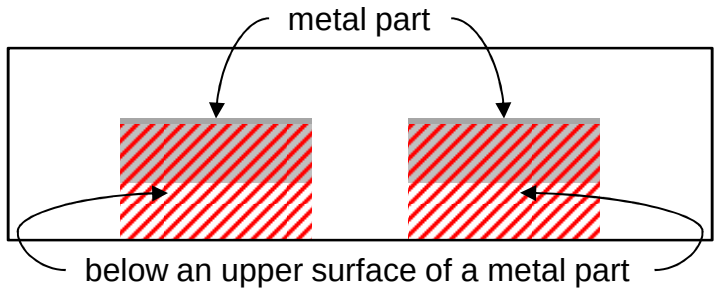
Response To Petitioner's Reply To Patent Owner's Sur-Reply (Paper No. 35), p. 1

- Disassociates the claimed *region* from the *upper surface*, and instead defines a plane that extends at a level of the upper surface
- Broadens the plain meaning to cover a device with only resin *between* the metal leads, and no resin underneath the metal leads

POR (Paper No. 20), pp. 1-2, 8-25; Petitioner's Reply (Paper No. 24), pp. 3-17

Patent Owner's Proposed Construction

"region below an upper surface of the metal part" means region "underneath" an upper surface of the metal part



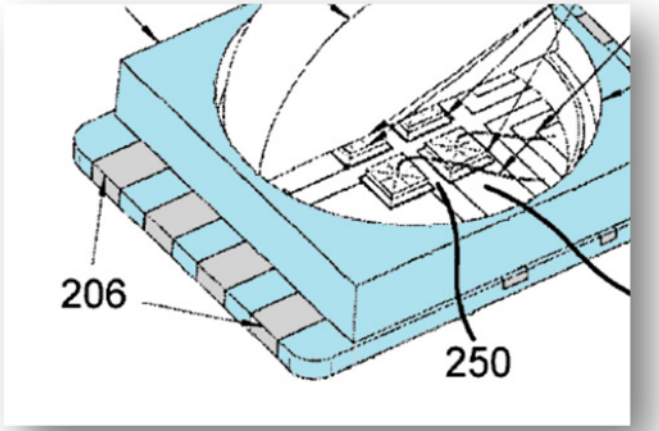
Response To Petitioner's Reply To Patent Owner's Sur-Reply (Paper No. 35), p. 1

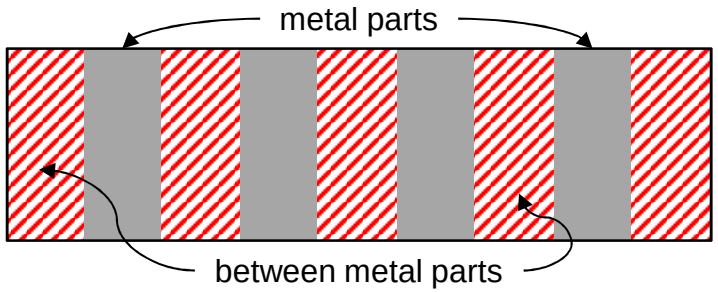
- Consistent with the plain meaning, and gives weight to all terms of the claim element
- Consistent with the specification and provides the advantages taught in the specification (*e.g.*, improves adhesion)

POR (Paper No. 20), pp. 1-2, 8-25; Petitioner's Reply (Paper No. 24), pp. 3-17

How Did We Get Here?

Loh shows resin between metal leads, not in a region underneath those leads' upper surfaces on two sides:





Response To Petitioner's Reply To
Patent Owner's Sur-Reply (Paper No. 35), p. 1

Petitioner's construction is a byproduct of Loh, not the plain meaning.

See Petition, pp. 30-32 ("resin fills the gaps between the leads at the outer lateral surfaces")

See POR (Paper No. 20), pp. 1-2; Institution Decision, pp. 8-9 ("Petitioner's arguments implicitly advance an interpretation that includes resin between the side surfaces of metal leads.")

Petitioner Is Wrong

Petitioner's construction is a byproduct of Loh.

- "disposed in a region ~~below~~ at a lower level than an upper surface of the metal part"
- In effect defining a plane that extends at the level of an upper surface of the metal part

Wrong because:

- Dismisses the specification's description of resin under metal due to concavities and convexities
- Inconsistent with the intrinsic evidence by requiring a "plane" that extends at a "level" of an upper surface
- Causes confusion when applying to an upper surface with different levels, leading to absurd results
- Fails to give meaning to all claim terms by disassociating the claimed "region" from the "upper surface"

POR (Paper No. 20), pp. 1-2, 8-25; Patent Owner's Sur-Reply (Paper No. 28), pp. 1-5; Response To Petitioner's Reply To Patent Owner's Sur-Reply (Paper No. 35), pp. 1-3

Summary of ’411 Patent

‘411 Patent

- In the ‘411 Patent, LEDs are made by providing notches in a metal lead frame, molding resin onto the lead frame, and then cutting along the notches to form singulated devices:

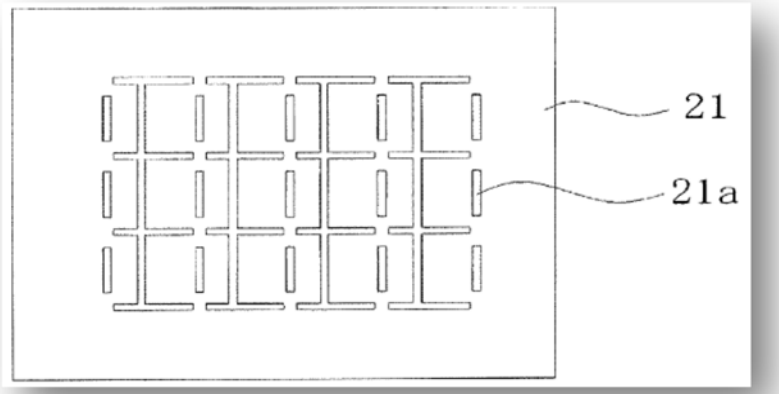


FIG. 3

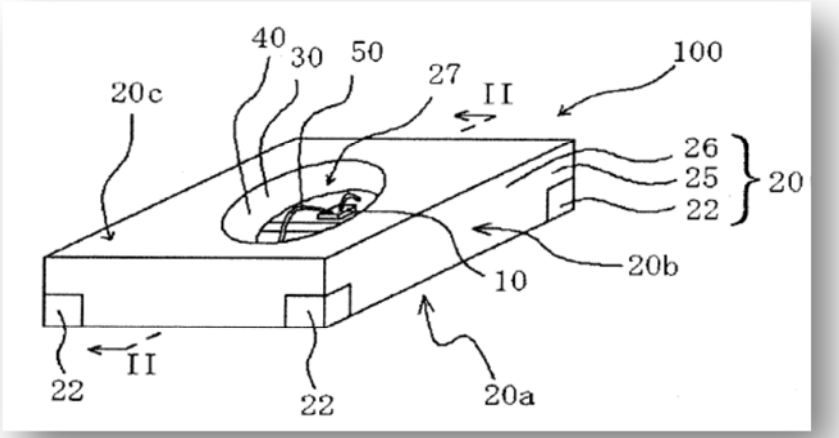


FIG. 1

Ex. 1001

- This use of notches results in resin-metal interfaces at each of the four outer lateral surfaces of the singulated device.

See POR (Paper No. 20), pp. 2-3 and 18-20

‘411 Patent

- In some embodiments, the lead frame used to form the devices has etched notches:

> etching. Although not illustrated, a concavity and convexity are formed in the cross-sectional surface of the notch part **21***a*. Ag is adhered to the lead frame by electrolytic plating.

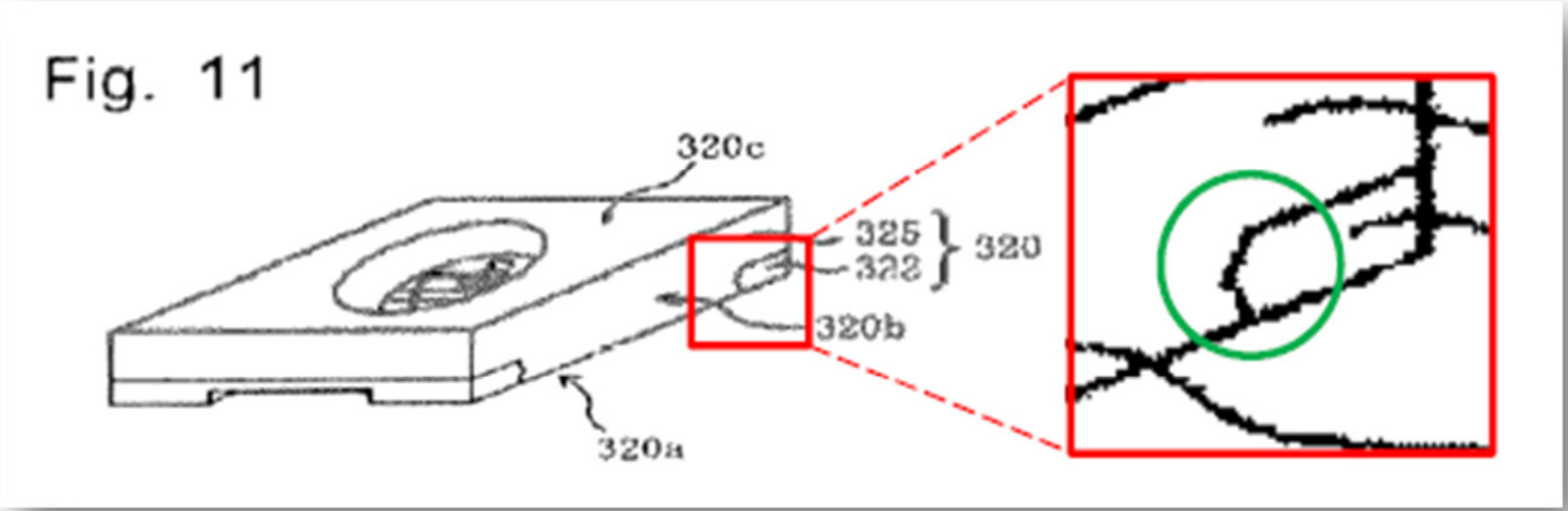
Ex. 1001 18:51-53

- This improves adhesion of the resin part to the metal leads, which is one of the stated goals of the ’411 Patent.

See POR (Paper No. 20), pp. 2-3

‘411 Patent

Due to these concavities/convexities of the notches, when the lead frame is singulated along the notches to form the individual devices, resin is present in the regions below the exposed metal leads at the outer lateral surfaces of the resultant devices.



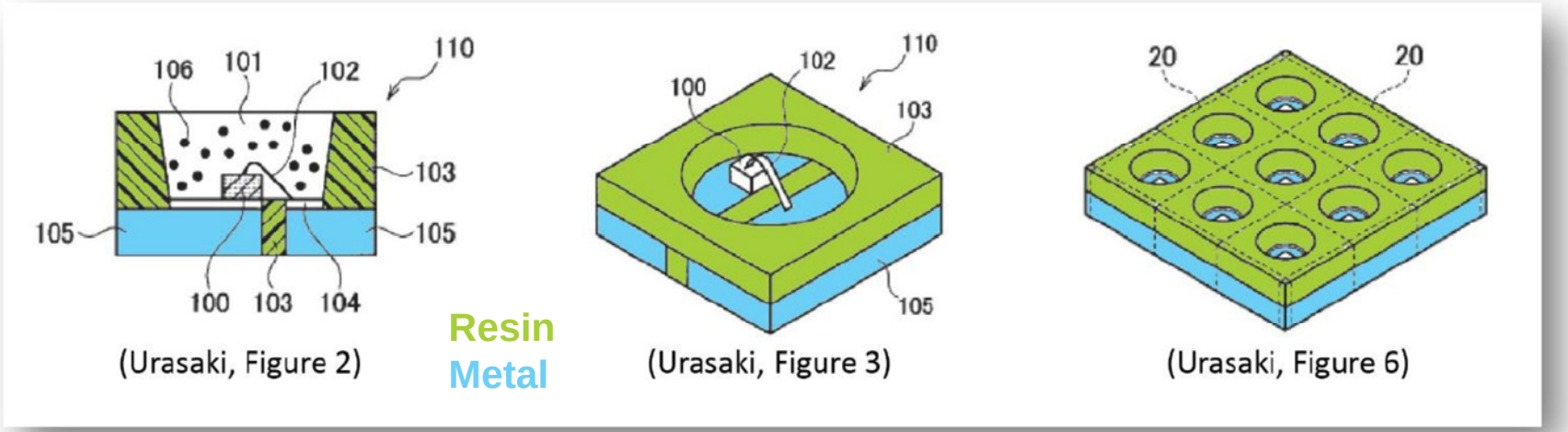
Ex. 2011 (Schubert Decl.), ¶ 54

See POR (Paper No. 20), pp. 2-3

Patent Owner's Construction Is Supported By The Specification And Purpose Of The '411 Patent

Adhesion Problem with Prior Art

- As explained in the background of the ’411 Patent, there was a detachment problem with certain prior art designs that used a flat, printed-wiring board as the substrate. Ex. 1001, 2:32-37 (“a lead frame and thermosetting resin composition are likely to be detached upon singulation”).
- There was no resin located below the leads at the outer surfaces of the prior art:



- While Urasaki had resin 103 above the metal 105 (see, e.g., Figure 6), and between the metal 105 (see, e.g., Figures 2 and 3), there was no resin 103 below the metal 105

See POR (Paper No. 20), pp. 14-15

The ‘411 Patent Provides a Solution

- Accordingly “an object of the present invention” is to provide LED devices with “high adhesion between” the resin part and leads. Ex. 1001, 3:26-30.

> a concavity and convexity. This concavity and convexity improve adhesion between the resin part and leads.

Ex. 1001, 16:53-54

- In other words, as a result of etching notches in the lead frame, concavities and/or convexities are formed in the regions below the surfaces of the exposed leads, which then fill with resin during processing.

See POR (Paper No. 20), pp. 14-16

Disclosure Of Improved Adhesion

etching. Although not illustrated, a concavity and convexity are formed in the cross-sectional surface of the notch part **21***a*. Ag is adhered to the lead frame by electrolytic plating.

Ex. 1001 18:51-53

part. With the configuration, the thermosetting resin is filled in the notch parts, and therefore an adhering area between the lead frame and the thermosetting resin becomes large, so that it is possible to improve adhesion between the lead frame and the thermosetting resin. Further, a thermosetting

Ex. 1001 3:51-55

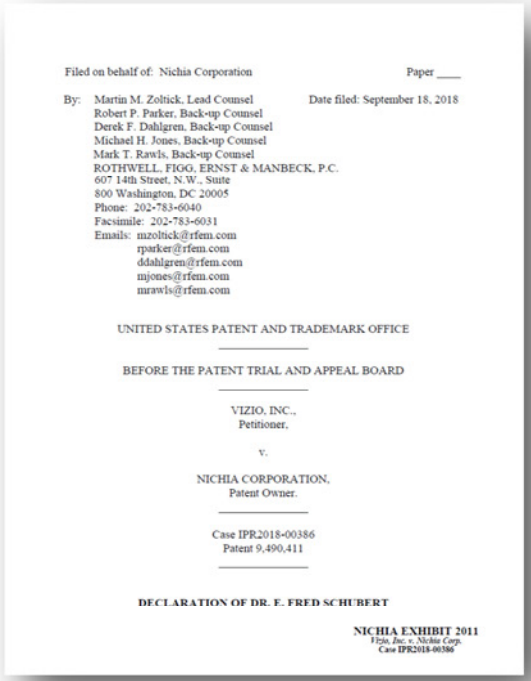
2,**1** from being detached. Further, not only the upper surface of the lead frame **21**, but also the side surfaces corresponding to the notch parts **21***a* adhere to the resin-molded body **24**, so that the adhesion strength between the lead frame **21** and resin molded body **24** is improved.

Ex. 1001 13:37-41

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See POR (Paper No. 20), p. 16

Improved Adhesion



Filed on behalf of: Nichia Corporation Paper ___

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Case IPR2018-00386
Patent 9,490,411

DECLARATION OF DR. F. FRED SCHUBERT

NICHIA EXHIBIT 2011
Vizio, Inc. v. Nichia Corp.
Case IPR2018-00386

Ex. 2011

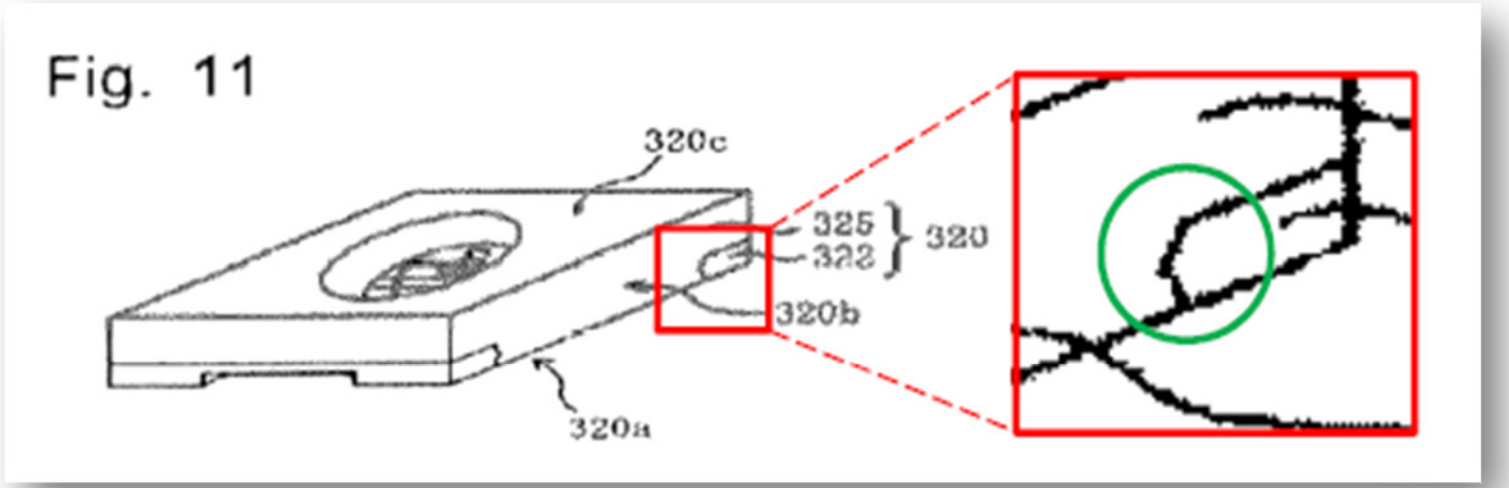
As explained by Dr. Schubert (Schubert Decl., ¶ 47)

The resin below the leads improves adhesion between the resin part and the leads because "of a greater adhesion area for the resin to surround and grip the metal lead frame…. [T]he claim element results in a greater mechanical interconnectedness between resin and lead frame."

"Specifically, the type of adhesion that the '411 Patent is attempting to provide, is adhesion that will avoid having the resin 'peel off' of the metal or detach upon singulation. This is also referred to as delamination."

See POR (Paper No. 20), p. 16

Resin Underneath Metal Leads



Ex. 2011, ¶ 54

An etched lead frame is used for the leads **322**. In the cut surface of the resin-molded body, the etched leads **322** have a concavity and convexity. This concavity and convexity improve adhesion between the resin part and leads.

Ex. 1001, 16:51-54

"[T]here is resin below metal, which provides for additional grip along a vertical axis…. This grip along a vertical axis helps to prevent delamination during singulation."

Ex. 2011 (Schubert Decl.), ¶¶ 52-53

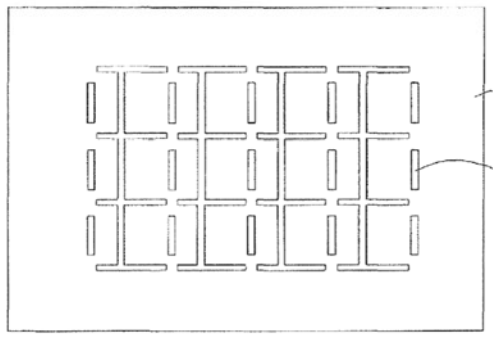
See POR (Paper No. 20), pp. 17-18

Resin Underneath Metal Leads

Ex. 1001, 9:28-42

The lead frame is formed by, for example, punching or etching a metal plate of a flat plate shape. A concavity and convexity are formed in a sectional shape of the etched lead frame, so that it is possible to improve adhesion between the lead frame and resin molded body. Particularly when a thin lead frame is used, although, with punching, differences in level or concave-convex shapes are formed to improve adhesion between a lead frame and resin-molded body, the effect of improving adhesion is little because the differences in level or concave-convex shapes are small. However, etching can form concave-convex shapes in the entire sectional (etched part) part of the lead frame, so that it is possible to increase a bonding area between the
and resin-molded body and mold a resin packag
adhesion.

Fig. 3



Ex. 1001

See POR (Paper No. 20), pp. 16-19

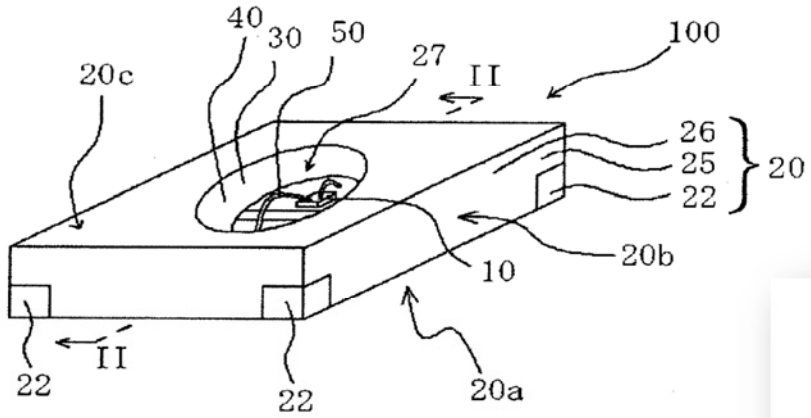
Resin Underneath Metal Leads

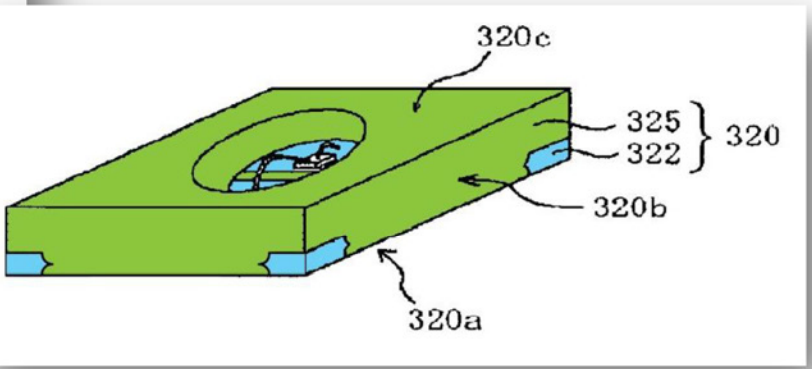
etching. Although not illustrated, a concavity and convexity are formed in the cross-sectional surface of the notch part **21***a*. Ag is adhered to the lead frame by electrolytic plating.

Ex. 1001
18:51-53

Ex. 1001

Fig. 1





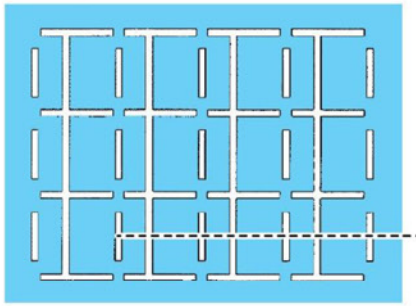
- The specification does disclose resin disposed under metal leads at the outside surfaces of a resin package.

See POR (Paper No. 20), pp. 18-22; *cf.* Institution Decision, p. 9

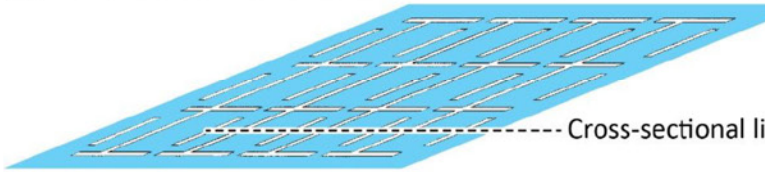
Resin Underneath Metal Leads

Dr. Schubert explains how, for example, the lead frame shown in FIG. 3 of the ’411 Patent would include concave-convex shapes in the entire sectional (etched part) part of the lead frame:

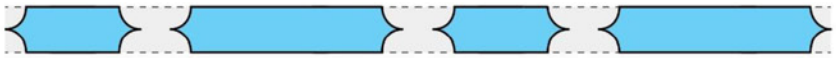
(1) Top view of metal lead frame (Nichia ’411 Figure 3)



(2) Perspective view of metal lead frame (Nichia ’411 Figure 3)



(3) Cross section of metal lead frame

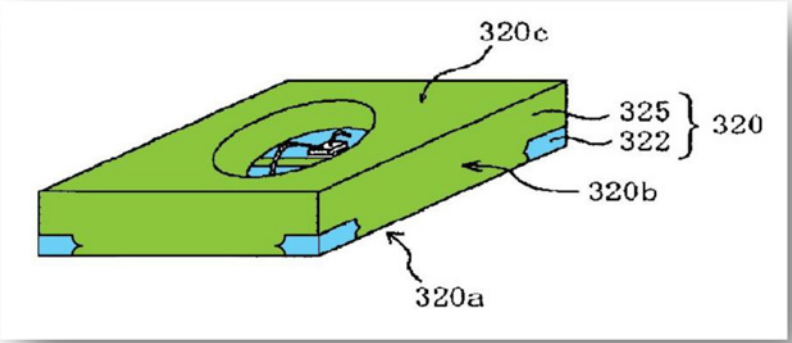


Ex. 2011

See POR (Paper No. 20), pp. 20-22; Ex. 2011 (Schubert Decl.), ¶ 51

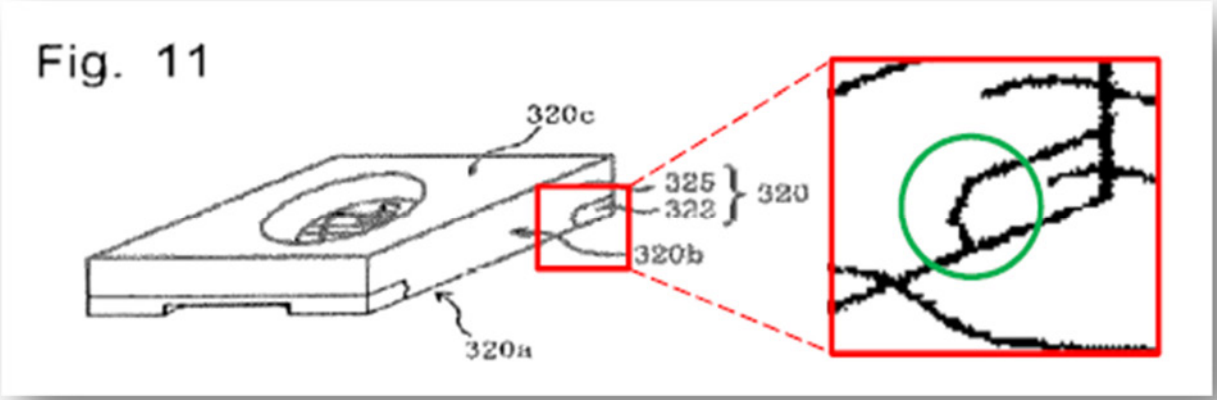
Resin Underneath Metal Leads

The lead frame would result in the following upon singulation:



Ex. 2011, ¶ 51

Dr. Schubert - “a person of ordinary skill in the art would have understood this device to be what the ’411 Patent describes by its various disclosures relating to etching a lead frame to result in concavities and convexities in the cross-sectional surface of the notch part.” *Ex. 2011 (Schubert Decl.), ¶ 51*



Ex. 2011, ¶54

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See POR (Paper No. 20), pp. 21-22

Petitioner's "New Surface" Argument Is Wrong

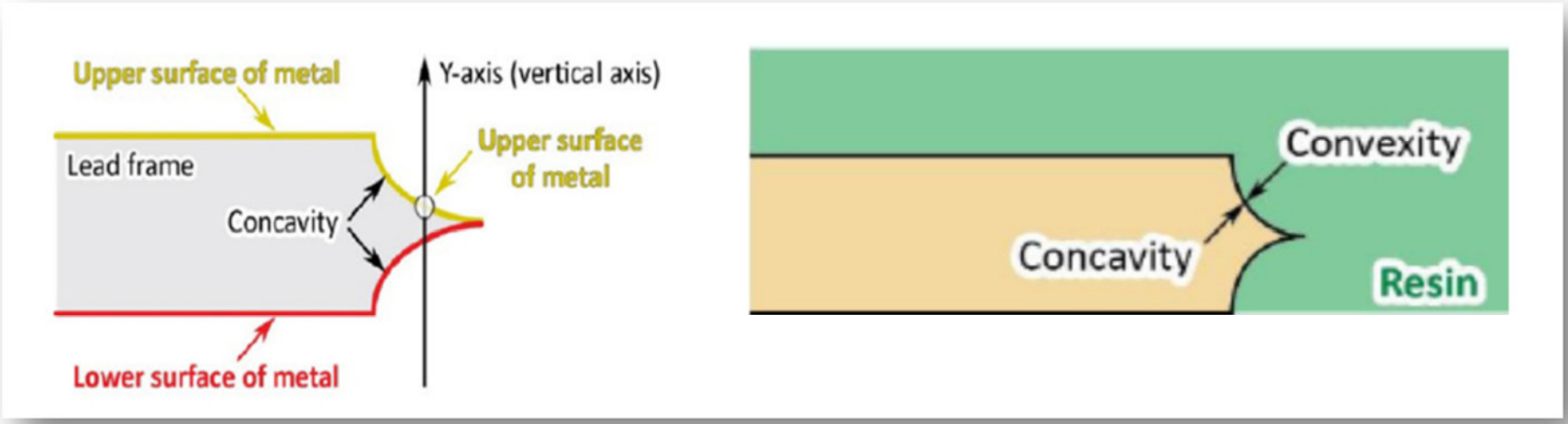
A Concavity/Convexity Can Be An Upper Surface

- Petitioner improperly dismisses the specification's description of resin under metal due to concavities and convexities.
- Petitioner contends that because the upper surface of the metal part is formed by etching, it cannot be the upper surface
  - This is based on the assertion that the description of another feature (step) redefines the ordinary meaning of what a surface is, such that the top of the metal part is not an upper surface because it has a concave/convex shape.
  - Such **a redefinition is not supported** – there is no rule that concave/convex top surfaces cannot be upper surfaces

See Patent Owner's Sur-Reply (Paper No. 28), pp. 3-4

A Concavity/Convexity Can Be An Upper Surface

- Dr. Schubert made no admission contrary to Patent Owner's position.



- The concavity or convexity on the upper portion of the lead is a part of the upper surface of the lead; the concavity or convexity on the lower portion of the lead is below that upper surface.

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

Response To Petitioner's Reply To
Patent Owner's Sur-Reply (Paper No. 35), pp. 2-3

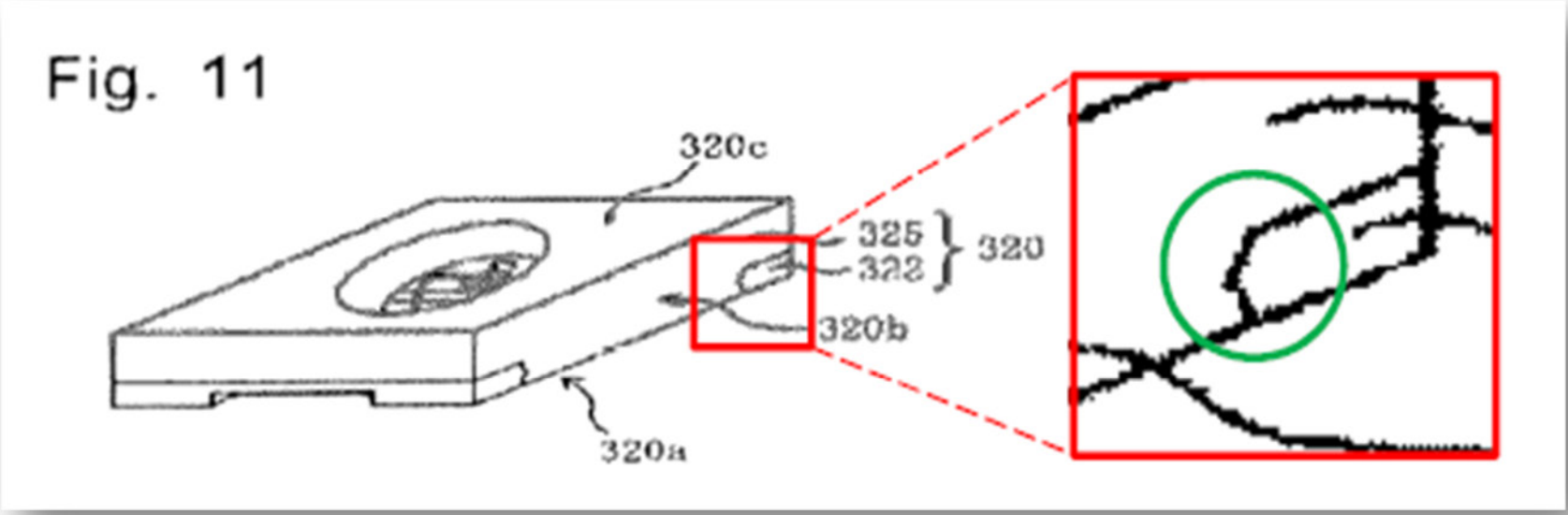
A Concavity/Convexity Can Be An Upper Surface

Ex. 1001, 16:51-53 (emphasis added). In other words, as a result of etching notches in the lead frame, concavities or convexities are formed in the regions below the upper surfaces of the exposed leads, which then fill with resin during processing. *See* Ex. 1001, 18:50-53 ("The lead frame is provided with the notch parts 21*a* by etching. Although not illustrated, a concavity and convexity are formed in the cross-sectional surface of the notch part 21*a*."), 3:51-55 ("resin is

Ex. 2011 (Schubert Decl.), ¶ 50

Response To Petitioner's Reply To
Patent Owner's Sur-Reply (Paper No. 35), pp. 2-3

A Concavity/Convexity Can Be An Upper Surface

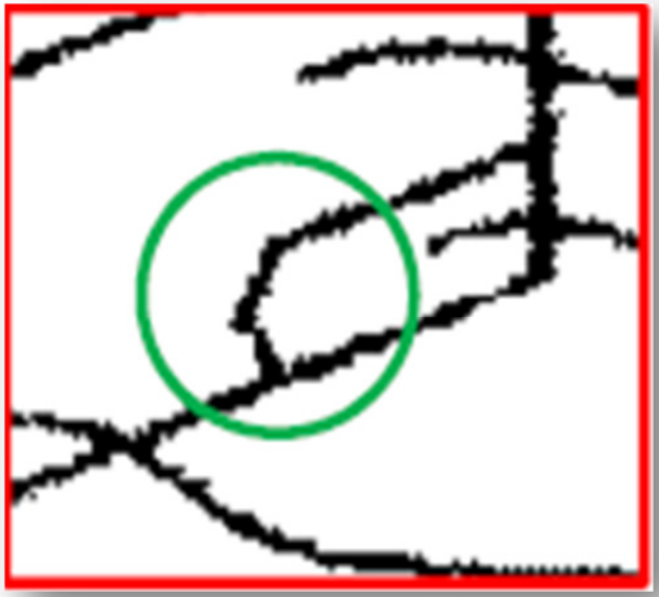


Ex. 2011 (Schubert Decl.), ¶ 54

See Patent Owner's Sur-Reply (Paper No. 28), pp. 3-4

Dr. Shanfield's Testimony

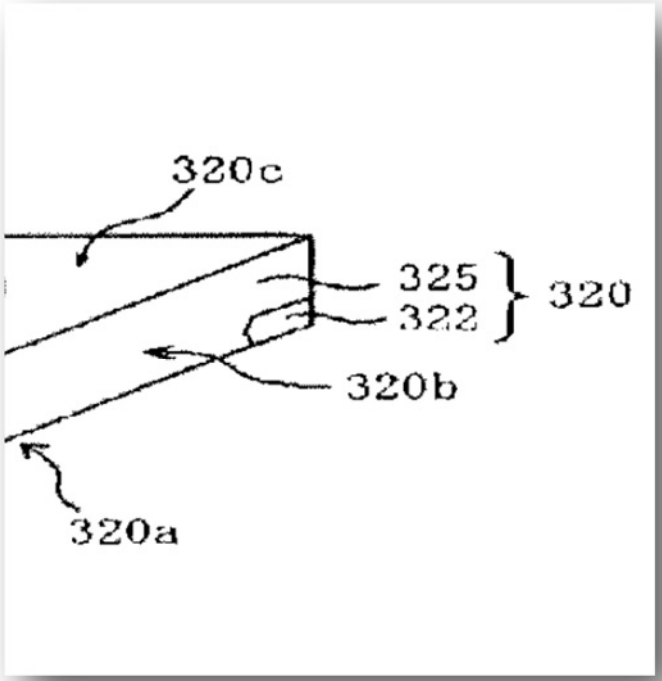
With reference to the image of FIG. 11 below, Dr. Shanfield acknowledged that there is resin underneath the concavities of the metal part:



Ex. 2011, ¶ 54

And concave/convex top surfaces can be upper surfaces

Dr. Shanfield's Testimony

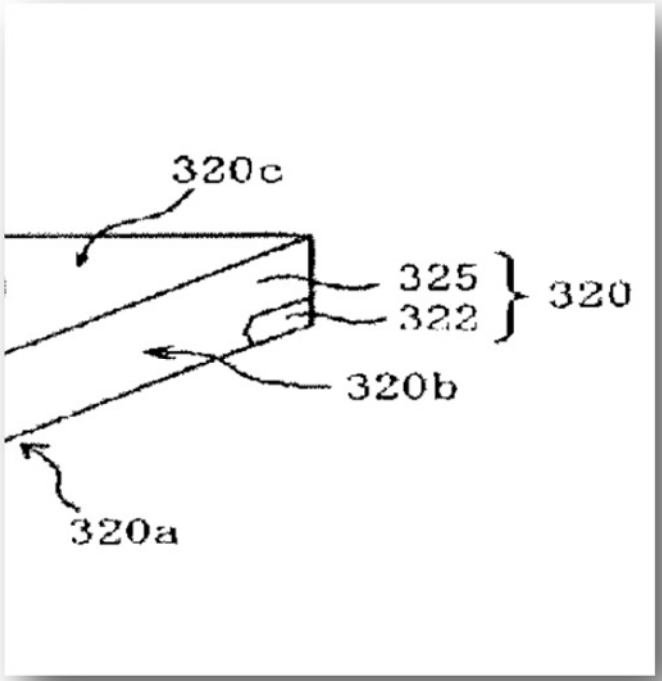


Ex. 1001, Fig. 11

A I think "pointy feature" is fine.
Q Okay. So that -- that pointy feature at the edge of the metal part there, that's -- those are concavities and convexities that have been etched into the metal part, correct?
A That's right, yes.
Q And that -- that pointy feature there, the concavities and convexities, those are a part of the metal part, right?
A Right, they are, although I disagree that the concavities and convexities form an upper surface of the metal part on the four outer lateral surfaces of the resin package.
Q Okay.
A So I want to be clear about that.
Q I understand your testimony. I was just – just taking it in pieces. That -- that feature is a part of the metal part, right?
A Yeah, it is.

Ex. 2021, 89:15-90:8

Dr. Shanfield's Testimony



Ex. 1001, Fig. 11

Q Okay. So which one is the concave one, and which one is the convex one?

A Depends on how you look at them, but --

Q Mark --

A The top -- the top one concave and the bottom one convex.

* * * * *

Q Yeah. So I'm -- I'm asking is there resin under the convex surface at the outer side surface shown in figure 11?

A Directly under? Is that what you mean by "under"?

Q Well, let's take those in turn. First, I'm asking "under."

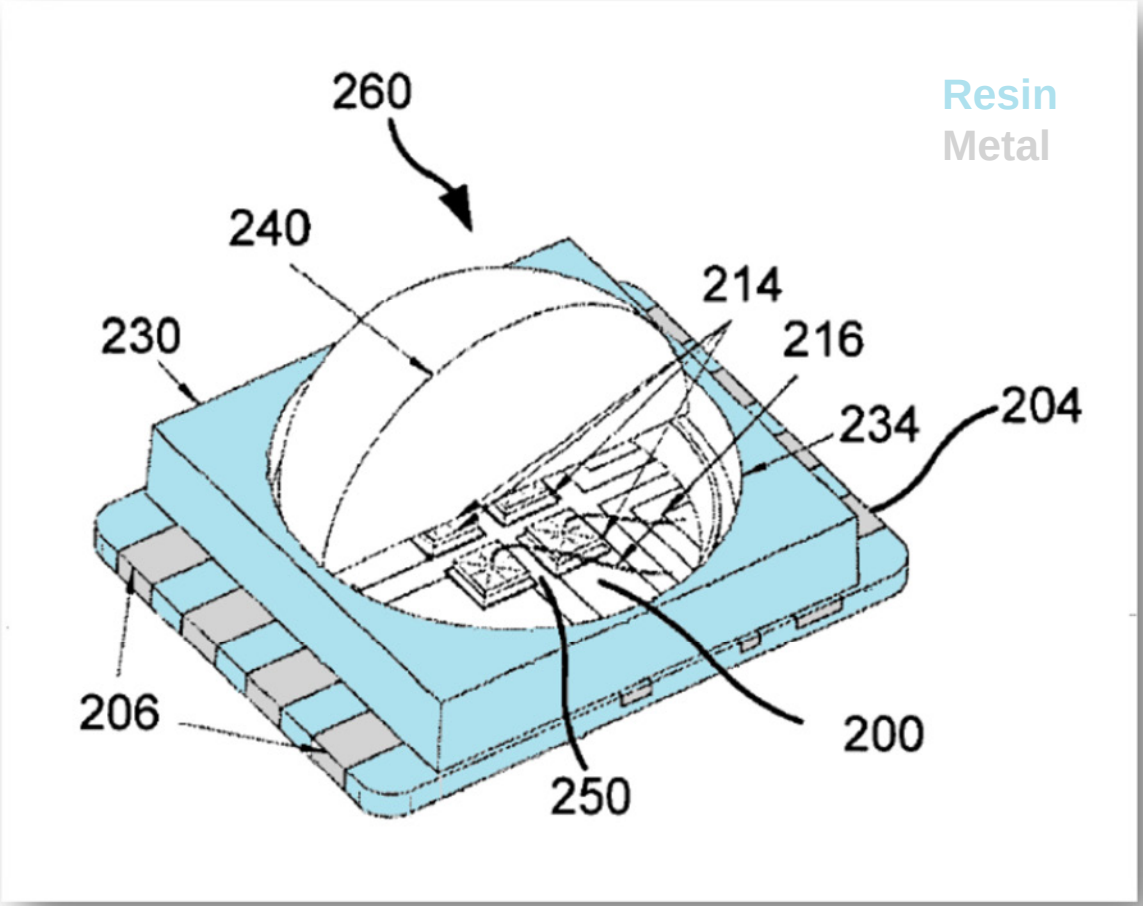
A There's resin directly under that convex surface that -- as we described it.

Ex. 2021, 93:13-96:2

Loh Does Not Disclose The Claimed Feature As Properly Construed

No Resin Disposed In A Region Underneath An Upper Surface Of The Metal Part

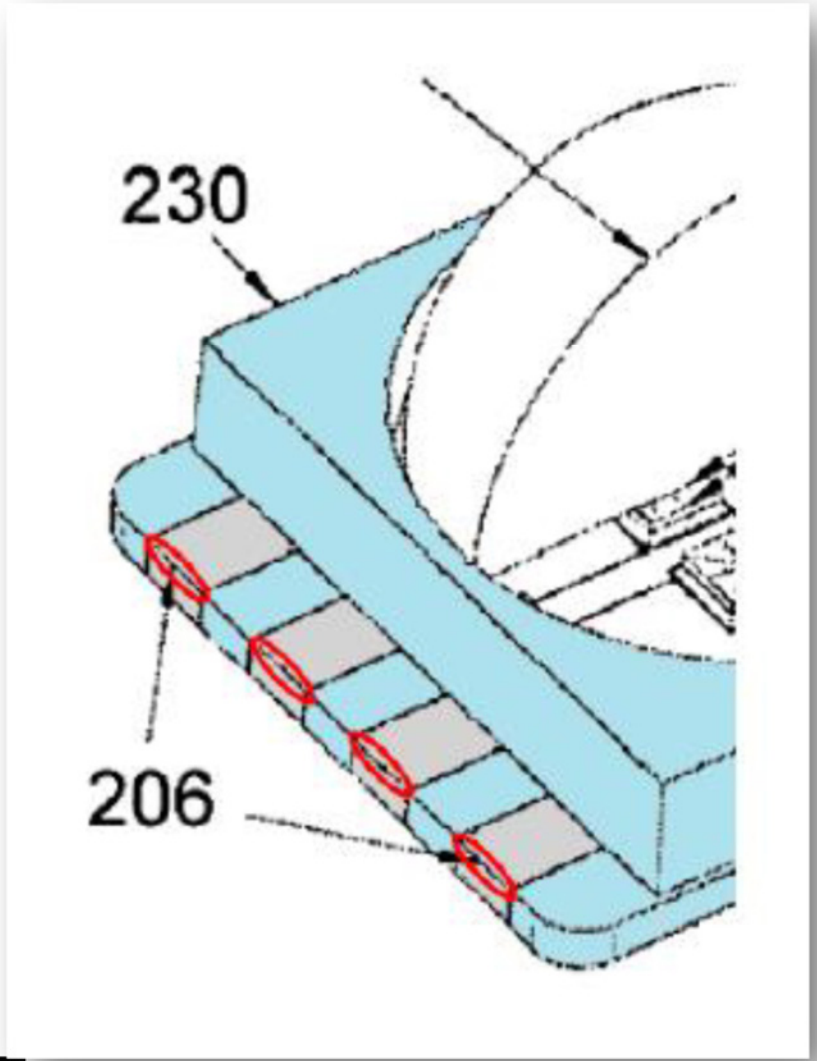
- Loh does not have both a part of the metal part and a part of the resin part disposed in a region below an upper surface of metal part on four outer lateral surfaces.
- There is no resin that is disposed in a region underneath the upper surface of the metal part on at least two of the outer lateral surfaces of the device, as properly construed.



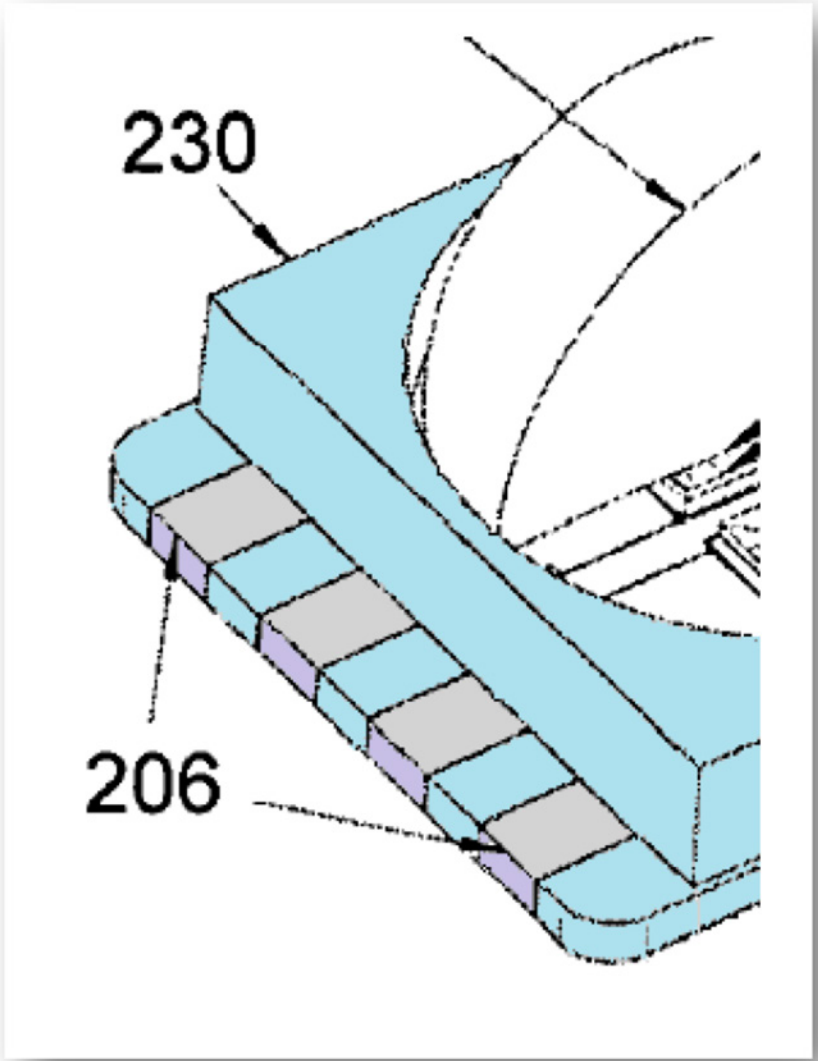
See POR (Paper No. 20), pp. 42-43; Ex. 2011, ¶¶ 109-122

Loh Has Resin “Next To” and “Between”

Upper surface of the metal part at the outer lateral surface



Only metal disposed in a region below



(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See POR (Paper No. 20), pp. 45-46

Resin Disposed To "Left And Right" Is Not "Underneath"

- A ***different patent*** of the family –the '071 Patent – claims light emitting devices with resin to the left and right of the metal part:

- The inventors knew how to describe (and claim) resin "next to" or "between the leads." Ex. 1001, 4:52-5.

1. A light emitting device comprising:

a resin package comprising a resin part and a metal part including first and second metal plates, said resin package having four outer lateral surfaces and having a concave portion having a bottom surface; and

a light emitting element mounted on the bottom surface of the concave portion and electrically connected to the metal part,

wherein at least a portion of an outer lateral surface of the resin part and at least a portion of an outer lateral surface of the metal part are coplanar at each of the four outer lateral surfaces of the resin package,

wherein a notch is formed in the metal part at each of the four outer lateral surfaces of the resin package,

wherein the resin part is located at left and right sides of a portion of the metal part at at least two of the four outer lateral surfaces of the resin package, and

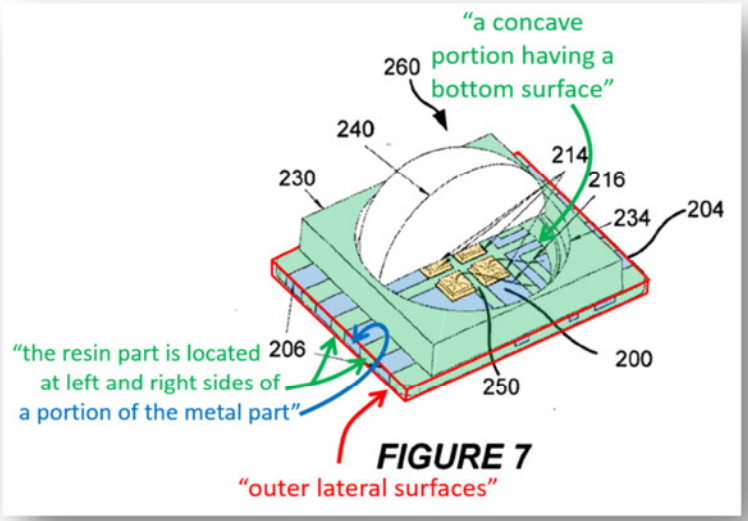
wherein each of the first and second metal plates is substantially flat.

Ex. 2006, 19:17-35

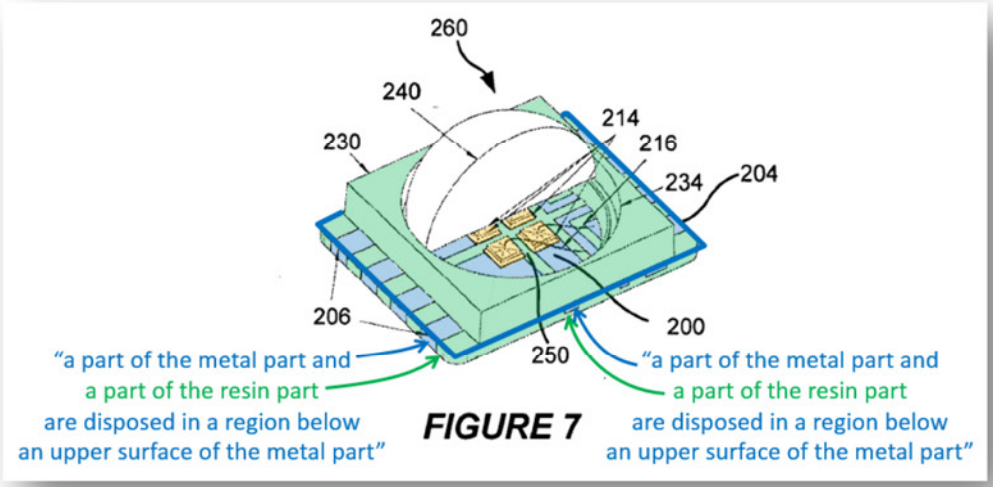
See POR (Paper No. 20), pp. 22-25

Resin Disposed To "Left And Right" Is Not "Underneath"

The terms "disposed in a region below" and "is located at left and right sides of" should have different meanings.



Ex. 2005 ('071 Petition), p. 16



'411 Petition, p. 30

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See POR (Paper No. 20), pp. 22-25

Loh's Disclosure Of "Etching"

- In the Institution Decision, the Board noted that "Loh discloses etching a lead frame," citing Loh at ¶¶[0027], [0076]. Decision, p. 16. Loh's references to etching, however, do not disclose the claimed "in a region below…, on four outer lateral surfaces …" feature
- Loh uses a dual-gauge lead frame, which provides for an interior region of the lead frame having a reduced thickness relative to the remainder of the lead frame. *See, e.g.*, Ex. 1004, ¶ [0076] and FIG. 5

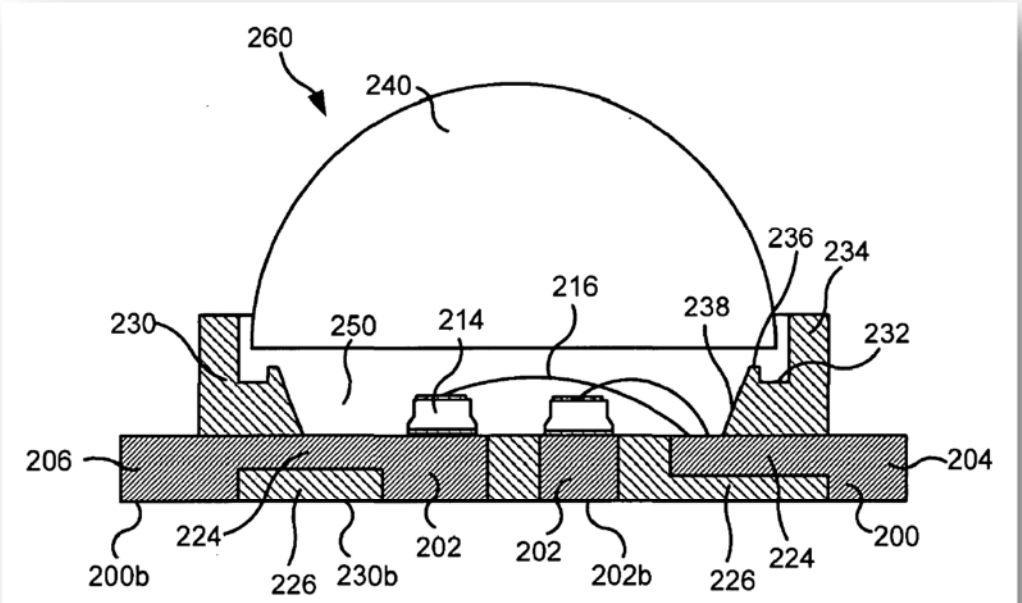


FIGURE 5

See POR (Paper No. 20), pp. 47-49; Institution Decision, p. 6

Loh's Disclosure Of "Etching"

- Loh describes that the reduced thickness regions 224, 226 in the *interior* of the lead frame (shown in FIG. 5) may be formed by *selectively* etching the lead frame
- This selective etching would not result in ***any*** etched features on the ***outer*** lateral surfaces of the resin package.

  Schubert Decl., ¶¶ 119-122 ("the selective etching discussed in Loh is fundamentally different from the etching of the notch parts that the '411 Patent describes")
- Not contested by Petitioner in its Reply or sur-sur Reply
- Not all etching generates concavities and convexities

Ex. 2011 (Schubert Decl.), ¶ 25

See POR (Paper No. 20), pp. 47-49; Institution Decision, p. 6

Petitioner's Construction Is Inconsistent With The Intrinsic Record

Inconsistent With Intrinsic Record

- Petitioner's construction requires a plane that extends at a "level" of an upper surface and fails to account for an upper surface having multiple levels
- Specification discloses a metal part with an upper surface having multiple levels
  - Encompassed by claim 1 via claim differentiation
  - Petitioner's construction leads to absurd results for non-flat metal parts

See POR (Paper No. 20), pp. 27-29

Inconsistent With Intrinsic Record

(Lead and Lead Frame)

Although a metal plate of a flat plate shape can be used for a lead frame, a metal plate in which differences in level or concavity and convexity are provided can be used.

The lead frame is formed by, for example, punching or etching a metal plate of a flat plate shape. A concavity and convexity are formed in a sectional shape of the etched lead frame, so that it is possible to improve adhesion between the lead frame and resin molded body. Particularly when a thin

Ex. 1001, 9:24-33

POR (Paper No. 20), pp. 27-31; Patent Owner's Sur-Reply (Paper No. 28), pp. 1-3

Inconsistent With Intrinsic Record

Claim 4 requires that the metal part has one or more upper surfaces that are coplanar which means that the metal part of claim 1 may have one or more upper surfaces that are not coplanar:

4. The light emitting device according to claim **1**, wherein:

the metal part comprises one or more major laterally extending upper surfaces, and

all of the one or more major laterally extending upper surfaces are coplanar.

Ex. 1001, Claim 4

POR (Paper No. 20), pp. 27-31; Patent Owner's Sur-Reply (Paper No. 28), pp. 1-3

Inconsistent With Intrinsic Record

Claim 3 requires that each of the at least two metal plates of the metal part are substantially flat which means that one or more of the metal plates need not be flat:

> **3**. The light emitting device according to claim **1**, wherein the each of the at least two metal plates is substantially flat.

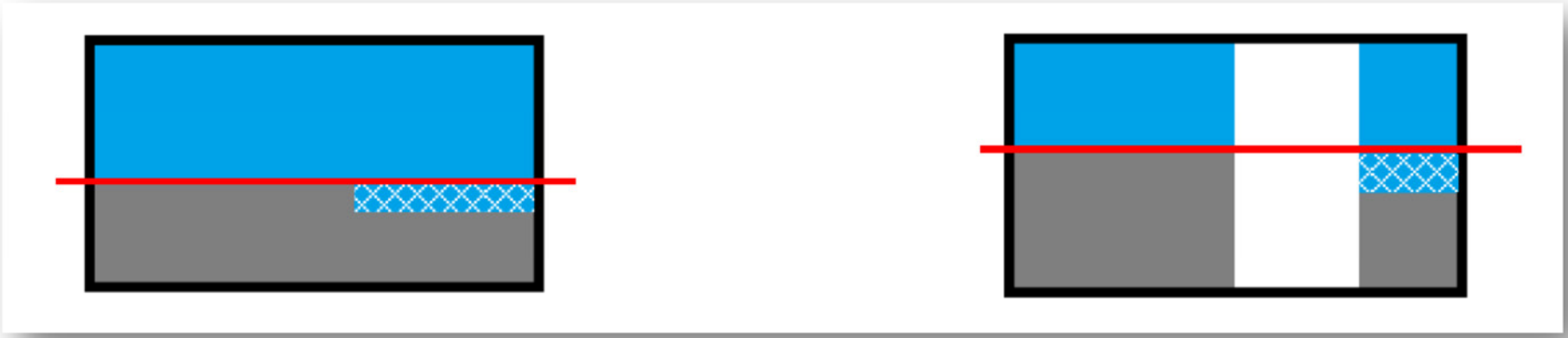
Ex. 1001, Claim 3

See Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 910 (Fed. Cir. 2004) ("[T]he presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim").

POR (Paper No. 20), pp. 27-31; Patent Owner's Sur-Reply (Paper No. 28), pp. 1-3

Petitioner's Construction Leads to Absurd Results

- For example, resin *above* the upper surface of the metal part being considered *below* the upper surface:



- Indeed petitioner affirmed that these "hypotheticals show resin disposed in a region below '***an***' upper surface of the metal part."
- This is because "region below an upper surface of the metal part" is not bounded by the upper surface of the metal part

Patent Owner's Sur-Reply (Paper No. 28), pp. 1-2; Response To Petitioner's Reply To Patent Owner's Sur-Reply (Paper No. 35), pp. 1-2

Dr. Shanfield Could Not Apply

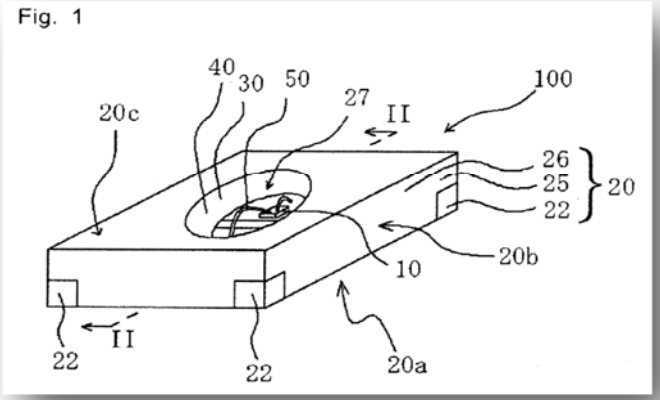
- Petitioner's construction fails to account for a metal part having differences in level.

  To apply Petitioner's construction to an upper surface having differences in level, one must ***arbitrarily*** select a level.

- During cross examination, Dr. Shanfield was not comfortable applying Petitioner's construction to an example like this.

Patent Owner's Sur-Reply (Paper No. 28), pp. 1-2

Dr. Shanfield Could Not Apply



Ex. 1001

Q … Can your claim construction be applied to an LED device in which ***the upper surfaces of the metal part are not coplanar***? Yes or no?

* * * * *

A … I can't take a geometric creation that does not represent the context of the '411 patent and doesn't fit into anything I've ever seen and that is ever referred to as -- from what I know of the patent. So in that case, I'm no longer comfortable applying it.

Ex. 2021, 68:15-69:4

* * * * *

86:2-6 ("Q. … Is an upper surface, singular upper surface, which has two different levels – A. That makes no sense.");

87:16-88:13 ("Q. Is it your testimony that a metal part having an upper surface that is at different levels at different places in the lead of the metal part is outside the scope of the '411 patent? A. Question makes no sense.")

See Patent Owner's Sur-Reply (Paper No. 28), p. 2 n1

Petitioner's Construction Fails To Give Meaning To All Terms Of The Claim

Petitioner's Construction Does Not Give Meaning to All Terms

- Petitioner's construction disassociates the claimed *region* from the *upper surface*.
- As recognized in the Institution Decision (p. 9):
  - "claim 1 was written to recite 'disposed in a region' below an upper surface, which differs from simply 'disposed below' an upper surface"
  - "the claim language recites 'below an upper surface of the metal part,' which differs from simply 'below a metal part'"
- *Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.")

See Patent Owner's Sur-Reply (Paper No. 28), pp. 1-3; Institution Decision, p. 9

Petitioner's Construction Does Not Give Meaning to All Terms

Petitioner's construction is that metal and resin are at a lower level than an upper surface of the metal part, anywhere on the outer lateral surface, irrespective of where the upper surface stops.

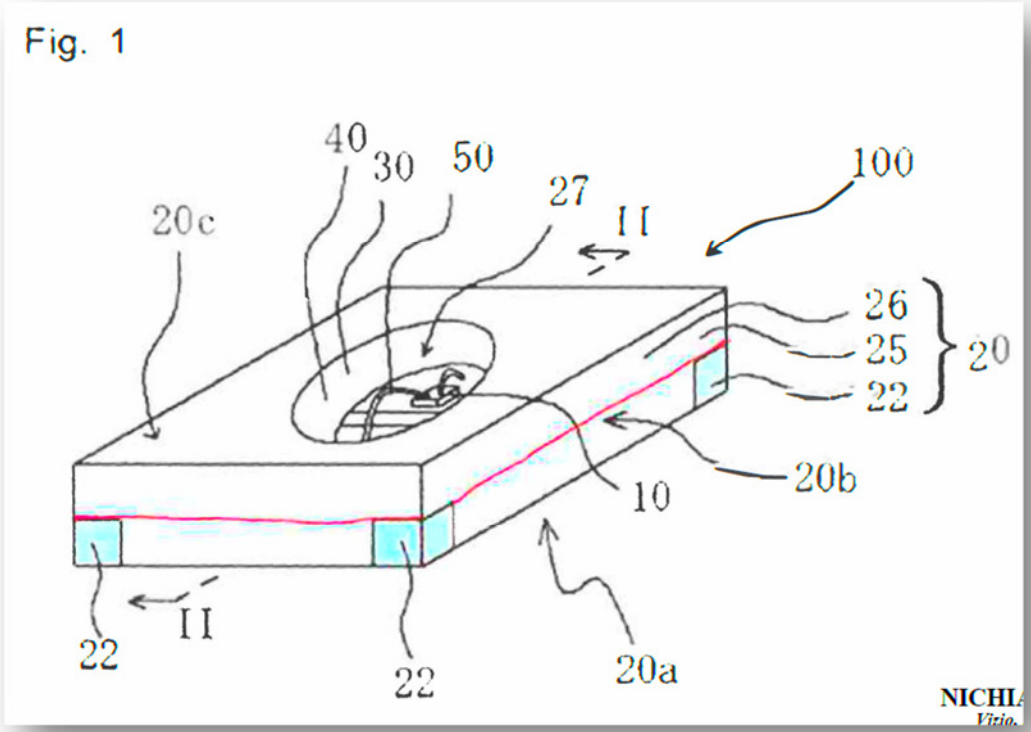
Reply, 5 ("no requirement … that the region be bounded by ... the metal plate….")

Because "the upper surface of the metal part" provides context for "*a region below*," the upper surface should provide the boundaries of the region.

See Patent Owner's Sur-Reply (Paper No. 28), pp. 1-3

Dr. Shanfield Confirmed

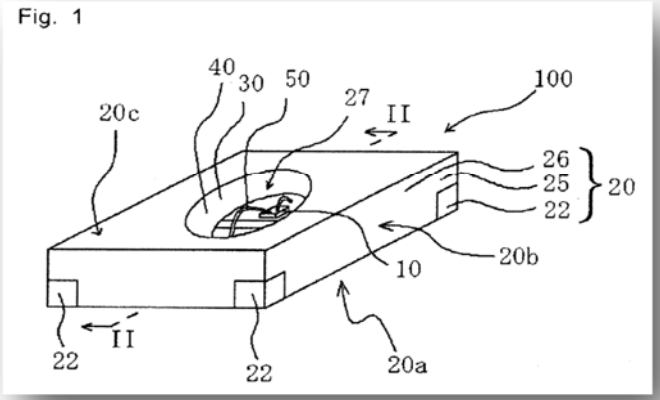
Dr. Shanfield drew the "upper surface" (red) in places where there **is no metal** (between the leads, blue). *See, e.g.*:



Ex. 2022 (S1); Ex. 2021, 18:4-19 ("what I've indicated … is the upper surface of the metal part on the outer lateral surface"); Ex. 1017 (Shanfield Decl.), p. 8 (same)

See Patent Owner's Sur-Reply (Paper No. 28), pp. 2-3; Ex. 2021, 18:4-19

Dr. Shanfield Confirmed



Ex. 1001

Q … Are you able to identify with the red pen the upper surfaces of the metal part at the outer lateral surfaces shown in [FIG. 1]?

* * * * *

A You are asking me to opine on something I haven't opined on, and I'm simply not comfortable opining on it.

Ex. 2021, 23:11-18

Q … Were you able to identify the upper surface of the metal part when you prepared your declaration?

* * * * *

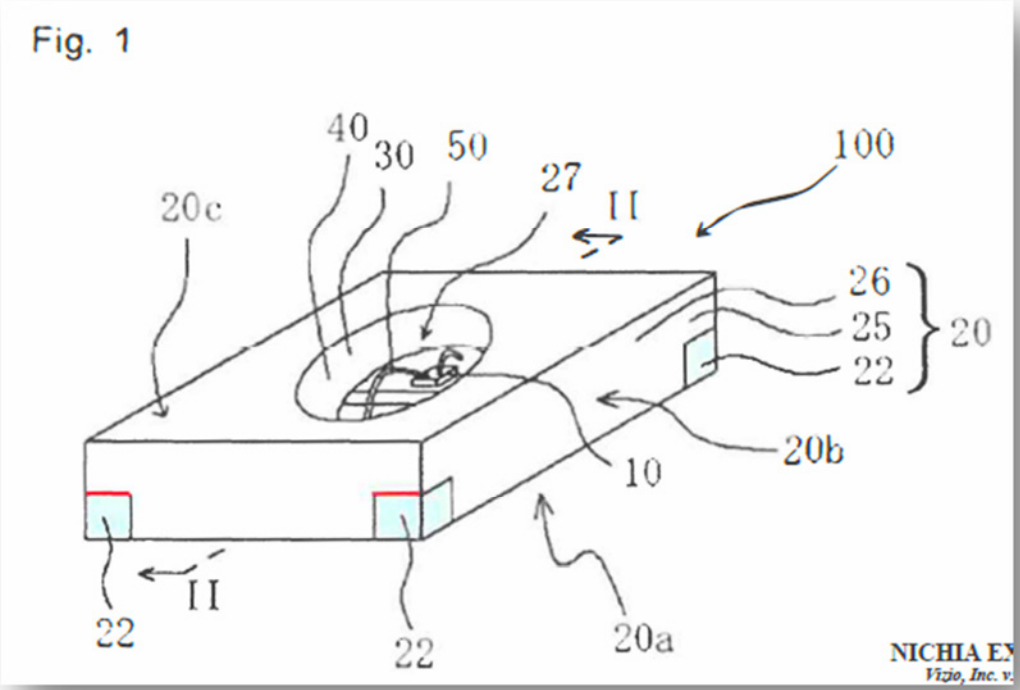
A You're asking now for a theoretical entity which I haven't opined on.

Ex. 2021, 27:13-18

See Patent Owner's Sur-Reply (Paper No. 28), p. 3; Ex. 2023 (S2)

Dr. Shanfield Confirmed

When shown the image below with red lines, Dr. Shanfield stated "**I don't know what these are, these red lines**. I don't know what you were indicating": Ex. 2021, 32: 7-8



See also Ex. 2021, 35:4-14 (Q … do those red lines accurately depict the upper surface of the metal part on that outer lateral surface…? A … I haven't opined on that….").

See Patent Owner's Sur-Reply (Paper No. 28), pp. 2-3; Ex. 2024 (S3)

Petitioner's "Plane" Argument Should Be Rejected

- The Institution Decision notes that, though not express, Petitioner's arguments may "turn on an interpretation of the claimed 'upper surface of the metal part' as defining a plane." Decision, p. 9 n.5
- Petitioner's "level" argument is the "plane" argument - a plane that extends at a level of an upper surface.

Wrong:

- The claim does not say "region below the plane of the upper surface of the metal part"
- The "upper surface" of the metal part in the '411 Patent is an actual, physical surface and not a theoretical plane
- Causes confusion when applying to upper surfaces with different levels

See POR (Paper No. 20), pp. 27-29; Patent Owner's Sur-Reply (Paper No. 28), p. 1

“Upper Surface”

An actual, physical surface:

- Plating processing is applied to at least one surface of the bottom surface (an outer bottom surface 20*a* of the resin package 20) and ***the upper surface*** (an inner bottom surface 27*a* of a concave part 27) ***of the leads 22***. (Ex. 1001, 6:43-47)
- Plating processing is applied to the ***upper surfaces***, outer bottom surfaces 120*a* and arc-shaped curved parts ***of the projecting leads 122***. (Ex. 1001, 13:62-64)
- Plating processing is applied to the bottom surface and ***upper surface of the leads 222***, and is not applied to the outer side surfaces. (Ex. 1001, 14:67-15:2)

See POR (Paper No. 20), pp. 27-28; *see also* Ex. 2011, ¶ 39

"Upper Surface" Has Meaning In Patent Owner's Construction

The "upper surface" language is included to account for the fact that the metal part has a thickness, and that *both* metal and resin are below the upper surface of the metal part. To recite both a portion of the metal part and a portion of the resin part below the metal part (as opposed to the *upper surface* of the metal part) could be confusing. In other words, the "upper surface" language provides clarity for the claim's requirement that *both* metal and resin are disposed in the region below.

See POR (Paper No. 20), pp. 27-28; *see also* Ex. 2011, ¶ 39

"Region" Has Meaning In Patent Owner's Construction

- Reciting the term "region" re-enforces Patent Owner's position by emphasizing that the resin is not merely "in between" the leads; rather, there must actually be a specific region, that is below the upper surface of the metal part, and that has *both* metal *and* resin.
- When something is described as a "region," it typically refers to a subdivision of a whole, and to refer to a subdivision, the region must be defined or bounded in some way. *See* Ex. 2011 *(*Schubert Decl.), ¶ 64. As the context of the claim makes clear, the claimed region is bounded by the prepositional-phrase "below an upper surface of the metal part."
- Use of the word "region" gives appropriate emphasis to the geometric arrangement required by the claim.

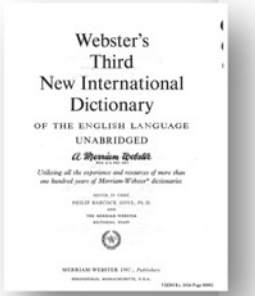
See POR (Paper No. 20), pp. 29-31

Petitioner's Extrinsic Evidence Cannot Resolve The Dispute

Petitioner's Dictionaries Do Not Clarify the Meaning

Petitioner offers definitions from two dictionaries to support its preferred meaning.

But, the dictionaries Petitioner provides also define *below* as meaning *underneath*.



2below \"\ *prep* **1 a** : downward from ⟨flower boxes ~ the windows⟩ **b** : further down from ⟨a river barge moored a mile ~ town⟩ : at a lower level than ⟨lava beds lying ~ the volcanic cone⟩ **c** : at the bottom of : directly underneath ⟨the caption ~ a picture⟩ **d** : farther south than ⟨Richmond is ~ Washington⟩ **2** : BENEATH ⟨he thought manual labor ~ him⟩ **3** : inferior to : lower down the scale than ⟨fairly high in the scale of animal life and only a little ~ the vertebrates —R.E.Coker⟩ **4** : covered, concealed, or hidden by ⟨the real reason ~ the mass of pretexts⟩ ⟨~ the sod⟩

2 Directly beneath; covered by, underneath; deeper than. E17.

See Patent Owner's Sur-Reply (Paper No. 28), p. 3; Ex. 1026; Ex. 1027.

(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

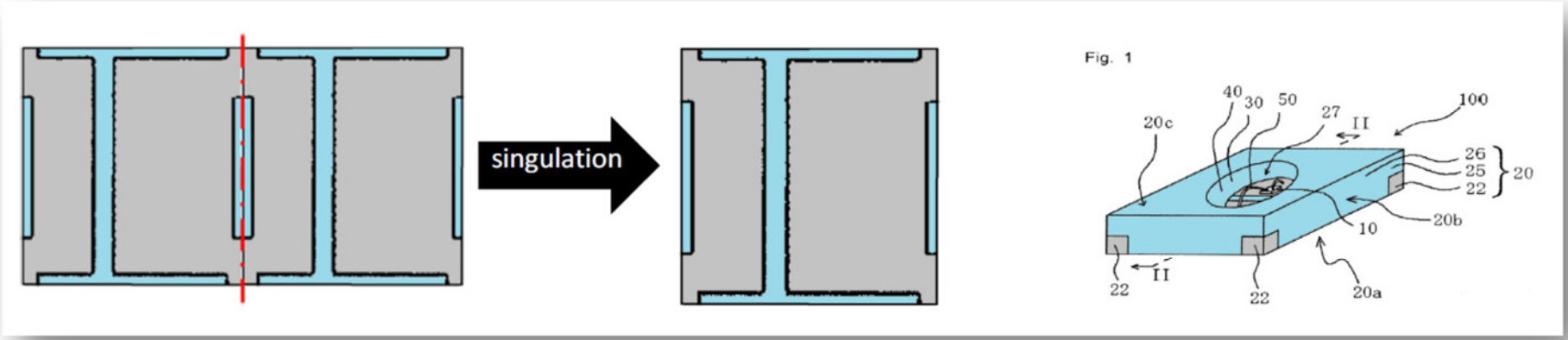
Petitioner's Construction Renders The Disputed Term Superfluous

Disputed Term Becomes Superfluous In View Of The Claimed "Notch"

- Claim 1 requires that "a notch is *formed in the metal part at each of the four outer lateral surfaces* of the resin package."
- A notch in a singulated device results from cutting a resin-filled notch in a lead frame.
- The resin-filled notch at each of the four outer lateral surfaces of the resin package means that there is necessarily resin at a lower level than an upper surface of the metal part (because the notch was formed in the metal part).

See Patent Owner's Sur-Reply (Paper No. 28), pp. 4-5; Ex. 2011, ¶50.

Illustration of Notch



"the '411 Patent use[s] lead frames with etched singulation notches such that after cutting, the singulated devices have resin-filled concavities or convexities at their outer surfaces"

Ex. 2011, ¶ 50

"resin is filled in the notch parts"

Ex. 1001, 4:11-15

See Patent Owner's Sur-Reply (Paper No. 28), pp. 4-5; *see also* Ex. 1001, 3:51-55, 6:49-52, 13:31-41, 19:7-8

Institution Decision

metal part" to describe the invention. In fact, we find no explicit disclosures in the '411 patent of resin disposed under metal leads at the outside surfaces of a resin package.

Copied below is Figure 1 of the '411 patent.

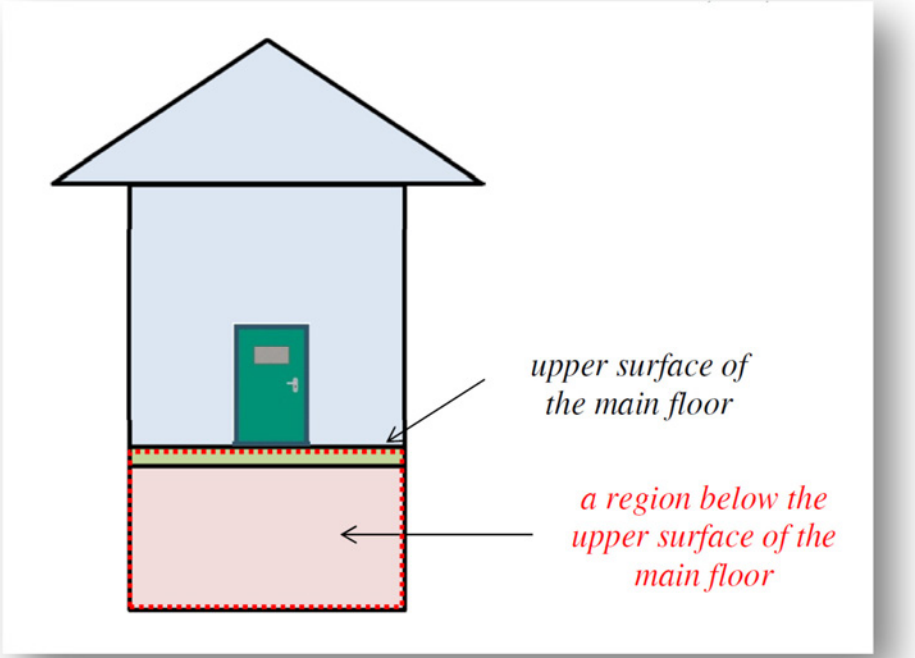
---

[5]Our decision reflects our current understanding of the parties' claim interpretations implicit from each party's arguments. Notably, we are not appraised of either party's specific interpretations, and, at this stage, we do not discern whether, for example, Petitioner's arguments turn on an interpretation of the claimed "upper surface of the metal part" as defining a plane, whether Petitioner's arguments turn on an interpretation of "disposed in a region" below an upper surface of the metal part, or some other interpretation. We are similarly unable to discern with any precision what Patent Owner contends "disposed in a region" means in the context of claim 1, for example.

Institution Decision, p. 9 n. 5

Appendix

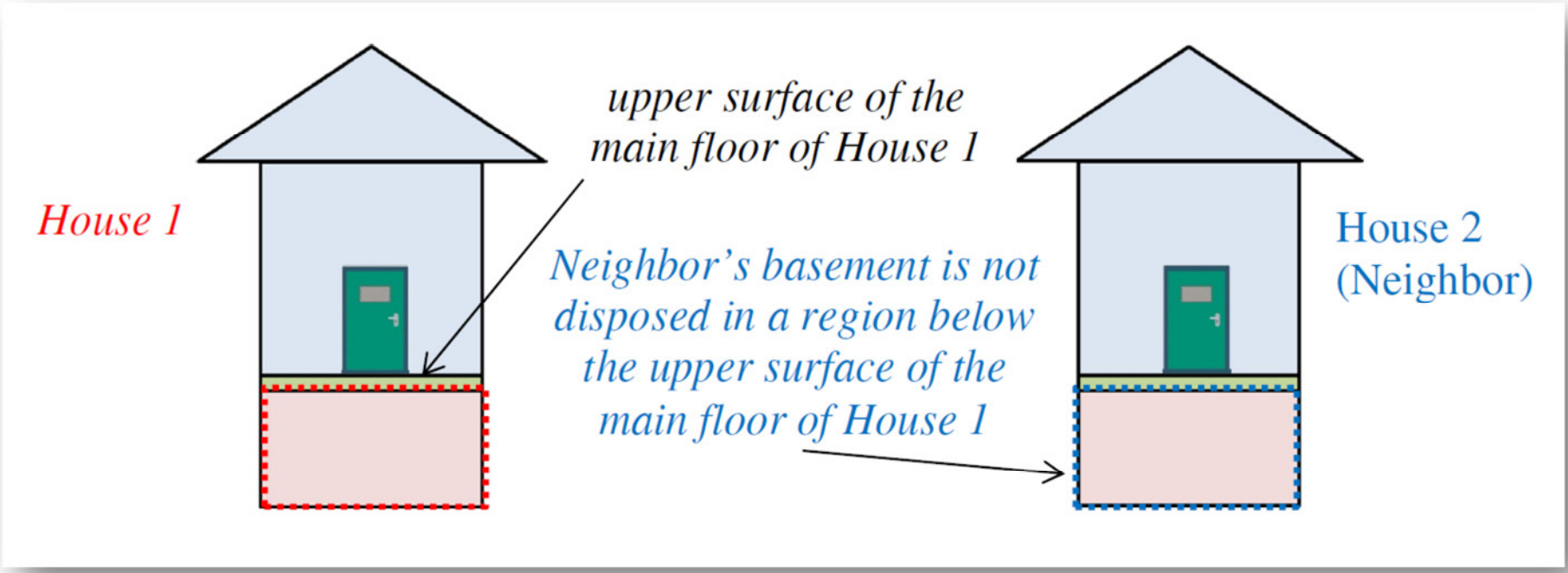
House Example With Patent Owner's Construction



(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See POR (Paper No. 20), p. 13

House Example With Petitioner's Construction



(DEMONSTRATIVE EXHIBIT – NOT EVIDENCE)

See POR (Paper No. 20), p. 13

Legal Citations

- *In re Power Integrations, Inc.*, 884 F.3d 1370, 1376 (Fed. Cir. 2018) (quoting *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 457 F.3d 1293, 1301 (Fed. Cir. 2006)) ("[C]laim construction must begin with the words of the claims themselves.")

  Here, by its plain terms, claim 1 requires that there be resin "disposed in a region below" the upper surface of the metal part.

- *Merck & Co. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so.")

  This specific requirement of the claim would be rendered superfluous if resin next to and "between" the leads were somehow encompassed by "below."

- *Chef America, Inc. v. Lamb-Weston, Inc.*, 358 F.3d 1371, 1372-73 (Fed. Cir. 2004) ("[O]rdinary, simple English words whose meaning is clear and unquestionable," absent any indication that their use in a particular context changes their meaning, are construed to "mean exactly what they say.").

See POR (Paper No. 20), pp. 10-11

Legal Citations

- *Nystrom v. Trex Co., Inc.*, 424 F.3d 1136, 1145-46 (Fed. Cir. 2005) ("Broadening of the ordinary meaning of a term in the absence of support in the intrinsic record indicating that such a broad meaning was intended violates the principles articulated in *Phillips*.").
- *Phillips v. AWH Corp.*, 415 F.3d 1303, 1317-19 (Fed. Cir. 2005) (when considered in the context of the intrinsic record, "extrinsic evidence in the form of expert testimony can be useful to a court for a variety of purposes, such as to provide background on the technology at issue, to explain how an invention works, [and] to ensure that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art").
- *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 910 (Fed. Cir. 2004) ("[T]he presence of a dependent claim that adds a particular limitation raises a presumption that the limitation in question is not found in the independent claim").

See POR (Paper No. 20), pp. 10-11; Patent Owner's Sur-Reply (Paper No. 28), p. 1.

Claim 6

6. The light emitting device according to claim **1**, wherein a lower surface of the metal part is exposed from the resin part in a region directly under the light emitting element.

Ex. 1001

- Claim 6 is directed to a different feature (and different portion of the device)
- Claim 6 uses different words
- Claim 6 does not modify the disputed claim term, and the features have different purposes.
- Claim differentiation therefore does not inform the dispute.

See Patent Owner's Sur-Reply (Paper No. 28), p. 4.

Contingent Motion to Amend

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIZIO, INC.,

Petitioner,

v.

NICHIA CORPORATION,

Patent Owner.

Case IPR2018-00437

Patent 9,537,071 B2

’071 Contingent Motion to Amend

- Amendments include:
  - Narrowed independent and dependent claims
- Patent Owner has demonstrated that:
  - Adequate written description support exists for the claims.
  - The substitute claims are not broadened.
  - The substitute claims are not unpatentable over the grounds in the Petition, or the new grounds set forth in the Opposition.
- Petitioner:
  - *No dispute* that the amendments overcome the Petition grounds
  - Argues that the claims are broadened, unsupported, and obvious in view of new references/combinations

Motion (Paper No. 24), pp. 1-2; Opposition (Paper No. 32), pp. 9-25; Reply (Paper No. 34), pp. 1-12

Summary Of Dispute

- Claim 27
  - Petitioner argues no support for device consisting of two leads
  - Petitioner argues that use of “metal lead” broadens the claim
- Claim 28
  - Petitioner argues no support for device consisting of two metal plates
  - Petitioner argues that use of “portions” broadens the claim
- Claim 31
  - Petitioner argues no written description of an “etched concave portion on an [upper/bottom] surface.”
- Obviousness
  - Missing limitations (***Petitioner does not dispute deficiency of Hsu***)
  - Is Petitioner’s threadbare argument sufficient to carry their burden?

Opposition (Paper No. 32), pp. 1-9; Reply (Paper No. 34), pp. 8-11; Sur-Reply (Paper No. 42), pp. 1-5

Summary of Amendments

New Independent Claim 27

- Claim 27 narrows the device by requiring that:
  - the resin package ***consist of*** a resin part and first and second metal leads;
  - the first metal lead is exposed at three outer lateral surfaces
- Other amendments are for grammatical/consistency purposes

a resin package ~~comprising~~ consisting of a resin part and [[a]] first and second metal leads, the resin part including a thermosetting resin~~part including first and second metal plates~~, and

wherein the first metal lead is exposed at three outer lateral surfaces of the resin package,

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 1

New Independent Claim 28

- Claim 28 narrows the device by:
  - the metal part ***consists of*** first and second metal plates;
  - portions of the resin parts are located ***above*** and at ***left*** and ***right*** sides of the respective exposed outer lateral surfaces of the first and second metal plates, and that these portions are integrally formed and coplanar with the exposed outer lateral surface of the respective metal plate.
- Other amendments are for grammatical/consistency purposes

wherein, at a first of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part ~~is~~ are located above and at left and right sides of an exposed outer lateral surface of the first metal plate, ~~a portion of the metal part at at least two of the four outer lateral surfaces of the resin package, and~~

Motion (Paper No. 24), p. 2; Ex. 2020 (Appendix A), p. 2

New Dependent Claim 31

Claim 31 requires:

~~19~~31. The light emitting device according to claim ~~16~~29,

wherein the light emitting device further comprises a sealing member that contains two or more kinds of phosphors~~.~~,

wherein each of the first and second metal plates includes an etched concave portion on an upper surface of the respective metal plate,

wherein each of the first and second metal plates includes an etched concave portion on a bottom surface of the respective metal plate, and

wherein each of said etched concave portions is curved.

Motion (Paper No. 24), p. 11; Ex. 2020 (Appendix A), p. 3

Written Description Support

Written Description Support – Claims 27 and 28

- Only written description challenge to independent claims is support for a device consisting of two leads (claim 27) or two metal plates (claim 28).
- **The specification describes:**
  - singulated devices (e.g., according to the first and fifth embodiments) having two leads exposed on the outer surfaces
  - jointed internally, separated at outer surfaces
- **The figures show:**
  - multiple embodiments shown in which two leads are separated into more than two at the outer surface
  - figures make clear the number of places that leads are exposed from the package does not dictate the number of leads within the package
- Petitioner was wrong to base its argument on extrinsic evidence and assumptions regarding FIG. 12.

Motion (Paper No. 24), pp. 5-6; Opposition (Paper No. 32), pp. 1-8; Reply (Paper No. 34), pp. 1-5

Specification Describes Fifth Embodiment

<Fifth Embodiment>

A light emitting device according to a fifth embodiment will be described. FIG. **12** is a perspective view illustrating the light emitting device according to the fifth embodiment. Description of some configurations employing the substantially same configuration as the light emitting device according to the first embodiment will be omitted where necessary.

Ex. 1001, 16:52-58

package **420**. In the outer side surface **420***b* of the resin package **420**, the leads **422** are separated into six. The leads **422** may be separated respectively, or jointed. The leads **422** provided with notch parts are more preferable than the leads of a fglate plate shape because a bonding strength between the resin part **425** and leads **422** becomes high. The outer upper surface **420***c* of the resin package **420** is formed in a generally rectangular shape formed with the resin part **425**.

Ex. 1001, 17:4-11

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE) Reply (Paper No. 34), pp. 3-4; Ex. 2030, ¶16

Specification Describes Fifth Embodiment

Example: the fifth embodiment

- The lead arrangement of the fifth embodiment is described in ***two sentences***:

  1. In ***the outer side surface*** 420b of the resin package 420, the leads 422 are ***separated into six***.
  2. The leads 422 may be **separated respectively, or jointed**.

Ex. 1001, 17:4-6

- As explained by Dr. Schubert:

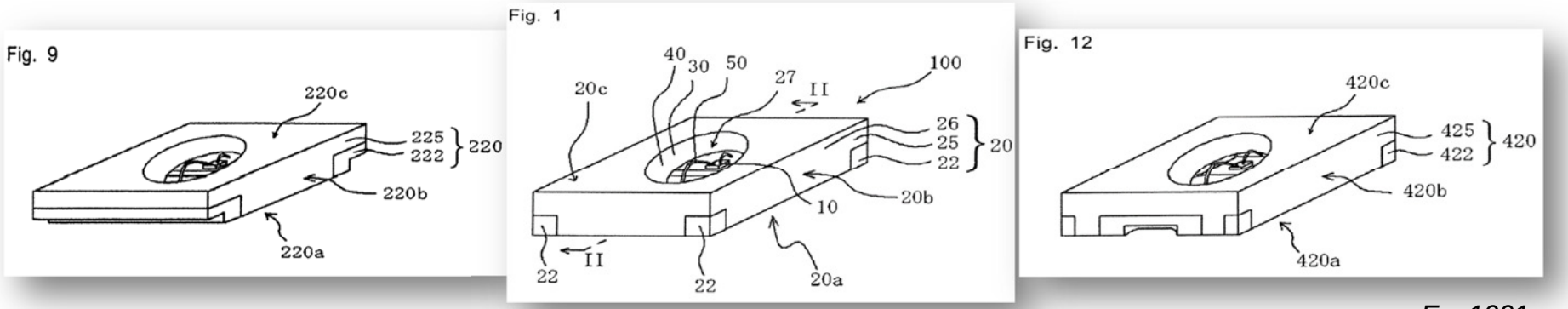
  "[A]lthough they are separated into six … at the outer surface, their internal configuration can be that of separate or jointed anodes and cathodes."

Ex. 2030, ¶ 16

Reply (Paper No. 34), pp. 3-4

Figures Show Leads Separated Into *n*=2,4,6

	Separated into *n* at outer side surfaces	**Separated or jointed in interior**
FIGS. 9, 11, 13 L/F shown at FIG. 10	2	Anode and cathode each jointed
FIGS. 1, 6 L/Fs shown at FIGS. 3, 7	4	Anode and cathode each jointed
FIG. 12 L/F not shown	6	Anode and cathode each separated or jointed



Ex. 1001

Dr. Schubert: "The '071 patent makes clear that the number of places that the leads are exposed from the package does not dictate the number of leads within the package."

Ex. 2030, ¶ 19

Reply (Paper No. 34), pp. 1-4; Ex. 2030, ¶¶ 16-20

Additional Support

- Two lead arrangements are operable:
  - Resin between the leads prevents shorting. Ex. 1001, 4:52-55 ("insulating resin part is provided between a positive lead and a negative lead … to prevent short circuiting")
  - Examples of other two lead arrangements include FIG. 1 (first embodiment)
- There are benefits to jointed leads that are separated at the outer side surface (improved adhesion and manufacturability):
  - advantages of separated leads include (i) larger notches allowing for ***easy sawing*** of resin rather than difficult sawing of metal and (ii) greater ***mechanical interaction between the resin part and the leads***, which improves adhesion.
  - advantages of internally jointed positive and negative leads include (i) greater mechanical ***integrity of the metal lead frame*** and (ii) larger lead area (e.g. on a bottom surface) allowing for ***easier soldering***.

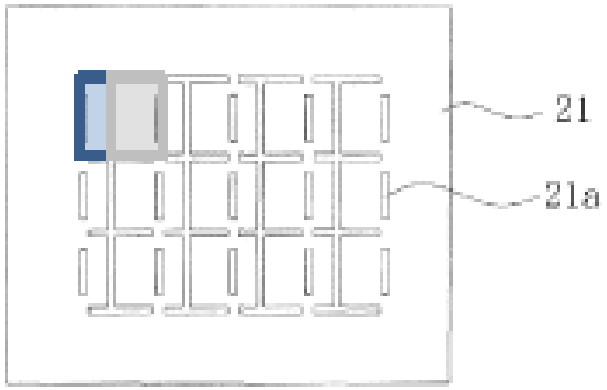
Reply (Paper No. 34), p. 4; Ex. 2030, ¶ 18

Additional Support

- For the fifth embodiment, the patent states that the "[d]escription of … configurations employing the **substantially same configuration** as the … first embodiment **will be omitted** where necessary."
- While other embodiments (e.g., the first embodiment) include a description of the **configuration of the lead frame**, such a description is **omitted** with respect to the fifth embodiment.
- A POSA would consider the description of the first embodiment when understanding the fifth embodiment

  - And in particular, the description of its **lead frame**.

Fig. 3



Motion (Paper No. 24), p. 5; Reply (Paper No. 34), pp. 2-3

POSA's Understanding

- A POSA would consider the description of the first embodiment's lead frame when understanding the fifth embodiment

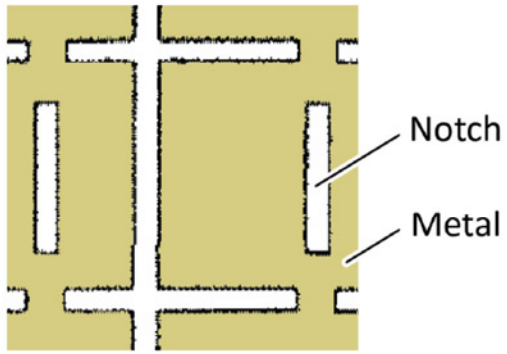
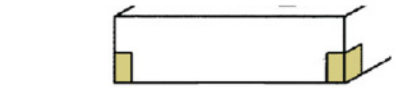
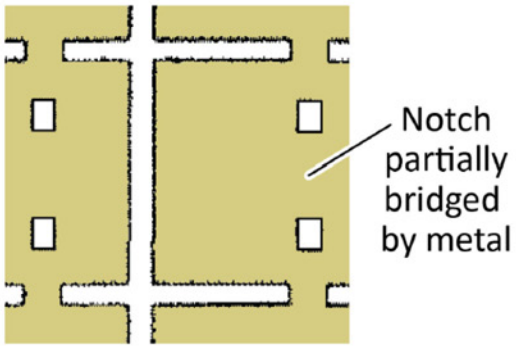


FIG. 3 (cropped and annotated)

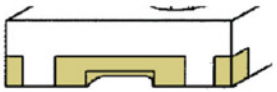


Two internal leads separated into four portions at outer side surface.

(Resulting device)



One possible jointed lead frame for fifth embodiment as described[4]



Two internal leads separated into six portions at outer side surface.

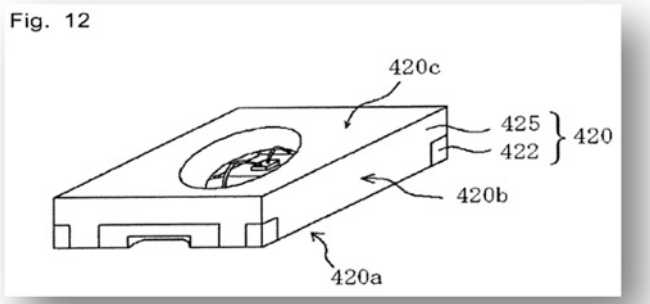
(Resulting device)

Reply (Paper No. 34), pp. 3-4; Ex. 2030, ¶¶ 19-20

Petitioner is Wrong

The fifth embodiment supports a resin package having two (and only two) leads/metal plates.

- Petitioner bases its argument on **extrinsic evidence** (a lab notebook) showing one possible lead frame configuration.
  - Petitioner suggests that FIG. 12 on its own shows three metal structures. Because the resin obscures the internal lead configuration, this is wrong; Petitioner must rely on ***lab notebooks*** to show a lead frame for FIG. 12.



  - FIG. 12 does not clearly show three distinct metal structures.
  - Even accepting Petitioner's argument, the fifth embodiment is not defined by FIG. 12 – ***it is defined by the specification that describes the fifth embodiment***.

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE)

Opposition (Paper No. 32), pp. 1-6; Reply (Paper No. 34), pp. 3-4; Ex. 2030, ¶ 20

Petitioner is Wrong

- Petitioner argues that if the leads are “jointed” to the third metal structure the device would short circuit and be inoperable.

  The specification teaches that anode and cathode are electrically insulated to avoid short circuits. All other embodiments have jointed leads without suffering from purported inoperability problem.

- As Dr. Schubert explains:

  “[A] person of skill in the art would have understood that each lead could be one contiguous piece (‘jointed’) at the interior of the package, while branching into different portions at the perimeter of the package.”

- Indeed, other embodiments show exactly this.

Opposition (Paper No. 32), pp. 4-5; Reply (Paper No. 34), pp. 3-4; Ex. 2030, ¶¶ 18-19

Petitioner is Wrong

- Petitioner argues that the leads may only be jointed at the outer side surface and therefore jointed leads would not read on resin to the left and right sides of an exposed lead.

  Specification does not limit "jointed" description to outer side surface. Other embodiments show, for example, jointed leads separated into two or four portions on outer surface.

- The lead arrangement of the fifth embodiment is described in ***two sentences***:

  1. In ***the outer side surface*** 420b of the resin package 420, the leads 422 are ***separated into six***.
  2. The leads 422 may be **separated respectively, or jointed**.

Ex. 1001, 17:4-6

Opposition (Paper No. 32), pp. 4-5; Reply (Paper No. 34), pp. 3-4; Sur-Reply (Paper No. 42), pp. 2-3

Improperly Incorporates Claim 31 Argument

The ’071 Patent supports an “etched concave portion on an [upper/bottom] surface”

- Petitioner’s entire “argument” is improperly incorporated from a different proceeding and <u>should be discarded</u>:

> There is no written description support for an “etched concave portion ***on an [upper/bottom] surface***.” As discussed in the ’411 Reply in IPR2018-00386 (pp. 9-11), the concavity/convexity in Fig. 11 is a side surface, not an upper or bottom surface. Ex. 1017 ¶¶83-84.

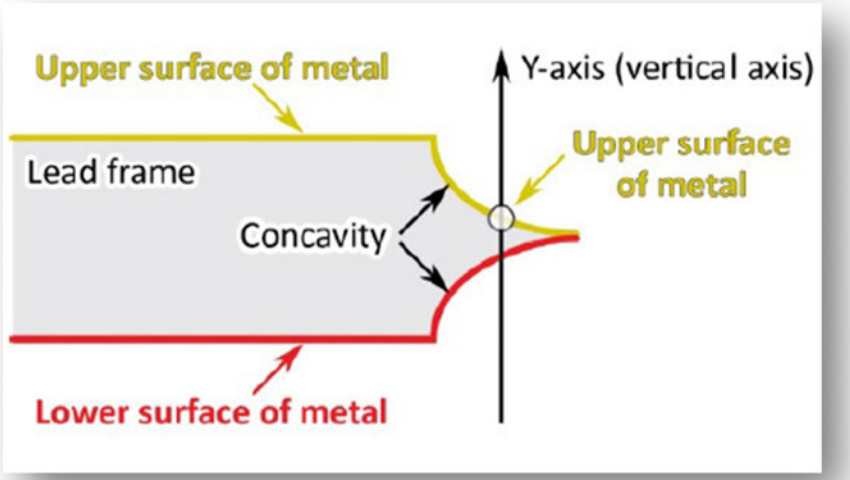
Opposition (Paper No. 32), p. 9

- Even if Petitioner’s argument is considered, it is wrong. Under BRI, the etched portion is on an upper/bottom surface.
  - The etched portions clearly form an upper surface and a bottom surface.
  - The specification ***does not redefine*** upper/bottom surface

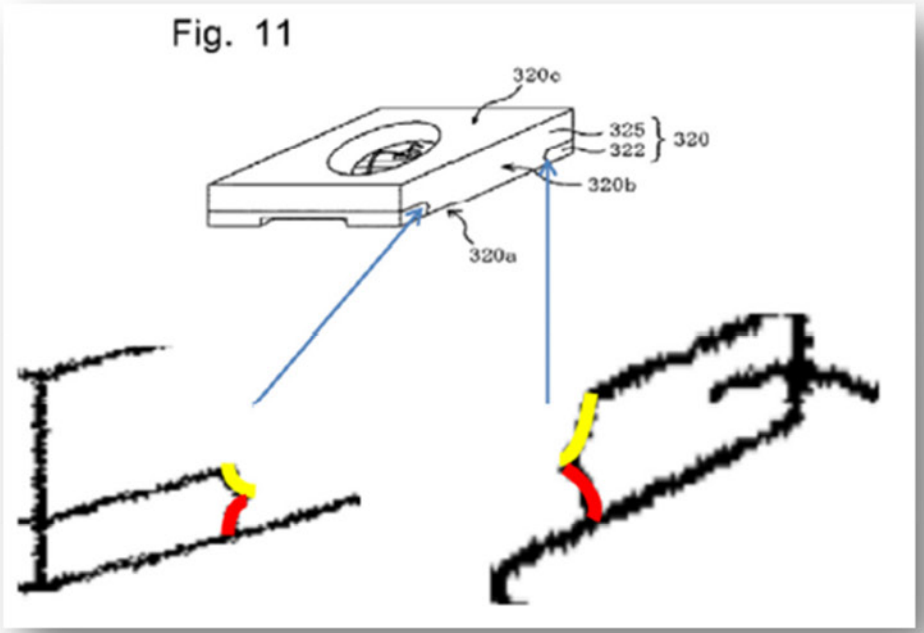
Opposition (Paper No. 32), p. 8; Reply (Paper No. 34), pp. 5-6

Written Description Support – Claim 31

The etched concave portion clearly forms an upper surface and a bottom surface.



(Upper surface shown in yellow, bottom surface shown in red)



Ex. 2030, ¶ 23

(Lead and Lead Frame)

Although a metal plate of a flat plate shape can be used for a lead frame, a metal plate in which differences in level or concavity and convexity are provided can be used.

Ex.1001, 9:21-24

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE)

Reply (Paper No. 34), pp. 5-6; Ex. 2030, ¶¶ 23-29, 31-32

Written Description Support – Claim 31

- The specification does not redefine upper/bottom surface and Petitioner does not advance its own construction of these terms
- In its incorporated argument, Petitioner argues that Nichia redefined the term in arguing that a different prior art reference did not teach a different claim element for a different, though related patent.
  - The claim at issue required that "a[n] inner side wall surface of the lead frame surrounding the at least one notch comprises concave portions."
  - Nichia stated (and the Board apparently credited) that "[i]t is apparent from a careful reading of the claims and from Figs. 2A, 2B and 4B of Koung, that no concave portions comprised in an inner side wall surface of the lead frame as claimed are shown."
- That goes too far. Nothing here supports a redefinition.

Reply (Paper No. 34), pp. 5-6; Ex. 2030, ¶¶ 24-25

Written Description Support – Claim 31

- In its incorporated argument, Petitioner also argues that a concavity/convexity must create a distinct surface because when describing a different feature in a LED device, the patent introduces terms first, second, third, and fourth surfaces to explain the step shown in FIG. 11.
  - This introduces artificial definitions of surface terms
  - Even if distinct surfaces, Petitioner does not explain why a surface that is the top of that portion of the lead cannot be considered an upper surface
- Again, nothing here supports a redefinition.

Reply (Paper No. 34), p. 6; Ex. 2030, ¶¶ 27-29

Written Description Support – Claim 31

- Petitioner points to one sentence that it asserts "makes clear … that … etching forms 'side surfaces'":

2,1 from being detached. Further, not only the upper surface of the lead frame **21**, but also the side surfaces corresponding to the notch parts **21***a* adhere to the resin-molded body **24**, so that the adhesion strength between the lead frame **21** and resin molded body **24** is improved.

Ex. 1001, 13:37-41

- Petitioner does not explain why a concave portion of an inner side wall surface of a lead frame (pre-singulation) cannot result in a device (post-singulation) with a lead having an upper surface with a concave portion. FIG. 11 shows just that.

Ex. 2030, ¶¶ 23-26

Opposition (Paper No. 32), p. 8; Reply (Paper No. 34), pp. 5-6

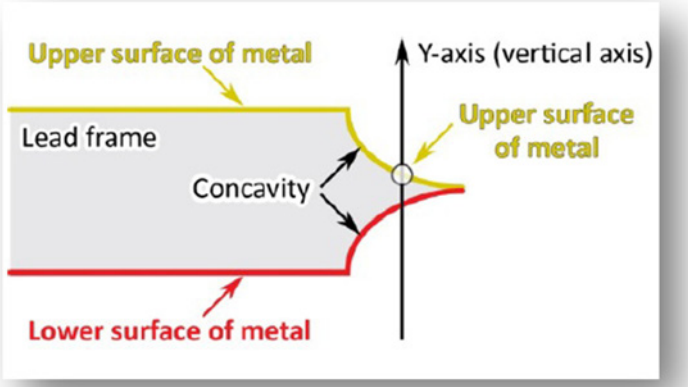
Written Description Support – Claim 31

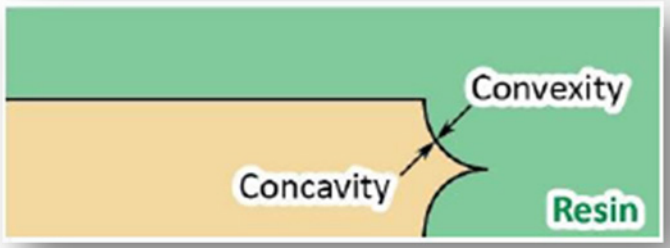
that appears to be what the magnified version of Figure 11 above shows. The concave portion of the lead's upper surface extends to the outer periphery of the device, and is visible from the outer side surface. Thus, the portion of the lead's upper surface that is concave and that intersects with the resin package's outer lateral surface, can be considered a concave portion of the outer side surface. That does not mean that this concave portion is a side surface and incapable of being part of an upper surface. Petitioner cannot and does not explain how Nichia's

Ex. 2030, ¶ 26

Written Description Support – Claim 31

- Petitioner quotes Dr. Schubert out of context to suggest he "concedes that" as a result of etching, concavities or convexities are formed in the regions ***below the upper surfaces*** of the exposed leads. Sur-Reply (Paper 42), pp. 3-4 (quoting IPR2018-00386, Ex. 2011, ¶ 50).
- Dr. Schubert was consistent that the concave features form an upper surface and a lower surface. IPR2018-00386, Ex. 2011, §VII(A)(2).





- The concavity or convexity on the upper portion of the lead is a part of the upper surface of the lead
- The concavity or convexity on the lower portion of the lead is below that upper surface.
- A concavity in the metal part corresponds to a convexity in the resin part, at the interface between the leads and resin.

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE) Response to Petitioner's Reply to Patent Owner's Sur-Reply (Paper No. 47), pp. 2-3

Substitute Claims Are Not Broadened

Substitute Claims Not Broadened – Claim 27

Claim 27 is not improperly broadened because "metal lead" replaces the term "metal plate"

- "metal lead" does not replace the term "metal plate"—"first and second metal leads" replaces "a metal part including first and second metal plates."

  Petitioner does not (and cannot) contend that "metal lead" is broader than "a metal part".

- Petitioner is also wrong that "lead" is broader than "plate" because a plate must be **flat**. Petitioner incorrectly quotes the specification, which in full explains that a metal plate can be flat or alternatively may have differences in level:

(Lead and Lead Frame)

Although a metal plate of a flat plate shape can be used for a lead frame, a metal plate in which differences in level or concavity and convexity are provided can be used.

Ex.1001, 9:21-24

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE)

Reply (Paper No. 34), pp. 6-7; Ex. 2030, ¶¶ 31-35

Substitute Claims Not Broader – Claim 27

a resin package ~~comprising~~ consisting of a resin part and [[a]] first and second metal leads, the resin part including a thermosetting resin~~part including first and second metal plates~~, and

Ex. 2020 (Appendix A), p. 1

Reply (Paper No. 34), pp. 6-7

Substitute Claims Not Broader – Claim 28

Claim 28 recites "portions" of the resin part located at left and right sides

- Not broader because it is illogical for the entire resin part to be located simultaneously at both left and right sides.
  - The original claim scope must have been that portions of the resin part are located at left and right sides of a portion of the metal part.
- Dr. Shanfield:

> and right sides of a portion of the metal part? That is, did the original claim scope require that the entire resin part be located at left and right sides of a portion of the metal part?
>
> A No.

Ex. 2033, 60:11-17

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE)

Reply (Paper No. 34), pp. 7-8

Substitute Claims Not Broader – Claim 28

Original claim 16:

wherein at least a portion of an outer lateral surface of the resin part and at least a portion of an outer lateral surface of the metal part are coplanar at each of the four outer lateral surfaces of the resin package,

wherein a notch is formed in the metal part at each of the four outer lateral surfaces of the resin package,

wherein the resin part is located at left and right sides of a portion of the metal part at at least two of the four outer lateral surfaces of the resin package, and

Ex. 1001, 20:47- 21:3 (claim 16)

Reply (Paper No. 34), pp. 7-8

Substitute Claims Not Broader – Claim 28

wherein, at a first of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part ~~is~~ are located above and at left and right sides of an exposed outer lateral surface of the first metal plate, ~~a portion of the metal part at at least two of the four outer lateral surfaces of the resin package, and~~

wherein, at a second of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part are located above and at left and right sides of an exposed outer lateral surface of the second metal plate,

Ex. 2020 (Appendix A), p. 2

Reply (Paper No. 34), pp. 7-8

Substitute Claims Are Not Unpatentable

Improper Incorporation Of 14 Grounds

Petitioner contends claims are obvious over **14 grounds**, up to and including a **5-way obviousness** combination, without adequate analysis:

- Petitioner improperly incorporates large portions of expert declaration without explaining obviousness rationale.
  - 37 C.F.R. § 42.6(a)(3) (no incorporation by reference)
  - 37 C.F.R. § 42.24(b)(3) (page limits)
  - Paper No. 29 (Order denying request for additional pages)
- For this reason alone the obviousness argument should be given little or no weight.

The base reference (Hsu) is missing a limitation ("resin part") – without obviousness analysis (not found in Petitioner's Opposition), Petitioner cannot carry its burden.

Opposition (Paper No. 32), pp. 9-25; Reply (Paper No. 34), pp. 8-11; Order, Conduct of the Proceedings (Paper No. 43), pp. 4-5; Ex. 1041, 10:8- 19:19

Inadequate Obviousness Analysis

Petitioner does not provide adequate analysis to support obviousness:

- "Petitioner needed to identify the *Graham* factors and articulate a motivation to combine the numerous references and why a POSA would have had a reasonable expectation of success in doing so. It did not."
- "The opposition is silent regarding any reasonable expectation of success for the various proposed combinations aside from conclusorily noting some combinations would be 'straightforward.'"
- "It has a threadbare discussion of an alleged motivation to combine the numerous references that boils down to a few conclusory statements."
- "Further, it is difficult to decipher from the opposition the precise nature of the grounds being asserted, which appear to be introduced implicitly in section headings and described together without detailed explanation."

Opposition (Paper No. 32), pp. 9-25; Reply (Paper No. 34), pp. 8-11; Order, Conduct of the Proceedings (Paper No. 43), pp. 4-5; Ex. 1041, 10:8- 19:19

Examples

- "[T]he practice of citing a declaration 'to support conclusory statements that are not otherwise supported in [a document] amounts to incorporation by reference.'" *Cisco Sys., Inc. v. C-Cation Techs., LLC*, Case IPR2014–00454, slip op. at 10 (PTAB Aug. 29, 2014) (Paper 12) (informative).
- **277 page declaration** accompanying **25 page Opposition**: *more than 200 pages incorporated by reference*
  - "The references are prior art under §102(a), (b), and/or (e). Ex. 1017 **¶¶91-381**." Op. at 10.
  - "Elements [27.Pre], [27.A]: Hsu discloses "[a] light emitting device" (e.g., "a light emitting diode (LED) package") and "a light emitting element" (e.g., "a white LED die 20"). E.g., Ex. 1030, 1:7-10, 3:11-13; Ex. 1017 **¶¶90-122**, **262-75**." Op. at 10.
  - "Alternatively, it would have been obvious to combine Lin's **similar disclosures for similar reasons**. E.g., Ex. 1010 ¶25, Figs. 2b, 3a, 4g; Ex. 1017 ¶¶277-80." Op. at 12.
- Also incorporates arguments from Petition:
  - "As in the Petition (claim 5), Wang and Oshio disclose this element. E.g., Ex. 1006 ¶¶40, 41, Fig. 4; Ex. 1007 ¶69; **Pet. 47-50**." Op. at 23-24.
  - "A POSA would have been … to use Mori's advantageous teachings of a sealing member that contains two or more kinds of phosphors in implementing Hsu's LED, or Hsu's LED in view of Koung or Lin, to convert light to a different color. E.g., id.; Ex. 1017 ¶¶219-22; **Pet. 45-47**." Op. at 23.

(DEMONSTRATIVE EXHIBIT - NOT EVIDENCE)

Opposition (Paper No. 32), pp. 9-25; Reply (Paper No. 34), pp. 8-11; Order (Paper No. 43), pp. 4-5; Ex. 1041, 10:8-19:19

Hsu Lacks The Claimed Resin Part

Hsu (the primary reference) lacks the claimed resin part.

- Regarding claims 27 and 28, Hsu's encapsulant 50 is not part of the claimed resin part.
- The specification draws a clear distinction between encapsulant (referred to as a "sealing member") and the resin part of the resin package.
  - They are separately labeled and serve different purposes.
  - The claims treat them differently.
  - Dependent claims further claim a sealing member (of the light emitting device) which is different from the resin part (of the resin package).

Hsu Lacks The Claimed Resin Part

- Regarding claim 27, the resin package must consist of the resin part and two metal leads.
- But in Hsu, the identified resin part includes reflecting ring 30 (molded in a first molding step) and encapsulant 50 [corresponding to the “sealing member”] (molded in a second molding step to produce base 51 and domelike protrusion 52).

- Hsu’s resin package includes multiple, separately molded resins and does not consist of a (single) resin part as claimed.

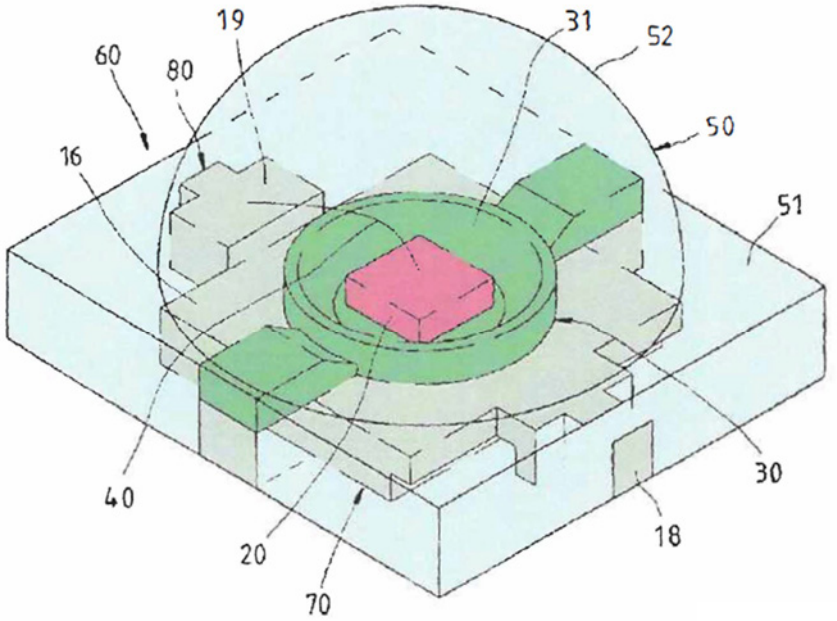


FIG. 12

Reply (Paper No. 34), pp. 9-11; Ex. 1030, p. 9; Ex. 2035 (S9)

Petitioner Misstates Patent Owner's Position

Petitioner contends that Patent Owner does not dispute combination of Hsu and Koung including motivation to combine and reasonable expectation of success. Sur-Reply (Paper No. 42), p. 4.

- Compare Petitioner's contention to Patent Owner's actual position stated in its Reply to Petitioner's Opposition and quoted in part on the previous slide.
  - Patent Owner does dispute the combination of Hsu and Koung
  - Patent Owner does dispute motivation to combine
  - Patent Owner does dispute reasonable expectation of success

Reply (Paper No. 34), pp. 8-11; Sur-Reply (Paper No. 42), p. 4

Koung, Hsu

Koung

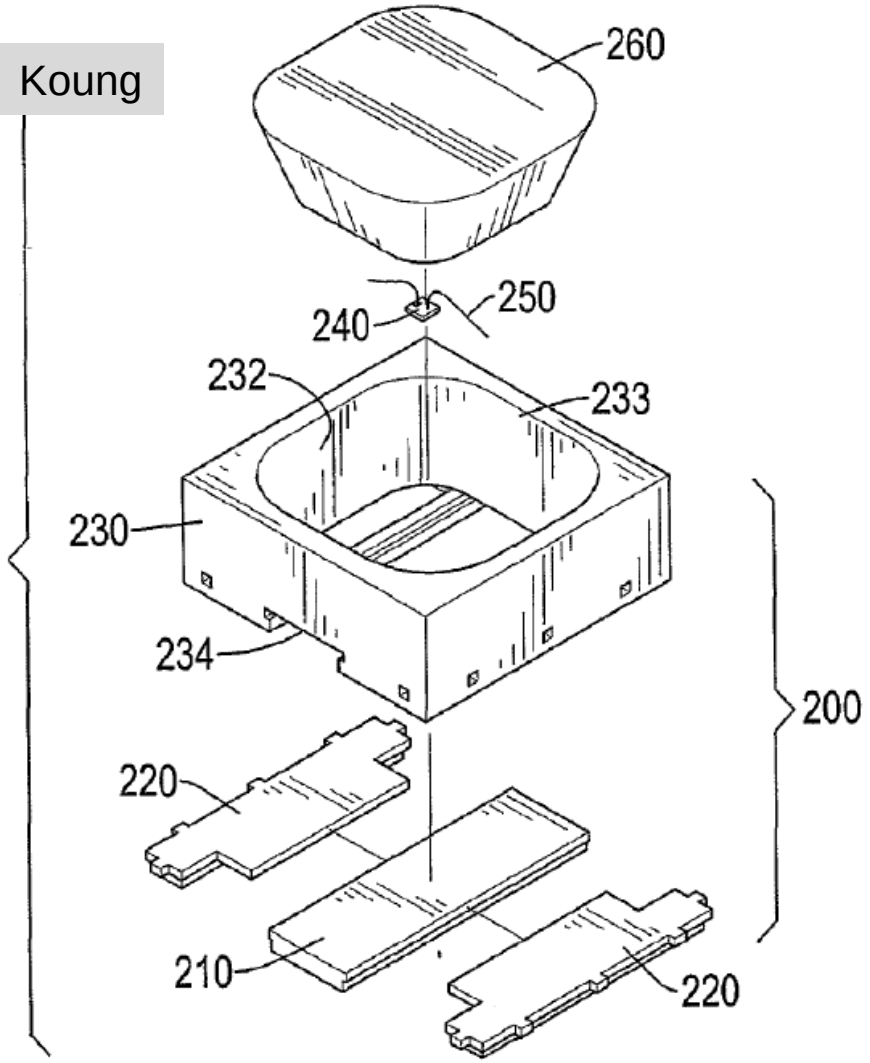


FIG.2B

Ex. 1008

Hsu

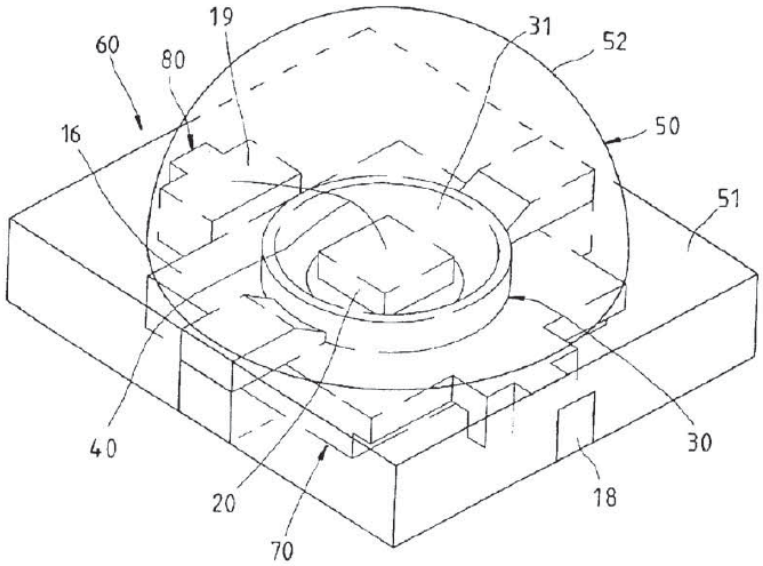


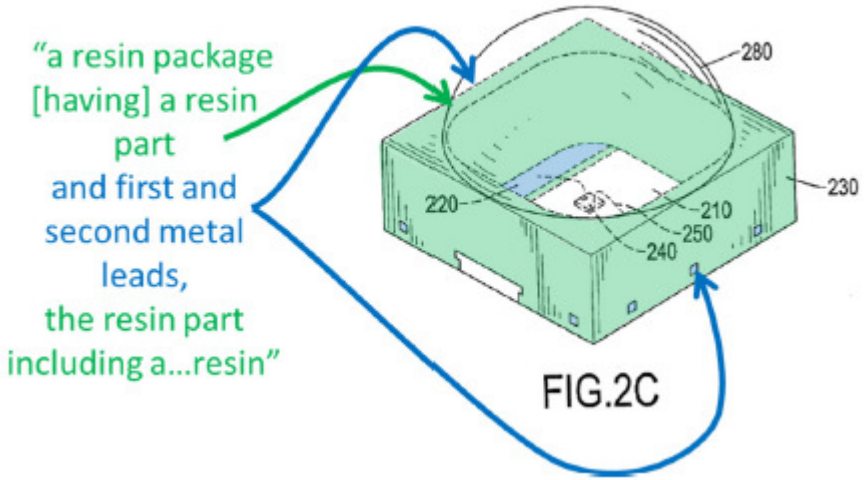
FIG. 12

Ex. 1030

Opposition (Paper No. 32), pp. 10-11

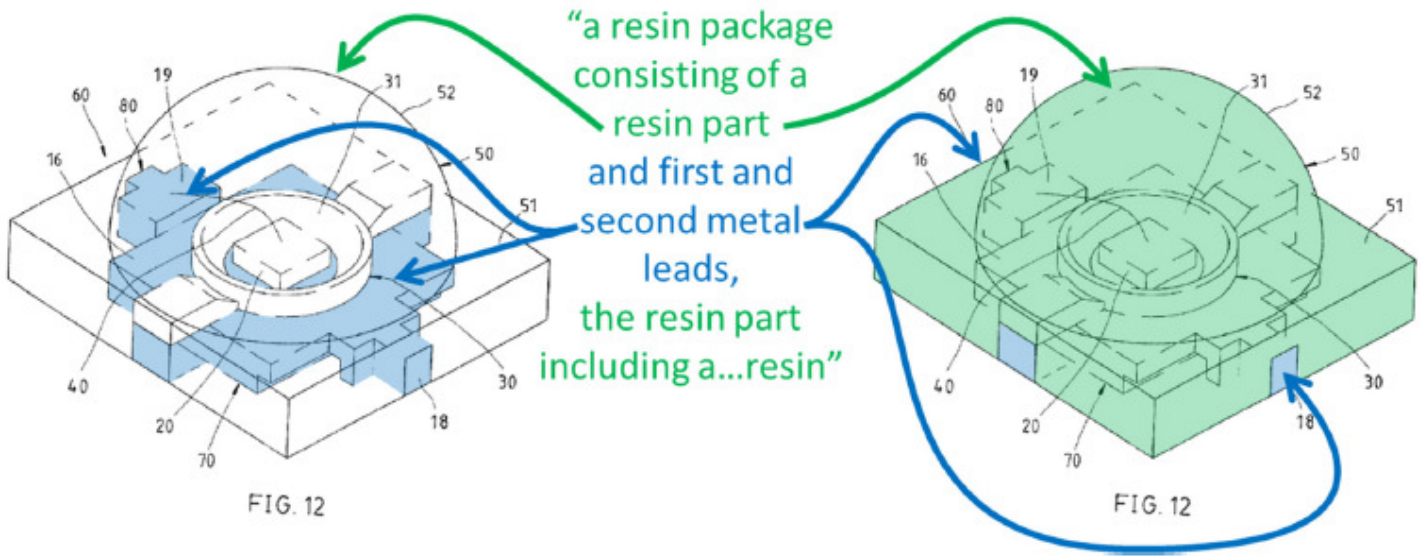
Koung, Hsu

Koung



Ex. 1008; Ex. 1017, ¶ 103

Hsu



Ex. 1030; Ex. 1017, ¶ 123

 Opposition (Paper No. 32), pp. 10-11

Koung, Hsu

FIG. **4**B). The after-treating metal board (**301**) comprises the margin (**310**) and multiple units to connect integrally to each other. Each unit has at least one pair of electrodes (**220**), a dissipating board (**210**) and multiple gaps (**311**). Each electrode (**220**) connects to an electrode (**220**) of an adjacent unit. The electrode (**220**) adjacent to the margin (**310**) further connect to the margin (**310**). Each dissipating board (**210**) is surrounded by at least one pair of the electrodes (**220**) and connects to a dissipating board (**210**) of an adjacent unit. The dissipating boards (**210**) adjacent to the margin (**310**) further connect to the margin (**310**). The gaps (**311**) are formed between each one pair of the electrodes (**220**) and the dissipating board (**210**).

Ex. 1008, ¶ 20

Koung, Hsu

Koung

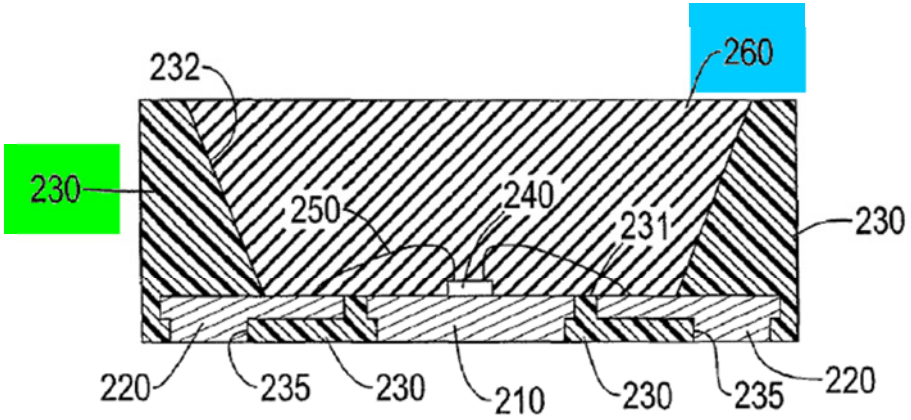


FIG.2A

Ex. 1008

Hsu

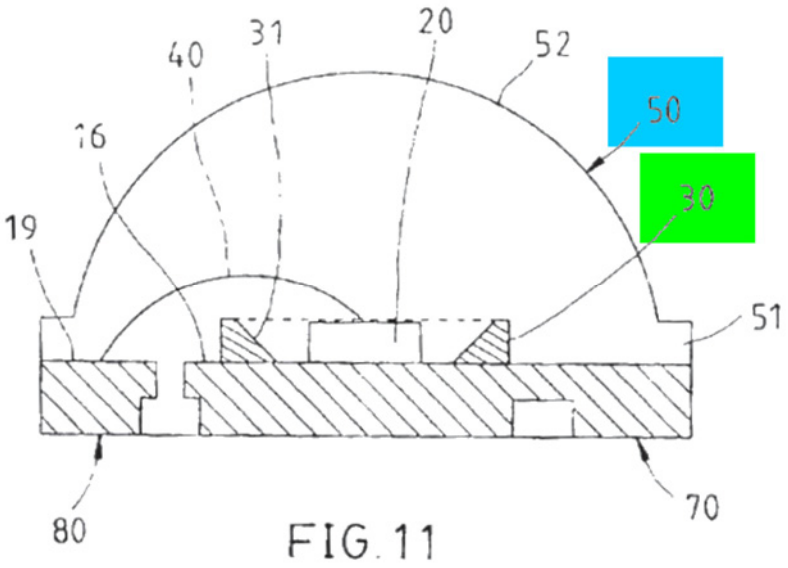


FIG. 11

Ex. 1030

 Opposition (Paper No. 32), pp. 10-11, 13

Claim 31 - Combination With Glenn Is Improper

E.g., Ex. [Glenn], 4:47-60, 5:63-6:4, Fig. 3. A POSA would have been motivated and found it obvious and straightforward to use Glenn's teachings of etched curved concave portions in implementing Hsu's device to advantageously improve adhesion and stability as *expressly* taught by Glenn. *E.g.*, *id.*, 2:53-61, 4:47-60; Ex. 1017 ¶¶223-31, 351-56.

Opposition (Paper No. 32), p. 23

Claim 31 - Combination With Glenn Is Improper

- Regarding claim 31, a district court has **rejected** the combination of Glenn with LED references
  - Specifically the **Urasaki** reference, which Petitioner uses for every Glenn ground
  - A POSA would have "dismissed" Glenn because it related to ICs, which have fundamentally different purposes
- The Federal Circuit affirmed
- Notwithstanding:
  - no discussion of the differences between Glenn and the other art in the grounds
  - no discussion of expectation of success
  - no meaningful discussion of motivation to combine

Reply (Paper No. 34), p. 12

Claim 31 - Combination With Glenn Is Improper

[FF157] In light of the competing considerations that underlie the design of an LED package, it would not have been obvious to a person of ordinary skill in the art that the combination of Hitachi with Sanyo or Glenn would predictably have yielded a viable LED device or a process for manufacturing such a device. *See, e.g.,* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 6:9-17); *but see* (5/13/2015 AM Trial Tr., Dkt. No. 170, at 114:6-115:23

[FF159] In view of these differences, a person of ordinary skill involved in the design or development of a new LED device or method for manufacturing an LED device would have dismissed references such as Sanyo or Glenn that are directed to the design and manufacture of electronic semiconductor devices (*e.g.,* integrated circuits), rather than LEDs. (5/13/2015 PM Trial Tr., Dkt. No. 171, at 91:7-20.)

Ex. 2024, pp. 44-45

Reply (Paper No. 34), p. 12

Other Combinations Are Also Inappropriate

- Grounds with Lin are inappropriate because Lin teaches an opposing method of creating a resin part that is incompatible with Hsu and/or Urasaki
- Lin teaches a method that *replaces* a molding process with an adhesive sheet sandwich process. This adhesive sheet sandwich process is not compatible with the molding that Hsu teaches.
- Urasaki is directed to proposed solutions to problems with prior art LED packages formed by a process where an adhesive sheet was sandwiched between a flat wiring board (or PCB) and a resin layer.
- Lin and Urasaki are ***directly contradictory*** to each other, similar to Lin and Hsu teaching opposing processes for creating a resin part.

Reply (Paper No. 34), p. 11; Ex. 2030, ¶¶49-53.

Claims Appendix

Proposed Substitute Claims

Original Claim	Substitute Claim
15	27
16	28
17	29
18	30
19	31
21	32
22	33
23	34

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 1-4

Substitute Claim 27

27. A light emitting device comprising:
a light emitting element;
a resin package consisting of a resin part and first and second metal leads, the resin part including a thermosetting resin, and
wherein said resin package has four outer lateral surfaces and has a concave portion having a bottom surface,
wherein the light emitting element is mounted on the bottom surface of the concave portion and electrically connected to the first and second metal leads,
wherein, at each of the four outer lateral surfaces of the resin package, at least a portion of an outer lateral surface of the resin part and at least a portion of an outer lateral surface of one or more of the first and second metal leads are coplanar,

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 5

Substitute Claim 27 (Cont'd)

wherein the first metal lead is exposed at three outer lateral surfaces of the resin package,

wherein a notch is formed in one or more of the first and second metal leads at each of the four outer lateral surfaces of the resin package,

wherein, at a first of the four outer lateral surfaces of the resin package, the resin part is located at left and right sides of an exposed surface of the first metal lead,

wherein, at a second of the four outer lateral surfaces of the resin package, the resin part is located at left and right sides of an exposed surface of the second metal lead, and

wherein all upper edges of the first and second metal leads are coplanar.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 5

Substitute Claim 28

28. A light emitting device comprising:

a resin package comprising a resin part and a metal part, said metal part consisting of first and second metal plates, said resin package having four outer lateral surfaces and having a concave portion having a bottom surface;

a light emitting element mounted on the bottom surface of the concave portion and electrically connected to the metal part, and

wherein at least a portion of an outer surface of the resin part and at least a portion of an outer surface of the metal part are coplanar at an outer bottom surface of the resin package,

wherein at least a portion of an outer lateral surface of the resin part and at least a portion of an outer lateral surface of the metal part are coplanar at each of the four outer lateral surfaces of the resin package,

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 5-6

Substitute Claim 28 (Cont'd)

wherein a notch is formed in the metal part at each of the four outer lateral surfaces of the resin package,

wherein, at a first of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part ~~is~~ are located above and at left and right sides of an exposed outer lateral surface of the first metal plate,

wherein, at a second of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part are located above and at left and right sides of an exposed outer lateral surface of the second metal plate,

wherein a lower surface of the metal part is exposed from the resin part in a region directly under the light emitting element,

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 5-6

Substitute Claim 28 (Cont'd)

wherein the portions of the outer lateral surface of the resin part that are located above and at left and right sides of the exposed outer lateral surface of the first metal plate are integrally formed and are coplanar with the exposed outer lateral surface of the first metal plate, and

wherein the portions of the outer lateral surface of the resin part that are located above and at left and right sides of the exposed outer lateral surface of the second metal plate are integrally formed and are coplanar with the exposed outer lateral surface of the second metal plate.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 5-6

Substitute Claims 29-30

29. The light emitting device according to **claim 28**, wherein the resin part is made using a thermosetting resin.

---

30. The light emitting device according to **claim 28** wherein:

the first metal plate has a first step portion that is exposed on the outer lateral surface of the first metal plate on a first side of the resin package, and

the second metal plate has a second step portion that is exposed on the outer lateral surface of the second metal plate on a second side of the resin package.

Substitute Claim 31

31. The light emitting device according to **claim 29**,

wherein the light emitting device further comprises a sealing member that contains two or more kinds of phosphors,

wherein each of the first and second metal plates includes an etched concave portion on an upper surface of the respective metal plate,

wherein each of the first and second metal plates includes an etched concave portion on a bottom surface of the respective metal plate, and

wherein each of said etched concave portions is curved.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 7

Substitute Claims 32-34

32. The light emitting device according to **claim 28**, wherein the metal part includes a base portion and a metal layer disposed on each of an upper surface and a lower surface of the base portion, the metal layers being made of a material that is different from that of the base portion.

33. The light emitting device according to **claim 32**, wherein the metal layer is disposed at all surfaces of the metal part except an exposed outer lateral surface of the metal part.

34. The light emitting device according to **claim 32**, wherein:

the resin part is disposed over a first portion of the metal layer at the upper surface of the metal part, and

a second portion of the metal layer on the upper surface of the metal part is exposed from the resin part.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 7

Substitute Claims Showing Amendments

wherein the first metal lead is exposed at three outer lateral surfaces of the resin package,

wherein a notch is formed in one or more of the first and second metal ~~part~~ leads at each of the four outer lateral surfaces of the resin package,

wherein, at a first of the four outer lateral surfaces of the resin package, the resin part is located at left and right sides of ~~a portion of the metal part at at least two of the four outer lateral surfaces of the resin package~~ an exposed surface of the first metal lead,

wherein, at a second of the four outer lateral surfaces of the resin package, the resin part is located at left and right sides of an exposed surface of the second metal lead, and

wherein all upper edges of the first and second metal ~~part~~ leads are coplanar.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 1

Substitute Claims Showing Amendments

~~15~~27. A light emitting device comprising:

---

a light emitting element;

---

a resin package ~~comprising~~ consisting of a resin part and [[a]] first and second metal leads, the resin part including a thermosetting resin~~part including first and second metal plates~~, and

---

wherein said resin package ~~having~~ has four outer lateral surfaces and ~~having~~ has a concave portion having a bottom surface~~,~~; ~~and~~

~~a~~wherein the light emitting element is mounted on the bottom surface of the concave portion and electrically connected to the first and second metal leads~~part~~,

---

wherein, at each of the four outer lateral surfaces of the resin package, at least a portion of an outer lateral surface of the resin part and at least a portion of an outer lateral surface of one or more of the first and second metal leads~~part~~ are coplanar ~~at each of the four outer lateral surfaces of the resin package~~,

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 1

Substitute Claims Showing Amendments

~~16~~28. A light emitting device comprising:

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a resin package comprising a resin part and a metal part ~~including at least two~~, said metal part consisting of first and second metal plates, said resin package having four outer lateral surfaces and having a concave portion having a bottom surface; ~~and~~

---

a light emitting element mounted on the bottom surface of the concave portion and electrically connected to the metal part, and

---

wherein at least a portion of an outer surface of the resin part and at least a portion of an outer surface of the metal part are coplanar at an outer bottom surface of the resin package,

---

wherein at least a portion of an outer lateral surface of the resin part and at least a portion of an outer lateral surface of the metal part are coplanar at each of the four outer lateral surfaces of the resin package,

---

wherein a notch is formed in the metal part at each of the four outer lateral surfaces of the resin package,

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 2-3

Substitute Claims Showing Amendments

wherein, at a first of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part ~~is~~ are located above and at left and right sides of an exposed outer lateral surface of the first metal plate, ~~a portion of the metal part at at least two of the four outer lateral surfaces of the resin package, and~~

wherein, at a second of the four outer lateral surfaces of the resin package, portions of an outer lateral surface of the resin part are located above and at left and right sides of an exposed outer lateral surface of the second metal plate,

---

wherein a lower surface of the metal part is exposed from the resin part in a region directly under the light emitting element,

---

wherein the portions of the outer lateral surface of the resin part that are located above and at left and right sides of the exposed outer lateral surface of the first metal plate are integrally formed and are coplanar with the exposed outer lateral surface of the first metal plate, and

wherein the portions of the outer lateral surface of the resin part that are located above and at left and right sides of the exposed outer lateral surface of the second metal plate are integrally formed and are coplanar with the exposed outer lateral surface of the second metal plate.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 2-3

Substitute Claims Showing Amendments

~~17~~29. The light emitting device according to claim 28~~16~~, wherein the resin part is made using a thermosetting resin.

~~18~~30. The light emitting device according to claim ~~16~~28~~,~~ wherein:

the first metal ~~part~~ plate has a first step portion~~, a concave portion, and/or a convex portion~~ that is exposed on the outer lateral surface of the first metal plate on a first side of the resin package, and

the second metal plate has a second step portion that is exposed on the outer lateral surface of the second metal plate on a second side of the resin package.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 3

Substitute Claims Showing Amendments

~~19~~31. The light emitting device according to claim ~~16~~29,

wherein the light emitting device further comprises a sealing member that contains two or more kinds of phosphors~~.~~,

wherein each of the first and second metal plates includes an etched concave portion on an upper surface of the respective metal plate,

wherein each of the first and second metal plates includes an etched concave portion on a bottom surface of the respective metal plate, and

wherein each of said etched concave portions is curved.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), p. 3

Substitute Claims Showing Amendments

~~21~~32. The light emitting device according to claim ~~16~~28, wherein the metal part includes a base portion and a metal layer disposed on each of an upper surface and a lower surface of the base portion, the metal ~~lavers~~layers being made of a material that is different from that of the base portion.

~~22~~33. The light emitting device according to claim ~~21~~32, wherein the metal layer is disposed at all surfaces of the metal part except an exposed outer lateral surface of the metal part.

~~23~~34. The light emitting device according to claim ~~21~~32, wherein:

the resin part is disposed over a first portion of the metal layer at the upper surface of the metal part, and

a second portion of the metal layer on the upper surface of the metal part is exposed from the resin part.

Motion (Paper No. 24), pp. 1-2; Ex. 2020 (Appendix A), pp. 3-4

Caselaw Appendix

Written Description Support Caselaw

- It is black letter law that the § 112 inquiry is an "objective inquiry into the four corners of the specification from the perspective of a person of ordinary skill in the art." *Streck, Inc. v. Research & Diagnostic Sys.*, 665 F.3d 1269, 1285 (Fed. Cir. 2012);
- *Trading Techs. Int'l, Inc. v. Open E Cry, LLC*, 728 F.3d 1309, 1319 (Fed. Cir. 2013) (contrasting the use of extrinsic evidence in claim construction versus § 112 which looks at the "specification itself").

“Resin Package”

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VIZIO, INC.,

Petitioner,

v.

NICHIA CORPORATION,

Patent Owner.

Cases IPR2018-00389, and -00437

Patents 9,490,411 B2 and 9,537,071 B2

Meaning of
“resin package comprising
a resin part and a metal part”

“Resin Package” Is Defined In The Specification

- The term “resin package comprising a resin part and a metal part” is defined to refer to “a singulated light emitting device”
  - Express lexicography – defined at Ex. 1001, 3:33-36
  - Through their consistent use – the terms “resin package”, “resin part”, and “metal part” (leads) each refer to a singulated light emitting device every time they are used in the ’411 and ’071 patents
- That definition should not be ignored
  - *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005):

“[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor’s lexicography governs.”

- The definition does not render the apparatus claims invalid or otherwise improper (as Petitioner wrongly contends)

‘411 IPR: POR (Paper No. 20), pp. 31-34; Response To Petitioner’s Reply To Patent Owner’s Sur-Reply (Paper No. 35), p. 3
‘071 IPR: POR (Paper No. 22), pp. 7-10; Response To Petitioner’s Reply To Patent Owner’s Sur-Reply (Paper No. 47), p. 3

Express Lexicography

In view of the above problems, an object of the present invention is to provide a simple and low-cost method for manufacturing, in a short time, multiple light emitting devices which has high adhesion between a lead frame and a thermosetting resin composition.

The present invention is earnestly studied and as a result is finally completed.

In this description, terms such as leads, a resin part, and resin package are used for a singulated light emitting device, and terms such as a lead frame and resin molded body are used in the stage prior to singulation.

Ex. 1001, 3:26-36

'411 IPR: POR (Paper No. 20), pp. 31-34
'071 IPR: POR (Paper No. 22), pp. 7-10

Express Lexicography Caselaw

- *Sinorgchem Co. v. ITC*, 511 F.3d 1132 (Fed. Cir. 2007)
- *SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187 (Fed. Cir. 2013)

"[T]he scope of the claim, 'as expressed in the specification, is regarded as dispositive'."

- *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363 (Fed. Cir. 2009)

"When a patentee explicitly defines a claim term in the patent specification, the patentee's definition controls."

- *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005)

"[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs."

'411 IPR: POR (Paper No. 20), pp. 31-34
'071 IPR: POR (Paper No. 22), pp. 7-10

Dr. Shanfield Recognized This Definition

Q And you understand also that the '250 patent specification and claims also uses the term "resin package." Is that correct?

A Yes.

Q Okay. And the resin package that's referred to, you understand that it's referring to a singulated light-emitting device. Correct?

A That is correct.

'411 IPR: Ex. 2013, 44:16-45:1; '071 IPR: Ex. 2009, 44:16-45:1

- Dr. Shanfield's prior testimony should not be disregarded
- Under BRI, the claims must be interpreted in light of the specification

'411 IPR: POR (Paper No. 20), pp. 31-34
'071 IPR: POR (Paper No. 22), pp. 7-10

Consistent Use Caselaw

SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc., 242 F.3d 1337, 1344 (Fed. Cir. 2001)

- "[T]he written description can provide guidance as to the meaning of the claims, thereby dictating the manner in which the claims are to be construed, even if the guidance is not provided in explicit definitional format."

Bell Atl. Network Servs., Inc. v. Covad Commc'ns Grp., Inc., 262 F.3d 1258, 1268-71 (Fed. Cir. 2001)

- "[A] claim term may be clearly redefined without an explicit statement of redefinition...."

'411 IPR: POR (Paper No. 20), pp. 34-39
'071 IPR: POR (Paper No. 22), pp. 10-15

Consistent Use Caselaw

Trs. of Columbia Univ. v. Symantec Corp., 811 F.3d 1359, 1363 (Fed. Cir. 2016)

- "[C]ase law does not require explicit redefinition or disavowal"

Eon Corp. IP Holdings LLC v. Silver Spring Networks, Inc., 815 F.3d 1314, 1320 (Fed. Cir. 2016)

- "A party is … 'not entitled to a claim construction divorced from the context of the written description and prosecution history.' Ordinary meaning is not something that is determined 'in a vacuum.' To the contrary, 'a word describing patented technology takes its definition from the context in which it was used by the inventor.'"

'411 IPR: POR (Paper No. 20), pp. 34-39
'071 IPR: POR (Paper No. 22), pp. 10-15

Defined Through Consistent Use

- The terms “resin package,” “resin part,” and “metal part” refer to a singulated light emitting device **every time they are used** the ’411 and ’071 Patents.
- The ’411 and ’071 Patents describe **six embodiments** and an example. **Each describes a singulated light emitting device**.
  - Schubert Decl., ¶¶ 42-48 (explaining embodiments).
  - Ex. 1001 (‘071 Patent), 6:25-13:41 (“First Embodiment”), 13:42-14:48 (“Second Embodiment”), 14:50-16:13 (“Third Embodiment”), 16:14-16:51 (“Fourth Embodiment”), 16:52-17:23 (“Fifth Embodiment”), 17:24-17:59 (“Sixth Embodiment”), and 17:60-19:15 (“Example”).
- “[R]eferences to singulation abound and permeate the disclosure.” Schubert Decl., ¶ 41.

‘411 IPR: POR (Paper No. 20), pp. 34-39; Ex. 2011 (Schubert Decl.), ¶¶ 75-82
‘071 IPR: POR (Paper No. 22), pp. 10-15; Ex. 2008 (Schubert Decl.), ¶¶ 41-48

Consistent With The Purpose Of The Invention

38. This understanding is also consistent with the purpose of the '071 Patent and the stated benefits of the challenged claims. Indeed, one of the problems described in the Background Art section, with respect to Patent Document 4, was that "a lead frame and thermosetting resin composition are likely to be detached upon singulation." '071 Patent, 2:35-37. In describing the benefits of an embodiment, the patent explains that "[i]t is not necessary to apply plating processing ***per singulated light emitting device*** and it is possible to simplify a manufacturing method." *Id.*, 3:67-4:3 (emphasis added); *see also id.* 5:33-36. The patent repeatedly discusses that manufacturing multiple light emitting devices quickly and efficiently is a stated goal. *E.g.*, *id.*, 3:26-30, 3:58-60, 4:41-44, 5:24-26, 5:64-67, 6:16-18, 19:10-11. The stated benefit of making many devices at once—such as, in some embodiments, by cutting a resin-molded body (a contiguous, molded array comprising a plurality of pre-singulation devices)—is consistent with the proposed construction of "a resin package comprising a resin part and a metal part" as being limited to a singulated (or post-singulation) device.

'071 IPR: Ex. 2008 (Schubert Decl.), ¶ 38

Response To Petitioner's Arguments On "Resin Package" Term

Response To Petitioner's Arguments

- Express definition should inform construction
- An IDS submission is not an admission
- Patents consistently use "resin package" to refer to a singulated device
- A singulated device is not improper

'411 IPR: Response To Petitioner's Reply To Patent Owner's Sur-Reply (Paper No. 35), p. 3
'071 IPR: Patent Owner's Sur-Reply (Paper No. 39), pp. 1-4;
Response To Petitioner's Reply To Patent Owner's Sur-Reply (Paper No. 47), p. 3

Express Definition Should Inform Construction

- Petitioner dismisses cases cited by Patent Owner because they "involved express definitions." *See* Reply, 6.
- Petitioner does not explain how "*are used for*" (from patent) is meaningfully different from, or less definitional than "*is*" or "*means*" (from cited cases).
- Petitioner's citation to *Acumed* is misplaced.
  - Claim language here is nothing like "defining a hole axis"
- The specification's discussion of singulation expressly limits (by its own language) how the terms "leads, a resin part, and resin package are used."
- The terms ***are used*** to refer to a ***singulated*** light emitting device.

'071 IPR: Petitioner's Reply to POR (Paper No. 31), p. 6; Patent Owner's Sur-Reply (Paper No. 39), pp. 1-2

An IDS Submission Is Not An Admission

- Petitioner asserts that Patent Owner's identification of certain references during prosecution constitute an admission regarding the scope of the claims. Reply, 5.
- **The Office's rules flatly dismiss this argument**.
  - 37 CFR § 1.97(h)

  Filing an IDS "shall not be construed to be an admission that the information cited … is considered to be, material to patentability."
  - Ex. 1002, pp. 85-86

  Patent Owner submitted IDS "in accordance with 37 CFR §§ 1.56, 1.97, [etc.]" and stated that the submission was "not an admission."

'071 IPR: Petitioner's Reply to POR (Paper No. 31), p. 5; Patent Owner's Sur-Reply (Paper No. 39), pp. 2-3; Ex. 1002

Patents Consistently Use “Resin Package” To Refer To A Singulated Device

- Petitioner misunderstands column 15, lines 9-13. It does not mean that “‘resin package’ can refer to a device that has not yet been singulated.” Reply, 6-7.
- This passage describes “[a] light emitting device according to a third embodiment.” – the method of manufacturing this device is described later.
- In describing the finished light emitting device (as opposed to the method of making it), the specification explains that “burrs extending in the direction of the outer bottom surface are likely to be produced in the cutting surface of the lead 222.”
- This is because “singulation is started from the outer upper surface of the resin package 220 using the singulation saw.”

‘071 IPR: Petitioner’s Reply to POR (Paper No. 31), pp. 6-7; Patent Owner’s Sur-Reply (Paper No. 39), p. 3

Patents Consistently Use “Resin Package” To Refer To A Singulated Device

- The specification confirms that for the third embodiment, “[t]he resin molded body and lead frame are cut [singulated] along the notch parts 221a [and the grooves 221c].” *Ex. 1001*, 16:6-8
- It is not until after this cutting (singulation) happens that the light emitting device is provided.
- The reference to “cutting surface of the lead 222” also implies that singulation has occurred.
- When explaining why burrs result on the singulated device, the specification describes where the singulation saw impacted the resin with reference to the already-singulated device, i.e. “from the outer upper surface of the resin package 220”.

‘071 IPR: Patent Owner’s Sur-Reply (Paper No. 39), p. 3; Ex. 1001

A “Singulated” Device Is Not Improper

- Terms such as “singulated” do not render an apparatus claim invalid *per se*.
- On the contrary, courts routinely permit such terms.
  - *In re Nordt Development Co., LLC.*, 881 F.3d 1371, 1375 (Fed. Cir. 2018) (“injected molded” limitation imparts structure)
  - *Id.* at 1376 (collecting cases holding “limitations to convey structure even when they also describe a process of manufacture”).
    - *3M Innovative Props. Co. v. Avery Dennison Corp., 350 F.3d 1365, 1371–72 (Fed. Cir. 2003)*
    - *Hazani v. U.S. Int'l Trade Comm'n, 126 F.3d 1473, 1479 (Fed. Cir. 1997)*
    - *Vanguard Prods. Corp. v. Parker Hannifin Corp., 234 F.3d 1370, 1372 (Fed. Cir. 2000)*
- There is nothing improper about requiring the claimed device to be “singulated.”

‘411 IPR: Response To Petitioner’s Reply To Patent Owner’s Sur-Reply (Paper No. 35), p. 3
‘071 IPR: Patent Owner’s Sur-Reply (Paper No. 39), p. 4;
Response To Petitioner’s Reply To Patent Owner’s Sur-Reply (Paper No. 47), p. 3

Loh Does Not Disclose a “Resin Package” as claimed

Loh Does Not Disclose a “Resin Package”

- Loh does not disclose a singulated light emitting device.
- Instead, it describes only a “modular” device and makes ***no reference*** to singulation or a singulated resin package. Schubert Decl., ¶ 72; Ex. 1004, Abstract, ¶ [0007] (referring to a “modular package” for a light emitting device).

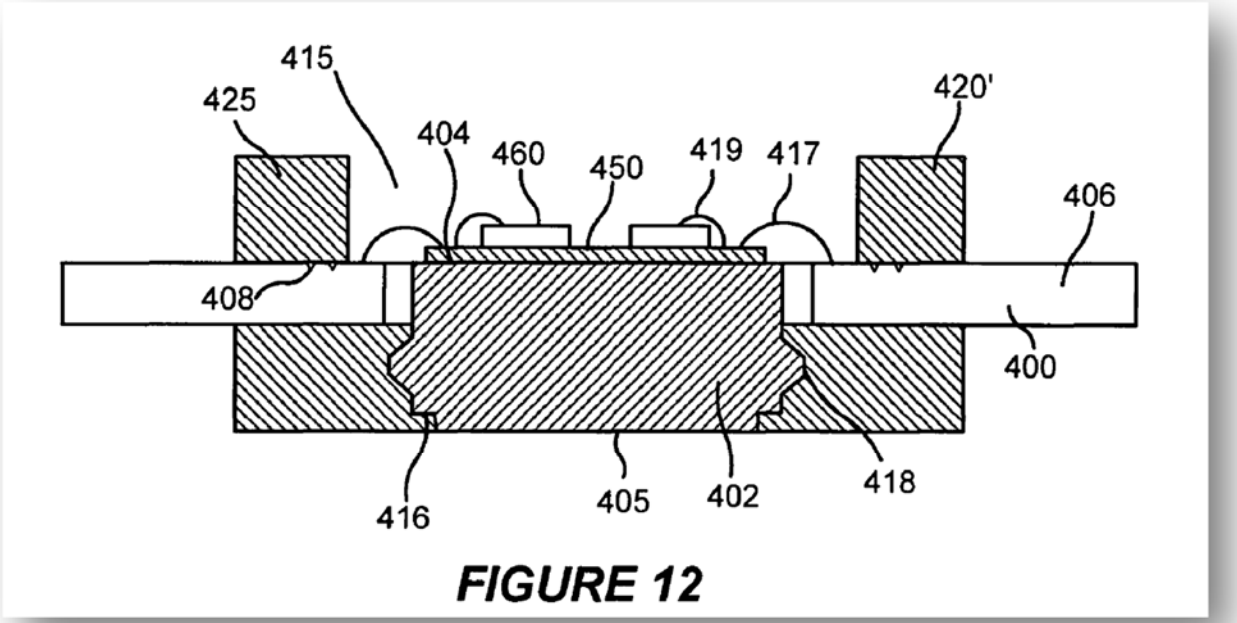
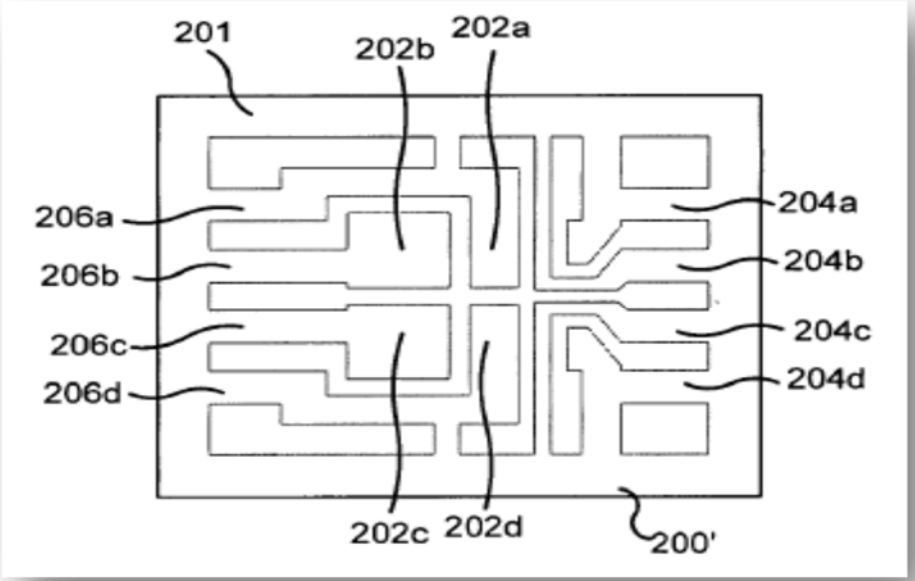


FIGURE 12

‘411 IPR: POR (Paper No. 20), pp. 49-51; Ex. 2011 (Schubert Decl.), ¶ 125
‘071 IPR: POR (Paper No. 22), pp. 17-18; Ex. 2008 (Schubert Decl.), ¶ 72

Loh Does Not Disclose a "Resin Package"

The devices of Loh are produced individually.



Ex. 1004, Fig. 6

- Ex. 1004, ¶¶ [0044] ("FIG. 6 is a top view of a leadframe configured for use in ***a*** package….")
- Ex. 1004, [0075] ("an external frame 201 that may be trimmed off after ***a*** package body is molded onto the leadframe blank 200'")
- Schubert Decl., ¶ 72 ("the lead frame that Loh discloses is a lead frame for a single package").

'411 IPR: POR (Paper No. 20), pp. 49-51; Ex. 2011 (Schubert Decl.), ¶ 125
'071 IPR: POR (Paper No. 22), pp. 17-18; Ex. 2008 (Schubert Decl.), ¶ 72

Response To Loh Arguments

Petitioner points to:

1. Loh's reference to "package(s)"
2. The fact that a lead frame may be formed from a strip.

Reply, 11.

- The issue is not whether Loh discloses multiple packages, it is whether any of those packages are a singulated light emitting device, as claimed. ***They are not***.
- Whether a lead frame came from a metal strip says nothing about the subsequent processing of that lead frame, or if a given device made from the lead frame is a "singulated light emitting device." ***In Loh, it is not*.**

'411 IPR: Petitioner's Reply to POR (Paper No. 24), pp. 26-28
'071 IPR: Petitioner's Reply to POR (Paper No. 31), pp. 10-12; Patent Owner's Sur-Reply (Paper No. 39), p. 4

Legally Defective Incorporation by Reference

Petitioner argues that Loh incorporates by reference descriptions of singulated devices.

Reply, 11-12.

This argument is **legally defective**: only those features expressly and specifically incorporated into the host document are considered part of the reference.

- *Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1272, 1282 (Fed. Cir. 2000) (in order for a patent to incorporate material by reference, "the host document must identify with ***detailed particularity*** what ***specific material*** it incorporates and clearly indicate ***where*** that material is found in the various documents") (emphasis added);
- *Zenon Envtl., Inc. v. U.S. Filter Corp.*, 506 F.3d 1370, 1379 (Fed. Cir. 2007) ("sufficient particularity").

'411 IPR: Petitioner's Reply to POR (Paper No. 24), pp. 26-28
'071 IPR: Petitioner's Reply to POR (Paper No. 31), pp. 10-12; Patent Owner's Sur-Reply (Paper No. 39), p. 5

Legally Defective Incorporation by Reference

- The relied-upon passage in Loh refers to mounting solid state light sources to provide protection, color selection, focusing, and the like, and then refers to packages described in other publications (Ex. 1004, ¶ 3)
  - The lead frames from the incorporated references are not identified with particularity.
  - LEDs are discussed only generally, without reference to lead frames or singulation.
- Moreover, the incorporation is in the description of the background art.
  - The next paragraph explains that there remains a need for improved packages, and then the application proceeds to describe modular devices made one at a time.
  - Even if the references are properly incorporated, nothing suggests that the disclosed embodiments would be modified to incorporate the alleged singulated aspect of the other references.

'071 IPR: Patent Owner's Sur-Reply (Paper No. 39), p. 5; Ex. 1004

CERTIFICATE OF SERVICE

I hereby certify that on this 1st day of March, 2019, a true and correct copy of the foregoing **PATENT OWNER'S NOTICE OF SUBMISSION OF DEMONSTRATIVE EXHIBITS FOR MARCH 5, 2019 ORAL HEARING** was served, via electronic mail, upon the following counsel of record for Petitioner Vizio, Inc.:

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