

**UNITED STATES PATENT AND TRADEMARK OFFICE BEFORE
THE PATENT TRIAL AND APPEAL BOARD**

IKEA Supply AG

Petitioner

v.

Everlight Electronics Co., Ltd.,

Patent Owner

Patent No. 9,640,733 to Hsieh *et al.* IPR Case No.: IPR2024-00972

**PETITION FOR *INTER PARTES* REVIEW OF
CLAIMS 1-5 AND 7 OF U.S. PATENT 9,640,733
UNDER 35 U.S.C. §§311-319 AND 37 C.F.R. §§42.100 *ET SEQ.***

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Table of Exhibits

Exhibit	Description
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1002	File history of U.S. Patent No. 9,640,733 (“’733 FH”)
1003	Declaration of Dr. Michael Lebby Regarding Invalidity of U.S. Patent No. 9,640,733
1004	U.S. Patent No. 7,771,093 to Kishikawa <i>et al.</i> (“Kishikawa”)
1005	U.S. Patent No. 7,462,870 to Nakashima <i>et al.</i> (“Nakashima”)
1006	Japanese Patent Publication No. 2014-041966 by Umeda <i>et al.</i> (“Umeda”)
1007	Certified English Translation of Umeda
1008	U.S. Patent Publication No. 2014/0124812 by Kuramoto <i>et al.</i> (“Kuramoto”)
1009	U.S. Patent No. 7,719,024 to Bando (“Bando”)
1010	Patent Owner’s Infringement Contentions – Claim Chart of the ’733 Patent to IKEA Ledare GX53 LED Bulb
1011	U.S. Patent No. 7,964,943 to Seo <i>et al.</i> (“Seo”)
1012	U.S. Patent No. 8,415,681 to Takada (“Takada”)
1013	Preliminary Opinion in German Nullity Proceeding for EP2947705
1014	English Translation of Preliminary Opinion in German Nullity Proceeding for EP2947705
1015	Scheduling Order issued in <i>Everlight Electronics Co., Ltd. v. IKEA US Retail LLC, et al.</i> , No. 6:23-cv-00481-AM-DTG (W.D. Tx. Jul. 5, 2023)

Exhibit	Description
1016	Claim Construction Order issued in <i>Everlight Electronic Co., Ltd. v. Walmart Inc.</i> , No. 23-cv-000439-AM-DTG (W.D. Tx. Jun. 9, 2023)
1017	U.S. Patent No. 7,161,190 to Chikugawa (“Chikugawa”)
1018	U.S. Patent No. 6,274,924 to Carey <i>et al.</i> (“Carey”)
1019	U.S. Patent No. 8,097,937 to Bogner <i>et al.</i> (“Bogner”)
1020	U.S. Patent Application Publication No. 2007/0139949 by Tanda <i>et al.</i> (“Tanda”)
1021	U.S. Patent No. 8,035,125 to Abe (“Abe”)
1022	W.I.P.O Publication No. WO2013118072A2 to Bierhuizen (“Bierhuizen”)
1023	<i>Curriculum Vitae</i> of Dr. Michael S. Lebby
1024	Attorney Declaration of Joseph R. Klinicki

I. INTRODUCTION

IKEA Supply AG (“Petitioner”) hereby petitions for *inter partes* review of Claims 1-5 and 7 (“Challenged Claims”) of U.S. Patent No. 9,640,733 (“the ’733 patent”) (Ex-1001). The Challenged Claims should be canceled because they do not claim anything new or inventive; they claim a previously known light emitting diode (LED) carrier with a protruding electrode configuration.

II. MANDATORY NOTICES UNDER 37 C.F.R. §42.8(a)(1) FOR INTER PARTES REVIEW

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

A real-party-in-interest in this petition is IKEA Supply AG (“ISAG”), which has a place of business at Grüssenweg 15, 4133 Pratteln, Switzerland. ISAG is a subsidiary of Inter IKEA Holding BV (“Inter IKEA”), which has a place of business at Olof Palmestraat 1, Delft, Zuid-Holland, 2616. IKEA US Retail LLC and IKEA North America Services, LLC, of Conshohocken, Pennsylvania, are real-parties-in-interest as they are currently named as Defendants in the district court proceeding identified in §II(B), *infra*, and are related through contracts, franchise agreements, and/or indemnification agreements with Inter IKEA and/or ISAG. OSRAM Opto Semiconductors GmbH, of Regensburg, Germany, Samsung Electronics Co., Ltd., of Suwon-si, South Korea, Seoul Semiconductor Co., Ltd, of Ansan-si, South Korea, Philips Lumileds Lighting LLC, of San Jose, California, Bridgelux, Inc. of Fremont,

California, Shenzhen Smalite Semiconductor Co., Ltd., of Shenzhen, China, and/or Intematix, Inc., of Fremont, California, may be real-parties-in-interest insofar as they supply components to ISAG that Patent Owner has accused of infringement and have certain contractual and/or indemnification obligations to ISAG in relation to those accused products.

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

This petition is related to three complaints filed by Patent Owner involving the '733 patent:

1) *Everlight Electronics Co., Ltd. v. IKEA US Retail LLC, et al.* (2:23-cv-00126-JRG) (E.D. Tx. Mar. 27, 2023), complaint served June 1, 2023, and subsequently voluntarily dismissed on July 5, 2023;

2) *Everlight Electronics Co., Ltd. v. IKEA US Retail LLC, et al.* (6:23-cv-00481-AM) (W.D. Tx. Jul. 5, 2023), complaint served July 6, 2023, which is pending (“IKEA-Everlight Litigation”); and

3) *Everlight Electronics Co., Ltd. v. Walmart Inc.* (6:23-cv-00439-AM-DTG) (W.D. Tx. Jun. 9, 2023), which is pending (“Walmart-Everlight Litigation”).

Everlight asserted EP2947705, a foreign counterpart to the '733 patent, against IKEA Deutschland GmbH & Co. KG and IKEA of Sweden AB in Germany in the District Court of Dusseldorf Civil Chamber. That case is pending. Two nullity proceedings have been filed against EP2947705 with the German Federal Patent

Court by SLV GmbH (2 Ni 16/23 (EP)) and IKEA Deutschland GmbH & Co. KG (2 Ni 1/24 (EP)). A copy of the initial preliminary opinion finding that the claims of EP2947705 likely lack novelty and/or inventive step is attached as Ex-1013, and an English machine translation of the preliminary opinion is attached as Ex-1014.

The undersigned is unaware of any other pending judicial or administrative matters that would affect, or be affected by, a decision in the proceeding.

C. Lead and Backup Counsel Under 37 C.F.R. §42.8(b)(3) and Service Information under 37 C.F.R. §42.8(b)(4)

Petitioner designates the following lead and backup counsel:

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Service on Petitioner may be made by mail or hand delivery to: Flaster Greenberg P.C., 1717 Arch Street, Suite 3300, Philadelphia, PA 19103. Petitioner

also consents to and prefers electronic service by emailing IKEA-Everlight-IPRs@flastergreenberg.com and counsel of record (shown above).

III. PAYMENT OF FEES UNDER 37 C.F.R. § 42.15

Petitioner submits that the fee set forth in 37 C.F.R. §42.15(a) was properly paid using the USPTO Financial Manager.

IV. CERTIFICATION OF WORD COUNT UNDER 37 C.F.R. § 42.24(d)

Petitioner certifies that the word count in this Petition is 13,572 words, as counted by the word-processing program (Microsoft Word for Office 365) used to generate this Petition, where such word count excludes the table of contents, table of authorities, mandatory notices, certificate of service, table of exhibits, and this certificate of word count. This Petition is in compliance with the 14,000 word limit set forth in 37 C.F.R. §42.24(a)(1)(i).

V. IPR REQUIREMENTS UNDER 37 C.F.R. §42.104

A. Grounds for Standing Under 37 C.F.R. §42.104(a)

Petitioner certifies that the '733 patent is available for *inter partes* review. Petitioner is not barred or estopped from requesting *inter partes* review on the identified grounds.

B. Identification of Challenge Under 37 C.F.R. §42.104(b) and Relief Requested

Petitioner respectfully requests that the claims 1-5 and 7 (“Challenged Claims”)

be cancelled based on the following grounds of unpatentability:

Ground of Unpatentability	'733 Patent Claim(s)	Basis for Rejection under 35 U.S.C. §§ 102/103
Ground 1	1-5	Anticipated by Kishikawa (Ex-1004)
Ground 2	1-5	Anticipated by Nakashima (Ex-1005)
Ground 3	1-5 and 7	Obvious over Umeda (Ex-1006 and Ex-1007 (Translation)) in view of Bando (Ex-1009) and/or the ordinary level of skill in the art (“OLSA”)
Ground 4	1-5 and 7	Anticipated by Kuramoto (Ex-1008)
Ground 5	7	Each of Grounds 1, 2, or 4 in view of Bando and/or the OLSA
Ground 6	1-5	Obvious over any of Kishikawa, Nakashima, or Kuramoto in view of OLSA

VI. OVERVIEW OF THE '733 PATENT

A. The Challenged Claims

The Challenged Claims generally relate to light emitting devices including an LED carrier having an electrode portion and a housing portion (Ex-1001 at Abstract; 14:6-20). Claim 1 is the only independent claim. Claims 2-5 and 7 depend from claim 1.

B. Priority and Effective Filing Date

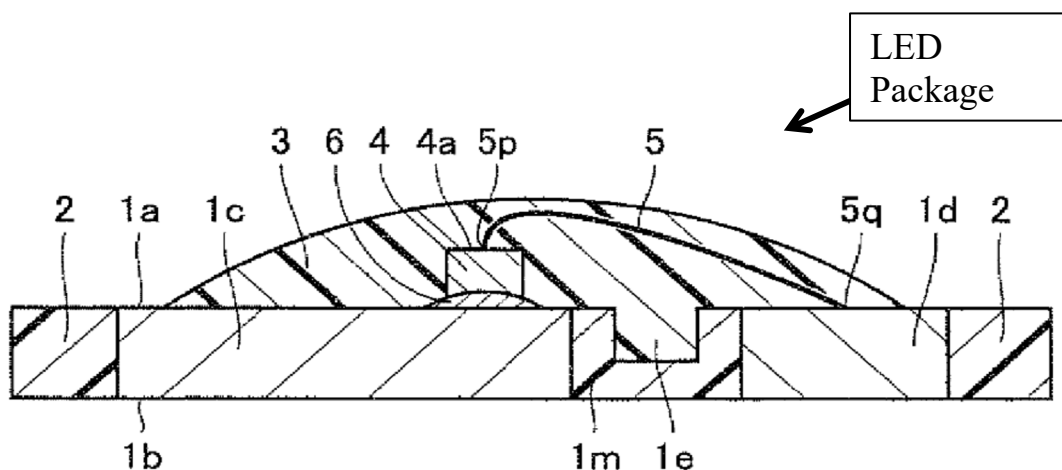
The '733 patent claims the benefit of Taiwanese Patent Application No. 103118060, filed on May 23, 2014, and Taiwanese Patent Application No. 104103527, filed on Feb. 3, 2015. Petitioner applies May 23, 2014 as the effective filing date here, without conceding that the '733 patent is entitled to it. *See PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1303-06 (Fed. Cir. 2008). As the effective filing date of the '733 patent is after March 16, 2013, post-AIA 35 U.S.C. §§ 102 & 103 apply. *Medtronic, Inc. v. Barry*, 891 F.3d 1368, 1375 (Fed. Cir. 2018).

C. Overview of the '733 Patent

1. General Background to the '733 Patent

Dr. Michael Lebby explains that LEDs are typically small and fragile and are included in an “LED package” (Ex-1003 at § 6.1). An LED package protects the LED, provides mechanical strength, electrical connections, and heat dissipation (Ex-

1003 at ¶¶ 61-63). The LED package may also include an encapsulant having phosphors to convert the wavelength of emitted light (*e.g.*, blue) to a desired color (*e.g.*, white) (Ex-1003 at § 6.4). As Dr. Lebby explains, all of this was well-known to a POSITA (*e.g.*, Takada shows an LED chip 4 inside of an LED package (Ex-1003 at §§ 6.2-6.4; Ex-1012 at Fig. 1; 6:21-65; 9:31-10:16)).



Takada FIG. 1 (Annotated)

The '733 patent admits that both “LEDs” and “carrier leadframes” were well-known (Ex-1001 at 1:26-58), stating “dicing-type carrier leadframe[s]” have been used in “recent years” for manufacturing LED packages (Ex-1001 at 1:40-42). The '733 patent admits that it was well-known for a “plastic body” to be “molded on a metal sheet material,” using a “die bonding process” to mechanically bond the LED to the package, “wire bonding” the LED to the package electrodes to create electrical connections, and “encapsulat[e]” the LED (Ex-1001 at 1:40-47). Dr. Lebby agrees

that these processes/structures were well-known (Ex-1003 at §§ 6.1-6.6).

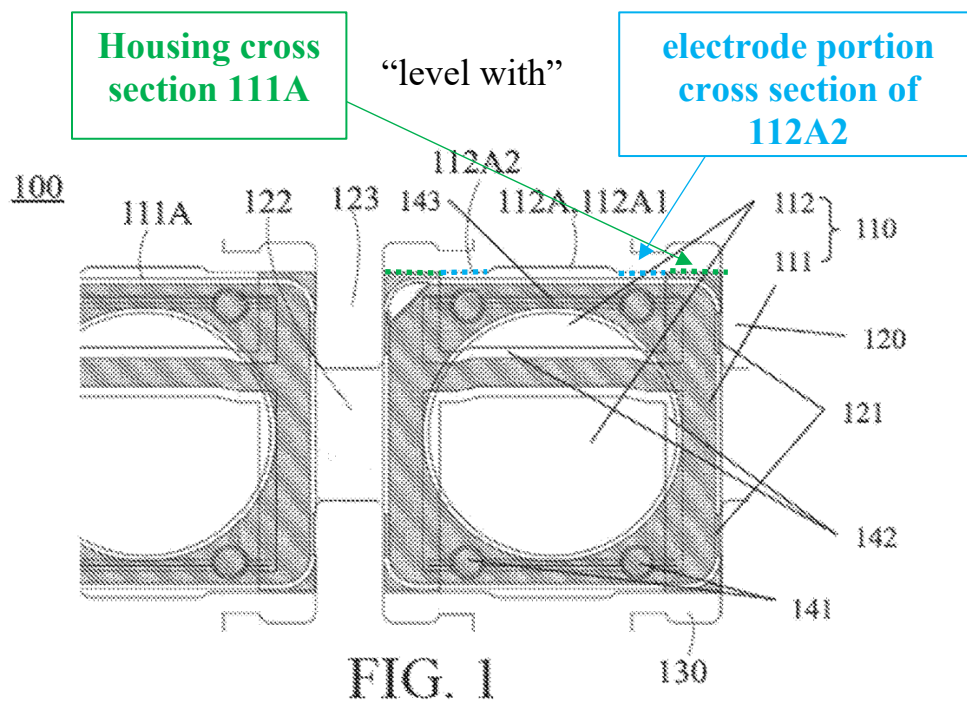
The focus of the '733 patent is alleged manufacturing problems including creating dust while dicing, electrically testing each LED in a sheet of LED packages before cutting into individual LED packages, and cutting LED packages simultaneously (Ex-1001 at 1:47-49; 1:51-58; 5:24-6:25). Despite the '733 patent's focus on manufacturing, the '733 patent does **not** claim a manufacturing process (*See* Ex-1001 at 14:6-49). Rather, the '733 patent claims a “light emitting device” divorced from the disclosed manufacturing processes (*Id.*). In any event, Dr. Lebby explains that the manufacturing processes described in the '733 patent were well-known (*See* Ex-1003 at § 6.6), for example, as exemplified by Takada (Ex-1003 at § 6.6.1; Ex-1012 at 11:3-12, 14:48-53, FIGs. 11-16) and Bierhuizen (Ex-1003 at § 6.6.4; Ex-1022 at ¶¶ [0019]-[0020], Fig. 2).

2. The '733 Patent LED Package Description

The '733 patent describes LED packages with conventional LED components, such as an LED, electrodes, a housing, and an encapsulant (*See infra* §VI(C)(4); Ex-1001 at 1:43-45). The '733 patent describes different configurations of the claimed “electrode portion” relative to the “housing” (Ex-1001 at 14:6-49). But no explanation is provided as to why these configurations are supposedly inventive.

The '733 patent describes that a “carrier includes a housing and at least one

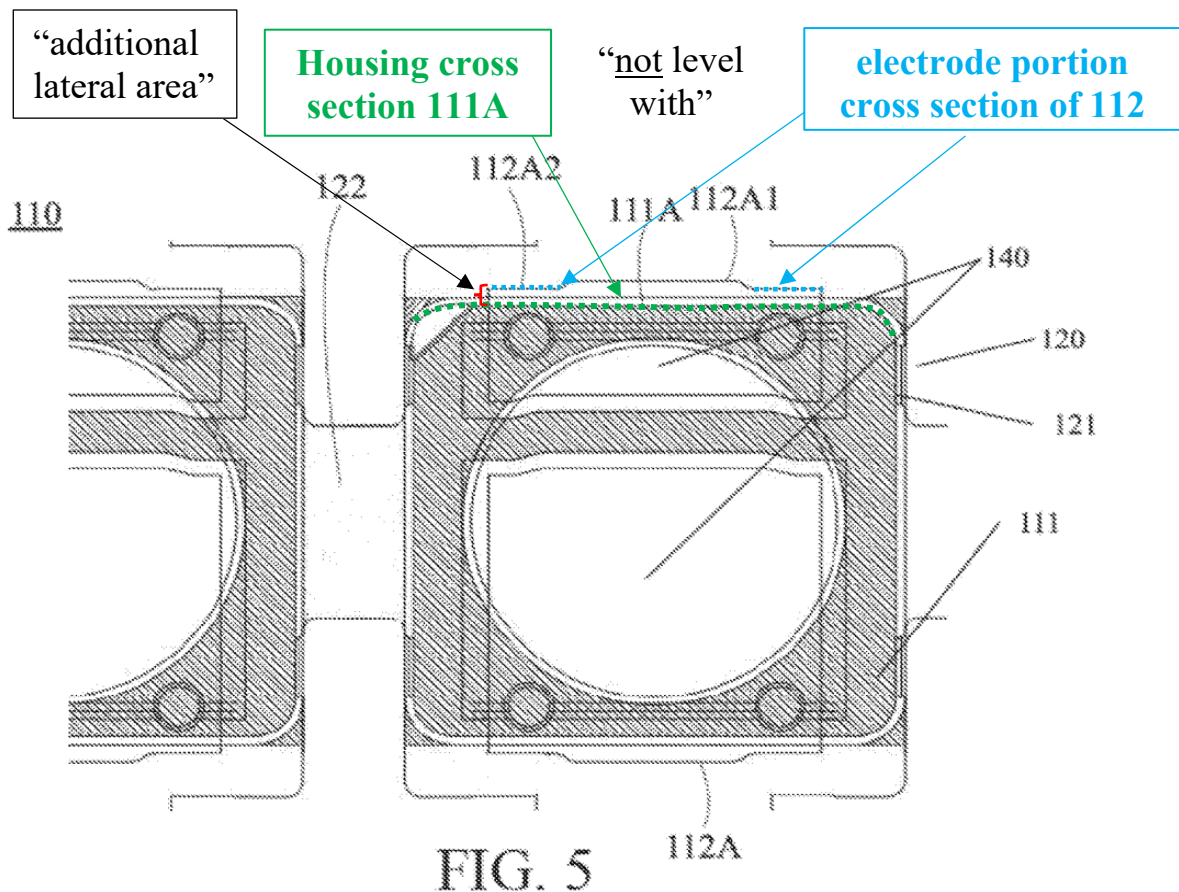
electrode portion” (Ex-1001 at 3:9-10). The carrier 110 of FIG. 1 comprises a housing 111 and two electrode portions 112 having wing portions 112A, which each have a central protruding area 112A1 and two outer edge areas 112A1, 112A2 (Ex-1001 at 3:26-29; 6:40-44). In FIG. 1, “each of the edge areas 112A2 comprises an electrode portion cross section, and the electrode portion cross sections are level with a part of the housing cross section 111A of the housing 111” (Ex-1001 at 6:44-47).



The '733 Patent FIG. 1 (Annotated)

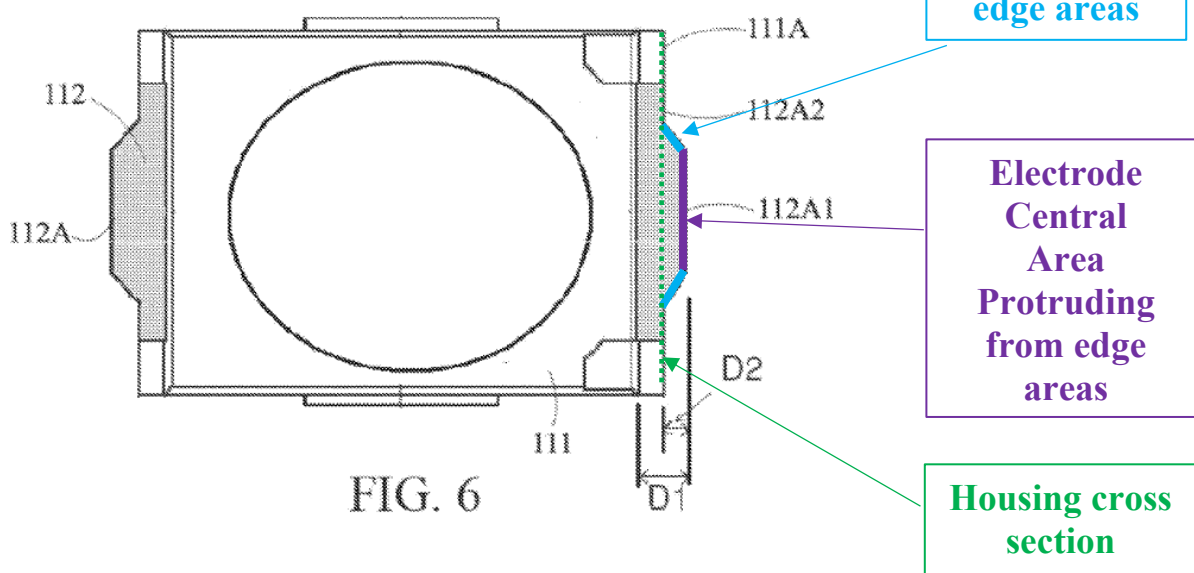
In the embodiment of FIG. 5, “the wing portion 112A of the electrode portion 112 comprises a central protruding area 112A1 and two outer edge areas 112A2” (Ex-1001 at 6:49-53). Regarding FIG. 5, the '733 patent states that the “electrode portion

cross section of the electrode portion 112 is not level with the housing cross section 111A of the housing 111” (Ex-1001 at 6:49-53). According to the ’733 patent, the “additional lateral area” of the “not level” electrode relative to the housing cross sections allegedly “increase[s] the binding force with the solder, so as to increase the component bonding strength of the light emitting devices” (Ex-1001 at 6:54-58). However, the ’733 patent does not identify any electrode cross section in FIG. 5. Examples electrode cross sections that can be drawn are provided for illustration.



The ’733 Patent FIG. 5 (Annotated)

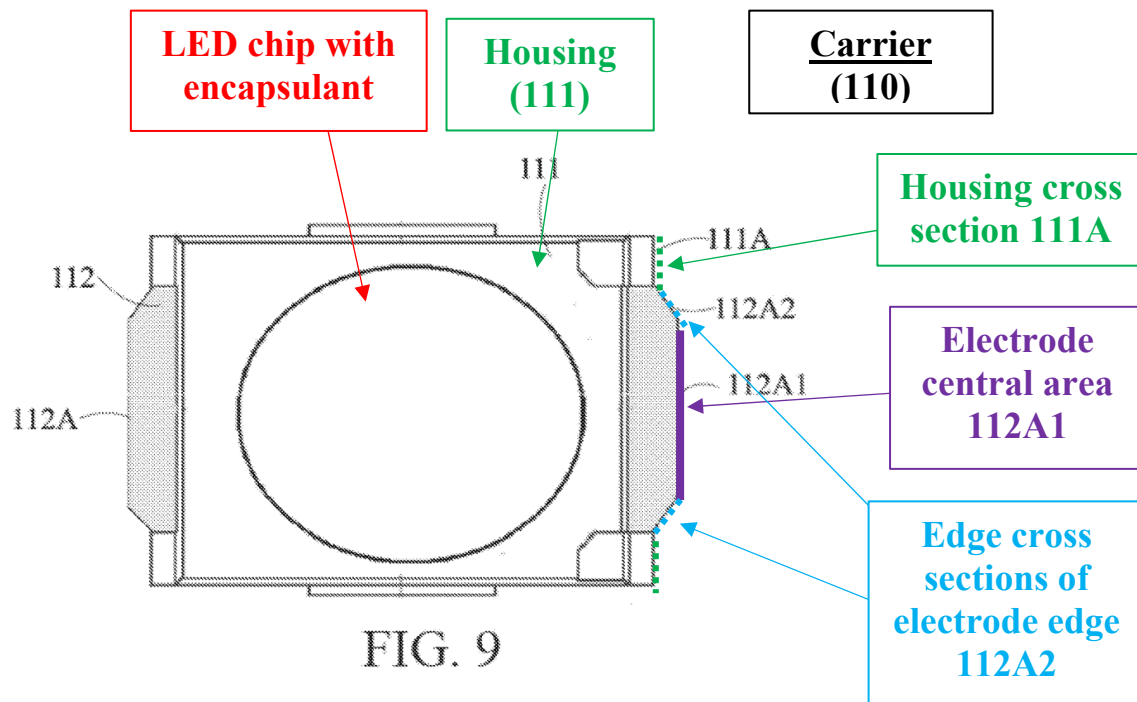
FIG. 6 illustrates another configuration of a carrier 110 having housing 111 and an electrode portion 112 (Ex-1001 at 2:43-44; 8:51-60). Although not identified in FIG. 6 (or any figure), the '733 patent describes that an LED chip is carried within the carrier and covered by an encapsulant, such as epoxy resin (Ex-1001 at 6:17-20). The FIG. 6 configuration has an electrode portion 112 having a central area 112A1 and wing portions 112A that protrude from the housing 111 (Ex-1001 at 8:53-60). FIG. 6's embodiment has a housing cross section 111A (green). The '733 patent does not identify any electrode cross sections for Figure 6.



The '733 Patent FIG. 6 (Annotated)

FIG. 9 of the '733 patent describes another example in which the “edge cross sections” of electrode edge 112A2 are described as “sloping surfaces” and the wing portion 112A is described as not being coplanar with the cross section 111A of

housing 111 (Ex-1001 at 8:43-48).



The '733 Patent FIG. 9 (Annotated)

While other housing/electrode configurations are discussed, none are described as novel or advantageous. Nor is any configuration touted as beneficial over another configuration. As the '733 patent admits, LED packages having a plastic body molded on a metal sheet, an LED that was die bonding to the package, wire bonds for electrically connecting the LED to the electrode, and an encapsulant for encapsulating the LED were all well-known (Ex-1001 at 1:26-47).

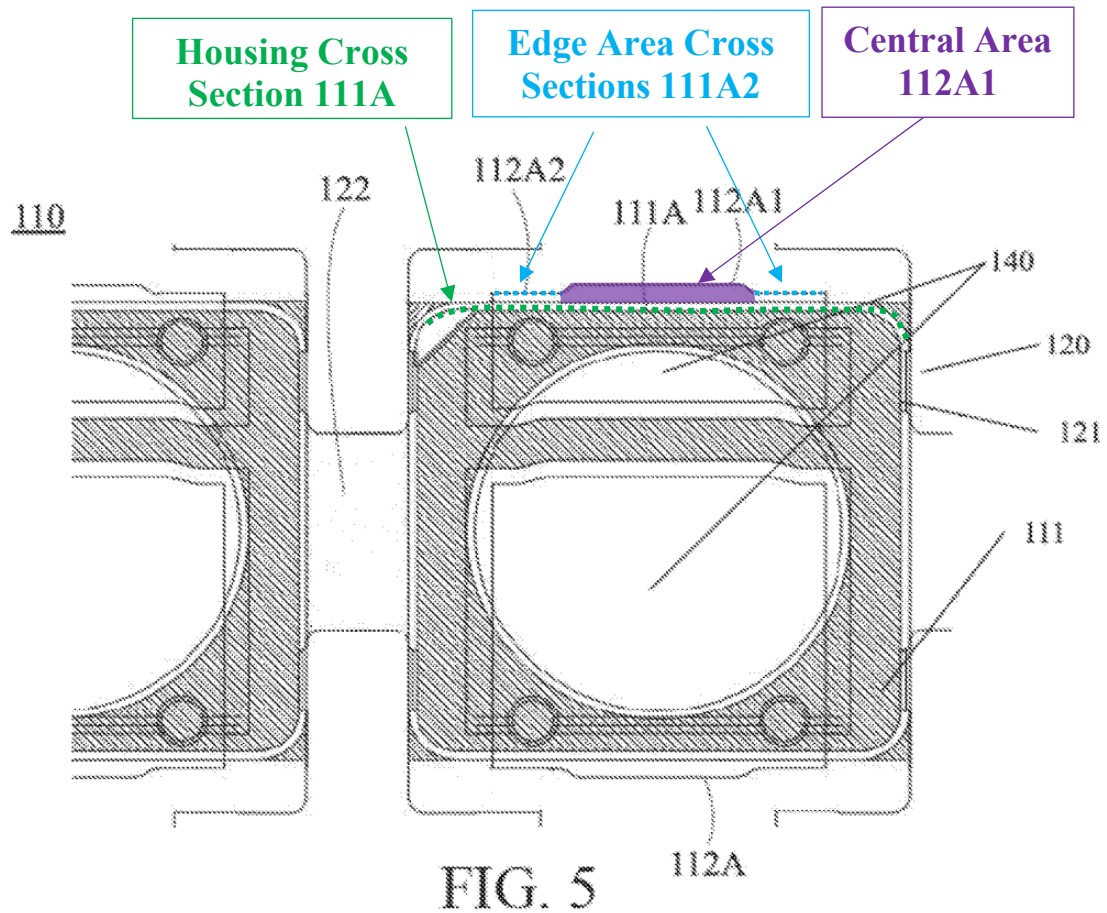
3. Prosecution History

The '733 patent was filed as U.S. App. No. 14/720,230 on May 22, 2015 (Ex-1001 at Cover). A restriction requirement was issued, alleging that the “application contains claims directed to the following patentably distinct species I (Fig. 1), and species II (Fig. 5), species III (Fig. 6), species IV (Fig. 7), Species 5 (Fig. 8), Species 6 (Fig. 9), Species 7 (Fig. 10), Species 8 (Fig. 11), Species 9 (Fig. 12A-D), Species 10 (Figure 13A-16), Species 11 (Fig. 17A-D), Species 12 (Fig. 18A-22)” (Ex-1002 at p. 262). Applicant elected “Species II (Fig. 5) for further examination and prosecution” and filed application claims 11-25 (Ex-1002 at p. 271). Application claims 11 and 15-25 issued as the '733 patent claims 1-12 (Ex-1002 at p. 510).

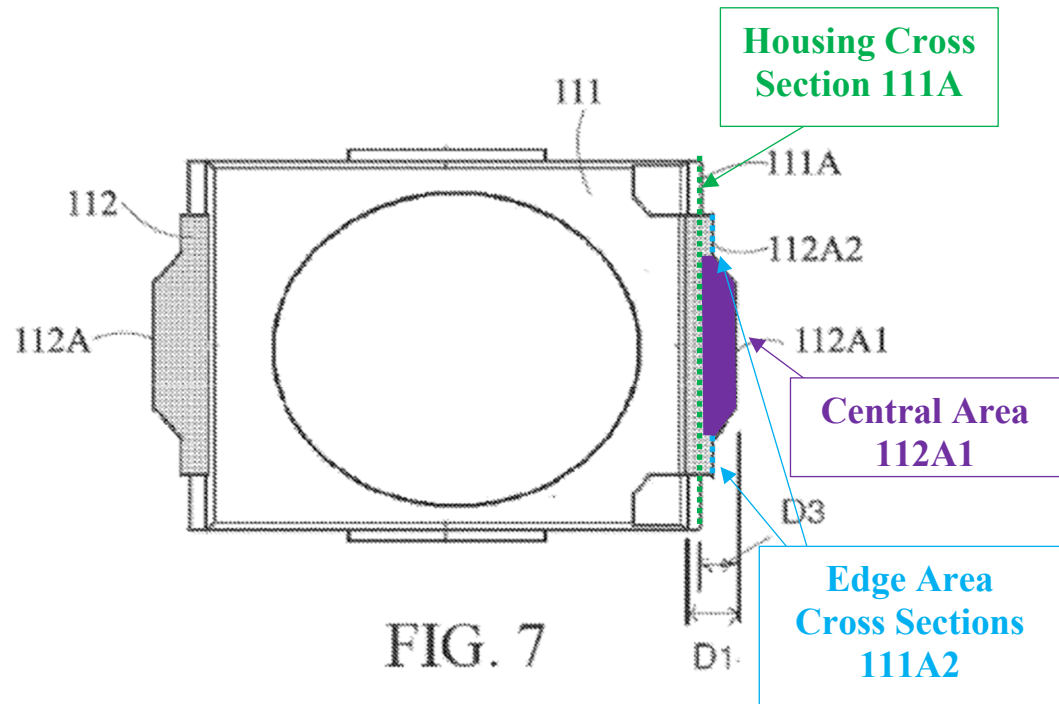
4. The '733 Patent Claims

Claim 1's “light emitting device” has just five structural elements: an “LED chip,” an “encapsulant,” and a “carrier” comprising “at least one electrode portion” and a “housing” (Ex-1001 at 14:6-13). The claims are drawn to the FIG. 5 species where the electrode central area and edge areas protrude from the housing. FIG. 7 is similar to FIG. 5 and is often referred to in this Petition because FIG. 7 provides a clearer illustration. In sum, what the '733 patent attempted to claim as inventive was an electrode extending from a housing, having a central area 112A1 and an edge area 112A2, as shown in FIG. 5, where the central area 112A1 protrudes from edge area

112A2.

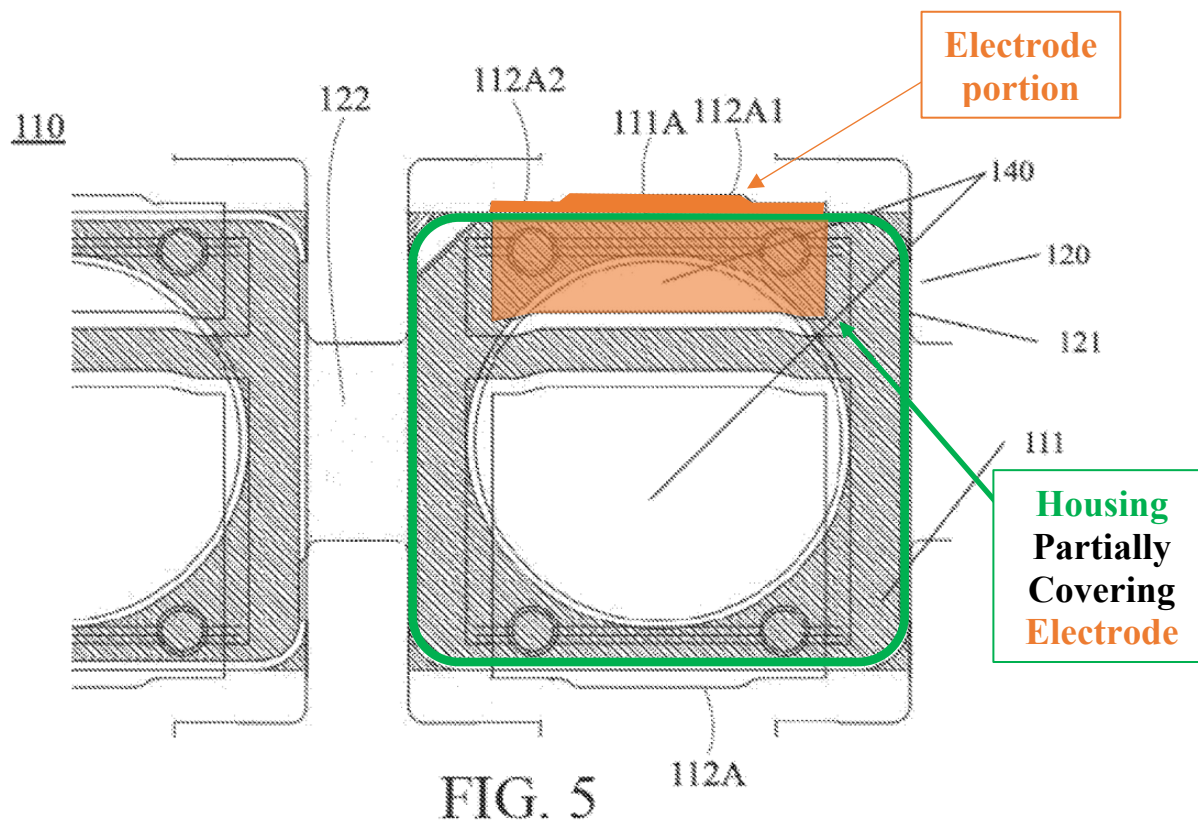


'733 Patent FIG. 5 (Annotated)



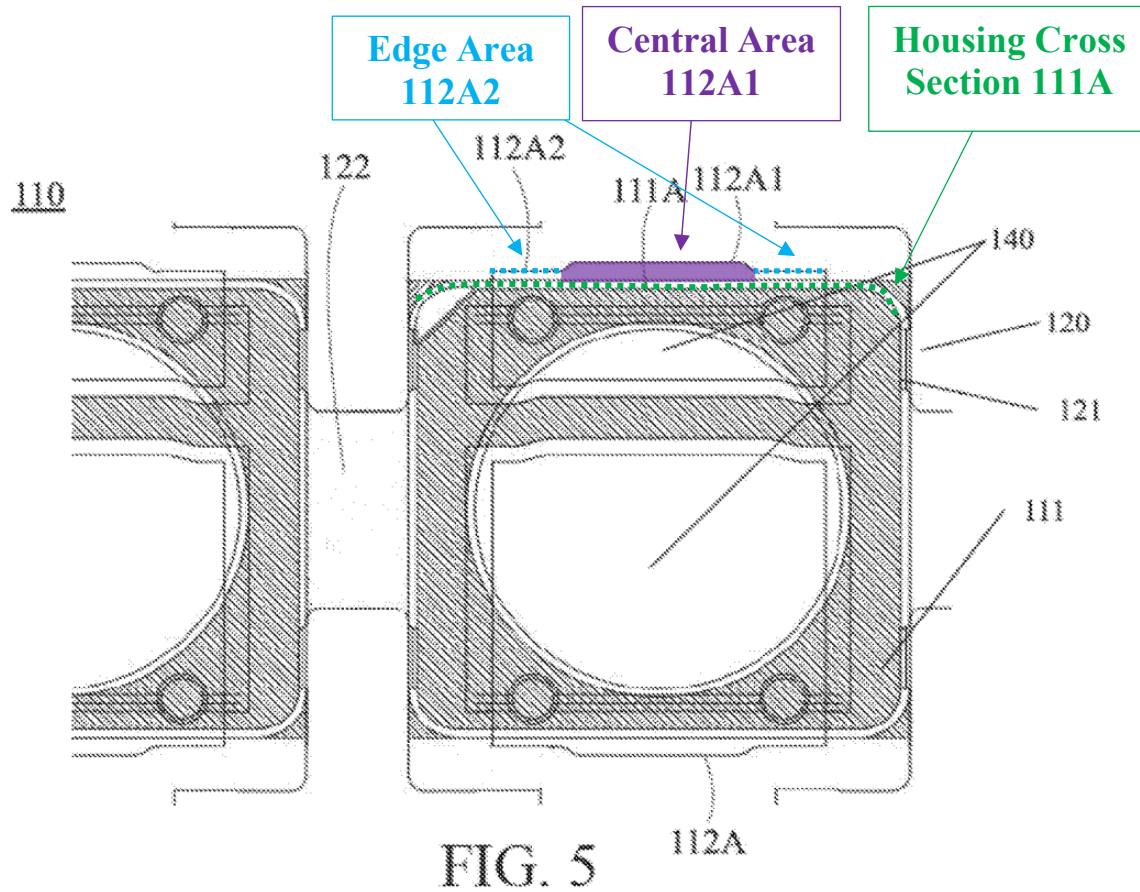
'733 Patent FIG. 7 (Annotated)

Claim 1's limitations relate to the configuration of the claimed "electrode portion" relative to the "housing" and can be described referencing FIG. 5 (Exhibit 1001 at 14:12-20). The claimed "carrier" comprises "at least one electrode portion" (Ex-1001 at 14:8-11) and a "housing," the housing at least partially covering the at least one electrode portion (Ex-1001 at 14:8-13), as shown below in FIG. 5.



The '733 Patent FIG. 5 (Annotated)

Claim 1 requires that the “at least one electrode portion further comprises a central area and two edge areas,” the central area and the two edge areas “protrude from a housing cross section,” the central area “protrudes from the two edge areas,” as shown with reference to FIG. 5, below (Ex-1001 at 14:15-16; 18-20).



The '733 Patent FIG. 5 (Annotated)

Claim 1 states that the electrode portion “comprises at least an electrode portion cross section” (Ex-1001 at 14:8-11), the electrode portion cross section is “located on at least one of the two edge areas” (Ex-1001 at 14:17-18), the housing has a “housing cross section” (Ex-1001 at 14:8-13), and “the housing cross section and the electrode portion cross section are not level with one another” (Ex-1001 at 14:13-15; *See* FIG. 6, below).



112A

VII. PERSON OF ORDINARY SKILL IN THE ART (“POSITA”)

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would have (1) a Bachelor's degree in electrical engineering, physics, or a comparable field of study, and (2) at least three years of professional experience with semiconductor optoelectronic devices and packaging (Ex-1003 at ¶ 33). This description is approximate, and a higher level of education or skill might make up for less experience, and additional experience could make up for a lower education level (for example, an M.S. in any of the above fields and two years of practical experience would qualify one as a POSITA) (*Id.*).

VIII. NO BASIS EXISTS FOR DISCRETIONARY DENIAL UNDER §§ 314(A) AND 325(D)

Each factor regularly considered under § 314(a) weighs in favor of institution or is neutral. *General Plastics* does not apply, as this is the only IPR filed against the '733 patent, so the Board can satisfy the requirements of 35 U.S.C. § 316(a)(11). *General Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 (PTAB Sept. 6, 2017) (precedential: §II.B.4.i).

Factors considered under § 314(a) related to parallel district court litigations weigh in favor of institution. Each factor set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (March 20, 2020) (precedential) are addressed below:

1. **District Court Stay:** Favors Institution. On May 29, 2024, the parties mutually agree to request a temporary one month stay in the IKEA-Everlight litigation, and such a stay favors institution. *Apple Inc. v.*

Fintiv, Inc., IPR2020-00019, Paper 15 at 12 (PTAB May 13, 2020).

2. **Proximity of Trial Date:** Favors Institution. Jury selection/trial has been scheduled for November 10, 2025 in the IKEA-Everlight Litigation (Ex-1015), which is close to the projected statutory deadline for this IPR. It is unlikely that Court would hold the trial if this IPR is instituted and a final written decision is imminent. A motion to move the trial date is likely if this IPR is instituted, particularly in view of the requested stay. Further, given that the claims of the '733 patent were found indefinite (Ex-1016 at 2-3), it is unlikely that the claims of the '733 patent will be litigated at any upcoming trial.
3. **Investment in Parallel Proceedings:** Favors Institution. Although the IKEA-Everlight Litigation was filed in July 2023, due to jurisdictional disputes and related briefing, a schedule was not set until March 6, 2024 (Ex-1015). The only scheduled dates that have passed are initial contention disclosures and identification of claim terms for construction (Ex-1015). Other than an initial identification of claim terms, claim construction has not yet begun, fact discovery is not open (and does not open until after the claim construction hearing, which has not been scheduled), and does not close until April 2025. Expert discovery is

from May to June 2025. Based on the initial nature of the litigation, this factor favors institution.

4. **Overlap in Issues:** Favors Institution. The grounds raised here are only a subset of the grounds being raised in the IKEA-Everlight litigation. Additionally, claim 7 is challenged here but is not asserted in the IKEA-Everlight litigation. Further, given that the claims of the '733 patent were found indefinite (Ex-1016 at 2-3), it is unlikely that prior art validity of the '733 patent will be litigated at any upcoming trial.
5. **Same Party:** Favors Institution. ISAG is not a party to any of the pending litigations involving the '733 patent, though ISAG has contractual relations with IKEA companies in the IKEA-Everlight Litigation.
6. **Other Circumstances:** Favors Institution. This Petition is strong on the merits in establishing the unpatentability of the claims. The factors considered for discretionary denial weigh in favor of the Board declining to exercise its discretion to deny institution.

Factors considered under § 325(d) relate to whether the same or substantially the same art was previously considered weigh in favor of institution. For example, each of Kishikawa, Nakashima, and Kuramoto form the basis of lack of novelty

grounds, and none of these references was considered by the Examiner (*See* Ex-1001 at References Cited; Ex-1002), which favors institution. *Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH*, IPR2019-01469, Paper 6 (PTAB. Feb. 13, 2020) (precedential).

IX. OVERVIEW OF PRIOR ART

As Dr. Lebby describes, the '733 patent did not invent electrodes extending from a housing, electrodes having a central area and two edge areas that protrude from a housing, a central electrode area protruding from edge areas, sloped edge areas, nor rounded housing corners (Ex-1003 at §§ 6.1-6.3). Also, because cross-sections can be taken of any structure, the '733 patent did not invent electrode nor housing cross sections (Ex-1003 at ¶ 130). Rather, the “cross-section” language of the claims of the '733 patent is nothing more than obtuse language used to describe a well-known LED structure, as illustrated by the figures of the '733 patent compared to the prior art. What the '733 patent attempted to claim – an electrode protruding from a housing, having a central area 112A1 and an edge area 112A2, where the central area 112A1 protrudes from an edge area 112A2 – was well-known in the art.

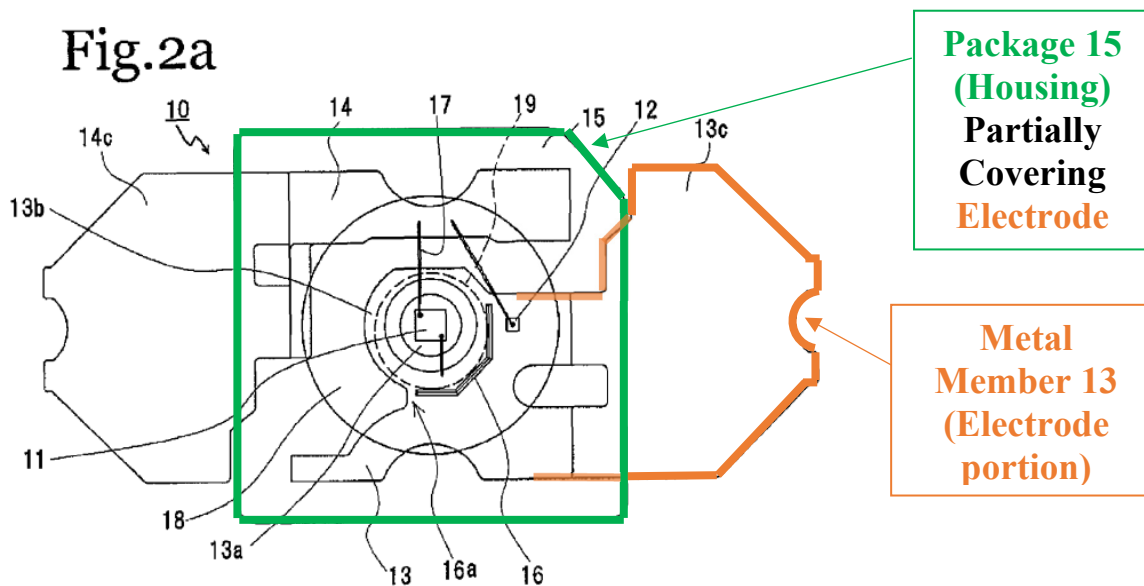
While the structure was well-known, the '733 patent claims do not precisely define where to take the cross sections and where the edge and central areas start and stop. By claiming the structures in such a broad and unrestricted manner, it is hardly

surprising that the claims read on the prior art.

A. Kishikawa

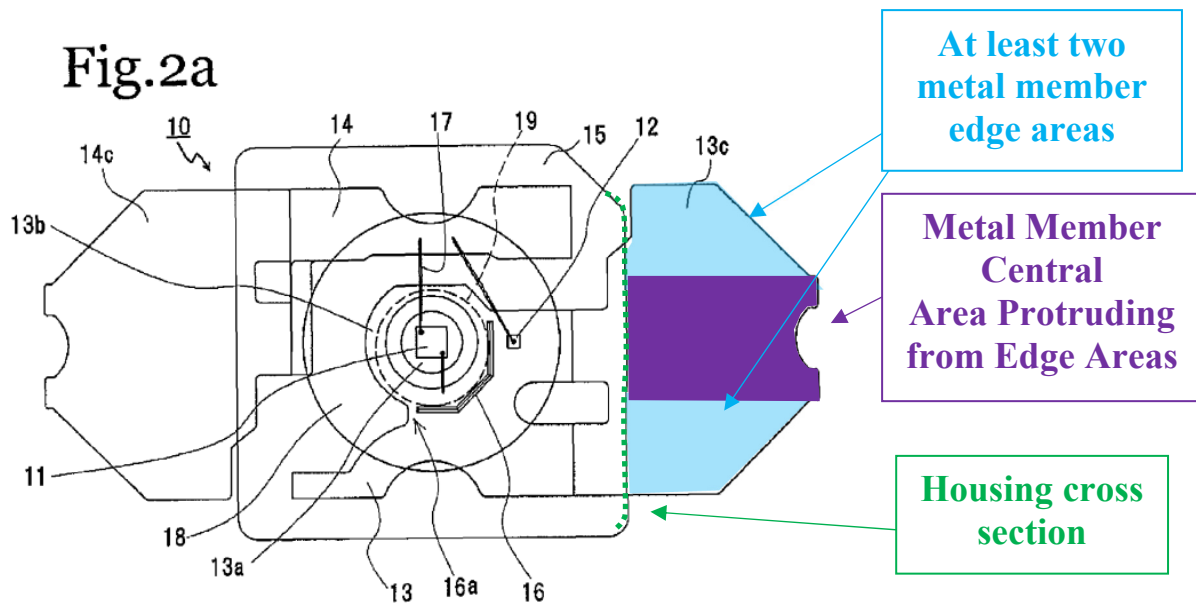
Kishikawa is a U.S. Patent entitled “Light Emitting Device” that was filed on August 6, 2007, and published on August 10, 2010 (Ex-1004 at Cover). Kishikawa is prior art under 35 U.S.C. §§ 102(a)(1) and (a)(2).

Kishikawa discloses a light emitting device with a light emitting element or LED chip mounted on a metal member embedded in a package (Ex-1004 at Abstract; 2:33-41). The package is a housing that insulates and partially covers the metal member and light emitting element(s) (Ex-1004 at 8:13-17; 9:14-19; FIG. 2a). The metal member is “electrically connected to the light emitting element” and “has the function of a lead electrode” (Ex-1004 at 3:16-18). A “translucent covering material” encapsulates the light emitting element and “protects the light emitting element against external force, moisture, and so forth, and also protects the wiring” (Ex-1004 at 7:15-17).



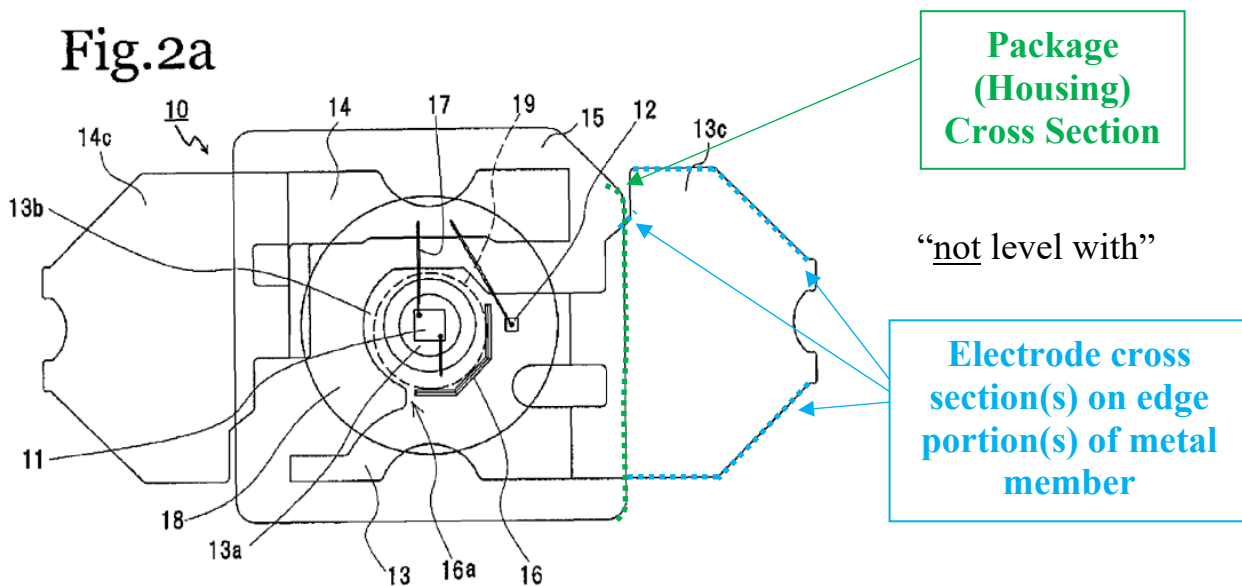
Kishikawa FIG. 2a (Annotated)

The metal members of Kishikawa comprise a central area and two edge areas (See Ex-1004 at 9:36-46; FIG. 1, 2a, and 2b). The central area and the two edge areas of the first and second metal members protrude from a housing cross section of the package and the central area protrudes from the two edge areas (Ex-1004 at FIG. 1, 2a, and 2b).



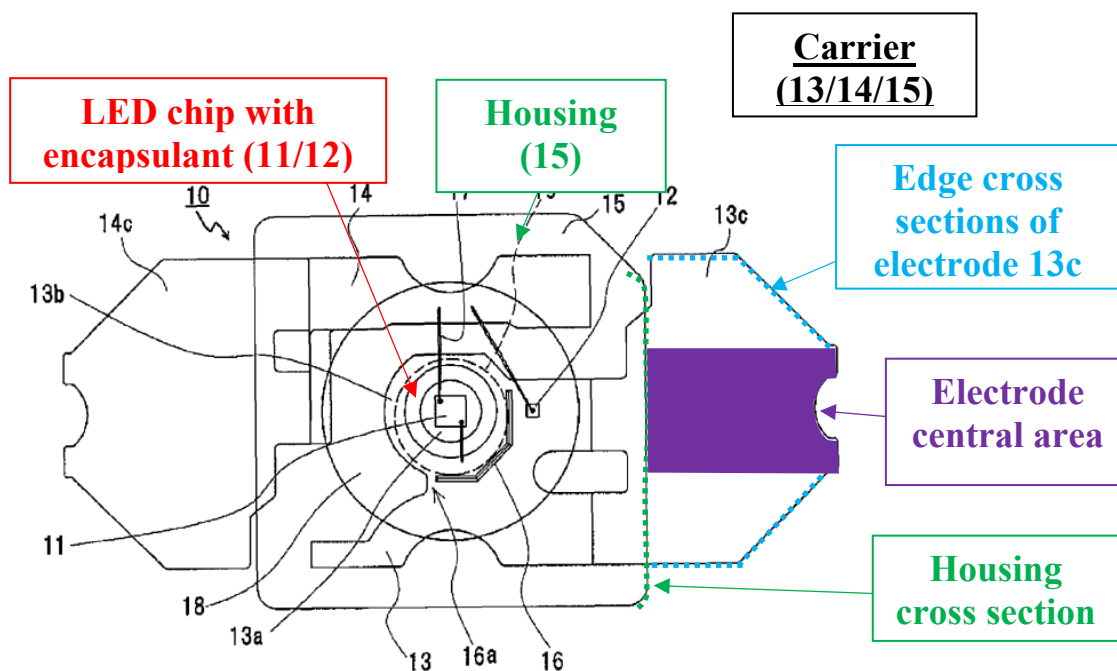
Kishikawa FIG. 2a (Annotated)

Kishikawa's metal member 13 has electrode portion cross sections located on at least one of the two edge areas and Kishikawa's housing has a housing cross section (Ex-1004 at FIG. 1, 2a, and 2b). As shown in FIG. 2a below, Kishikawa discloses that a "housing cross section" of package 15 is not level with one of the multiple cross sections that can be defined on the metal member's edge areas.



Kishikawa FIG. 2a (Annotated)

Claim 1 of the '733 patent is identical to, and anticipated by, the structure disclosed in at least Kishikawa's FIG. 1/2a/2b (Example 1) (Ex-1004 at 9:12-10:11).



Kishikawa FIG. 2a (Annotated)

B. Nakashima

Nakashima is a U.S. patent entitled “Molded package and semiconductor device using molded package,” filed March 3, 2006 and published December 9, 2008 (Ex-1005 at Cover). Nakashima is prior art under 35 U.S.C. §§ 102(a)(1) and (a)(2).

Nakashima discloses a molded package 100 (“carrier”) (FIGS. 1 & 2) comprising a metal member, such as a lead electrode (electrode), which supplies electric power to a semiconductor element incorporated into the mold member (housing) (Ex-1005 at Abstract; 9:2-8; 9:52-57). “[M]etal member 102 is the positive electrode,” and “metal member 103 is the negative electrode” (Ex-1005 at 9:3-5). The metal members 102, 103 (“electrodes”) are inserted into and protrude from the sides of mold member 105, which is a housing for light emitting element/LED chip 108 (Ex-1008 at 9:6-7; 31:28-30). Molded package 100 (*e.g.*, carrier) includes a mold member 105 (*i.e.*, housing) partially covering metal members 102, 103 (*i.e.*, electrodes) (Ex-1005 at 6:62-65; 7:3-4).

“[T]he light emitting element 108 is mounted in the recess and enclosed by a first encapsulating member 111” (Ex-1005 at 10:5-7). The first encapsulating member “enclose[es] the semiconductor components housed in the molded package” in a transparent resin and may include fluorescent material and/or a diffusing agents (Ex-1005 at 16:16-26).

FIG. 2

Mold Member 105 (Housing)

Metal Members 102, 103 (Electrode portion)

200

104

102a

102b

105

130

120

101

III

106c

108

109

107

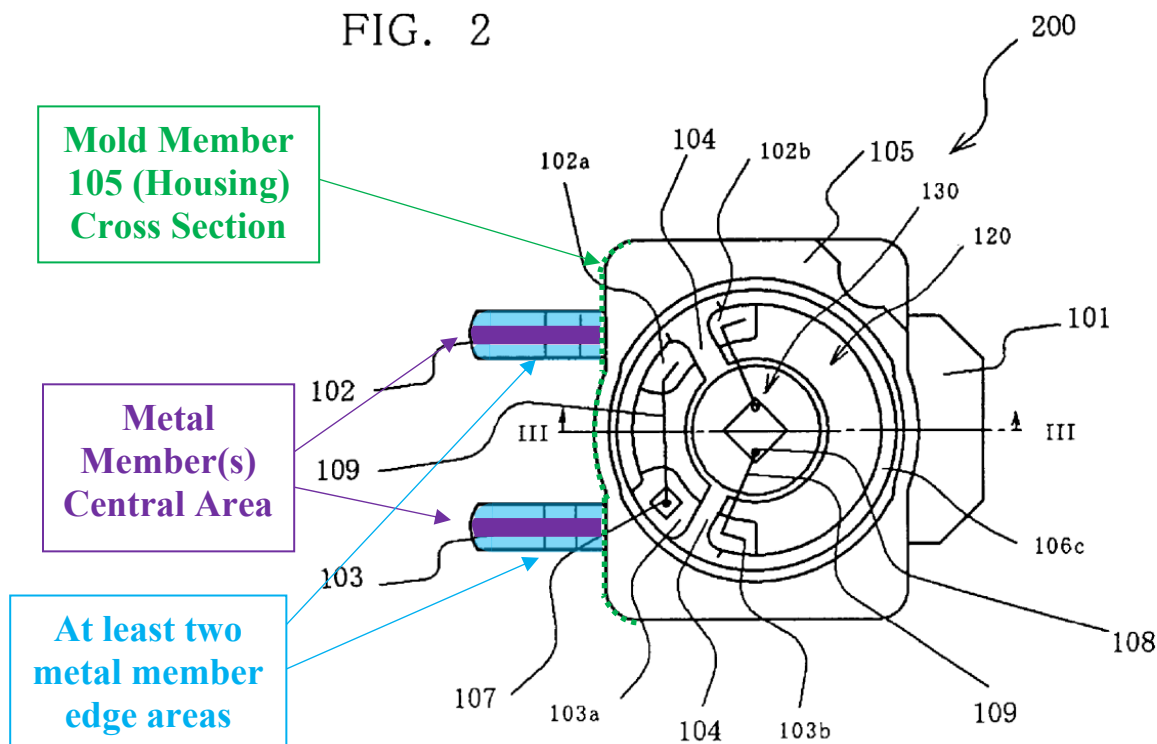
103a

104

103b

Nakashima FIG. 2 (Annotated)

Nakashima's metal members 102, 103 further comprise a central area and two edge areas (*See* Ex-1005 at 11:33-41; FIG. 1-4). The electrodes/metal members protrude from a molded package cross-section with "a gull-wing shape" but Nakashima notes that "the structure of the contact terminal portion according to the present invention is not limited to a gull-wing type and it may be made to have other structures" (Ex-1005 at 11:39-41).

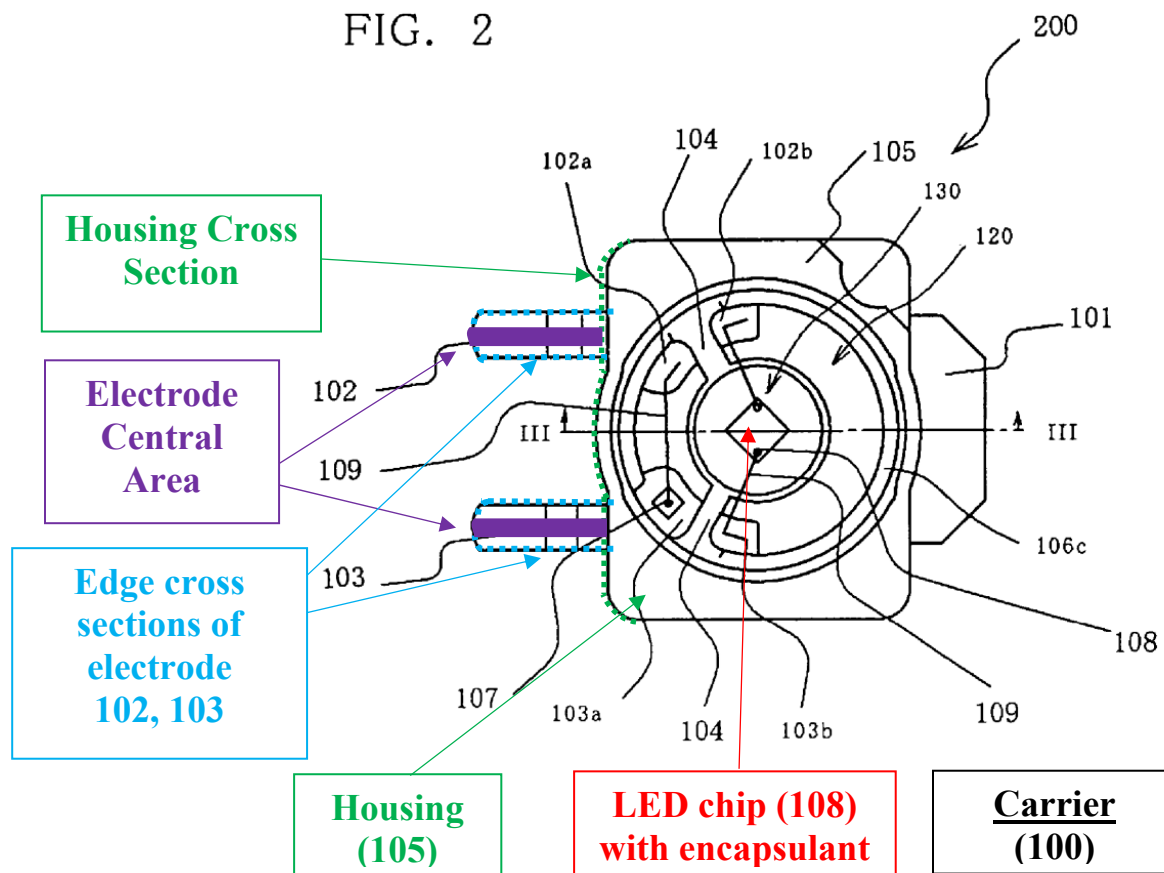


Nakashima FIG. 2 (Annotated)

The electrode portion cross section on the metal member(s) is located on at least one of the two edge areas (Ex-1005 at FIG. 1-4). Under any possible meaning of the term “not level,” the mold member 105’s “housing cross section” is not level with the electrode cross section defined on the edge areas of the metal members 102, 103.



The claimed structure claim 1 of the '733 patent is identical to and anticipated by the structure disclosed in at least FIG. 1-4 (Embodiment 1) of Nakashima (Ex-1005 at 5:65-7:67).



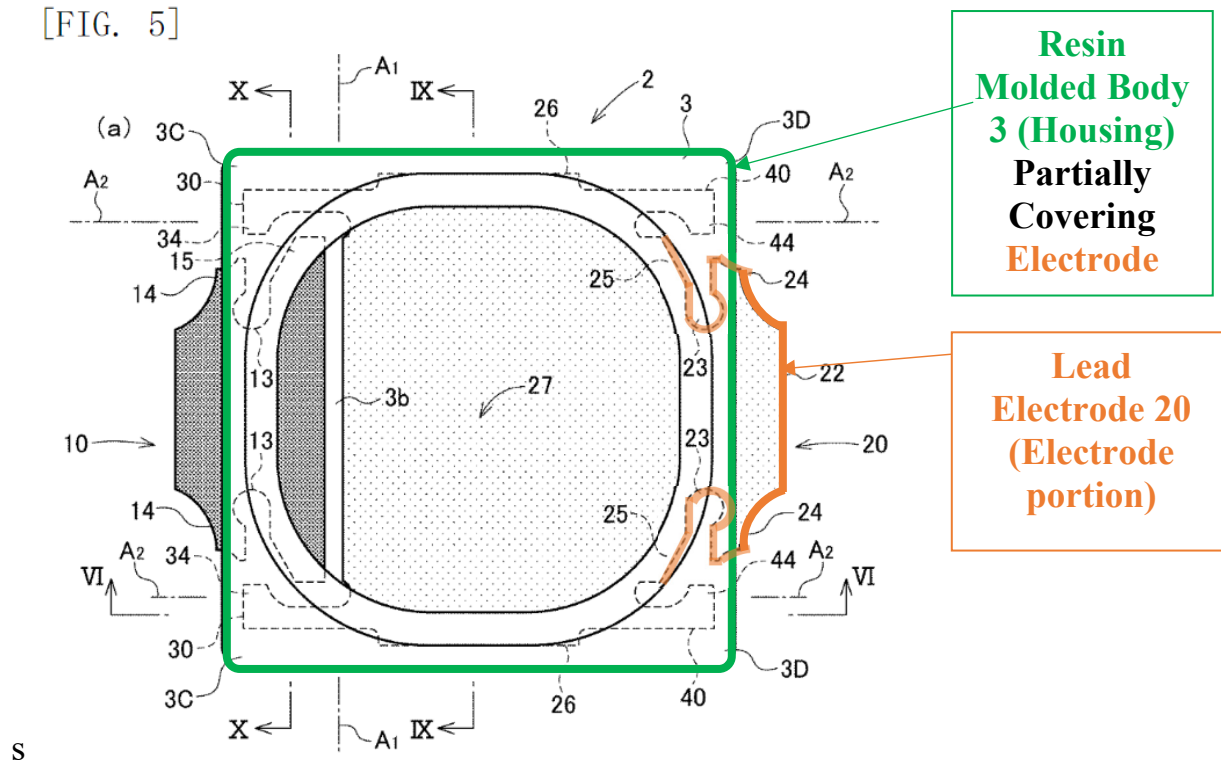
C. Umeda

Umeda (Ex-1006) is a Japanese patent publication entitled “Package for Light Emitting Device and Light Emitting Device,” and a certified English translation of Umeda is Ex-1007. Umeda was filed on August 23, 2012 and published on March 6, 2014 (Ex-1007 at Cover). Umeda is prior art under 35 U.S.C. §§ 102(a)(1).

Umeda discloses a package for a light emitting device (Ex-1007 at [0015]). The package is a carrier that includes a resin molded body (housing) that is integrated

with a pair of lead electrodes (*Id.*). The resin molded body houses the light emitting element in a central “cup portion” (*Id.*), and the light emitting element is an “LED element” (Ex-1007 at [0001]). Umeda’s package 2 is a carrier that includes a resin molded body 3 (housing) partially covering first and second lead electrodes 10 and 20 such that “a front edge 22” of the electrode 20 “protrud[es] from the resin molded body 3” (Ex-1007 at [0039]) while “recessed portions” 13 and 23 of the electrodes are covered by resin molded body 3 (Ex-1007 at [0040], [0042]).

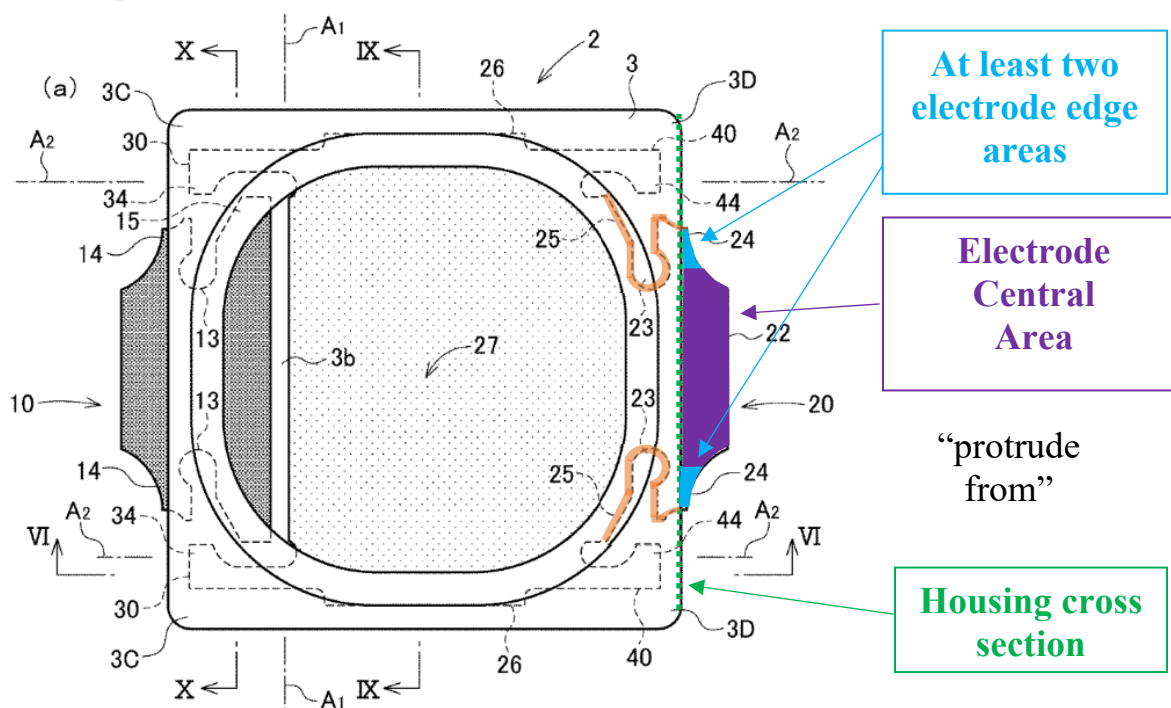
[FIG. 5]



Umeda FIG. 5a (Annotated)

The lead electrodes of Umeda comprise a central area (*e.g.*, front edges 12, 22) and two edge areas (*e.g.*, first side edges 14, 24) (Ex-1007 at [0041]-[0042]; FIGs. 5a

[FIG. 5]



Umeda FIG. 5a (Annotated)

33

(a)

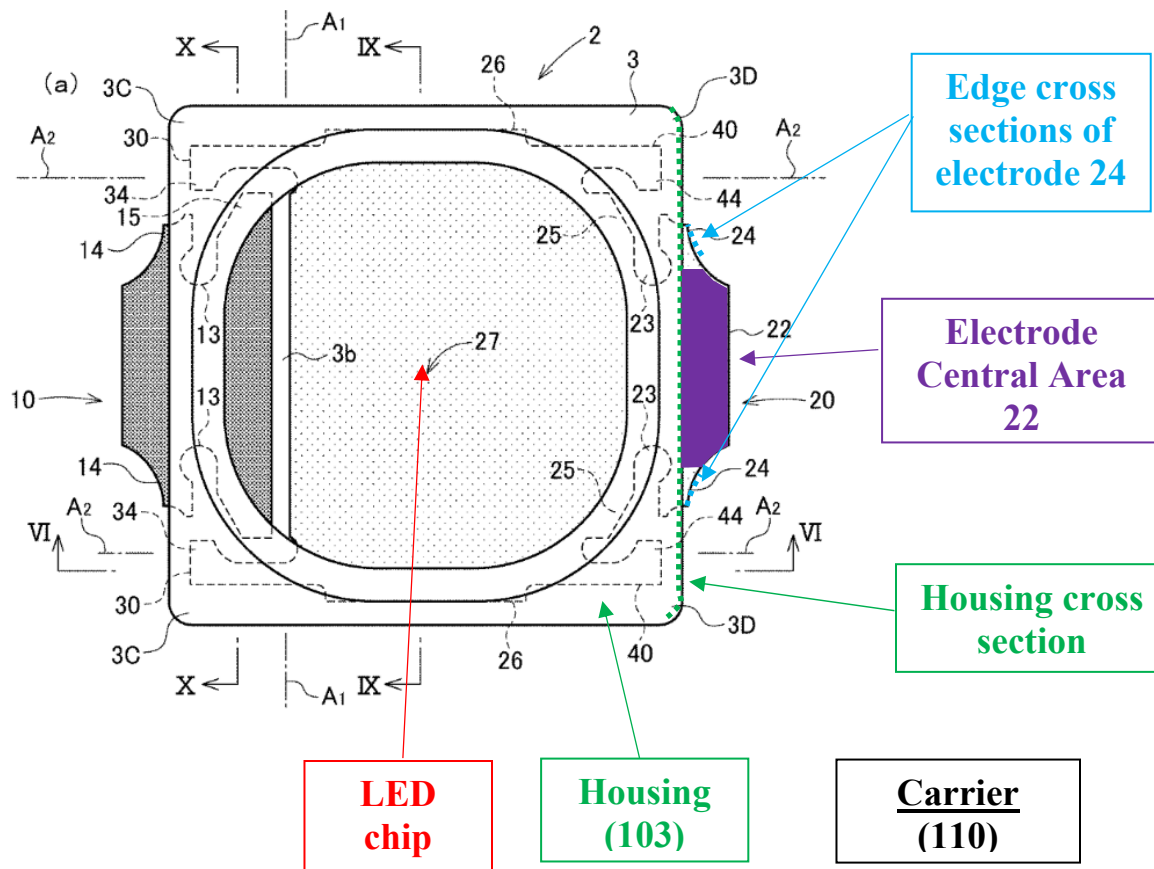
Housing Cross Section

“not level with”

Electrode cross section(s) on edge portion(s) 24 of lead electrode(s)

Although Umeda does not explicitly disclose that its light emitting element 4 (*e.g.*, LED element) is covered by “an encapsulant,” using an encapsulant to cover an LED chip was well-known in the art in 2014 to both protect the LED chip, shape light, and introduce phosphors that could be used to change the color of the emitted light (Ex-1003 at § 6.3; Ex-1007 at [0038]-[0046]).

[FIG. 5]



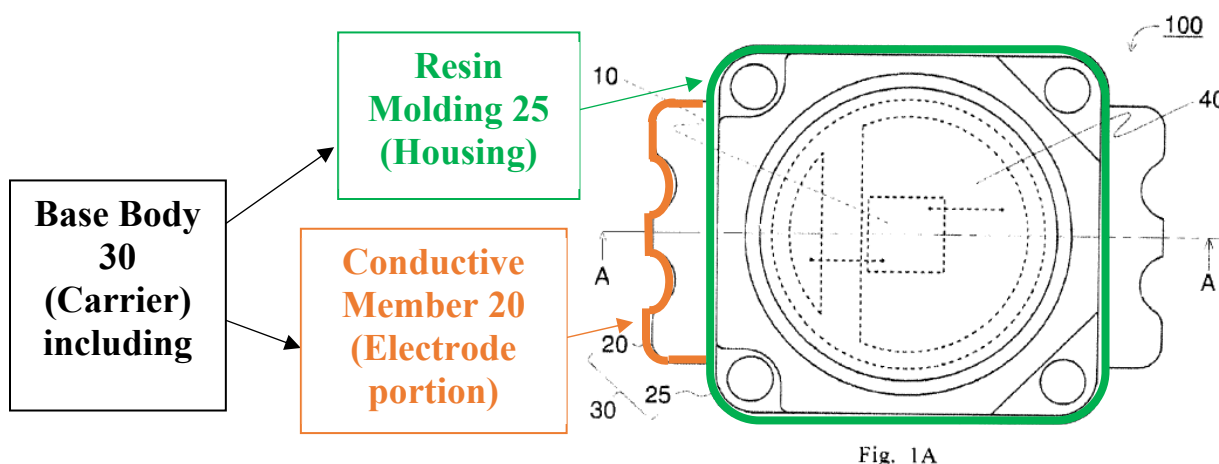
Umeda FIG. 5a (Annotated)

D. Kuramoto

Kuramoto is a U.S. Patent Publication entitled “Light emitting device and method for manufacturing the same,” which is the national phase application of PCT/JP2012/062418 with an international filing date of May 15, 2012, and priority claims to Japanese Patent Applications 2011-109134 and 2011-163510 on May 16, 2011 and July 26, 2011, respectively (Ex-1008 at Cover). Kuramoto published on May 8, 2014 (*Id.*). Kuramoto is prior art under 35 U.S.C. §§ 102(a)(1) and (a)(2).

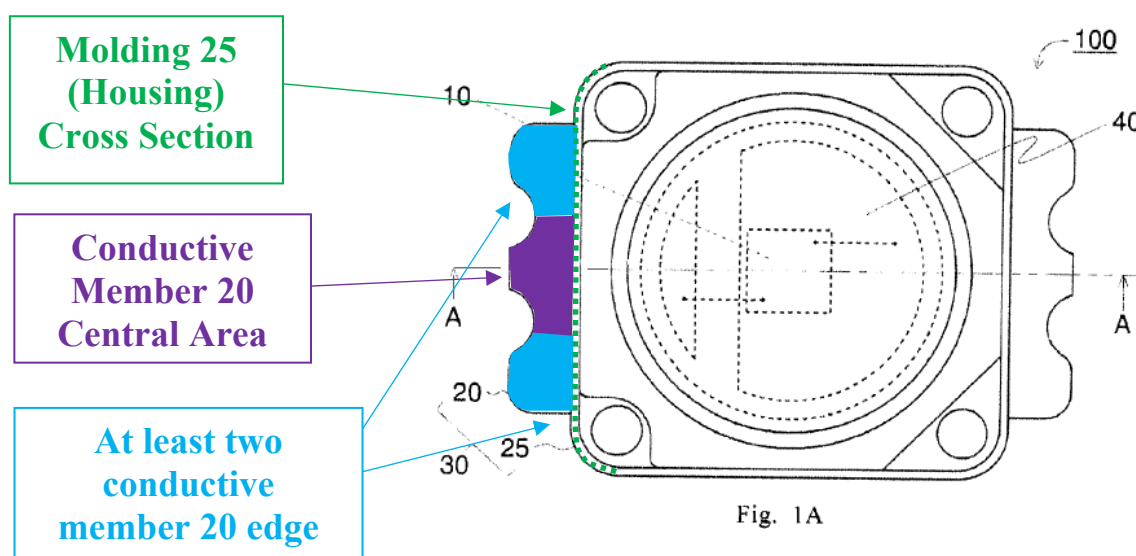
Kuramoto discloses a light emitting device having a base body 30 that “is a package including the conductive member 20 that is composed of a pair of positive and negative lead frames” and a “resin molding 25 that [] integrally holds the conductive member” (Ex-1008 at [0044]). The light emitting element 10 “is an LED chip that is pasted on the bottom surface of the recess 31 of the base body ... and is connected to the conductive member 20 by wires” (*Id.*). A sealing member 40 (encapsulant) “is provided to cover the light emitting element 10 inside the recess 31 of the base body” and “may contain a phosphor or a diffuser” (*Id.*).

FIGs. 1A and 1B of Kuramoto, which are top views and cross-sectional views of the light emitting device (Ex-1008 at [0029]), illustrate the same structures claimed in the '733 patent. The base body 30 is a package (carrier) including a resin molding 25 (housing) with integrally formed conductive member 20 (electrodes) that protrudes from the resin molding (Ex-1008 at [0043]).



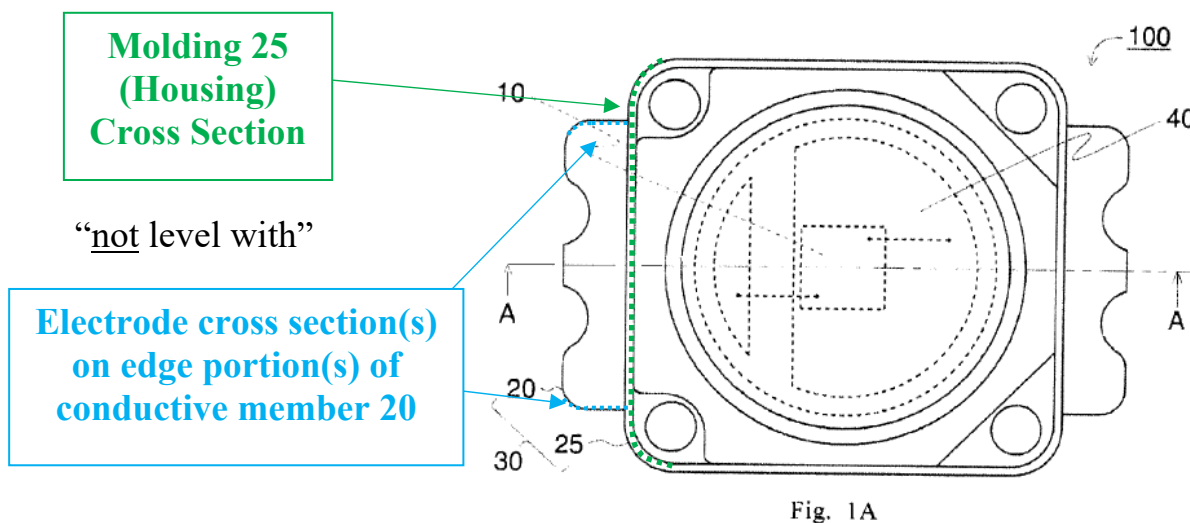
Kuramoto FIG. 1A (Annotated)

Conductive member 20 comprises a central area and two edge areas protruding from molding 25 and a molding cross-section (Ex-1008 at FIG. 1A). Kuramoto discloses several examples of shapes for the protruding portions of the conductive member 20, but they each include a central area and two edges areas (*See e.g.*, Ex-1008 at FIGs. 1A, 4A, 6A).



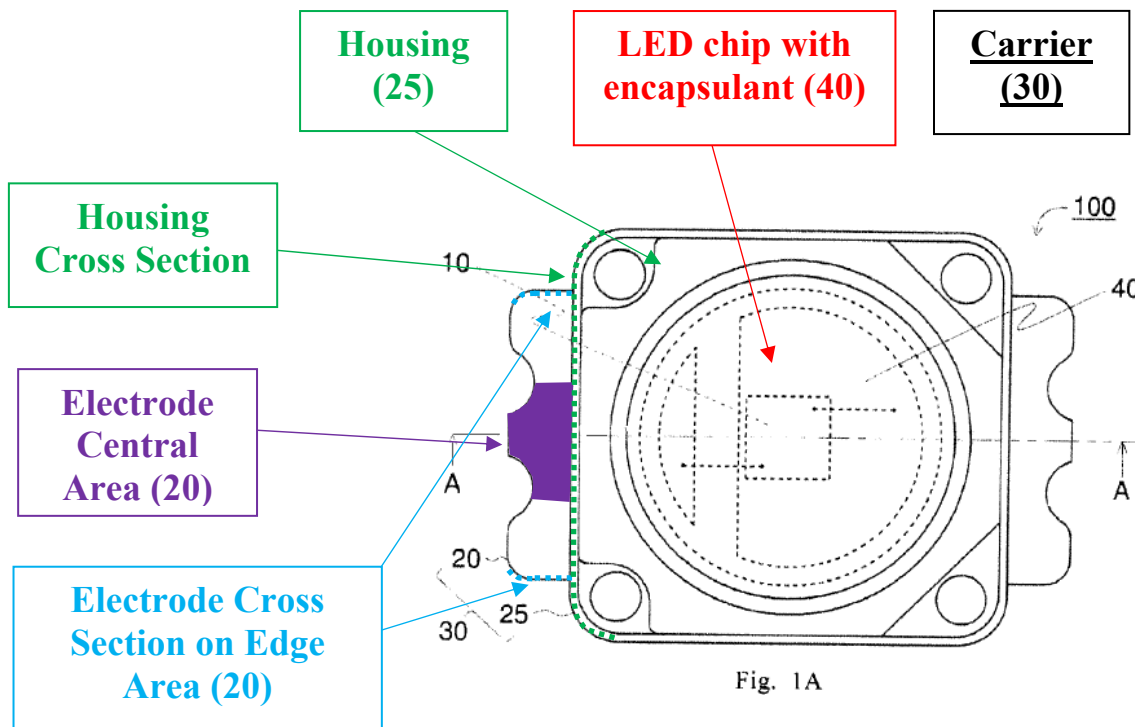
Kuramoto FIG. 1 (Annotated)

The conductive member 20 has an electrode cross section on at least one of the two edge areas (Ex-1008 at FIG. 1A). Under any possible meaning of the term “not level,” the “housing cross section” of resin mold 25 is not level with electrode cross defined on the edge areas of the conductive member 20.



Kuramoto FIG. 1a (Annotated)

The claimed structure of the '733 patent is identical to and anticipated by the structure in at least Embodiment 1 of Kuramoto (*See* Ex-1008 at [0043]-[0068]).

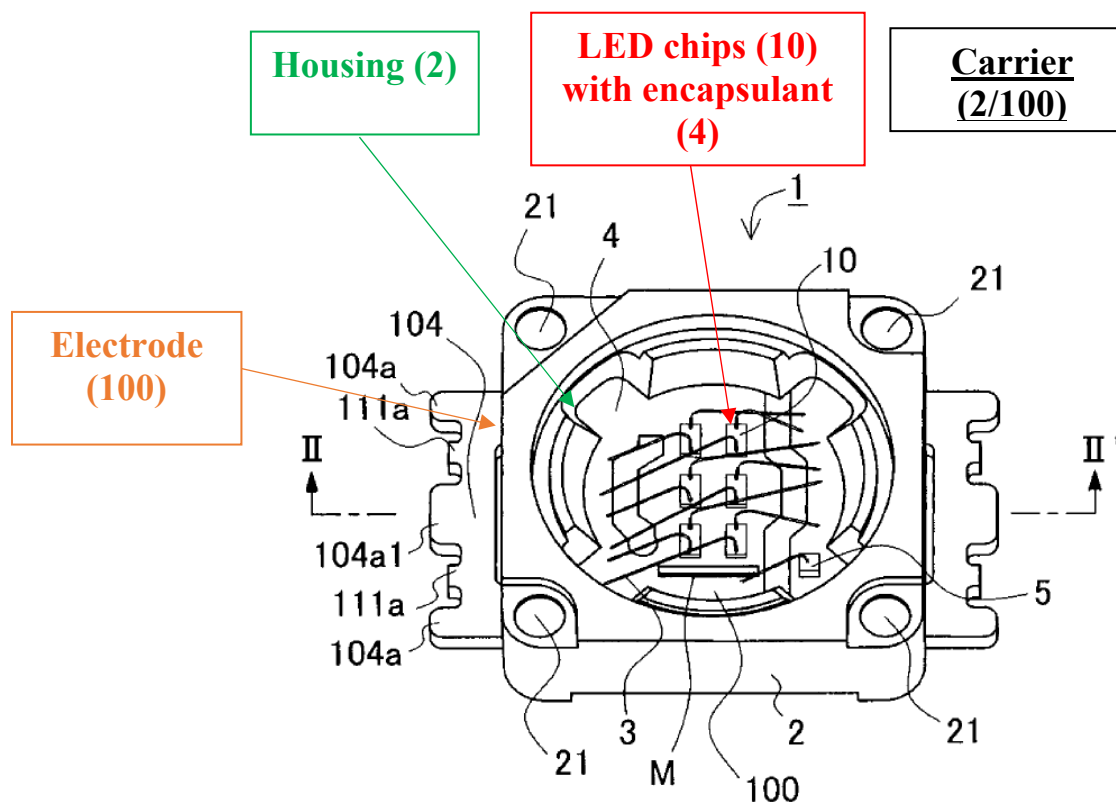


Kuramoto FIG. 1 (Annotated)

E. Bando

Bando is a U.S. patent entitled “Semiconductor Light Emitting Device and Method for Producing the Same,” filed on December 27, 2006 and published on May 18, 2010 (Ex-1009 at Cover). Bando is prior art under 35 U.S.C. § 102(a)(1) and (a)(2).

Bando discloses a light emitting device 1 with package 2 (housing) with lead arrangement 100 (electrodes) with a plurality of mounted light emitting elements 10 (LED chips) encapsulated by a sealing resin 4 (encapsulant) (Ex-1009 at 8:17-24).



Bando FIG. 1 (Annotated)

Bando teaches that “in order to prevent corrosion of metal ... a noble metal such as silver, gold, palladium and rhodium is plated on the other parts of the lead arrangement” (Ex-1009 at 10:44-46). The plated the electrode 100 “is less prone to be oxidized by air, and thus is prevented from corrosion of metal” and “has good wettability, and thus can provide electrical adhesiveness between the lead arrangement 100 and a separate mount body with solder” (Ex-1009 at 19:3-8). “After silver is plated, the lead connection portions 111 are cut off. As a result, silver is not plated on the lead cut surfaces 111 b as cut surfaces of the lead connection portions

111” (Ex-1009 at 8-11). Thus, Bando teaches the antioxidant of claim 7.

F. Other Background Prior Art

Other background art includes Takada (Ex-1012), Chikugawa (Ex-1017), Carey (Ex-1018), Bogner (Ex-1019), Tanda (Ex-1020), Abe (Ex-1021), Seo (Ex-2011), and Bierhuizen (Ex-1022). Takada is prior art to the ’733 patent under 35 U.S.C. §§ 102(a)(1) and 102(a)(2). Chikugawa is prior art to the ’733 patent under 35 U.S.C. §§ 102(a)(1) and 102(a)(2). Carey is prior art to the ’733 patent under 35 U.S.C. §§ 102(a)(1) and (a)(2). Bogner is prior art to the ’733 patent under 35 U.S.C. §§ 102(a)(1) and (a)(2). Bogner is prior art to the ’733 patent under 35 U.S.C. §§ 102(a)(1) and (a)(2). Abe is prior art to the ’733 patent under 35 U.S.C. §§ 102(a)(1) and (a)(2). Seo is prior art under 35 U.S.C. § 102(a)(1) and (a)(2). And Bierhuizen is prior art to the ‘733 patent under 35 U.S.C. §§ 102(a)(1) and (a)(2). As Dr. Lebby explains in further detail, this other background art is informative as to what would be well-known to a POSITA in 2014 (Ex-1003 at § 6).

Takada discloses prior art techniques for dicing a leadframe (*See* Ex-1003 at § 6.6.1). Chikugawa discloses prior art LED packaging having a carrier housing, with protruding electrodes (*See* Ex-1003 at §§ 6.2.1 and 6.3.1). Carey illustrates an LED carried in a carrier housing with protruding electrodes and an encapsulant covering the LED (*See* Ex-1003 at §§ 6.2.2; 6.3.2; 6.4.1). Bogner describes a prior art LED carried in a carrier housing with protruding electrodes and an encapsulant

covering the LED (*See* Ex-1003, §§ 6.2.3; 6.3.3; 6.4.2). Tanda illustrates the use of LED encapsulants and prior art manufacturing (*See* Ex-1003 at § 6.4.3). Abe illustrates prior art techniques for dicing leadframes (*See* Ex-1003, § 6.6.2). Bierhuizen illustrates prior art techniques for dicing leadframes (*See* Ex-1003, § 6.6.4).

X. CLAIM CONSTRUCTION

A claim construction order was recently issued in the Walmart-Everlight Litigation (Ex-1016). For the terms construed in the Order, Petitioner applies the constructions here (Ex-1016). For instance, when defining electrode and/or housing cross sections below, Petitioner identifies a “plane surface formed by cutting a solid” (Ex-1016 at pp. 2-3). Otherwise, no other constructions are needed for purposes of this petition, and Petitioner applies the plain meaning. Given that the prior art is nearly identical to the structures disclosed in the '733 patent, additional constructions do not appear necessary. *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

Petitioner notes that the claim 1 element “the housing cross section and the electrode portion cross section are not level with one another” was found indefinite in the Everlight-Walmart litigation (Ex-1016 at p. 3). While a Court found the claim scope indefinite and indefiniteness is beyond the scope of an *inter partes* review, the prior art clearly falls within the scope of any meaning that can be ascribed to the

claims because the art is identical to the structural embodiments disclosed and claimed in the '733 patent. The “cross sections” identified in the prior art references are clearly “not level” under any meaning that can be ascribed to the claim term, and – regardless of whether the full claim scope can be ascertained – “the phrase is broad enough to create a reasonable likelihood that it reads on the prior art that is asserted here.” *Amneal Pharmaceuticals LLC v. Alkermes Pharma Ireland Limited*, IPR2018-00943, Paper 8 at p. 12 (PTAB Nov. 7, 2018). It is not necessary to determine the precise contours of the “not level” limitation to determine that it encompasses the prior art identified here and that trial should be instituted. *Id.* at pp. 12-13 (*citing Vivid Techs.*, 200 F.3d at 803). The merits of the prior art unpatentability grounds are sufficiently strong that they should be affirmed even if the claims do not comply with § 112. *Vibrant Media Corp. v. General Electric Co.*, IPR2013-00172, Paper 50 at pp. 9-11 (PTAB July 29, 2013) (*citing In re Collier*, 397 F.2d 1003, 1005–1006 (CCPA 1968)). For the purposes of this petition, Petitioner applies a plain meaning construction for the “not level” term.

XI. SPECIFIC GROUNDS FOR PETITION

The six petition grounds are provided below.

A. GROUND 1: Anticipation by Kishikawa

For Ground 1, the prior art consists of Kishikawa (Ex-1004). The challenged claims are claims 1-5.

1. Claim 1

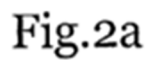
Kishikawa anticipates claim 1 as described below (Ex-1003 at § 9.1).

a) Preamble

Kishikawa discloses a “light emitting device” whether or not the preamble is a limitation (*See* Ex-1003 at § 9.1.1.1). Kishikawa is entitled “Light emitting device” (Ex-1004 at Cover). Kishikawa’s lighting emitting device 10 satisfies the preamble (Ex-1004 at 2:13-16; 9:14-15; FIGs. 1/2a/2b).

b) A carrier ... comprises at least one electrode portion ... and a housing

Kishikawa discloses a “carrier” that comprises “at least one electrode portion” and a “housing” (*See* Ex-1003 at § 9.1.1.2). Kishikawa shows in FIG. 2a and 2b, a “carrier” that includes a package 15 (“housing”) and metal members 13 and 14 (each are “at least one electrode portion”) that provide support for the light emitting element 11 (Ex-1004 at 9:65-67). Kishikawa discloses that the light emitting element 11 and parts of the first and the second metal members 13, 14 are integrally sealed in a package 15 or “housing” made of an epoxy resin (Ex-1004 at 9:14-19). The carrier of Kishikawa includes at least one metal member “embedded in the package, ... that functions as a lead electrode and a platform for mounting the light emitting element” (Ex-1004 3:20-23).

[illegible]

Although Kishikawa does not use the term “carrier,” Kishikawa’s package 15

Carrier 110 = housing 111 and electrode portions 112

The '733 Patent FIG. 1 (Annotated)



Carrier

Below:

Housing cross section

Electrode portion cross section

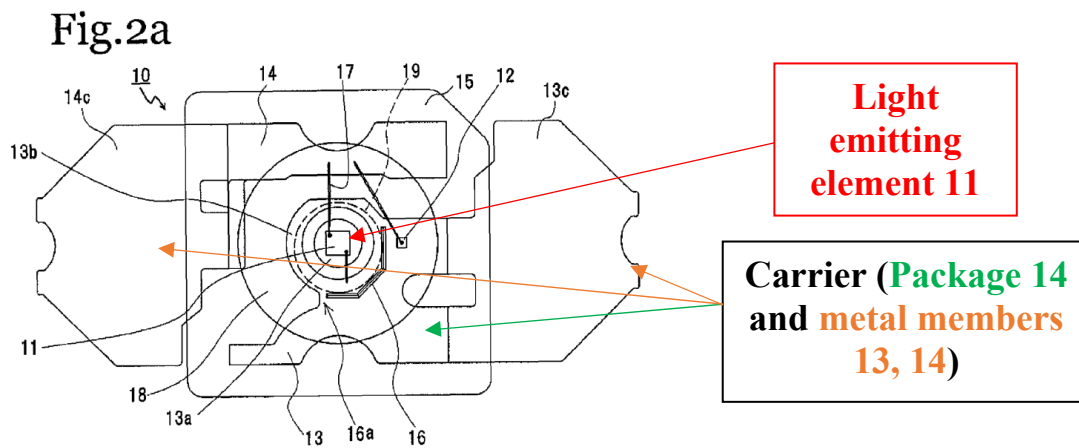
Electrode portion

Housing

47

c) A light emitting diode (LED) chip carried within the carrier

Kishikawa discloses an LED chip carried within the carrier. Light emitting element 11 is an LED “chip carried within a carrier” as shown in Fig. 2a (Ex-1003 at § 9.1.1.3; Ex-1004 at 2:33-41; 9:30-34; *see also* 3:48-51; 9:65-67).



Kishikawa FIG. 2a (Annotated)

d) An encapsulant covering the LED chip

Kishikawa discloses “an encapsulant covering the LED chip” (*See* Ex-1003 at § 9.1.1.4) Kishikawa discloses a “translucent covering material” (*i.e.*, encapsulant) that “is embedded in the concave portion of the first metal member after the light emitting element has been placed in ... the first metal member” such that “[t]he translucent covering material protects the light emitting element” (Ex-1004 at 7:6-17; 1:54-56).

e) The carrier comprises: at least one electrode portion,

Kishikawa's carrier comprises "at least one electrode portion" (*See* Ex-1003 at § 9.1.1.5). Kishikawa's metal members 13, 14 are each the claimed "at least one electrode portion." Each of Kishikawa's metal members 13, 14 are "embedded in the package ... that functions as a lead electrode and a platform for mounting the light emitting element" (Ex-1004 3:20-23).

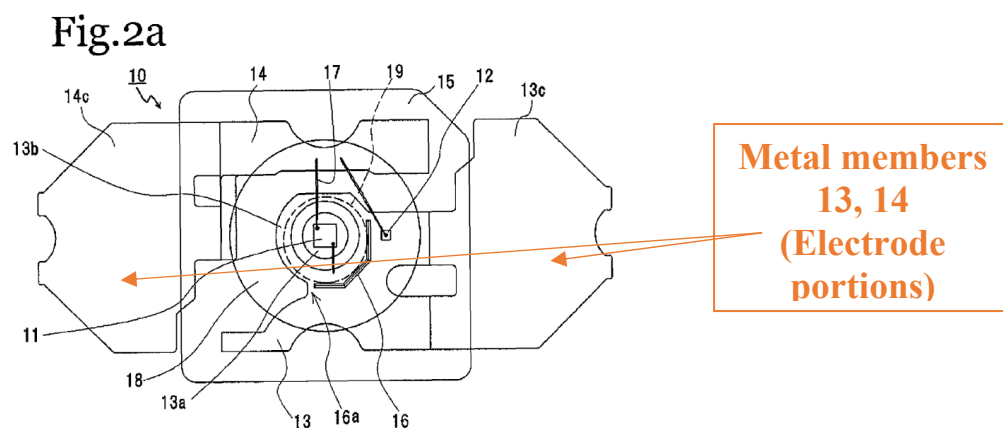


FIG. 2a of Kishikawa (Annotated)

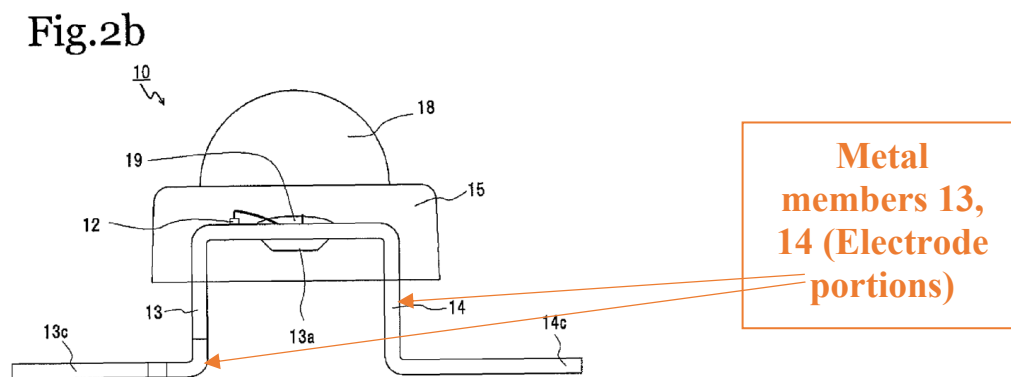
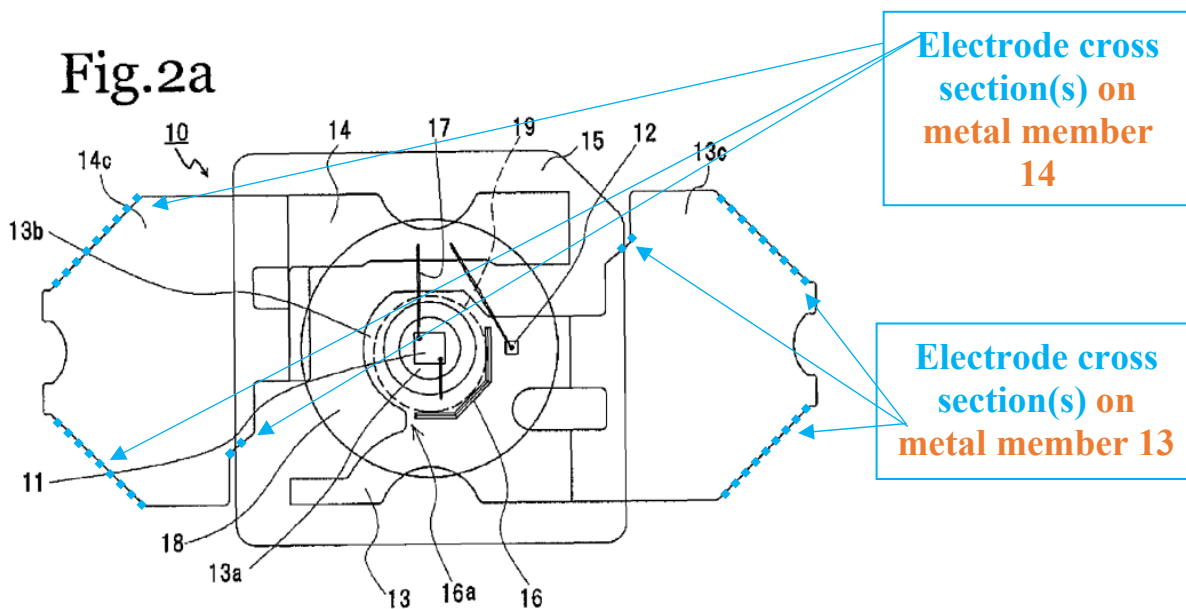


FIG. 2b of Kishikawa (Annotated)

f) Each of the at least one electrode portion comprising at

least an electrode portion cross section

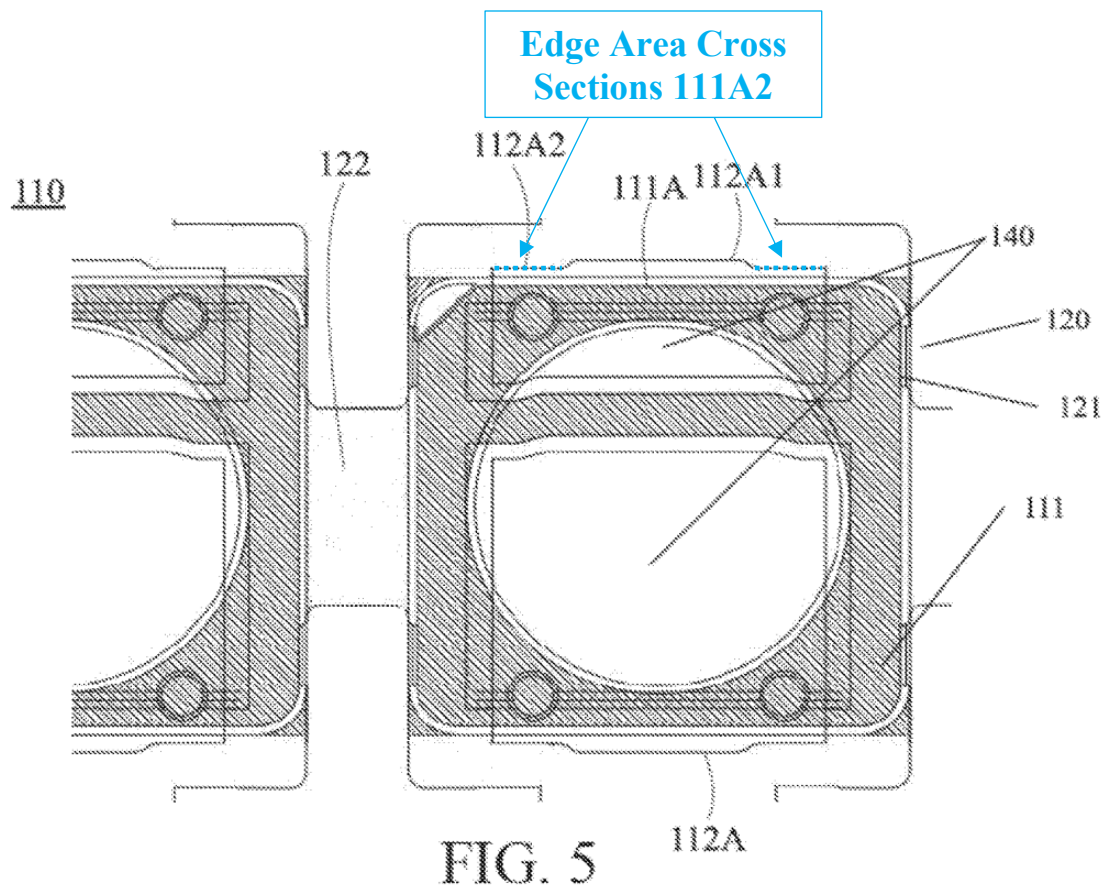
Kishikawa discloses “each of the at least one electrode portion comprising at least an electrode portion cross section” (*See* Ex-1003 at § 9.1.1.6). Although Kishikawa does not use the same “cross sections” terminology, the structural arrangement of Kishikawa is the same as that claimed in the ’733 patent. FIG. 2A of Kishikawa is reproduced below and illustrates the electrode portion cross sections on each of metal members 13, 14 (*i.e.*, electrode portions).



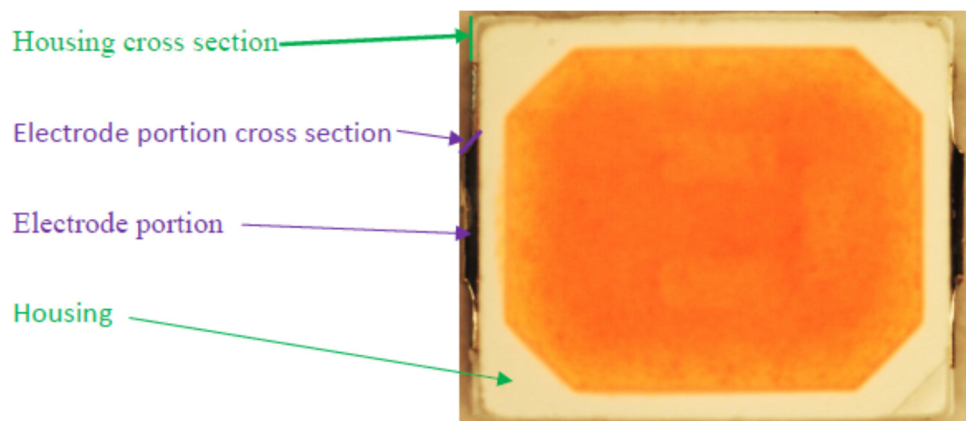
Kishikawa FIG. 2a (Annotated)

These electrode portion cross-sections in Kishikawa are the same as/consistent with the electrode portion cross sections described in the ’733 patent and asserted by Patent Owner in its infringement contentions (Ex-1010 at p. 5) and are a plane surface

formed by cutting a solid.



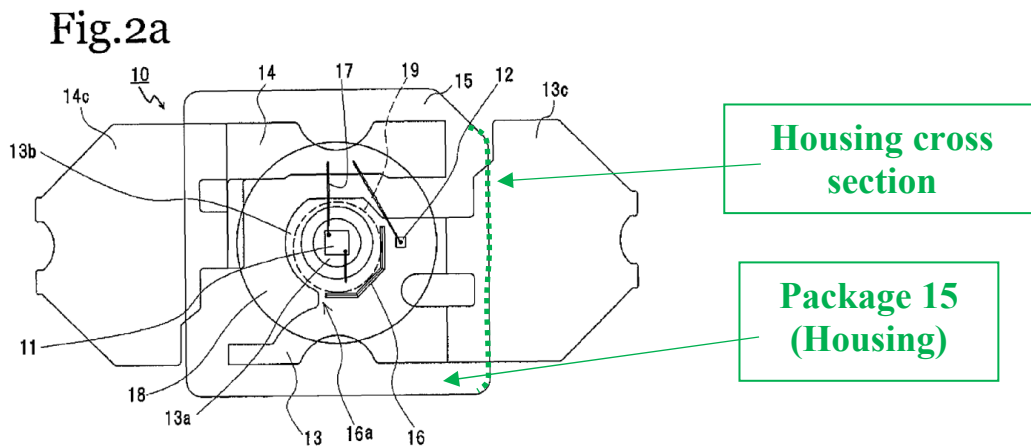
'733 Patent FIG. 5 (Annotated)



Patent Owner Infringement Contentions p. 5

g) The carrier comprises ... a housing comprising a housing cross section

Kishikawa discloses the claimed housing (*e.g.* package 15) “comprising a housing cross section” (*See* Ex-1003 at § 9.1.1.7). As Kishikawa describes, “the package may be formed from any material as long as it can integrally embed part of the above-mentioned metal member and seal it in the form of a block, and can ensure insulation of the light emitting elements and the metal member” (Ex-1004 8:13-17). Although Kishikawa does not use the “cross section” language of the ’733 patent, the edges of package 15 form are a plane surface formed by cutting a solid (*i.e.*, the claimed housing cross section).

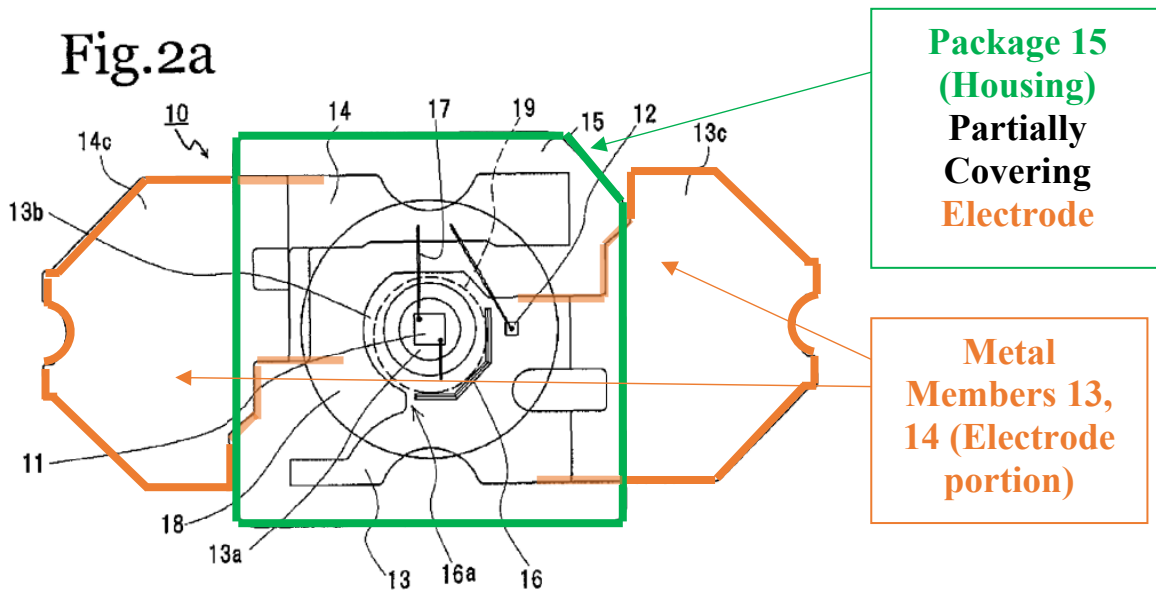


Kishikawa FIG. 2a (Annotated)

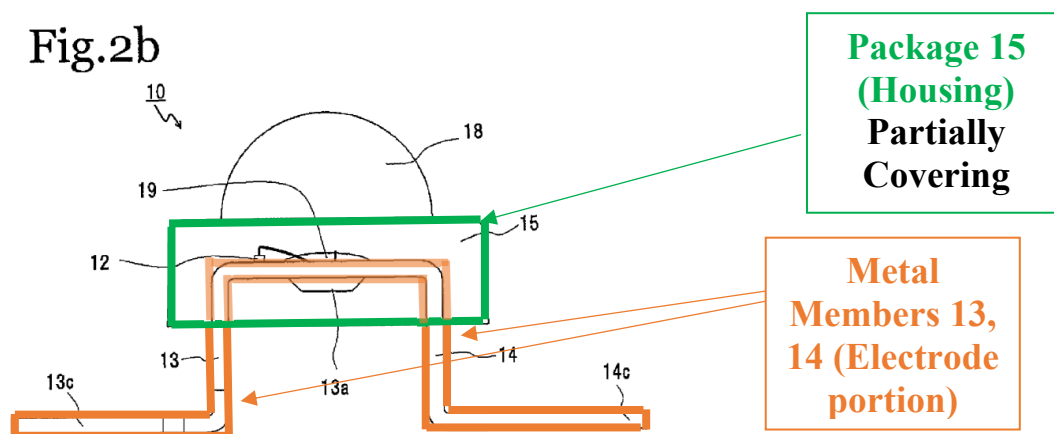
h) The housing at least partially covering the at least one electrode portion,

Kishikawa discloses “the housing at least partially covering the at least one electrode portion” (*See* Ex-1003 at § 9.1.1.8). Kishikawa discloses that its “package”

(housing) “can integrally embed part of the above-mentioned metal member and seal it in the form of a block, and can ensure insulation of the light emitting elements and the metal member” (Ex-1004 8:13-17). The housing (package 15) at least partially covers the at least one electrode portion (metal members 13, 14), as illustrated below.



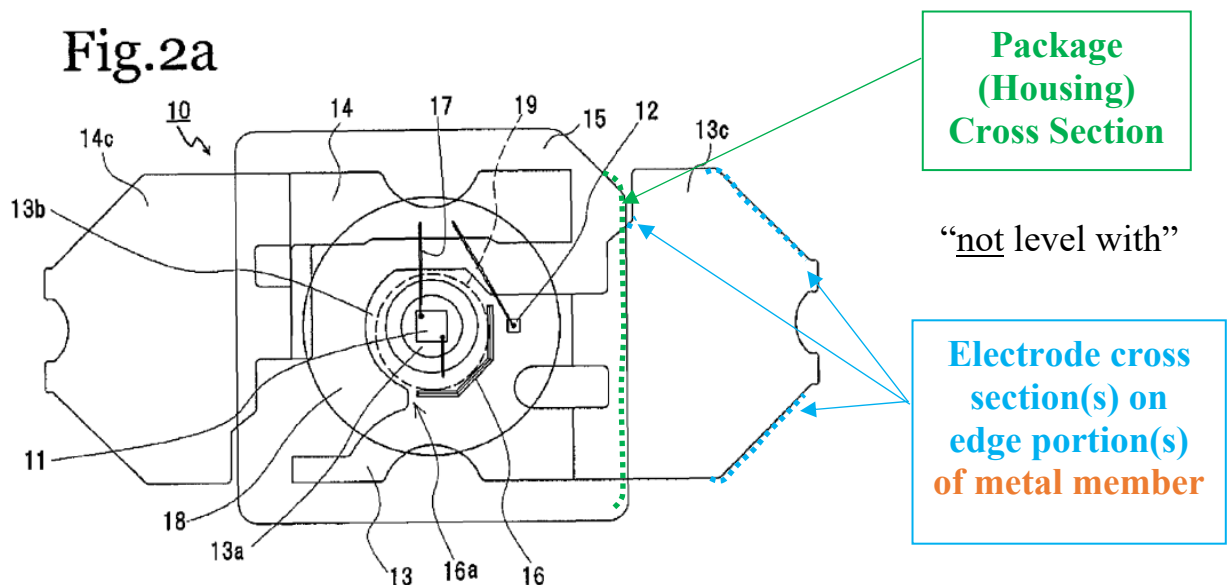
Kishikawa FIG. 2a (Annotated)



Kishikawa FIG. 2b (Annotated)

i) Wherein the housing cross section and the electrode portion cross section are not level with one another;

Kishikawa discloses “wherein the housing cross section and the electrode portion cross section are not level with one another” (*See* Ex-1003 at § 9.1.1.9). As explained in §XI(A)(1)(f)-(g), *supra*, Kishikawa discloses a housing cross section on the edge of package 15 and an electrode portion cross section on outer edges of metal members 13, 14. As shown in FIG. 2a of Kishikawa, the housing cross section on the edge of package 15 and an electrode portion cross section on outer edges of metal members 13, 14 are not level with one another and would intersect with each other.

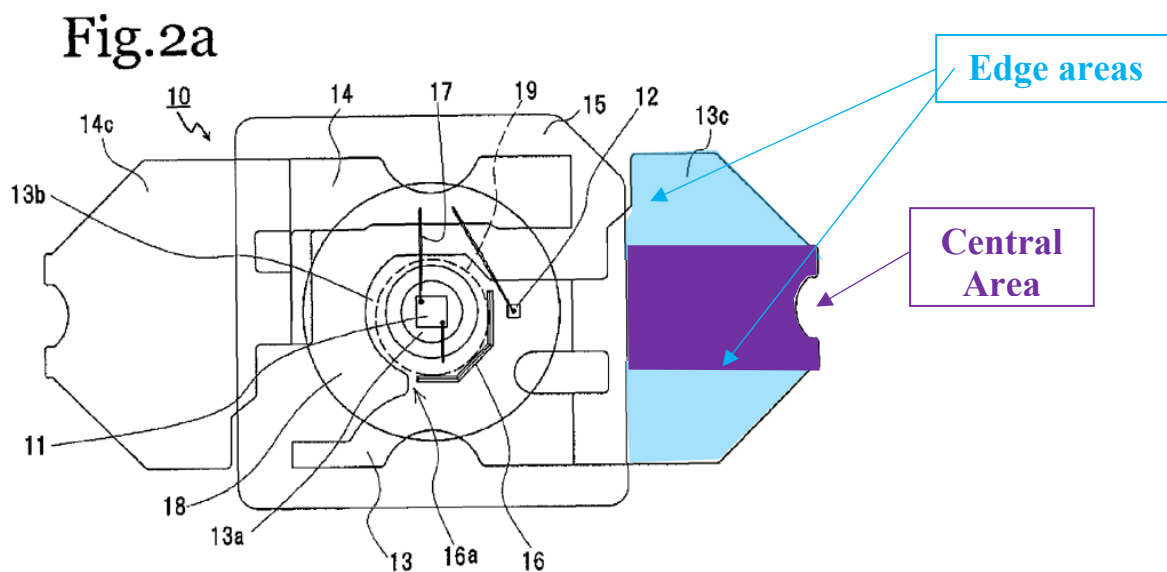


Kishikawa FIG. 2a (Annotated)

j) Each of the at least one electrode portion further

comprises a central area and two edge areas,

Kishikawa discloses “wherein each of the at least one electrode portion further comprises a central area and two edge areas” (*See* Ex-1003 at § 9.1.1.10). Each of Kishikawa’s metal members 13, 14 (electrode portions) comprises a central area and two edge areas.



Kishikawa FIG. 2a (Annotated)

k) Wherein the electrode portion cross section is located on at least one of the two edge areas

Kishikawa discloses “wherein the electrode portion cross section is located on at least one of the two edge areas (*See* Ex-1003 at § 9.1.1.11). As shown below for FIG. 2a, the electrode portion cross sections are located on at least one of the two edge areas of metal members 13, 14 as identified in §XI(A)(1)(j), *supra*.

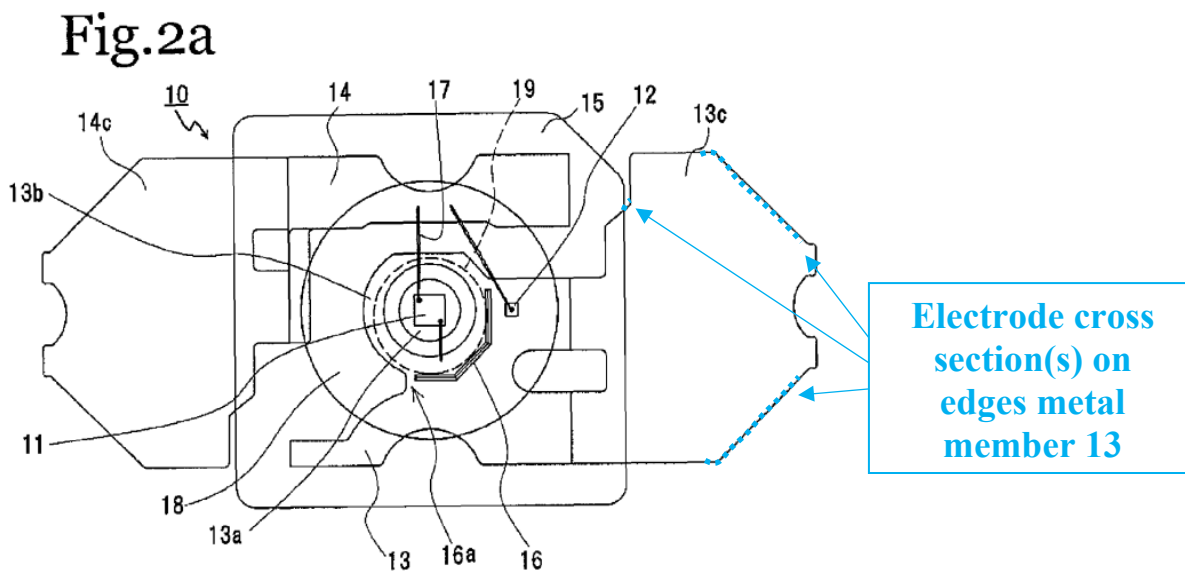


FIG. 2a of Kishikawa (Annotated)

l) Wherein the central area and the two edge areas protrude from the housing cross section;

Kishikawa discloses “wherein the central area and the two edge areas protrude from the housing cross section” (See Ex-1003 at § 9.1.1.12). The central area and two edge areas of metal members 13, 14 (e.g., the claimed electrode portions) protrude from the housing cross-section as shown below.



Kishikawa discloses “wherein in the central area protrudes from the two edge areas” (*See* Ex-1003 at § 9.1.1.13). The central area of Kishikawa’s metal members 13, 14 protrudes from the two edge areas of metal members 13, 14, respectively, as shown below for member 13.

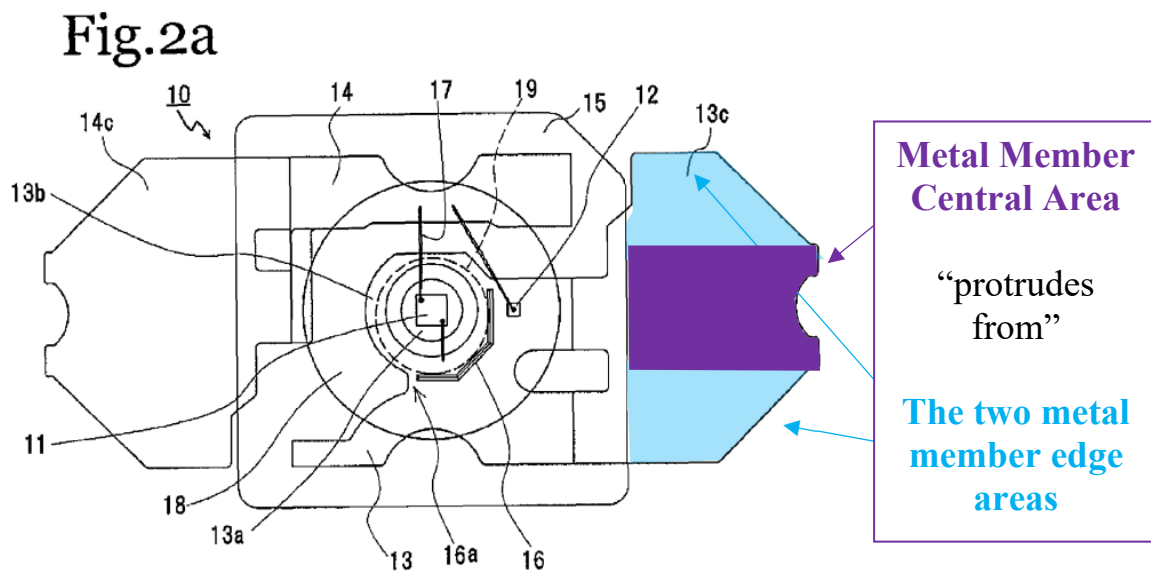
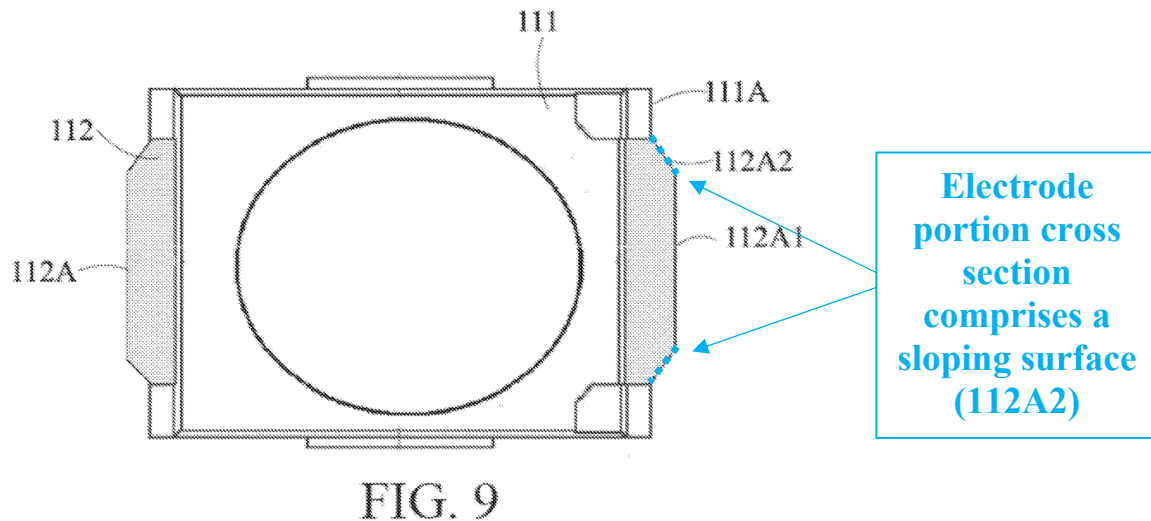


FIG. 2a of Kishikawa (Annotated)

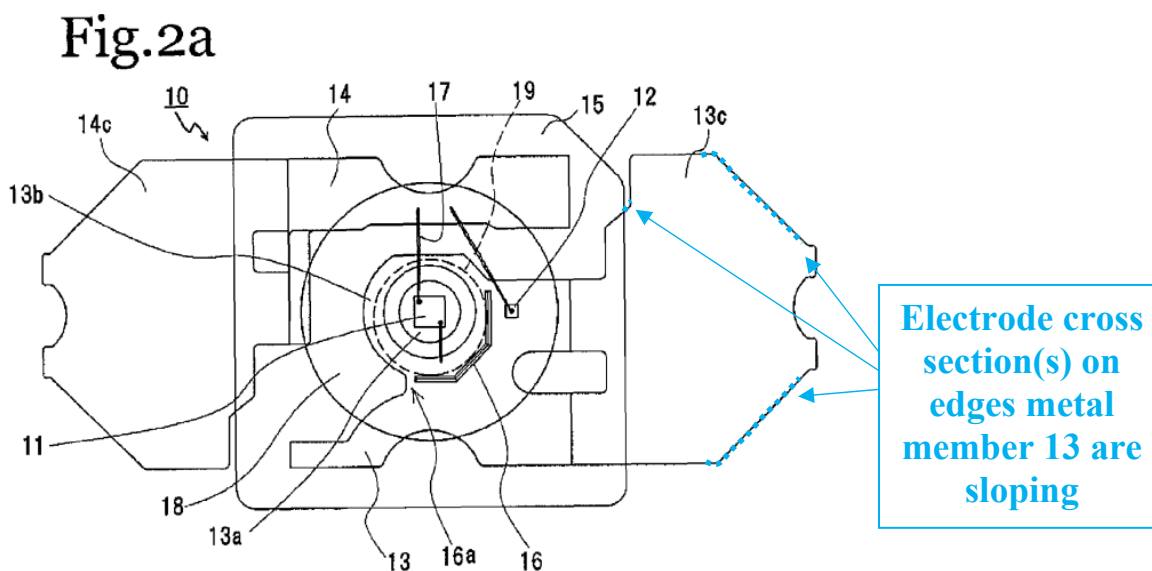
2. Claim 2

Kishikawa discloses “the electrode portion cross section comprises a sloping surface” (See Ex-1003 at § 9.1.2). While not described in relation to the elected species of claim 5, the ’733 patent describes “two edge areas 112A2” as “sloping surfaces” with respect to FIG. 9, which is shown below (Ex-1001 at 8:26-27; 8:43-44).



The '733 Patent FIG. 9 (Annotated)

Numerous cross sections on edge portions of Kishikawa's metal members 13, 14 have the claimed "sloping surfaces" (e.g., with respect to the housing cross section of package 15), as shown below.



Kishikawa FIG. 2a (Annotated)

3. Claim 3

Kishikawa discloses “wherein the electrode portion cross section and the central area are not coplanar” (*See* Ex-1003 at § 9.1.3). The central portion of Kishikawa’s metal member 13 (electrode) is irregularly shaped and not co-planar with the sloped electrode cross sections on the edge portions.

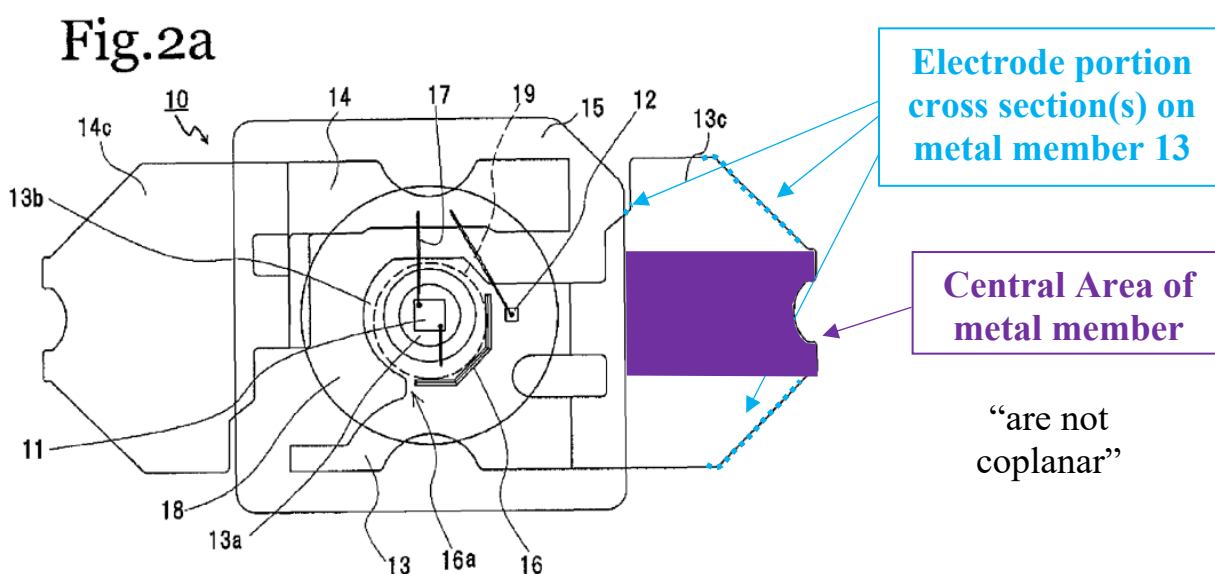
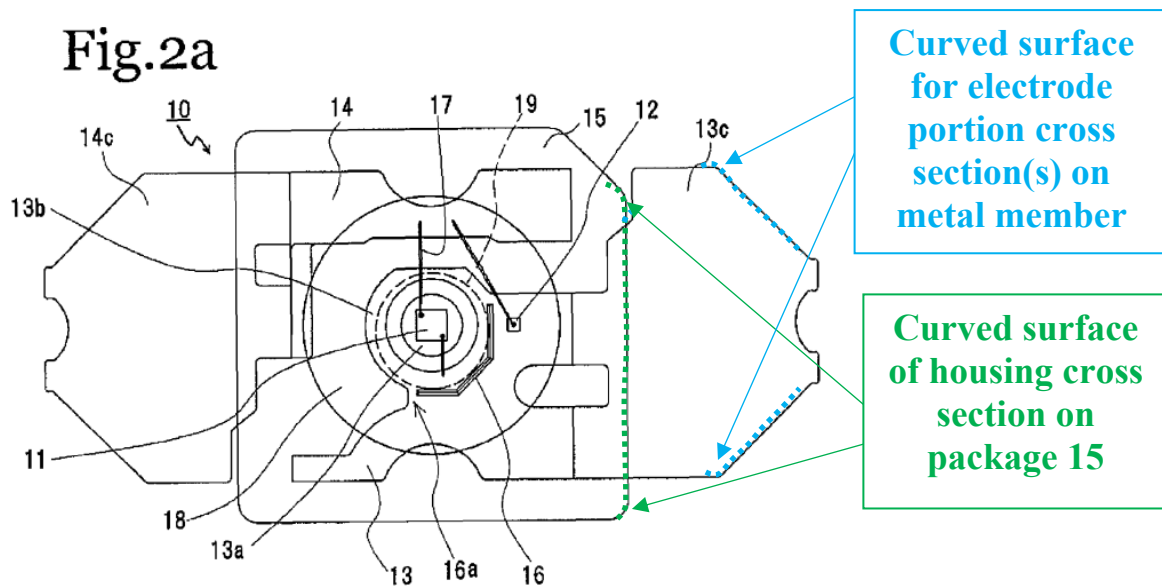


FIG. 2a of Kishikawa (Annotated)

4. Claim 4

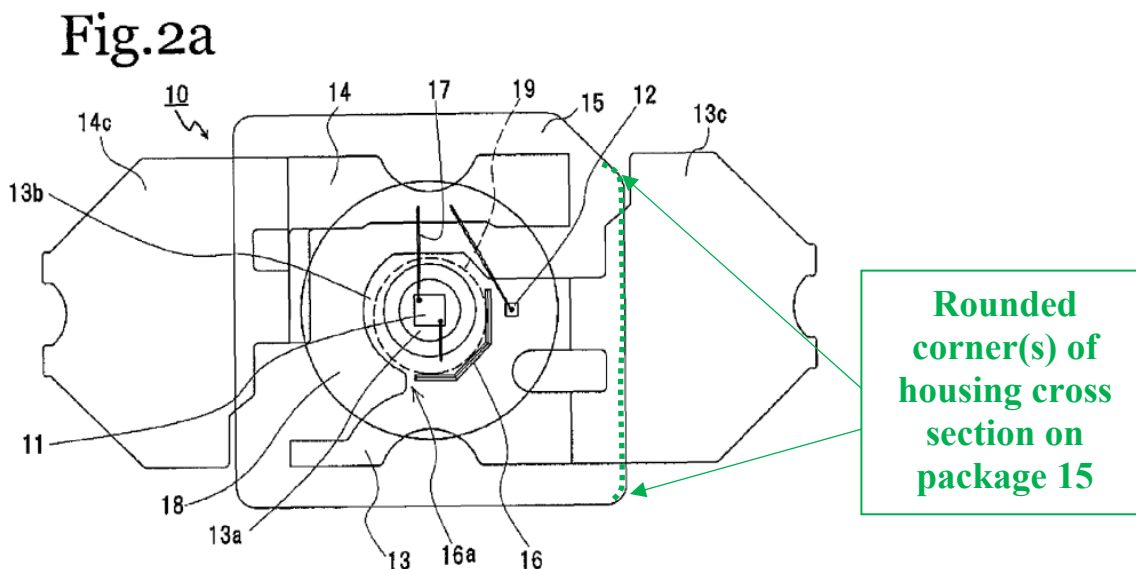
Kishikawa discloses that “the housing cross section or the electrode portion cross section comprises a curved surface” (*See* Ex-1003 at § 9.1.4). For example, each of the housing cross section on package 15 and the electrode cross section on metal member 13 comprises a curved surface as shown in Fig. 2a. below.



Kishikawa FIG. 2a (Annotated)

5. Claim 5

Kishikawa discloses that the “housing cross section comprises a rounded corner” (*See* Ex-1003 at § 9.1.5). Package 15 (housing) is shown to have a rounded corner in FIG. 2a, and thus the housing cross-section, which is located on the edges of the package 15 housing, includes a rounded corner.



Kishikawa FIG. 2a (Annotated)

B. GROUND 2: Anticipation by Nakashima

For Ground 2, the prior art consists of Nakashima (Ex-1005). The challenged claims are claims 1-5.

1. Claim 1

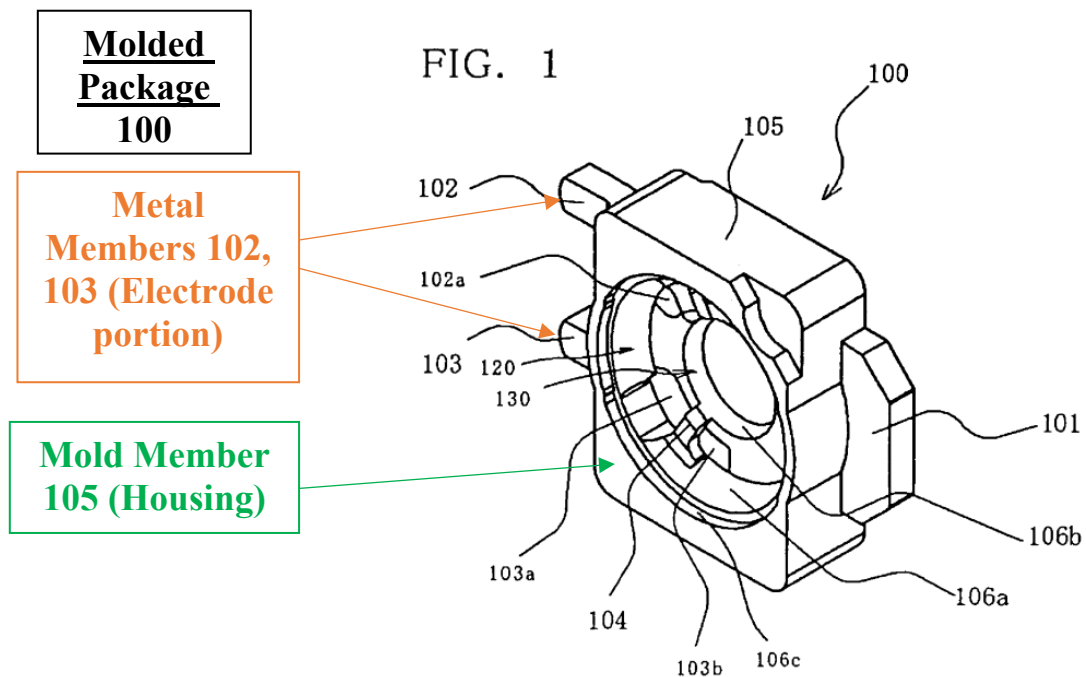
Nakashima anticipates claim 1 as described below (*See* Ex-1003 at § 9.2.1).

a) Preamble

Nakashima discloses a “light emitting device” whether or not the preamble is a limitation (*See* Ex-1003 at § 9.2.1.1). Nakashima describes how its “present invention relates to a light emitting device” (Ex-1005 at 2:51), and FIGs. 1-4 illustrate views of the “light emitting device” (Ex-1005 at 2:51-3:15; 5:20-29).

**b) A carrier ... comprises at least one electrode portion ...
and a housing**

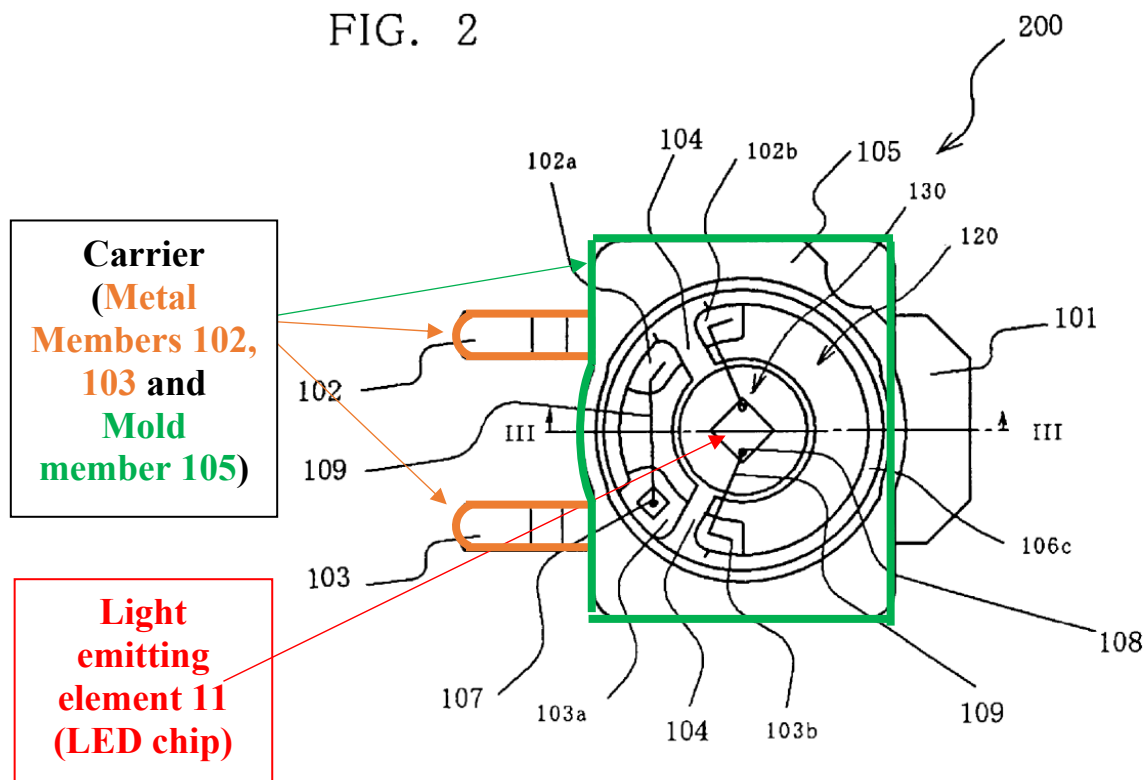
Nakashima discloses a “carrier” that comprises “at least one electrode portion” and a “housing” (*See* Ex-1003 at § 9.2.1.2). Nakashima discloses “molded package” 100 which is the claimed “carrier” that includes metal members 102, 103 (each being “at least one electrode portion”) and mold member 105 (“housing”) (Ex-1005 at 6:5-15 “the molded package is formed by way of integral molding so that ... one end of the second metal base 102, and one end of the third metal base 103 are inserted in the mold member 105 and respective other ends are protruded from the outer surface of the mold member 105”). Metal members 102, 103 are positive and negative electrodes, respectfully (Ex-1005 at 9:3-5). A “recess” in the mold member is designed for “housing the light emitting element 108” (Ex-1005 at 9:43-46).



Nakashima FIG. 1 (Annotated)

c) A light emitting diode (LED) chip carried within the carrier

Nakashima discloses light emitting element 108 which is the claimed “LED chip” and discloses that the element 108 is “carried with the carrier” (Ex-1003 at 9.2.1.3; Ex-1005 at 12:65-13:1; 13:57-59; 18:21-25; 19:56). Nakashima describes that the “light emitting element 108 [is] mounted on the bottom surface of the second recess 130” of the molded package 100 (carrier) (Ex-1005 at 7:12-14) as shown in FIG 2.



Nakashima FIG. 2 (Annotated)

d) An encapsulant covering the LED chip

Nakashima discloses “an encapsulant covering the LED chip” (*See* Ex-1003 at § 9.2.1.4). Nakashima discloses a “encapsulating member 111, 112 covering the semiconductor component” (Ex-1005 at 9:32-33), for example with a “rubber-like flexible resin” that can include “fluorescent material” or “diffusing agent” (Ex-1005 16:15-51).

e) The carrier comprises: at least one electrode portion,

Nakashima discloses that the “carrier” comprises “at least one electrode portion” (*See* Ex-1003 at § 9.2.1.5). As explained in §XI(B)(1)(b), *supra*,

Nakashima's carrier/molded package 100 comprises at least one electrode portion in the form of each of metal members 102, 103 (Fig. 1).

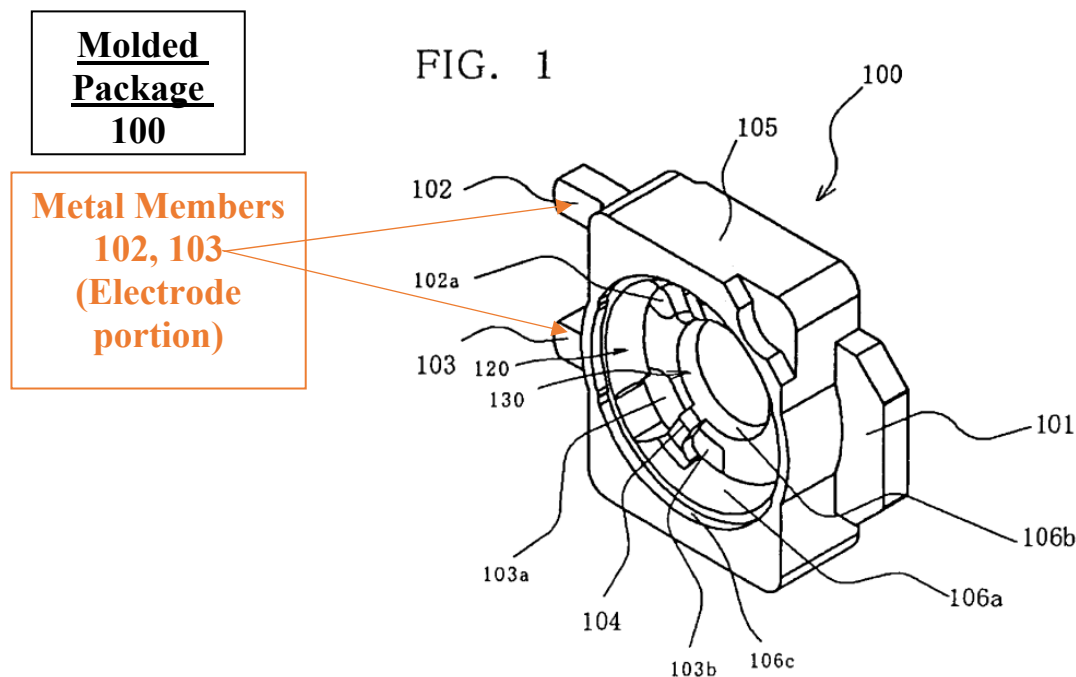


FIG. 1 of Nakashima (Annotated)

f) Each of the at least one electrode portion comprising at least an electrode portion cross section

Nakashima discloses “each of the at least one electrode portion comprising at least an electrode portion cross section” (See Ex-1003 at § 9.2.1.6). Although Nakashima does not describe its light emitting device structure in terms of “cross sections,” Nakashima’s structural arrangement is the same as that claimed in the ’733 patent. FIG. 2 of Nakashima illustrates the electrode portion cross sections on each of metal members 102, 103 (electrode portions).

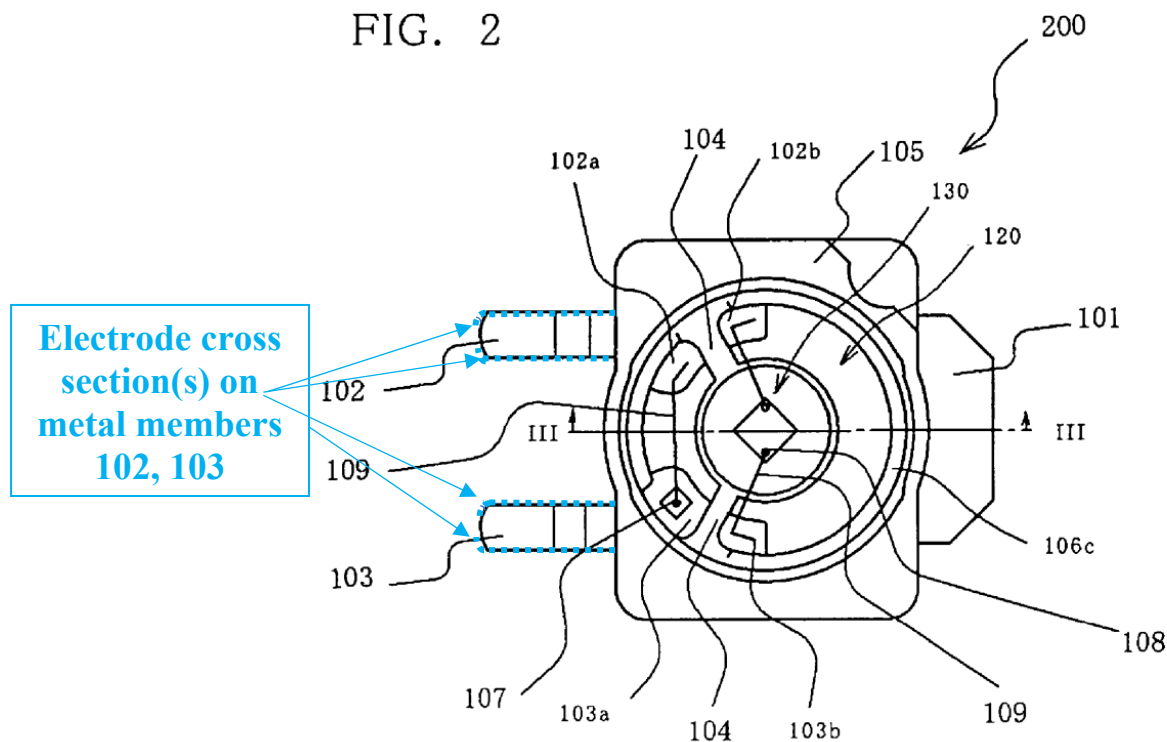


FIG. 2 of Nakashima (Annotated)

g) The carrier comprises ... a housing comprising a housing cross section

Nakashima discloses “a housing comprising a housing cross section” (*See* Ex-1003 at § 9.2.1.7). As explained in §XI(B)(1)(b), *supra*, Nakashima’s carrier comprises a housing in the form of mold member 105. Although Nakashima does not use “cross section” terminology, the mold member 105 has a housing cross section.

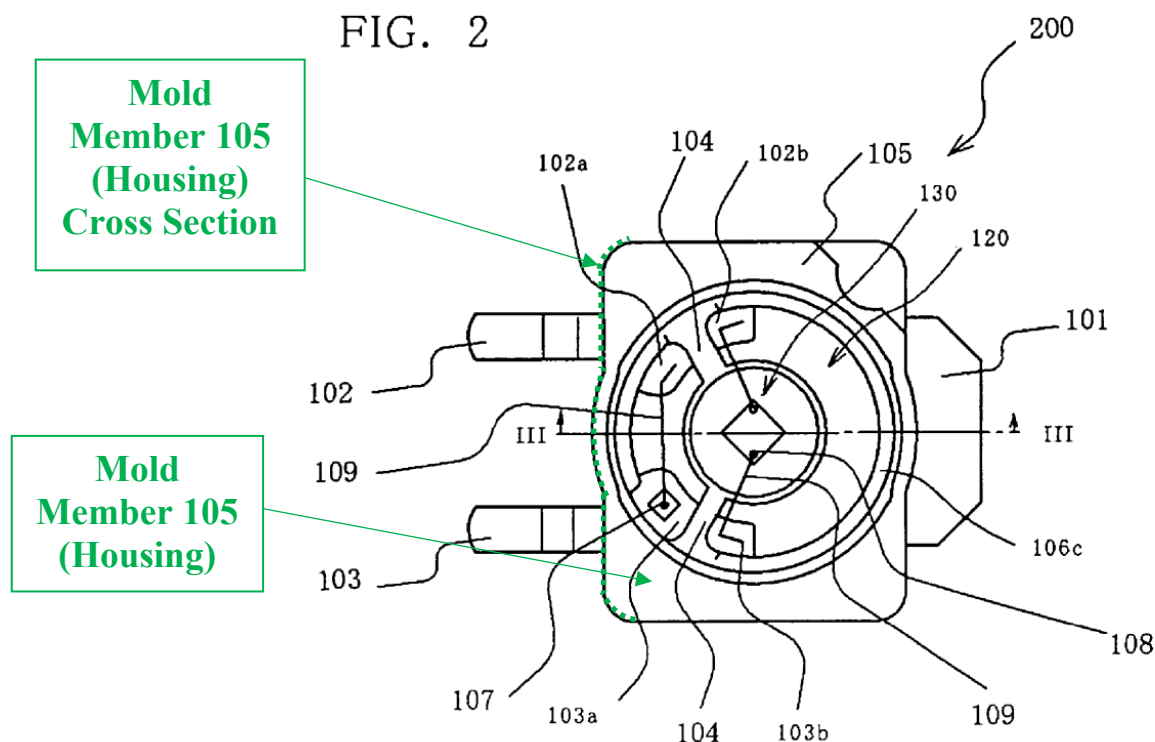


FIG. 2 of Nakashima (Annotated)

h) The housing at least partially covering the at least one electrode portion,

Nakashima discloses the “housing at least partially covering the at least one electrode portion” (*See* Ex-1003 at § 9.2.1.8). Nakashima discloses that the second and third metal members 102, 103 (electrode portions) are inserted into and protrude from the sides of mold member 105, which is a housing for light emitting element/LED chip 108 (Ex-1005 at 9:6-7; 31:28-30). Nakashima explains that the housing/mold member partially covers the metal member 102, 103 because “bonding regions of 102a, 102b, 103a, and 103b” are within the interior of mold member 105

(Ex-1005 at 7:19-20).

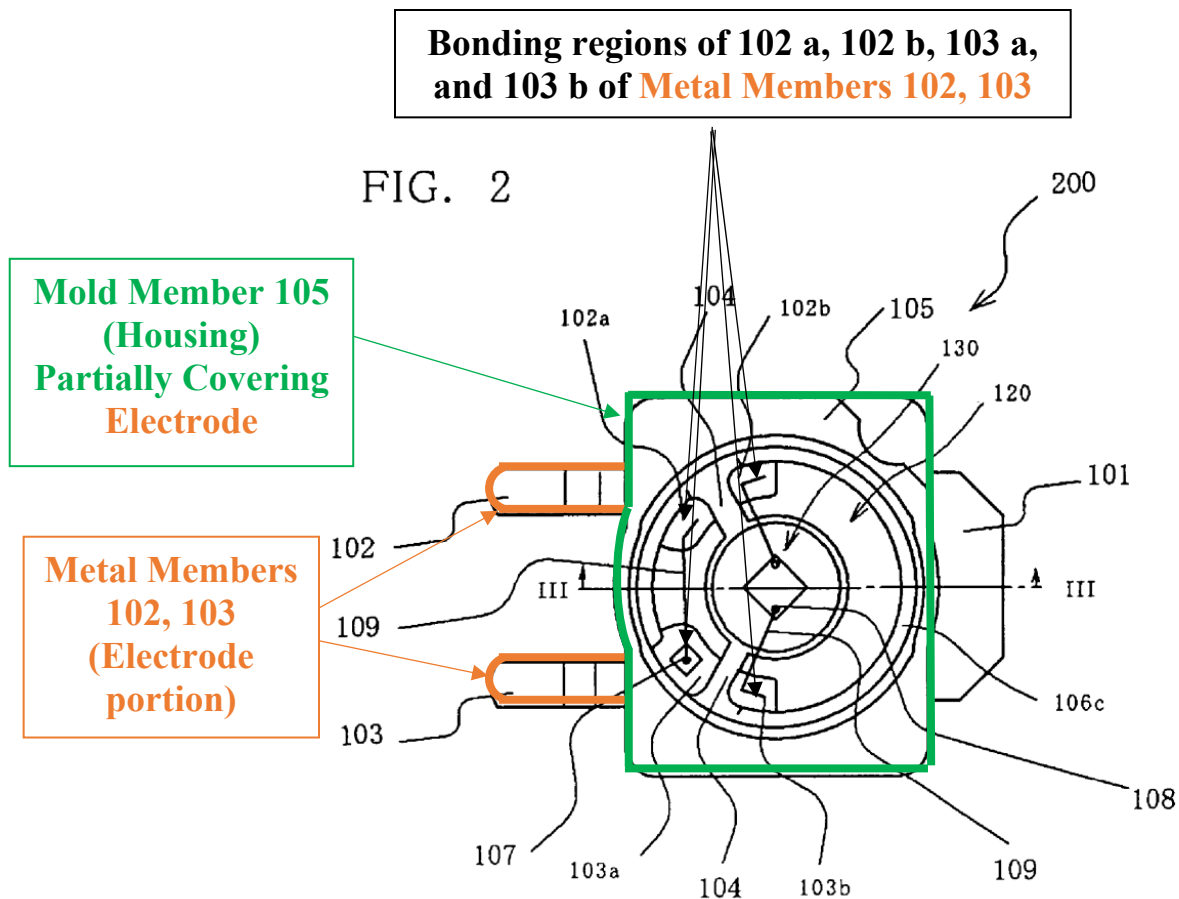


FIG. 2 of Nakashima (Annotated)

i) Wherein the housing cross section and the electrode portion cross section are not level with one another;

Nakashima discloses “wherein the housing cross section and the electrode portion cross section are not level with one another” (*See* Ex-1003 at § 9.2.1.9). As shown in Nakashima’s FIG. 2, the housing cross section on the edge of mold member 105 and an electrode portion cross section on outer edges of metal members 102, 103 are not level with one another.

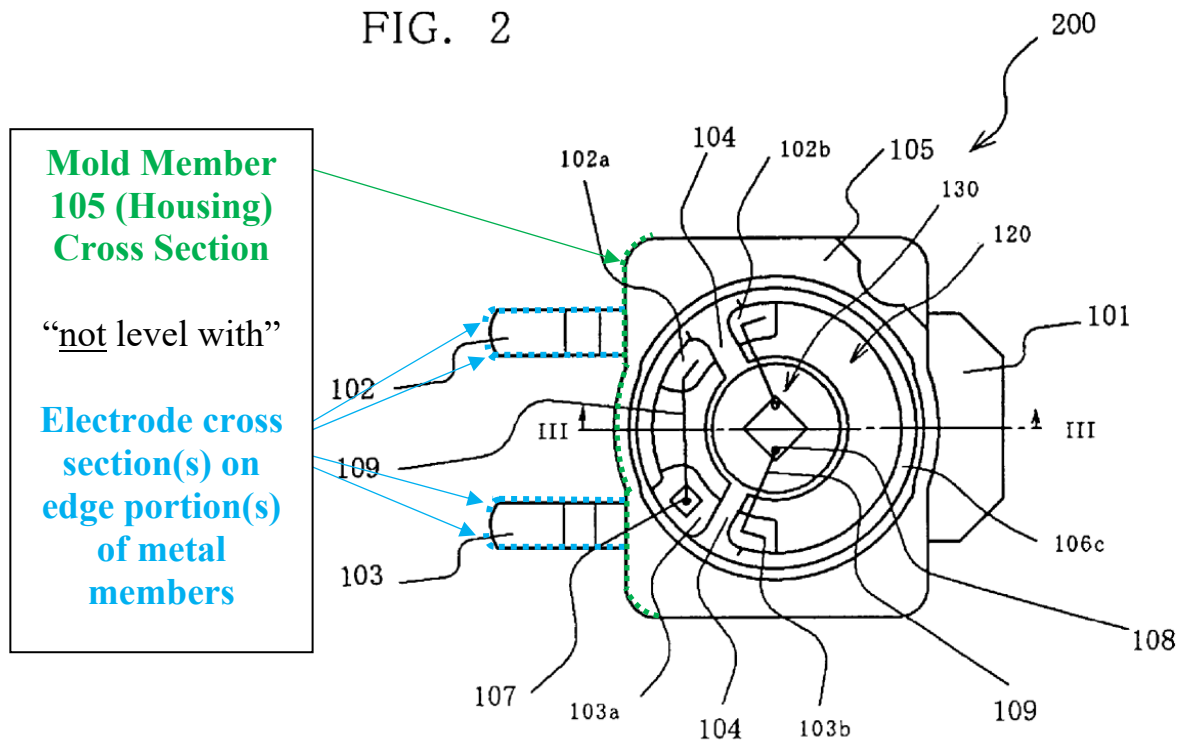


FIG. 2 of Nakashima (Annotated)

j) Each of the at least one electrode portion further comprises a central area and two edge areas,

Nakashima discloses “wherein each of the at least one electrode portion further comprises a central area and two edge areas” (See Ex-1003 at § 9.2.1.10). As shown in FIG. 2 of Nakashima, each of metal members 102, 103 (electrode portions) comprises a central area and two edge areas.

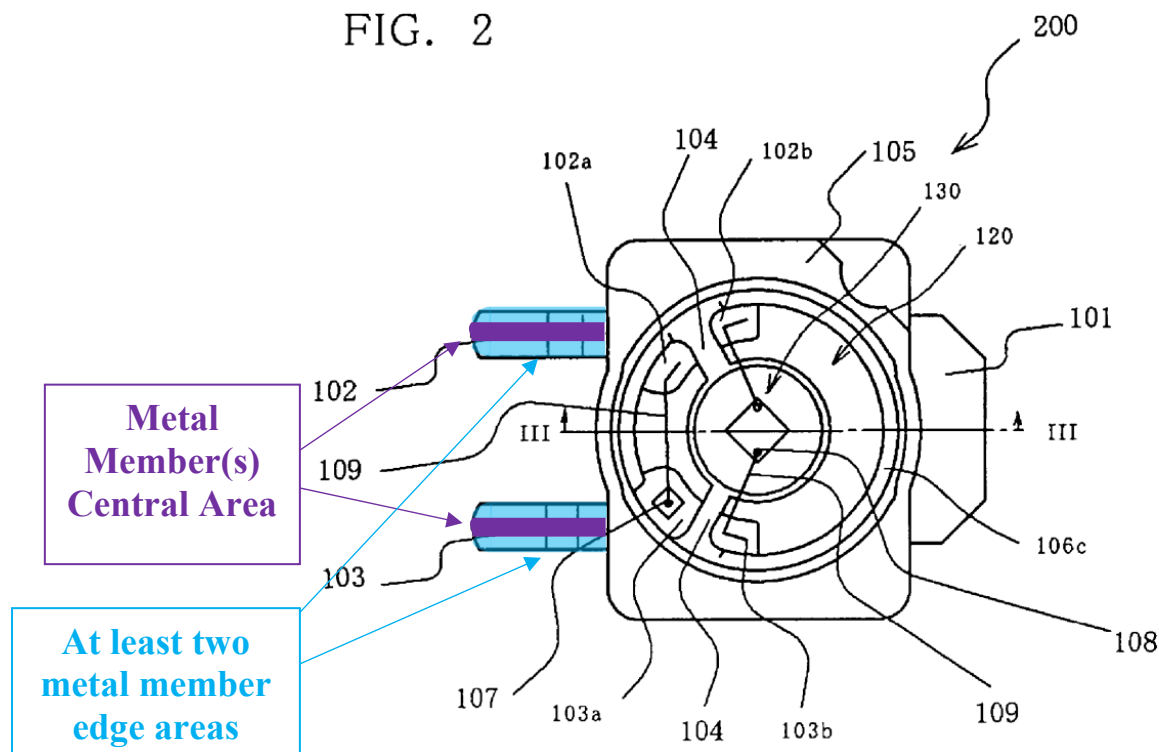


FIG. 2 of Nakashima (Annotated)

k) Wherein the electrode portion cross section is located on at least one of the two edge areas

Nakashima discloses “wherein the electrode portion cross section is located on at least one of the two edge areas” (*See* Ex-1003 at § 9.2.1.11). As explained in §XI(B)(1)(f), *supra*, the electrode portion cross section is located on metal members 102, 103. The electrode portion cross sections are located on at least one of the two edge areas of metal members 102, 103 as identified in §XI(B)(1)(j), *supra*.

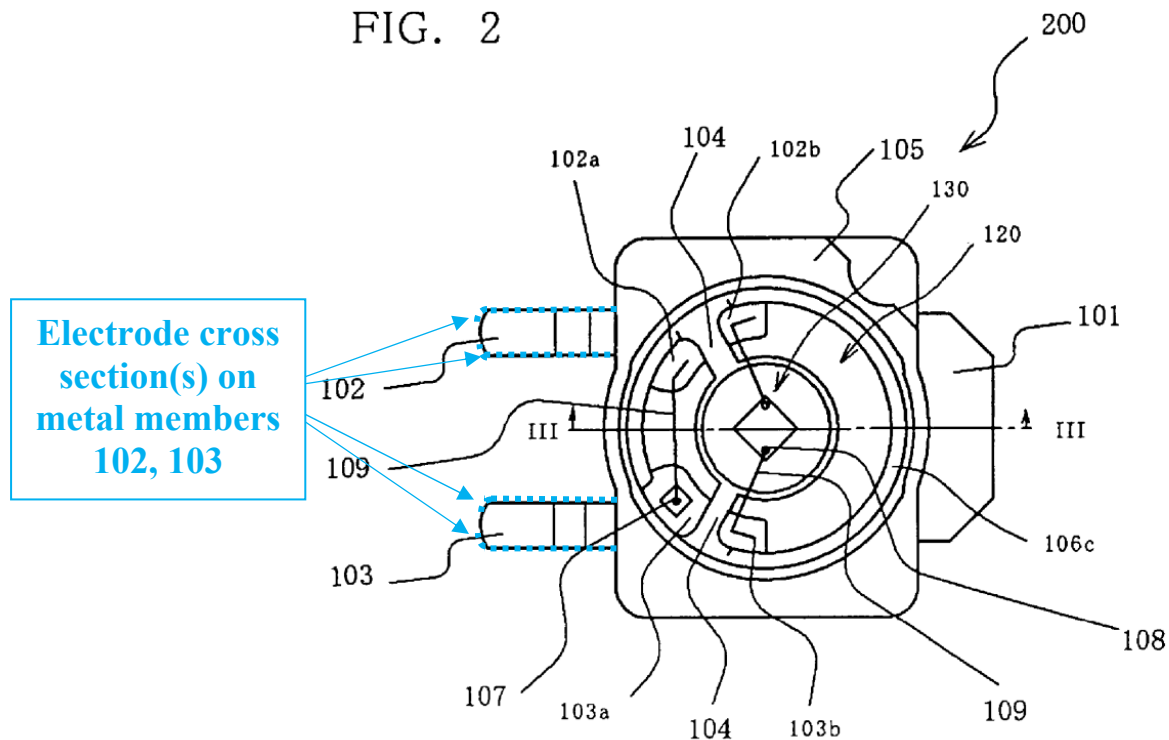


FIG. 2 of Nakashima (Annotated)

I) Wherein the central area and the two edge areas protrude from the housing cross section;

Nakashima discloses “wherein the central area and two edge areas protrude from the housing cross section” (See Ex-1003 at § 9.2.1.12). Metal members 102, 103 protrude from the housing cross-section. As shown in annotated FIG. 2, Nakashima’s “metal members 102, 103” (e.g., each is an “electrode portion”) each have the claimed “central area,” and “two edge areas” that protrude from the “housing cross section.”

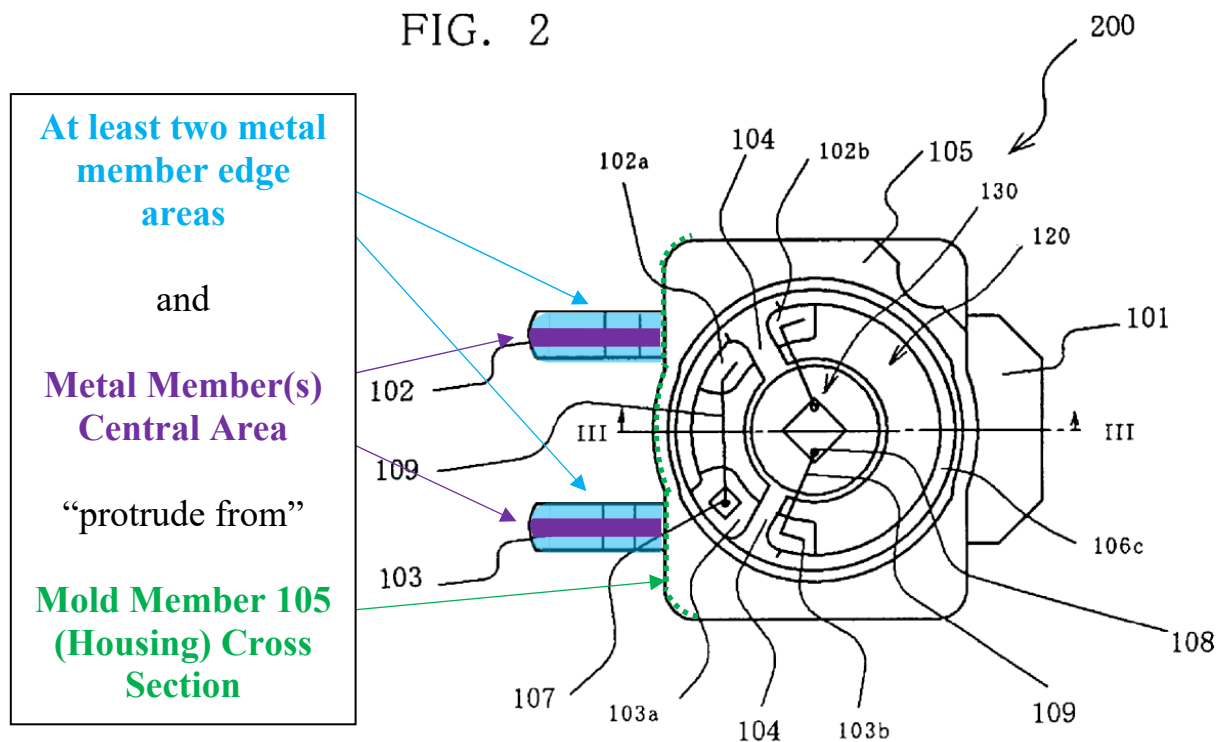


FIG. 2 of Nakashima (Annotated)

m) Wherein the central area protrudes from the two edge areas

Nakashima discloses “the central area protrudes from the two edge areas” in each of metal members 102, 103 (*e.g.*, each are an “electrode portion”) as shown in an annotated FIG. 2 (*See* Ex-1003 at § 9.2.1.13).

200

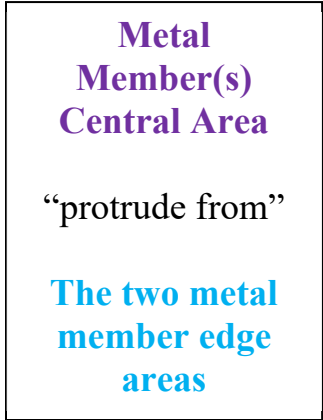


FIG. 2 of Nakashima (Annotated)

2. Claim 2

Nakashima discloses that each of the electrode portion cross section and the housing cross section comprise a “sloping surface” as shown in FIG. 2 (*See* Ex-1003 at § 9.2.2).

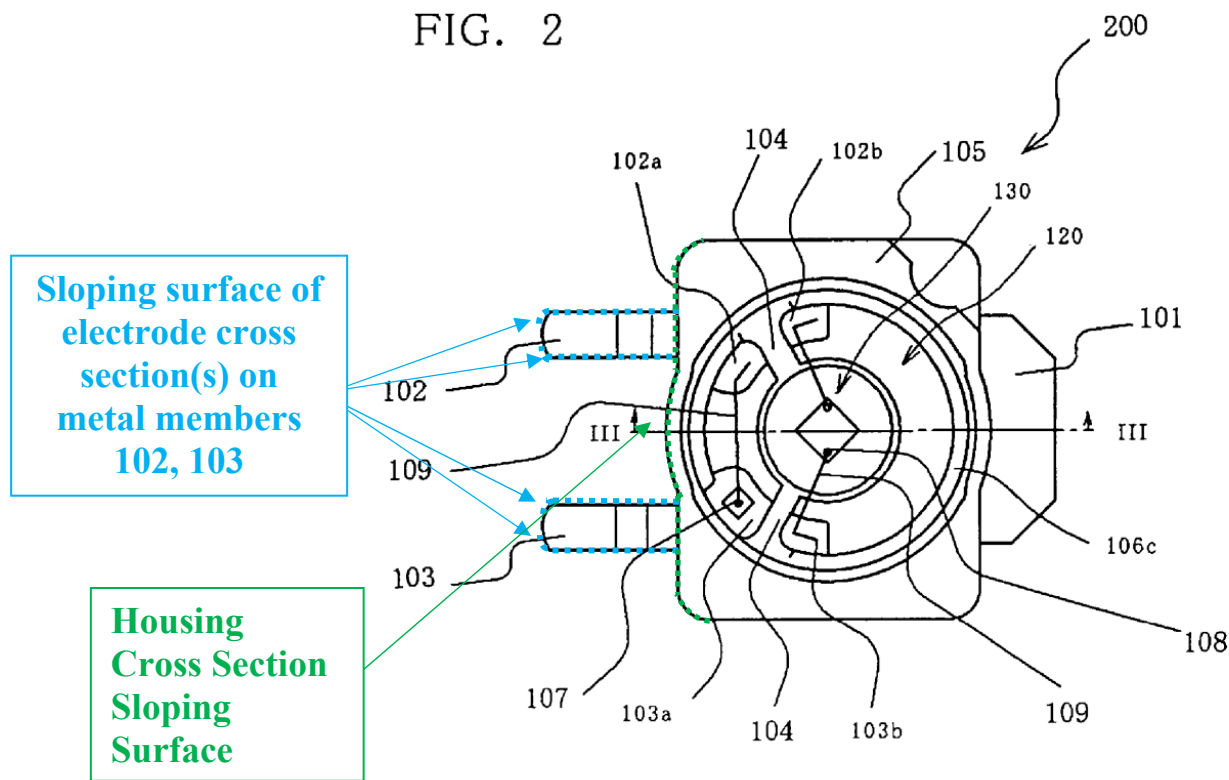


FIG. 2 of Nakashima (Annotated)

3. Claim 3

Nakashima discloses that the electrode portion cross section and the central area are not coplanar (*See* Ex-1003 at § 9.2.3). The central portion of metal members 102, 103 (electrode) are rounded at their tips and are not co-planar with the electrode cross sections on the edge portions.

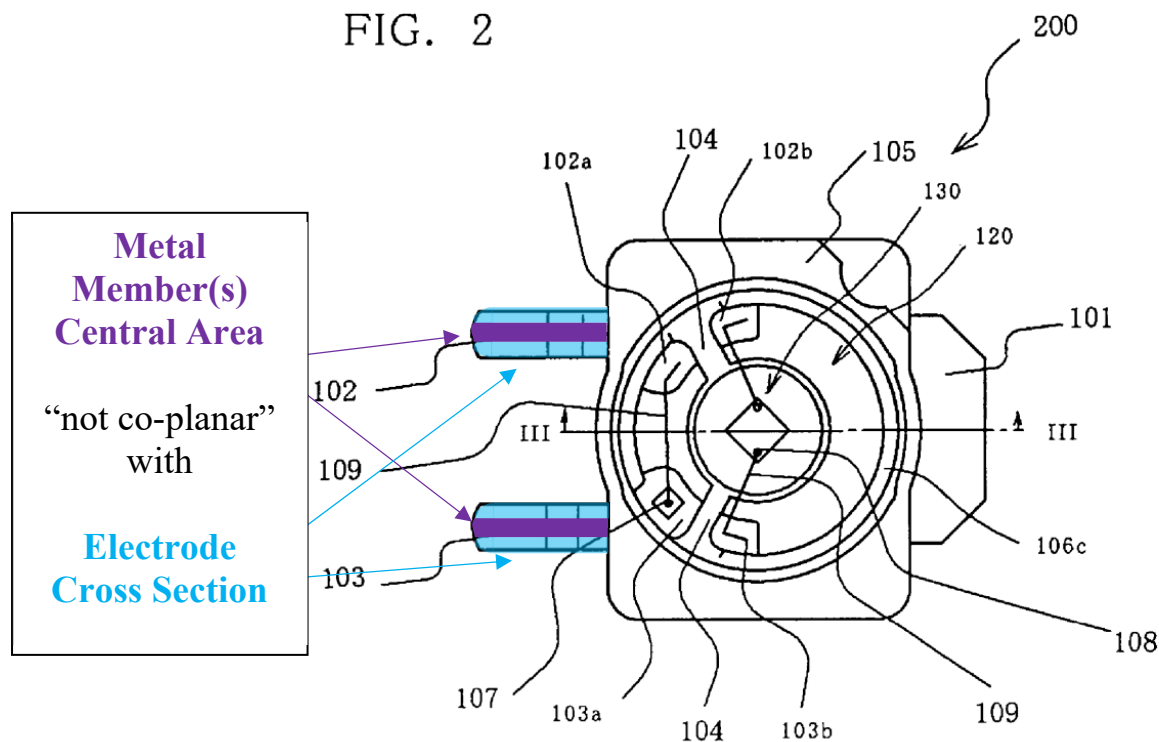


FIG. 2 of Nakashima (Annotated)

4. Claim 4

Nakashima discloses that the housing cross section or the electrode portion cross section comprises a curved surface (*See* Ex-1003 at § 9.2.4). Mold member 105 (housing) on which the housing cross section is located comprises a curved surface. The electrode cross section could also extend to the curved portion of metal members 102, 102.

[illegible]

5. Claim 5

77

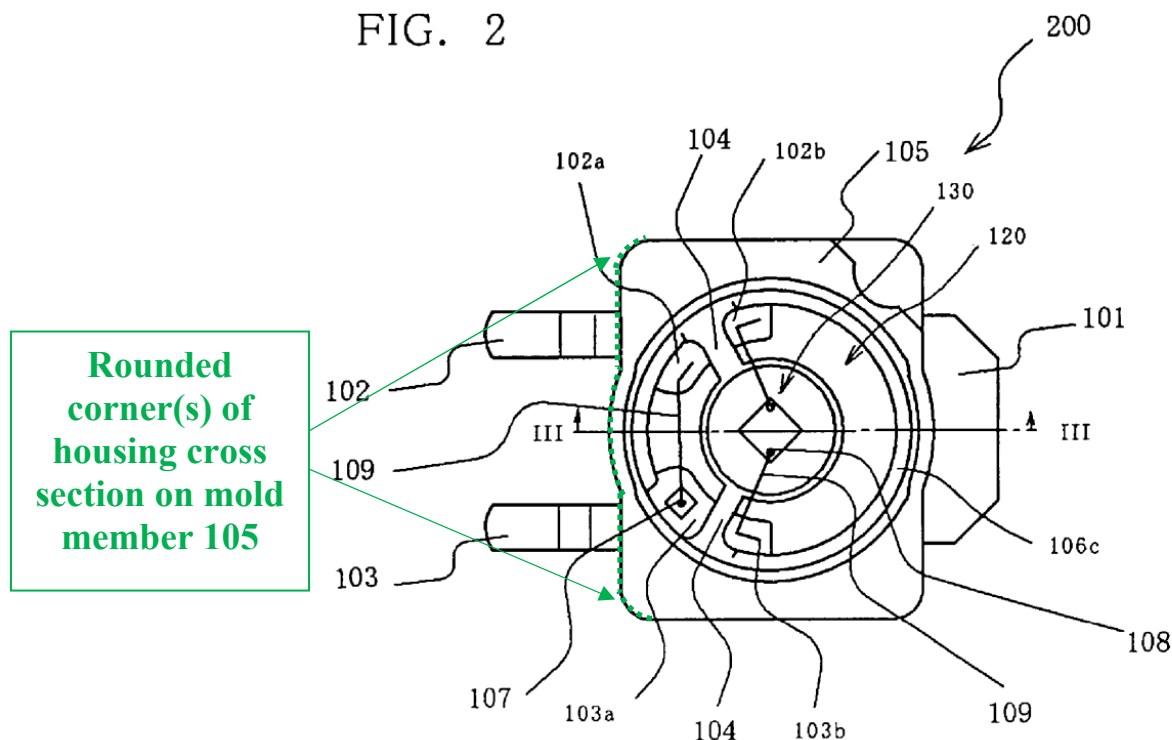


FIG. 2 of Nakashima (Annotated)

C. GROUND 3: Umeda in View of Bando and/or the OLSA

For Ground 3, the prior art consists of Umeda and Bando in view of the ordinary level of skill in the art (OLSA). The challenged claims are claims 1-5. Umeda discloses all of the elements of claim 1 of the '733 patent except an “encapsulant” covering the LED chip. It would have been obvious to include an encapsulant to cover the LED chip in Umeda in view of Bando and/or the OLSA (*See* Ex-1003 at § 9.3).

1. Claim 1

Umeda and Bando disclose each element of and render obvious claim 1 as

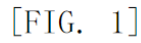
described below (*See* Ex-1003 at § 9.3.1).

a) Preamble

Umeda discloses a “light emitting device” whether or not the preamble is a limitation (*See* Ex-1003 at § 9.3.1.1). “Light emitting device 1” of Umeda is a light emitting device (Ex-1007 at [0033]).

**b) A carrier ... comprises at least one electrode portion ...
and a housing**

Umeda discloses a carrier that comprises at least one electrode portion and a housing (*See* Ex-1003 at § 9.3.1.2). For example, package 2 of Umeda is a carrier that is “made up of a first lead electrode 10, a second lead electrode 20, and a resin molded body 3 molded to be integrated with the lead electrodes 10 and 20” (Ex-1007 at [0033]). The lead electrodes 10, 20 are at least one electrode portion and resin molded body 3 is a housing. Umeda discloses that “each of the lead electrodes 10 and 20 is exposed at the bottom of the cup portion 3a” of the resin molded body, and “[t]he outer ends of the lead electrodes 10 and 20 extend outward from the outer periphery of the resin molded body 3” (Ex-1007 at [0034]).



c) A light emitting diode (LED) chip carried within the carrier

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[FIG. 1]

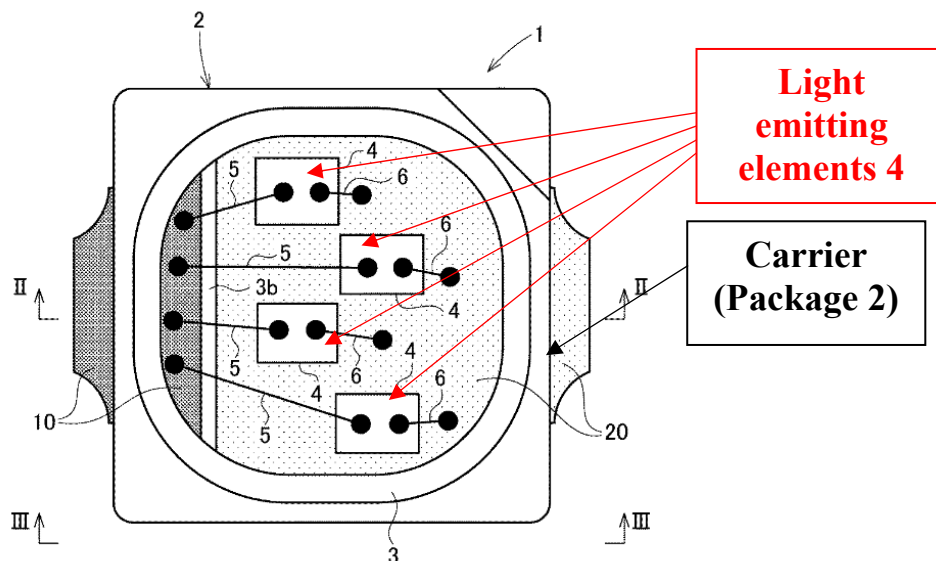


FIG. 1 of Umeda (Annotated)

d) An encapsulant covering the LED chip

Umeda does not explicitly disclose an encapsulant covering the LED chip/light emitting element 4.

Bando discloses an encapsulant covering an LED chip (*See* Ex-1003 at § 9.3.1.4). Bando discloses that after its light emitting elements 10 (which are semiconductor light emitting elements *i.e.*, LED chips (Ex-1009 at 8:35-49; Ex-1003 at ¶ 277)) are secured in package 2, sealing resin 4 is filled or “encapsulates” the package (Ex-1009 at 14:41-45). Bando discloses that the sealing resin 4 encapsulating the light emitting element has the beneficial effect of “prevent[ing] short circuit of the wire lines 3, and the p-pad and n-pad electrodes of the light emitting elements 10” (Ex-1009 at 14:45-47). Bando teaches using a sealing resin 4

or “encapsulant” to “protect[] the light emitting element against external force, moisture, and so forth, and also protects the wiring” (Ex-1009 at 7:6-17). Bando’s encapsulant has the beneficial effect of being “formed in a desired shape on the light emission side to provide a lens effect” in order to focus the light from the light emitting element 10 in a desired direction (Ex-1009 at 14:65-15:10). Bando’s encapsulant can also “improve adhesion between the light emitting element 10 and the lead middle region 101” (Ex-1009 at 15:11-14). Finally, if “sealing resin 4 is mixed with a wavelength conversion member such as phosphor material that is excited by light from the light emitting elements 10 and emits luminescent radiation, the light from the light emitting elements 10 is converted to light with different wavelength, thus, it is possible to emit mixture light of the light from the light emitting elements 10 and the light with wavelength converted by the wavelength conversion member” (Ex-1009 at 15:22-29).

As Dr. Lebby testifies, the use of an encapsulant to protect an LED chip was well-known to a POSITA in 2014, for example as evidence by Kishikawa (Ex-1003 at ¶ 277; Ex-1004 at 7:6-17 (to protect the LED chip from external elements); 7:45-51 (to allow for wavelength conversion using diffuser or fluorescent substance and improve directionality)). The use of an encapsulant to diffuse or change the direction of light was well-known to a POSITA in 2014 (Ex-1003 at ¶ 273; *see also id.* at §

6.4). And the use of an encapsulant that includes a fluorescent material to change the color of emitted light – particularly to change the light to mimic white light – was well known to a POSITA in 2014 (*Id.*). A POSITA would have been motivated to use an encapsulant to cover the light emitting elements of Umeda based on these well-known benefits and the explicit teachings of disclosure and teaching of Bando and/or Kishikawa (Ex-1003 at ¶ 274).

A POSITA would have found no technical problems or difficulties incorporating the sealing resin 4 of Bando or that known to a POSITA into to light emitting device 1 of Umeda in order to cover the light emitting element 4 of Umeda (Ex-1003 at ¶¶ 274-278). Application of such an encapsulant was well-known, ordinary, and routine in 2014, and could easily be applied to or filled or potted “cup portion 3a” of Umeda just as Bando describes how it is applied to its opening of package 2 (Ex-1009 at 14:32-50). It would have been obvious to a POSITA in 2014 to incorporate the sealing resin encapsulant of Bando into the Umeda in order to cover Umeda’s light emitting element.

e) The carrier comprises: at least one electrode portion,

As explained in §XI(C)(1)(b), *supra*, the carrier/package 2 of Umeda comprises at least one electrode portion in the form of lead electrodes 10, 20. Package 2 of Umeda is a carrier “made up of a first lead electrode 10, a second lead electrode 20” (Ex-1007 at [0033]; Fig. 1).

[FIG. 1]

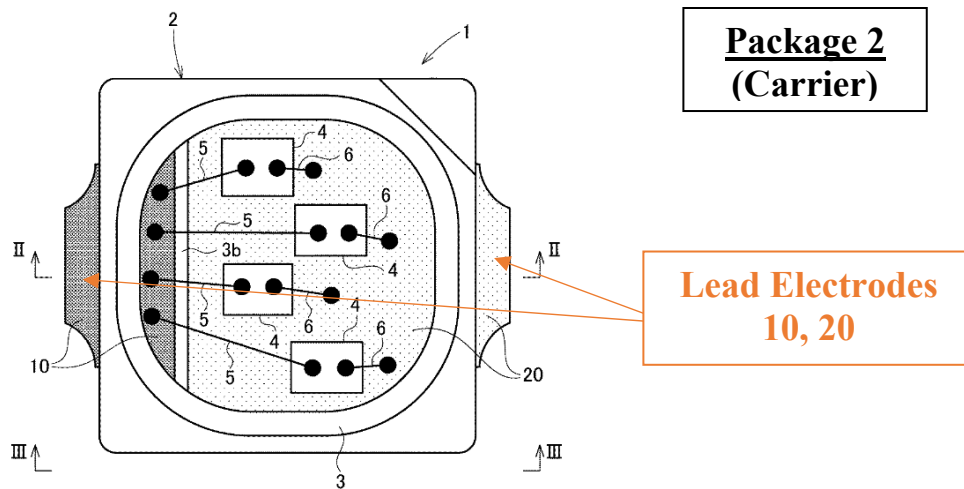


FIG. 1 of Umeda (Annotated)

f) Each of the at least one electrode portion comprising at least an electrode portion cross section

Umeda discloses each of the at least one electrode portions comprises at least an electrode portion cross section (*See* Ex-1003 at § 9.3.1.5). Although Umeda does not describe its light emitting device structure in terms of “cross sections,” the structural arrangement of Umeda is the same as that claimed in the ’733 patent. Umeda FIG. 5a is reproduced below to illustrate the electrode portion cross sections on lead electrode 20.

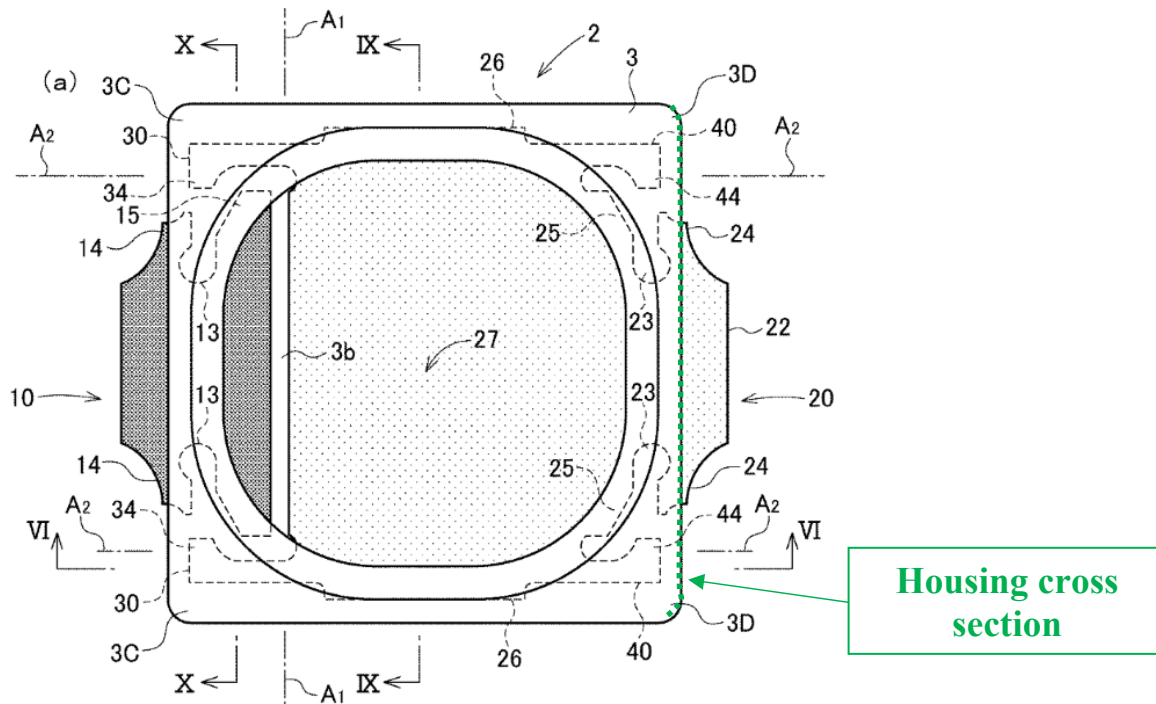
**Electrode cross
section(s) on
edge portions
24 of lead
electrode 20**

Umeda FIG. 5a (Annotated)

g) The carrier comprises ... a housing comprising a housing cross section

As explained in §XI(C)(1)(b), *supra*, the carrier/package 2 of Umeda comprises at housing in the form of resin molded body 3 (*See* Ex-1003 at § 9.3.1.6; Ex-1007 at [0033]). Although Umeda does not use the “cross section” language of the ’733 patent, the edges of resin molded body 3 has a housing cross section.

[FIG. 5]



Umeda FIG. 5a (Annotated)

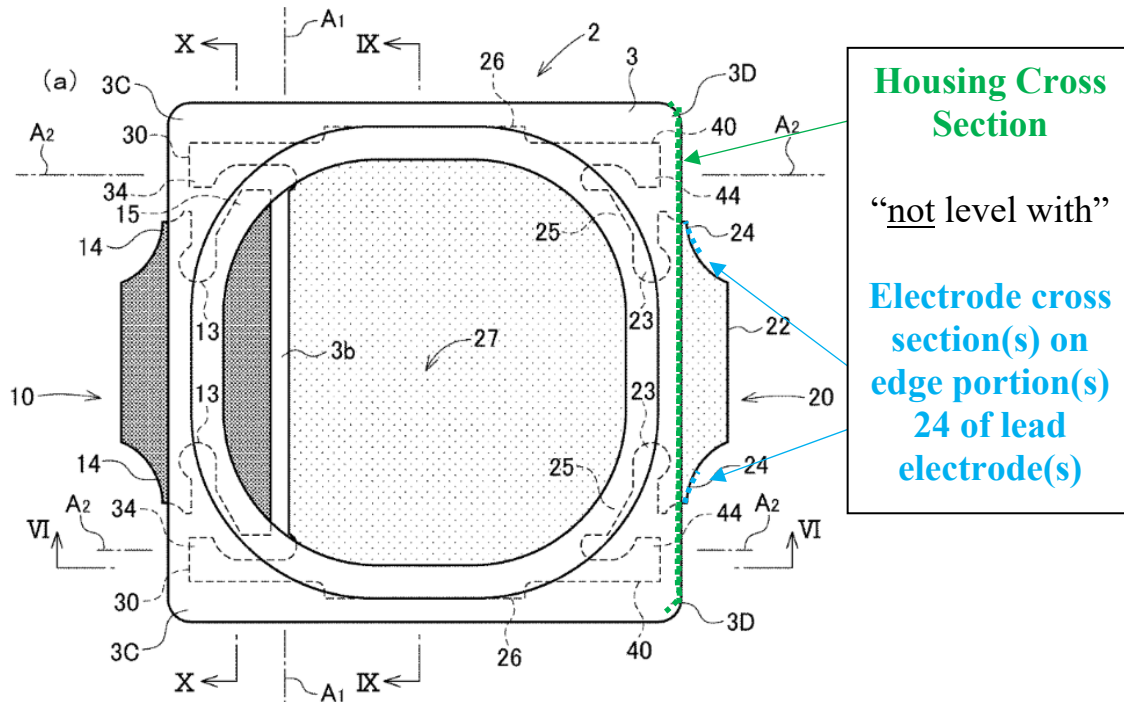
h) The housing at least partially covering the at least one electrode portion,

Umeda discloses the housing at least partially covering the at least one electrode portion (*See* Ex-1003 at § 9.3.1.7). Umeda discloses that its “front edge 22” of the electrode 20 “protrude[es] from the resin molded body 3” (Ex-1007 at [0039]) while “recessed portions” 13 and 23 of the electrodes are covered by resin molded body 3 (Ex-1007 at [0040], [0042]). This is illustrated in FIG. 5a, for lead electrode 20.

i) Wherein the housing cross section and the electrode portion cross section are not level with one another;

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[FIG. 5]



Umeda FIG. 5a (Annotated)

j) Each of the at least one electrode portion further comprises a central area and two edge areas,

Umeda discloses each of the at least one electrode portion further comprises a central area and two edge areas (*See* Ex-1003 at § 9.3.1.9). Umeda discloses that lead electrode 10 includes “front edge 12” (central area) and first side edges 14 (at least two edge areas), while lead electrode 20 includes “front edge 22” (central area) and first side edges 24 (at least two edge areas) (Ex-1007 at [0055]; FIG. 5a).

Diagram (a) shows a top view of a device 10. It features a central area 27, which is a large, roughly circular region with a dotted pattern. Surrounding this central area is a ring-like structure containing electrode edge areas 24, highlighted in orange. The device is composed of several layers and regions, including a central area 27, electrode edge areas 24, and various structural layers and regions labeled with numbers and letters. The diagram includes labels for regions A1, A2, and A3, and axes X, Y, and Z. The central area 27 is surrounded by a ring-like structure containing electrode edge areas 24. The device is composed of several layers and regions, including a central area 27, electrode edge areas 24, and various structural layers and regions labeled with numbers and letters. The diagram includes labels for regions A1, A2, and A3, and axes X, Y, and Z.

Umeda FIG. 5a (Annotated)

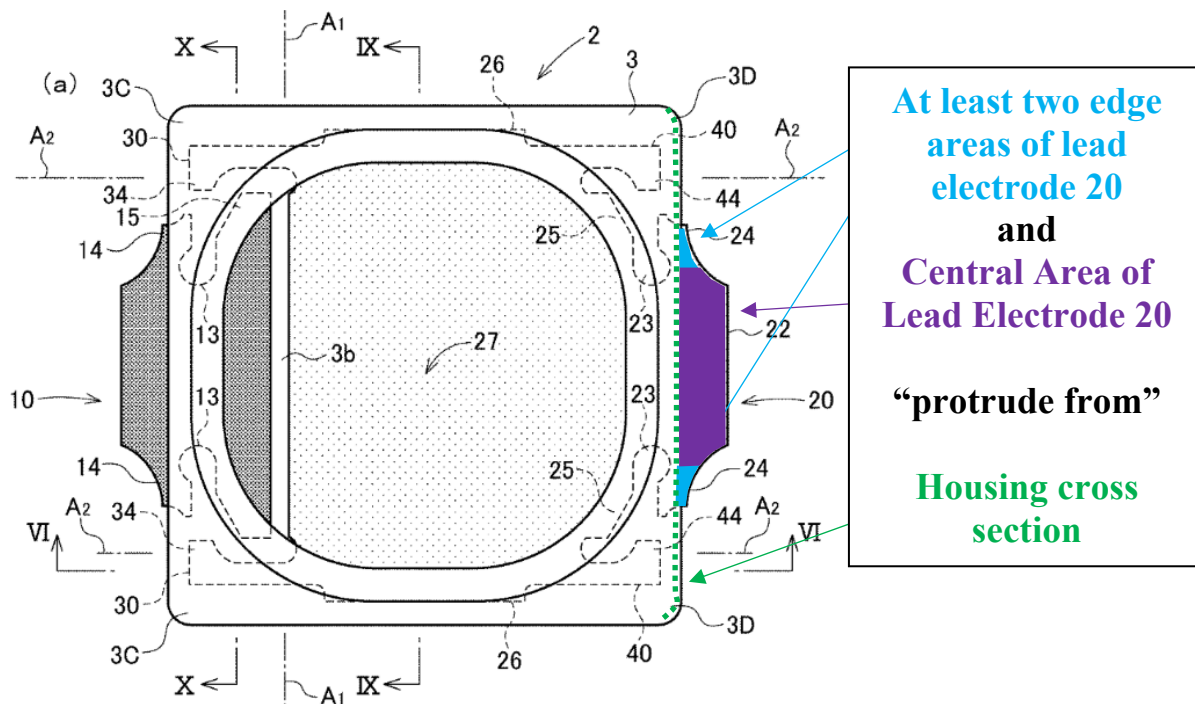
k) Wherein the electrode portion cross section is located on at least one of the two edge areas

As explained in §XI(C)(1)(f), *supra*, the electrode portion cross section is located on lead electrodes 10, 20 which are electrodes (*See* Ex-1003 at § 9.3.1.10). The electrode portion cross sections on first side edges 14 and 24 for lead electrodes 10 and 20, respectively, are edge areas (FIG. 5a).

l) Wherein the central area and the two edge areas protrude from the housing cross section;

90

[FIG. 5]

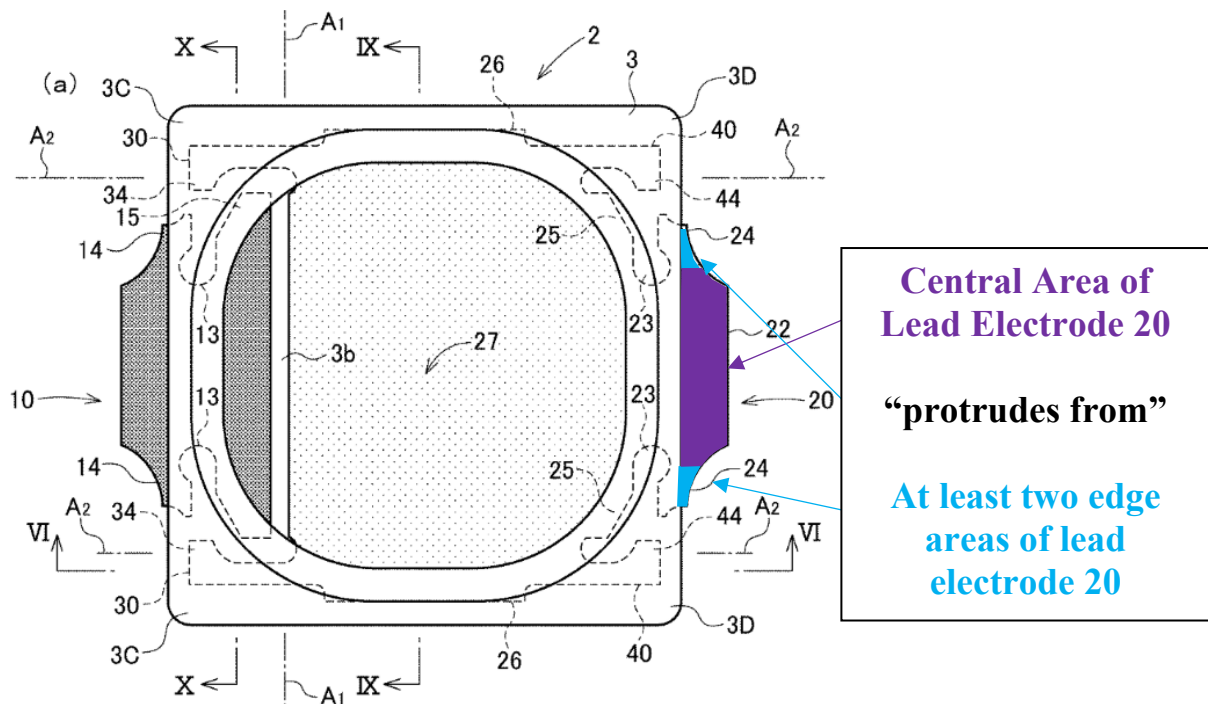


Umeda FIG. 5a (Annotated)

m) Wherein the central area protrudes from the two edge areas

The front edges 12 and 22 (central area) protrude from the first side edges 14 and 24 (two edge areas) of lead electrodes 10 and 20, respectively (See Ex-1003 at § 9.3.1.12). This is shown in the below annotated Umeda FIG. 5a for lead electrode 20.

[FIG. 5]



Umeda FIG. 5a (Annotated)

2. Claim 2

Umeda discloses the electrode portion cross section comprises a sloping surface (*See* Ex-1003 at § 9.3.2). For example, Umeda describes how the center portion of the lead electrode 20 “forms an extending portion 28 that extends outward in a substantially trapezoidal shape” (Ex-1007 at [0042]). As illustrated in Umeda FIG. 5a, the first side edges 14 and 24 (two edge areas) of lead electrodes 10 and 20 are curved. As appreciated by a POSITA and anyone who has taken high school geometry, each point on a curve is associated with a tangential slope of the curve (Ex-1003 at ¶ 307). Thus, each point on the first side edges 14 and 24 (two edge areas) of lead electrodes 10 and 20 is associated with a slope and the first side edges 14 and

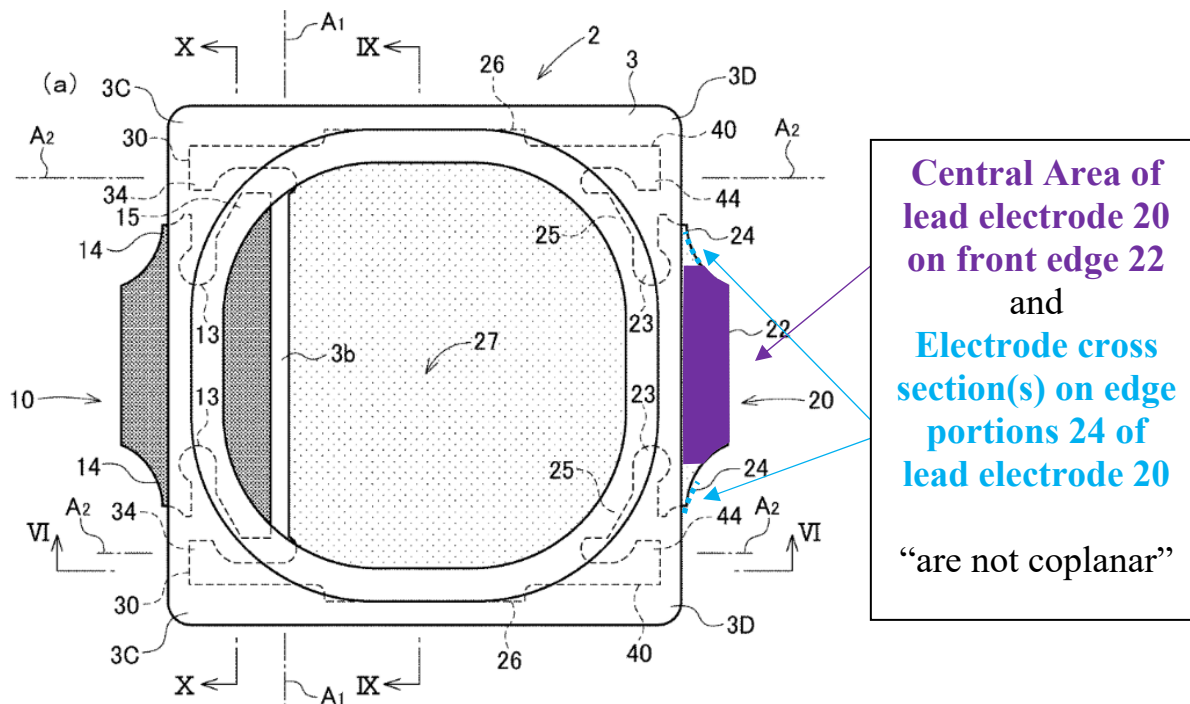
24 (two edge areas) of lead electrodes 10 and 20 are sloping surfaces, and the electrode portion cross section comprises a sloping surface (*Id.*).

Further, as Dr. Lebby testifies, whether a flat sloping surface or curved sloping surface is used for the lead electrodes is a mere design choice that would be well-known to a POSITA (*e.g.*, as illustrated by the flat sloped surfaces of Kishikawa). Thus, to the extent that the curved sloped surface of the first side edges 14 and 24 (two edge areas) of lead electrodes 10 and 20 of Umeda are not considered sloped surfaces, it would have been obvious to have a flat edge sloped surface as taught by Kishikawa as a design choice or to easier cut and shape the electrodes (Ex-1003 at § 9.3.2; 9.6).

3. Claim 3

Umeda discloses that the electrode portion cross section and the central area are not coplanar (*See* Ex-1003 at § 9.3.3). As shown in Umeda FIG. 5a, the electrode portion cross sections on first side edges 14 and 24 of lead electrodes 10 and 20 are not co-planar with front edges 12 and 22 of lead electrodes 10 and 20.

[FIG. 5]

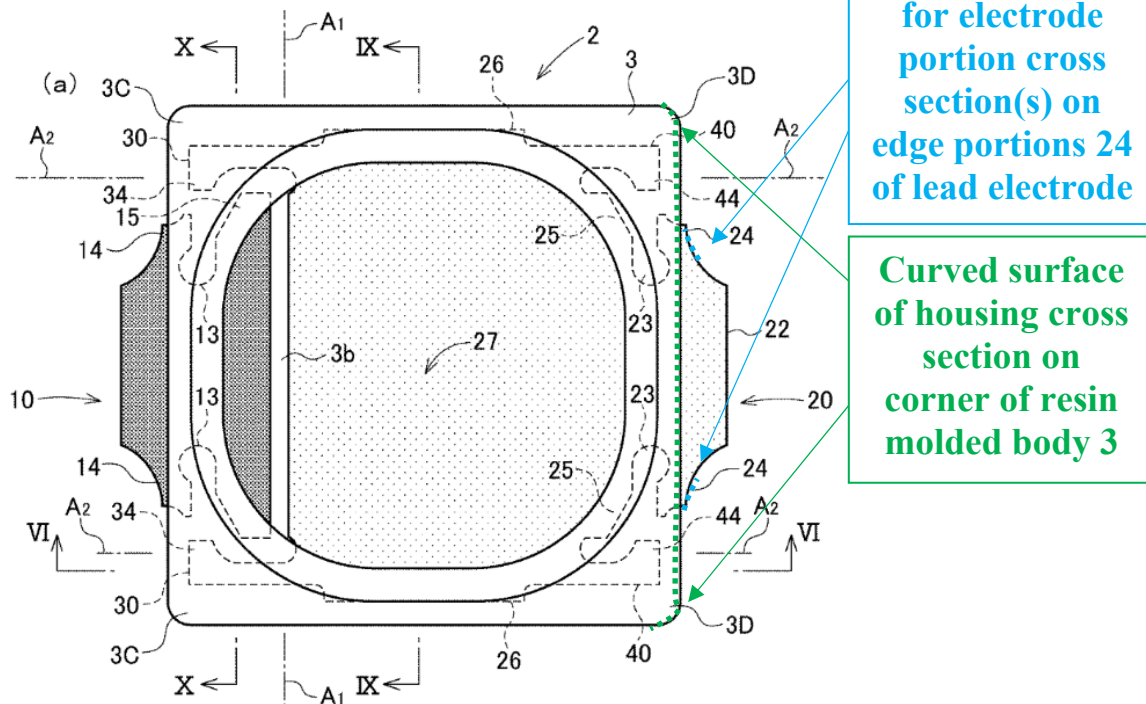


Umeda FIG. 5a (Annotated)

4. Claim 4

Umeda discloses that each of the housing cross section (e.g., cross section through housing corners) and the electrode portion cross section (e.g., cross section through side edges 14, 24) comprises a curved surface (FIG. 5a) (*See* Ex-1003 at § 9.3.4).

[FIG. 5]

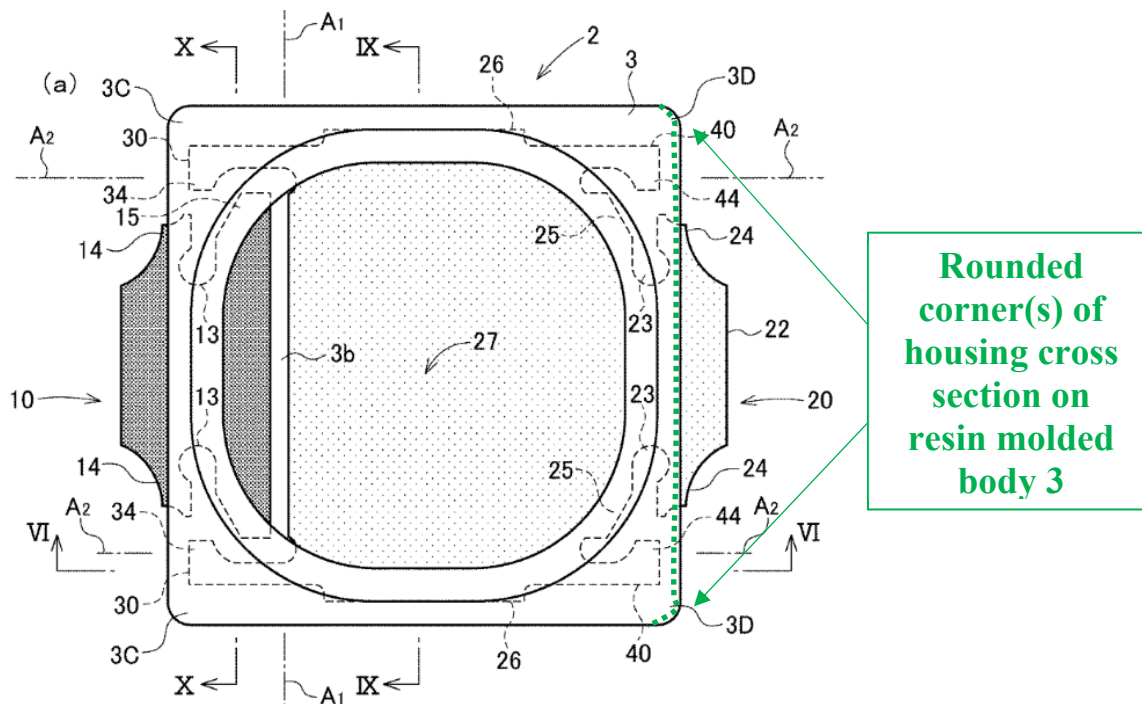


Umeda FIG. 5a (Annotated)

5. Claim 5

Umeda discloses that the housing cross section comprises a rounded corner via the rounded corners of resin molded body 3 as shown in FIG. 5a (See Ex-1003 at § 9.3.5).

[FIG. 5]



Umeda FIG. 5a (Annotated)

6. Claim 7

Although Umeda does not explicitly disclose that at least one electrode portion comprises an antioxidant layer, and wherein the electrode portion cross section comprises a cross section uncovered by the antioxidant layer, Bando does disclose the claimed antioxidant layer (*See* Ex-1003 at § 9.3.6). Bando describes how electrodes can be “plated to prevent oxidation” (Ex-1009 at 2:3-8) where, for example, “silver is plated thereon” such that it “is less prone to be oxidized by air, and thus is prevented from corrosion of metal” (Ex-1009 at 19:3-5). The electrodes and structural arrangements disclosed in Bando and Umeda are substantially similar,

and one skilled in the art would not have faced any technical difficulties in using a plated metal disclosed as disclosed in Bando for the electrodes of Umeda, for example to achieve Bando's disclosed benefit of preventing corrosion (Ex-1003 at ¶ 316; Ex-1009 at 19:3-5).

Bando discloses that when a plated electrode (*i.e.*, electrode with antioxidant layer) is cut in order to form the (e.g., Umeda's trapezoidal) shape desired during manufacturing, the portion that is cut on the edge of the electrode would form a cross section that is uncovered with the antioxidant plating (*See e.g.*, Ex-1009 at 17:66-18:3 (“cut surfaces of the lead connection portions 111 are not subjected to plating that prevents corrosion of metal”)) and 19:9-13 (“silver is not plated on the lead cut surfaces 111 b as cut surfaces of the lead connection portions 111. Accordingly, the lead cut surfaces 111 b may be oxidized by air or the like.”)).

Thus, using a plated metal as disclosed in Bando for the electrode material in Umeda would result in an electrode with an antioxidant layer where the electrode portion cross section comprising a cross section uncovered by the antioxidant layer (Ex-1003 at ¶ 317). One skilled in the art would find it obvious to use such a plated metal in order to prevent corrosion on the electrode as taught by Bando (Ex-1003 at ¶ 318).

D. GROUND 4: Anticipation by Kuramoto

For Ground 4, the prior art consists of Kuramoto (Ex-1008). The challenged

claims are claims 1-5 and 7.

1. Claim 1

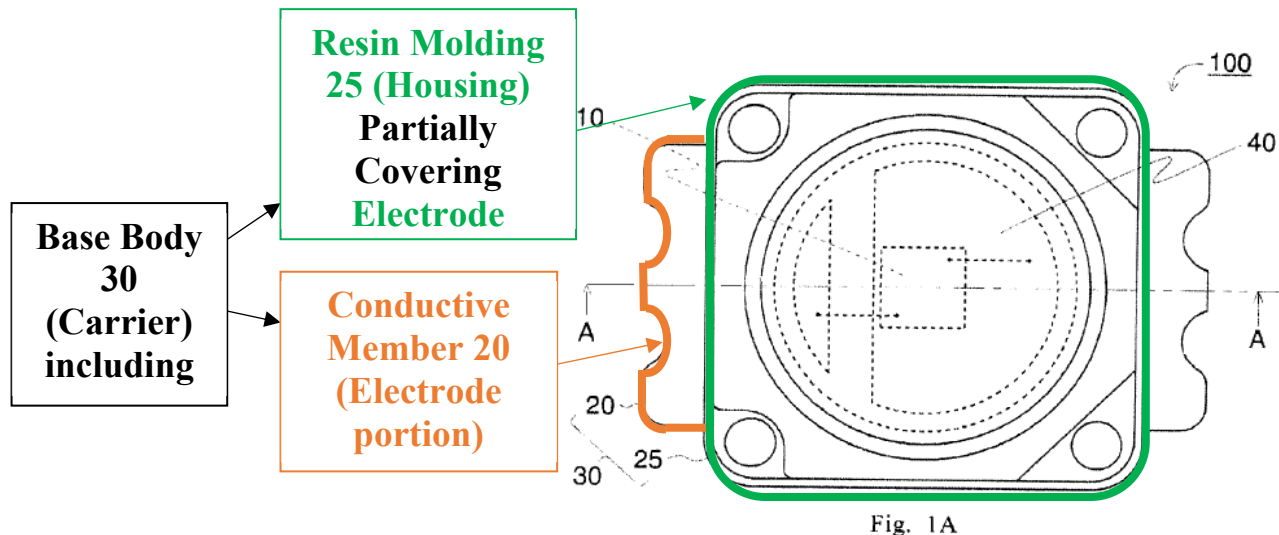
Kuramoto discloses each element of claim 1 as described below (Ex-1003 at § 9.4.1).

a) Preamble

Kuramoto discloses a “light emitting device,” whether or not the preamble is a limitation (Ex-1003 at § 9.4.1.1). Kuramoto’s light emitting device 100 is a light emitting device (Ex-1008 at [0043]).

b) A carrier ... comprises at least one electrode portion ... and a housing

Kuramoto discloses a “carrier” that comprises “at least one electrode portion” and a “housing” (Ex-1003 at § 9.4.1.2). Kuramoto’s base body 30 is a carrier that “is a mount base on which the light emitting element is mounted” (Ex-1008 at [0128]; Fig. 1A). The base body includes “a conductive member 20” (at least one electrode portion) “that is connected to the light emitting element 10” (Ex-1008 at [0043]). The base body includes “a molding 25” or “housing” that is integrally formed with the conductive member 20” (*Id.*). “[T]he base body is package including ... the resin molding 25” which made be made of a thermoplastic, thermosetting, epoxy, silicone, polyamide, or polyurethane resins (Ex-1008 at [0044]; [0130]).



Kuramoto FIG. 1A (Annotated)

c) A light emitting diode (LED) chip carried within the carrier

Kuramoto discloses an LED chip carried within the carrier (Ex-1003 at § 9.4.1.3). “[L]ight emitting element 10 is an LED chip that is pasted on the bottom surface of the recess 31 of the base body by an adhesive (not shown) and is connected to the conductive member 20 by wires” (Ex-1008 at [0044]; [0127]; Fig. 1A).

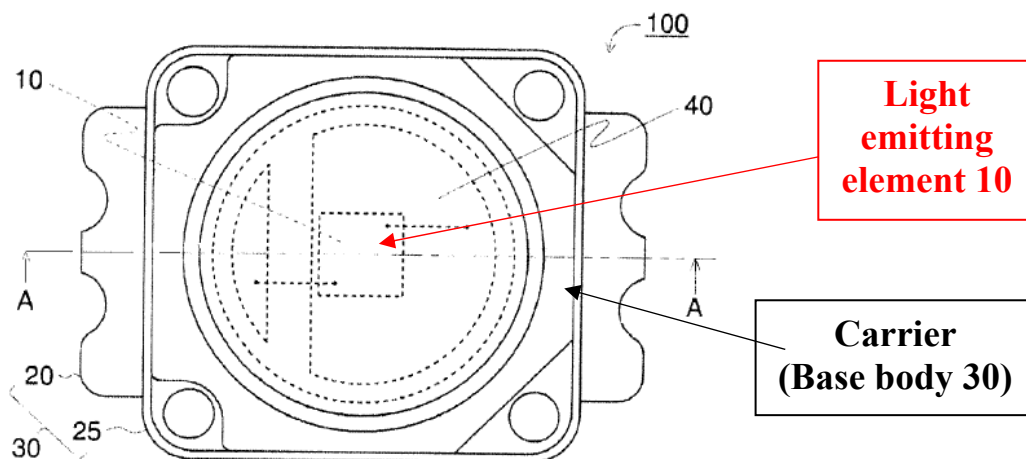


Fig. 1A

Kuramoto FIG. 1A (Annotated)

d) An encapsulant covering the LED chip

Kuramoto discloses an encapsulant covering the LED chip (Ex-1003 at § 9.4.1.4). Sealing member 40 is an encapsulant that “seals the light emitting element, the wires and a part of the conductive member so as to protect them from dust, moisture external force and the like” (Ex-1008 at [0133]). It may be a “sealing resin that is provided to cover the light emitting element 10” (Ex-1008 at [0044]).

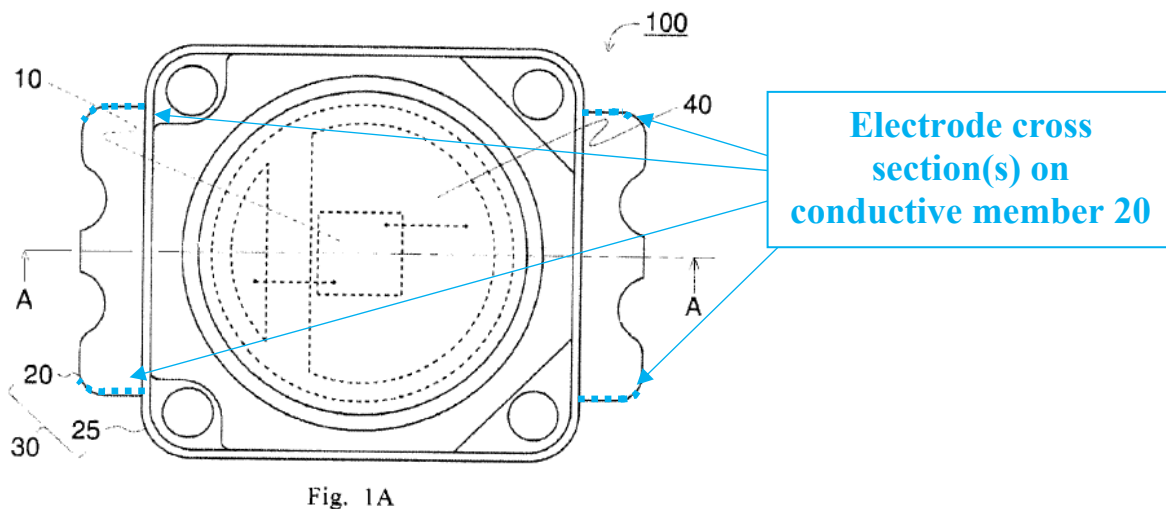
e) The carrier comprises: at least one electrode portion,

As explained in §XI(A)(1)(b), *supra*, the carrier (base body 30) of Kuramoto comprises “at least one electrode portion” in the form of conductive member 20 (Ex-1003 at § 9.4.1.4; Ex-1008 at [0043]). Conductive member 20 “may be made of a metal that can be connected to the light emitting element to conduct electricity. Specifically, it may be a lead frame or a lead electrode made of copper, aluminum,

gold, silver, tungsten, iron, nickel, cobalt, molybdenum, an alloy thereof, phosphor bronze, iron-containing copper or the like” (Ex-1008 at [0129]).

f) Each of the at least one electrode portion comprising at least an electrode portion cross section

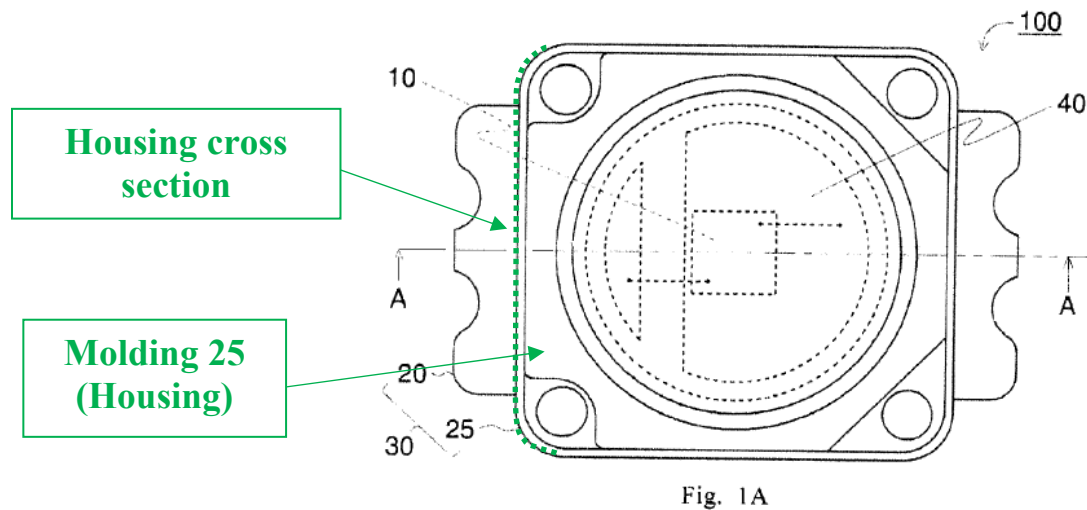
Kuramoto discloses each of the at least one electrode portion comprising “at least an electrode portion cross section” (Ex-1003 at § 9.4.1.6). Kuramoto FIG. 1A illustrates example cross electrode portion cross sections on the edge portions of each of conductive member 20 (*i.e.*, electrode portion).



Kuramoto FIG. 1A (Annotated)

g) The carrier comprises ... a housing comprising a housing cross section

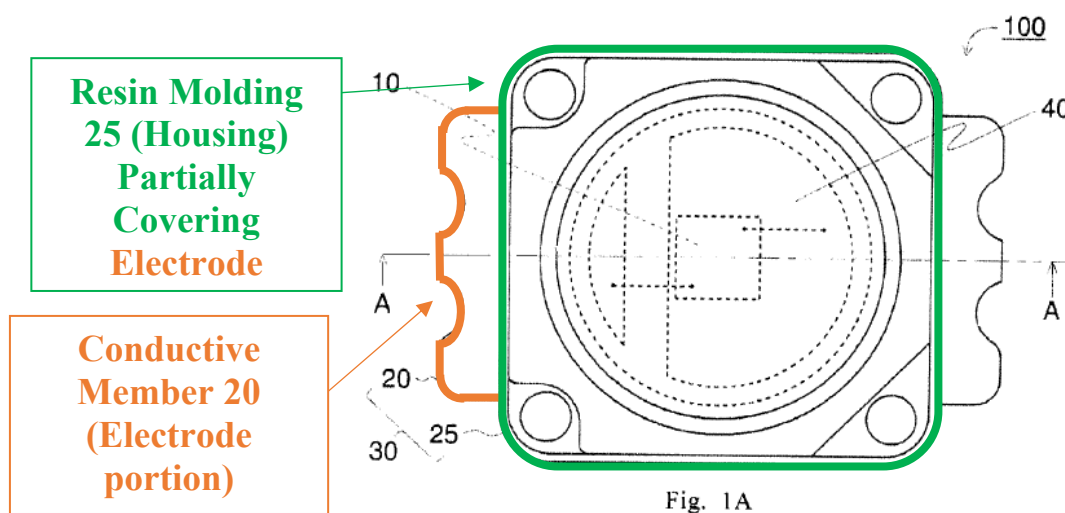
As shown in Kuramoto FIG. 1A, Kuramoto’s “housing” has a “housing cross section” (Ex-1003 at § 9.4.1.7).



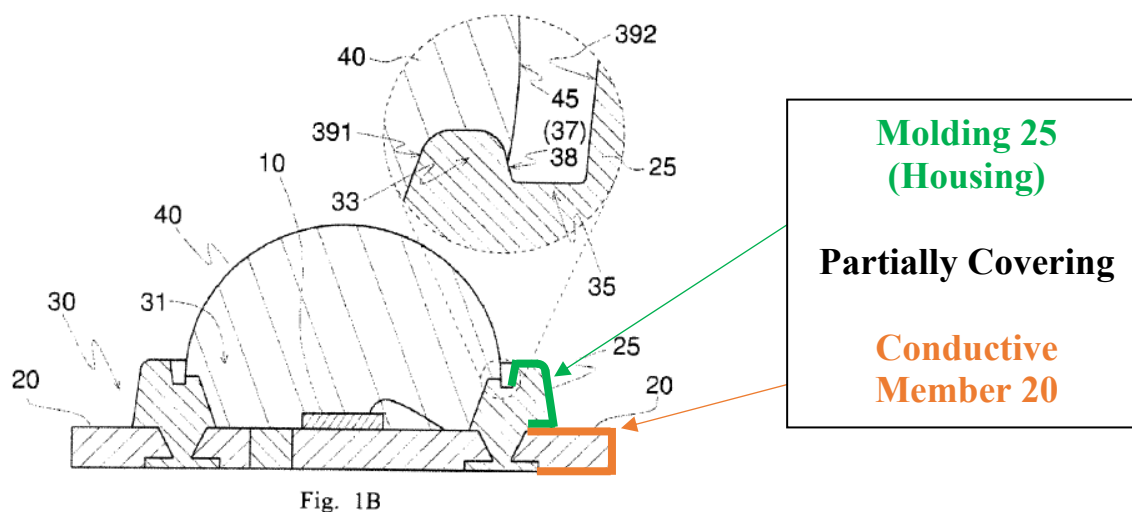
Kuramoto FIG. 1A (Annotated)

h) The housing at least partially covering the at least one electrode portion,

Kuramoto discloses the “housing” (molding 25) at least partially covering the “at least one electrode portion” (conductive member 20) as shown in Kuramoto FIGs. 1a and 1b (Ex-1003 at § 9.4.1.8). Kuramoto describes that that its molding 25 (*i.e.*, housing) “is integrally formed with” and “integrally holds” conductive member 20 (*i.e.*, electrode portion (Ex-1008 at [0043]-[0044])).



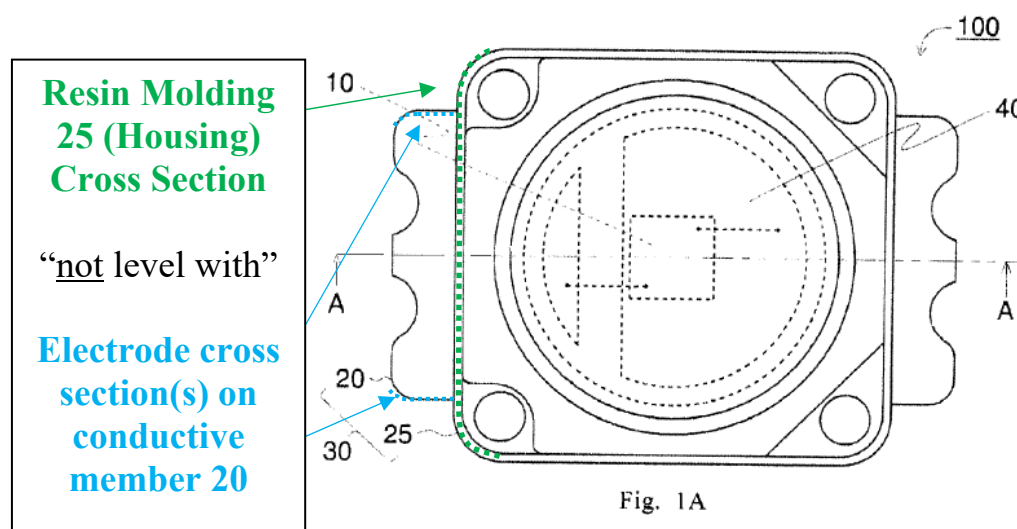
Kuramoto FIG. 1A (Annotated)



Kuramoto FIG. 1B (Annotated)

- i) Wherein the housing cross section and the electrode portion cross section are not level with one another;

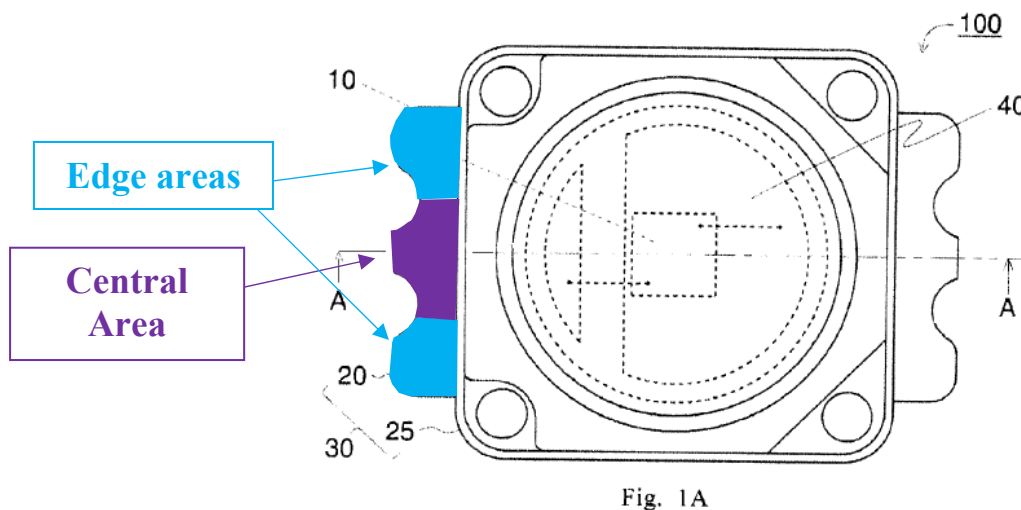
As shown in Kuramoto FIG. 1A, Kuramoto's housing cross section and electrode portion cross section are not level with one another (Ex-1003 at § 9.4.1.9).



Kuramoto FIG. 1A (Annotated)

- j) Each of the at least one electrode portion further comprises a central area and two edge areas,**

Kuramoto discloses each of the at least one electrode portion further comprises a central area and two edge areas (Ex-1003 at § 9.4.1.10). As shown in FIG. 1A, conductive member (*i.e.*, electrode portion) comprises a central area and two edge areas.



k) Wherein the electrode portion cross section is located on at least one of the two edge areas

As shown in FIG. 1A, the electrode portion cross sections are located on at least one of the two edge areas of conductive member 20 (Ex-1003 at § 9.4.1.11; *see also supra* §XI(A)(1)(j)).

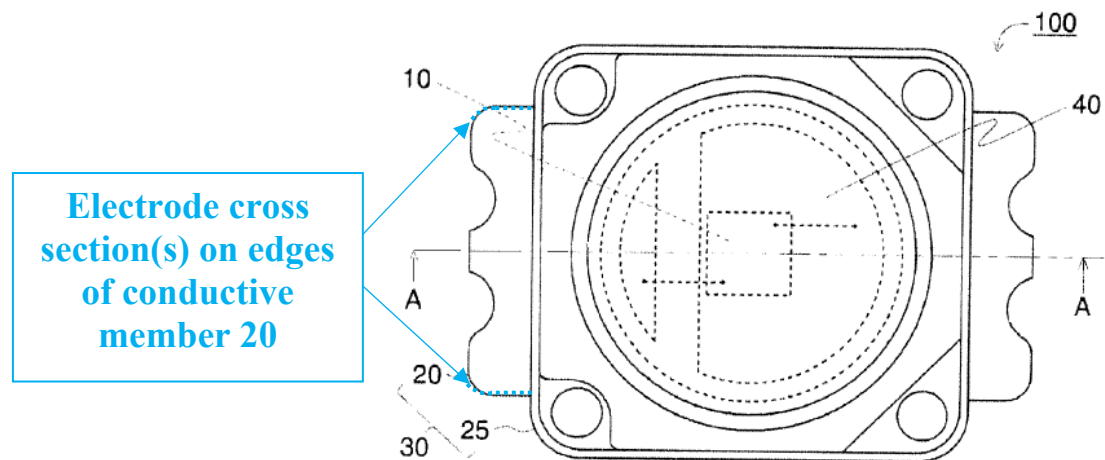


Fig. 1A

Kuramoto FIG. 1A (Annotated)

l) Wherein the central area and the two edge areas protrude from the housing cross section;

Kuramoto discloses that the central area and two edge areas of conductive member protrude from the housing cross-section as shown in FIGs. 1A and 1B (Ex-1003 at § 9.4.1.12; *see also supra* §XI(A)(1)(f)-(g)&(j)).



The central area of conductive member 20 protrudes from the two edge areas of metal member 20, as shown in the below annotated Kuramoto Fig. 1A (Ex-1003 at § 9.4.1.13).



2. Claim 2

Kuramoto discloses the electrode portion cross section comprises a sloping surface (Ex-1003 at § 9.4.2). For example, as shown in FIG. 1A of Kuramoto, the edge area cross section is sloped.

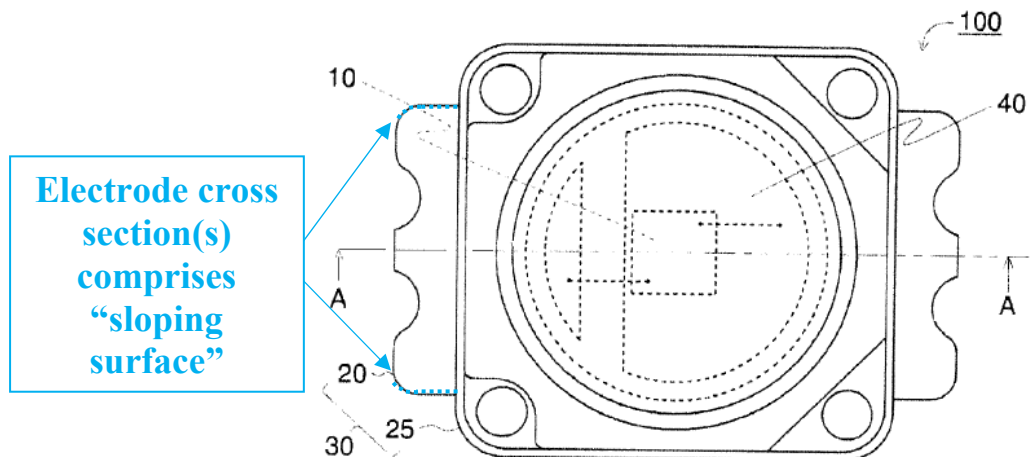
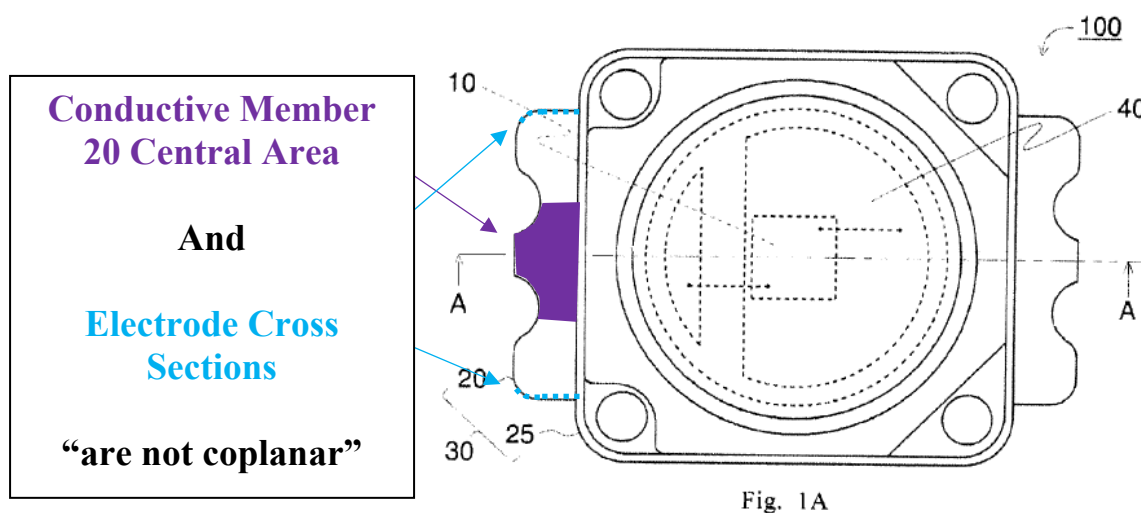


Fig. 1A

Kuramoto FIG. 1A (Annotated)

3. Claim 3

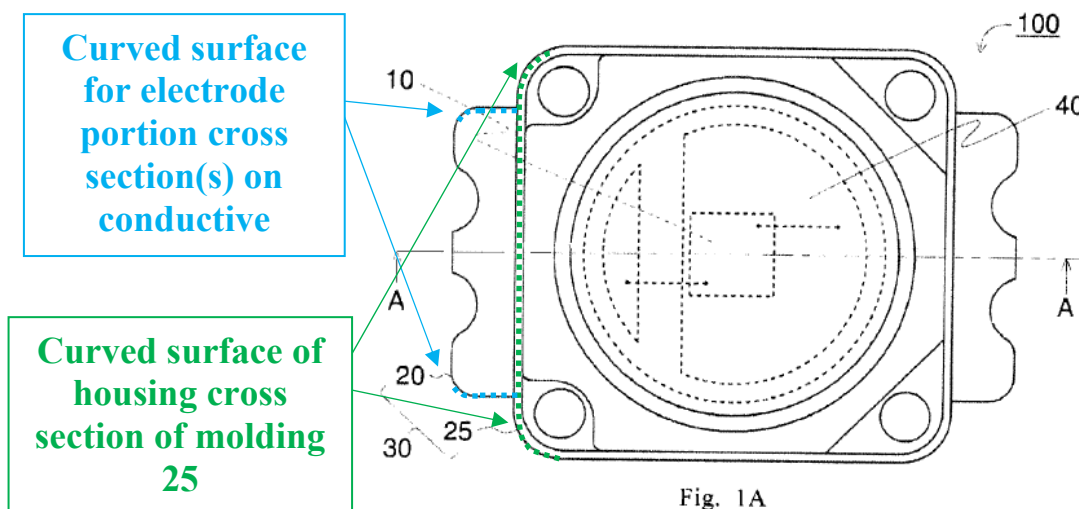
Kuramoto discloses that the electrode portion cross section and the central area are not coplanar (Ex-1003 at § 9.4.3). As shown in the annotated version of Kuramoto FIG. 1A, the central portion of conductive member 20 is somewhat irregularly shaped and not co-planar with the electrode cross sections on the edge portions of conductive member 20.



Kuramoto FIG. 1A (Annotated)

4. Claim 4

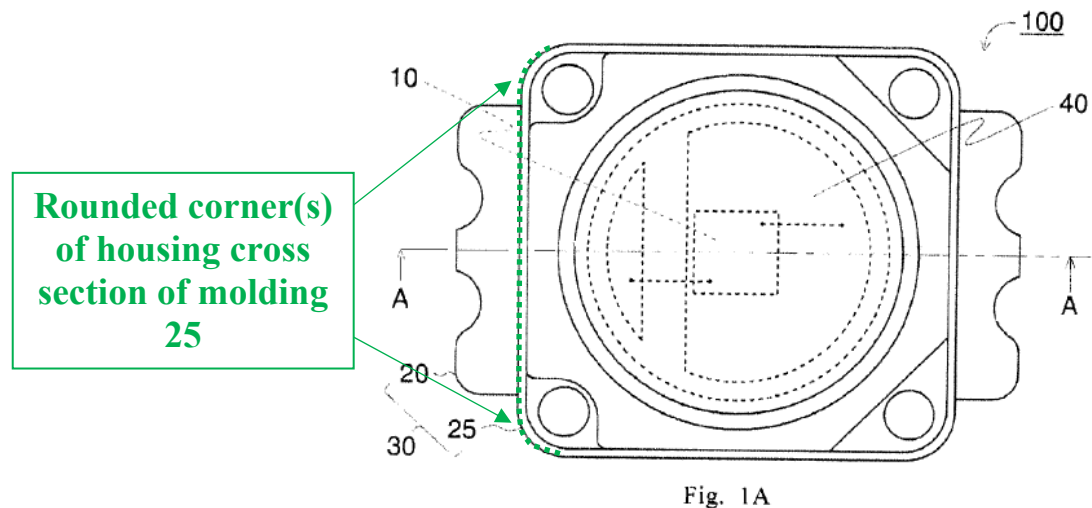
Kuramoto discloses that the housing cross section along the molding 25 (“housing”) corners and the electrode portion cross section each comprises a curved surface in FIG. 1A below (Ex-1003 at § 9.4.4).



Kuramoto FIG. 1A (Annotated)

5. Claim 5

Kuramoto discloses that the housing cross section comprises a rounded corner through the rounded corners of molding 25 (housing), as shown in the below annotated Kuramoto FIG. 1A (Ex-1003 at § 9.4.5).



Kuramoto FIG. 1A (Annotated)

6. Claim 7

Kuramoto discloses that at least one electrode portion comprises an antioxidant layer, and wherein the electrode portion cross section comprises a cross section uncovered by the antioxidant layer (Ex-1003 at § 9.4.6). Kuramoto discloses that the surface of conductive member 20 (at least one electrode portion) may be protected or “coated with a plating of silver, aluminum, rhodium, gold, copper or an alloy thereof” (*Id.*).

As noted by Dr. Lebby, these types of coatings would protect the underlying

metal (*e.g.*, copper) from interacting with oxygen in the air (Ex-1003 at ¶ 355). For example, Bando describes how electrodes can be “plated to prevent oxidation” (Ex-1009 at 2:3-8) where, for example, “silver is plated thereon” such that it “is less prone to be oxidized by air, and thus is prevented from corrosion of metal” (Ex-1009 at 19:3-5). Thus, the coated plating of silver in of silver Kuramoto would be understood by a POSITA to be an anti-oxidant layer (Ex-1003 at ¶ 355).

Further, Kuramoto describes its processing for manufacturing its light emitting device 100 with respect to FIG. 2A-2E (Ex-1008 at [0030]). Kuramoto describes cutting the plate in order to form individual light emitting diodes 100 (Ex-1008 at [0052]). This is illustrated in FIG. 2E, below.

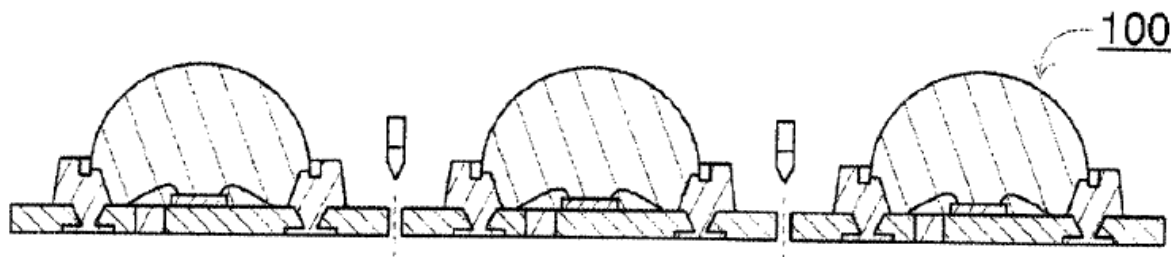


Fig. 2E

FIG. 2E of Kuramoto

The cutting results in exposed portions of the conductive member – including the electrode portion cross section and the silver plating antioxidant layer – on the edge area of conductive member 20 (Ex-1003 at ¶¶ 352-353; *see also* Ex-1009 at 17:66-18:3 (“cut surfaces of the lead connection portions 111 are not subjected to

plating that prevents corrosion of metal”); 19:9-13 (“As a result, silver is not plated on the lead cut surfaces 111b as cut surfaces of the lead connection portions 111. Accordingly, the lead cut surfaces 111b may be oxidized by air or the like.”)).

Thus, the antioxidant layer of silver plating applied to conductive member 20 would be uncovered when the cutting of light emitting device 100 is performed in accordance with FIG. 2E, resulting conductive member 20 (electrode portion) comprising a silver plating (an antioxidant layer), and wherein the electrode portion cross section comprises a cross section uncovered by the silver plating.

E. GROUND 5: Obviousness over Bando

For Ground 5, claim 7 is the challenged claim. Claim 7 is obvious over any of Grounds 1, 2, or 4, the analysis of which are incorporated by reference into Ground 6, in view of Bando and/or the level of ordinary skill in the art (Ex-1003 at § 9.5).

Bando discloses the claimed “antioxidant layer” limitations. Bando describes how electrodes can be “plated to prevent oxidation” (Ex-1009 at 2:3-8) where, for example, “silver is plated thereon” such that it “is less prone to be oxidized by air, and thus is prevented from corrosion of metal” (Ex-1009 at 19:3-5). Bando discloses that when a plated electrode (*i.e.*, electrode with antioxidant layer) is cut in order to form the desired shape during manufacturing, the portion that is cut on the edge of the electrode would form a cross section that is uncovered with the antioxidant plating (*See e.g.*, Ex-1009 at 17:66-18:3 (“cut surfaces of the lead connection portions 111

are not subjected to plating that prevents corrosion of metal.”) and 19:9-13 (“silver is not plated on the lead cut surfaces 111 b as cut surfaces of the lead connection portions 111. Accordingly, the lead cut surfaces 111 b may be oxidized by air or the like.”).

The electrodes and structural arrangements disclosed in Bando and Nakashima, Kishikawa, and Kuramoto are substantially similar, and one skilled in the art would not have faced any technical difficulties in using a plated metal disclosed as disclosed in Bando for the electrodes of Nakashima, Kishikawa, and Kuramoto, for example to achieve Bando’s disclosed benefit of preventing corrosion (Ex-1003 at ¶¶ 357-359; Ex-1009 at 19:3-5). One skilled in the art would have found it obvious to use such a plated metal in order to prevent corrosion on the electrode as taught by Bando (Ex-1003 at ¶ 360). It would have been obvious to utilize the “protection film” disclosed in Bando to “protect the lead arrangement” and “prevent oxidation” (Ex-1009 at 6:19-21) on any of the electrodes disclosed by Nakashima, Kishikawa, or Kuramoto (to the extent the antioxidant limitations are found not to be met in Ground 4). Using a plated metal as disclosed in Bando for the electrode material in Nakashima, Kishikawa, or Kuramoto would result in an electrode with an antioxidant layer where the electrode portion cross section comprises a cross section uncovered by the antioxidant layer (Ex-1003 at ¶¶ 356-360).

F. GROUND 6: Obviousness over Kishikawa, Nakashima, or Kuramoto

Although Grounds 1, 2, and 4 (which are incorporated by reference into this Ground 6) are presented as novelty grounds, to the extent that any aspect of the claims is found to be novel over Kishikawa, Nakashima, or Kuramoto, given the substantial similarities between the structure of the prior art and the claimed structure of the '733 patent, as Dr. Lebby testifies, such differences would be inconsequential and would not provide any technical benefit in view of a POSITA's common knowledge (Ex-1003 at ¶ 362). Thus, the claims 1-5 are obvious over Kishikawa, Nakashima, or Kuramoto (Ex-1003 at § 9.6).

XII. SECONDARY CONSIDERATIONS

Petitioner is not aware of any secondary considerations that would overcome the strong showing of obviousness provided by the Petition. Further, any attempt by Patent Owner to rely on alleged secondary considerations cannot overcome the showing of obviousness detailed above. *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1370 (Fed. Cir. 2011).

XIII. CONCLUSION

Petitioner respectfully requests that the *inter partes* review of the '733 patent be instituted, as the Petition establishes a reasonable likelihood of prevailing with respect to the Challenged Claims. Petitioner respectfully requests cancellation of

Patent No. 9,640,733
IPR2024-00972

Petition Requesting *Inter Partes* Review

the Challenged Claims.

Respectfully submitted,

FLASTER GREENBERG P.C.

Date: May 29, 2024

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Certificate of Service

Pursuant to 37 C.F.R. §§ 42.6 and 42.106, the undersigned certifies that a true and correct copy of the foregoing Petition for *Inter Partes* Review of U.S. Patent No. 9,640,733, together with Petitioner's exhibits identified in the above Table of Exhibits, and Petitioner's Powers of Attorney, have been served on the Patent Owner via Federal Express Overnight, a means at least as fast and reliable as Priority Mail Express, mailed on the below date, at the following correspondence address of record for the '733 patent:

Attn: SUGHRUE MION, PLLC
2000 PENNSYLVANIA AVENUE, N.W.
SUITE 9000
WASHINGTON, DC 20006

Respectfully submitted,

FLASTER GREENBERG P.C.

Date: May 29, 2024

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