

Filed: January 23, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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INNOSCIENCE (ZHUHAI) TECHNOLOGY COMPANY, LTD., AND  
INNOSCIENCE AMERICA, INC.,

Petitioner,

v.

EFFICIENT POWER CONVERSION CORPORATION,

Patent Owner.

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IPR2023-01384

U.S. Patent 10,312,335

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**LIST OF EXHIBITS**

<b><u>Exhibit</u></b>	<b><u>Description</u></b>
Ex. 1030	Excerpt of the Declaration of Dr. Eric Fred Schubert in Support of Complainant's Opening Claim Construction Brief, <i>In the Matter of Certain Semiconductor Devices, and Methods of Manufacturing Same and Products Containing the Same</i> , ITC Investigation No. 337-TA-1366
Ex. 1031	Excerpt of Complainant's Supplemental Responses to Respondents' Supplemental Invalidity Contentions, <i>In the Matter of Certain Semiconductor Devices, and Methods of Manufacturing Same and Products Containing the Same</i> , ITC Investigation No. 337-TA-1366

**TABLE OF ABBREVIATIONS**

<b>Abbreviation</b>	<b>Description</b>
'335 patent	U.S. Patent No. 10,312,335
<i>Ahn</i>	Ex. 1010, U.S. Patent No. 5,905,274 to Ahn et al.
<i>Beach</i>	Ex. 1008, U.S. Patent Application Publication No. US 2007/0007547 A1 to Beach
GaN	Gallium nitride
Petition	Petition for <i>Inter Partes</i> Review of U.S. Patent No. 10,312,335 (Paper No. 1)
POPR	Patent Owner's Preliminary Response (Paper No. 7)
<i>Saxler</i>	Ex. 1007, U.S. Patent Application Publication No. US 2006/0108606 A1 to Saxler et al.
Shealy	Ex. 1003, Declaration of James Richard Shealy, Ph.D.
<i>Shenoy</i>	Ex. 1009, R.V. Shenoy and M. Datta, Effect of Mask Wall Angle on Shape Evolution during Through-Mask Electrochemical Micromachining, 143 J. Electrochemical Soc'y, pp. 544-549 (1996)
<i>Yoshida</i>	Ex. 1006, Certified Translation of Japanese Patent Publication No. JP H11-261053 to Yoshida

\*All emphasis added unless otherwise indicated.

**I. Introduction: The POPR Relies on Legally and Factually Deficient Arguments**

Patent owner advances legally flawed arguments in an attempt to salvage the claims from invalidity. That attempt fails.

**First**, Patent Owner misapplies *Hockerson, Inc. v. Avia Group, Int'l, Inc.*, 322 F.3d 951 (Fed. Cir. 2000). POPR, 26-27, 31-32. *Hockerson* and its progeny hold that patent drawings cannot be used to invalidate claims requiring precise proportions or particular sizes when not drawn to scale. Patent Owner agrees the drawings of *Yoshida* and *Saxler* shown in the Petition depict a pair of horizontal ledges with “substantially equal widths” but wrongly contends *Hockerson* forbids using these drawings for invalidity. POPR, 26-27, 31-32. *Hockerson* does **not apply** because the claim limitation “substantially equal widths” does not require precise proportion or size. The art thus renders obvious this limitation.

**Second**, Patent Owner advances unsupported attorney argument, not evidence, to contend that *Shenoy* is not analogous art. POPR, 38-39, 43. Petitioner’s expert thus stands un rebutted. Shealy, [044]-[045], [153]-[164], [233]-[240]. Moreover, the record shows Patent Owner’s attorney argument is factually incorrect. *Shenoy* addresses the same field of endeavor and provides solutions for achieving the gate structure of the ’335 patent. *Id.*; Petition, 8-9, 58-63, 88-92.

**II. Horizontal Ledges of “Substantially Equal Widths” is Not a Precise Proportion, and it is Disclosed by Each of *Saxler* and *Yoshida***

Patent Owner mischaracterizes *Hockerson* by extending it to claim 1’s requirement for ledges of “substantially equal widths,” which is not a precise proportion or size. POPR, 26-27, 31-32; *Hockerson*, 222 F.3d 951. *Hockerson* held that patent figures not drawn to scale do not supply written description support for “precise proportions of the elements” or “particular sizes” if the specification is silent on those issues. *Id.* at 956. Courts have extrapolated *Hockerson* from written description to invalidity for the premise that prior art drawings do not disclose precise proportions when not drawn to scale. *E.g.*, *Nystrom v. Trex Company, Inc.*, 374 F.3d 1105, 1116-18 (Fed. Cir. 2004). **But courts have repeatedly declined to extend *Hockerson* to relative proportions, terms of degree, and approximation.**

For example, in *Ex parte Bjorn*, the Board sustained rejection of a claim based on a patent drawing. No. 2018-001567, 2019 WL 6173305 (P.T.A.B. Oct. 16, 2019). There, the Board distinguished *Hockerson* because the limitation reciting “an exterior surface diameter that is ‘*less than or substantially equal* to the maximum thread diameter of the male screw section of the bone fixture’” required “[n]o particular dimensions or proportions,” and the prior art “clearly disclose[d] to a skilled artisan” that a drawing had that feature. *Id.* at \*10.

The Board reached the same conclusion when instituting review in *Presidio*

*Components Inc. v. Am. Tech. Ceramics Corp.* IPR2015-01330, Paper No. 11 at 11 (P.T.A.B. Dec. 3, 2015). The Board found *Hockerson* did not apply because the claims “did not require precise proportions,” only various co-extensive dimensions, surfaces, and ends of di-electric layers of a capacitor. *Id.* Accordingly, “a skilled artisan would glean all [claim] features from simply viewing Figures 3 and 5 of [the prior art] in conjunction with the corresponding written disclosure.” *Id.*

Numerous additional examples found *Hockerson* does not apply when terms do not involve precise proportions or sizes. In one case, a drawing of a “small kidney bean-shaped device located right under each eye of the wearer” provided written description support for placing an “under-eye” device that “*substantially cover[ed]*” the cheekbone. *Mueller Sports Medicine, Inc. v. Sportstar Athletics, Inc.*, 385 F. Supp. 2d 775, 777 (W.D. Wisc. 2005) (distinguishing *Hockerson*). In another, the below drawing disclosed a claimed slot that was “generally oval” and “aligned longitudinally,” finding *Hockerson* inapposite because those terms are not precise proportions or measurements. *Drop Stop LLC v. Jian Qing Zhu*, No. CV 16-07916 AG, 2017 WL 11501883, at \*7-8 (C.D. Cal. Aug. 28, 2017).



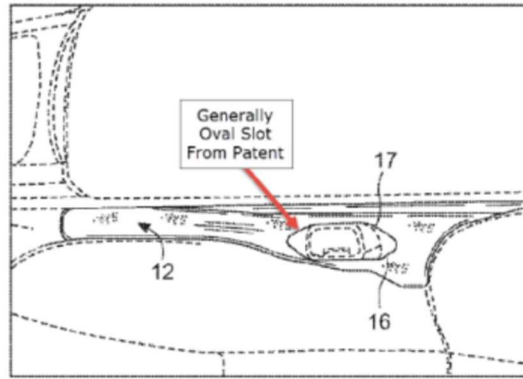


Fig. 4

*Id.* at \*8 (annotated Figure 4 of U.S. Patent No. 8,267,291). In yet another decision, prior art drawings disclosed active regions formed in a semiconductor substrate with a “**substantially oblong**” shape. *Qualcomm Incorporated v. Monterey Res. LLC*, IPR2020-01491, Paper No. 8 at 30-31 (P.T.A.B. Mar. 4, 2022).

As in the above examples, the term “substantially equal” recited in claim 1 of the ’335 patent is not a precise proportion or measurement—it is instead an approximation or term of degree. *See Seattle Box Co., Inc. v. Indus. Crating & Packing, Inc.*, 731 F.2d 818, 826 (Fed. Cir. 1984) (“substantially equal to” a term of degree). The M.P.E.P. devotes an entire subsection explaining that “substantially” is a common approximation in patent claims. § 2173.05(b)(II)(D) (substantially “is a broad term.”). Thus, “substantially equal” is not a precise proportion or measurement, so *Hockerson* does not apply. *See Ex parte Bjorn*, 2018-001567, 2019 WL 6173305 at \*10; *Presidio*, IPR2015-01330, Paper No. 11 at 11; *Drop Stop*, No. CV 16-07916 AG, 2017 WL 11501883, at \*7-8; *Qualcomm*, IPR2020-01491, Paper

No. 8 at 30-31.

Patent Owner's only defense for this claim limitation rests on a misapplication of *Hockerson*. Patent Owner does not dispute that the prior art drawings discussed in the Petition depict ledges with "substantially equal widths," as recited in claim 1. POPR, 26-27, 31-32. Patent Owner expressly admits *Yoshida* provides "the appearance of substantially equal widths." POPR, 32. Patent Owner also admits the Petition's drawings of *Saxler*'s non-recessed embodiment shows sidewalls "largely equidistant" from the overlying gate metal. POPR, 26. Because *Hockerson* does not apply to "substantially equal widths," Patent Owner admits the prior art discloses it.

Accordingly, this limitation is obvious, and the Board should institute review.

### **III. Shenoy Is Analogous Art, and Patent Owner's Unsupported Arguments Do Not Show Otherwise**

*Shenoy* is analogous art because it is in the same field of endeavor and addresses the same problem as the '335 patent claims. Patent Owner contests that *Shenoy* is analogous with unsupported assertions and through the veil of arguing there is no motivation to combine *Shenoy* with other references. POPR, 38-39, 43. Not only is this **the incorrect test**—*Shenoy* should be compared to the '335 patent, not the references it is combined with—but Patent Owner is wrong. Moreover, the Board should disregard Patent Owner's unsupported attorney argument. Patent Owner provides no evidence or supporting expert testimony to contend that *Shenoy*'s

electrochemical etching is inoperative with other references and not in the same field as the '335 patent. *See id.* Such attorney argument is not evidence and cannot rebut Dr. Shealy's (and the Petition's) explanation that *Shenoy* falls well within the same field of endeavor as the '335 patent and addresses problems the patent purports to address. Shealy, [044]-[045], [153]-[164], [233]-[240]; Petition, 8-9, 58-63, 88-92.

**A. Dr. Shealy's Unrebutted Testimony Provides a Reasoned Rational for Why *Shenoy* Is in the Same Field of Endeavor as and Reasonably Pertinent to the Problem of the '335 Patent**

Unsupported attorney argument does not rebut expert testimony. *See, e.g., Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1380 (Fed. Cir. 2009) (“[U]nsworn attorney argument . . . is not evidence and cannot rebut . . . other admitted evidence . . . .”); *United Servs. Auto. Ass’n v. Auto Telematics Ltd.*, IPR2023-00857, Paper No. 10 at 37-38 (P.T.A.B. Dec. 19, 2023).

In *Cellco Partnership v. General Access Solutions, Ltd.*, the Board granted institution on grounds where Petitioner provided expert testimony but Patent Owner presented “mere attorney argument in interpreting [a first reference].” IPR2023-01147, Paper No. 14 at 23-24, 50 (P.T.A.B. Jan. 9, 2024). The Board also instituted on other grounds, finding Patent Owner's interpretation of a second reference “unsupported attorney argument, which is not evidence.” *Id.* at 38-39, 50.

Here, Patent Owner makes only conclusory attorney arguments that *Shenoy* is not analogous, which rely on unsupported interpretations of *Shenoy* to address the

Petition's well-supported rationale. POPR, 20-21, 38-39, 43. Patent Owner asserts "a POSA would not have considered *Shenoy*" and proceeds to interpret its disclosure as having "little relevance" because it supposedly does not address relevant materials and would require undue experimentation to combine. *Id.* at 38-39. These wholly unsupported assertions fail to rebut Dr. Shealy's reasoned explanation showing *Shenoy* is analogous art when he provides a motivation to combine *Shenoy* to address problems in transistors, the same field as the '335 patent. Shealy, [155]-[164], [233]-[240]; Petition, 59-63, 88-92. The Board should give Patent Owner's arguments no weight and grant institution.

**B. *Shenoy* Is Analogous Art**

*Shenoy* is analogous art. As the Federal Circuit explained when finding a prior art toothbrush reference was analogous art to a patent directed to a hairbrush, "[t]wo separate tests define the scope of analogous prior art: (1) whether the art is from the same field of endeavor, regardless of the problem addressed and, (2) if the reference is not within the field of the inventor's endeavor, whether the reference still is reasonably pertinent to the particular problem with which the inventor is involved." *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). Patent Owner's unsupported contention that *Shenoy* is not analogous is incorrect. POPR, 38-39, 43. As the Petition demonstrates, *Shenoy* is analogous to the '335 patent under either test.

**1. *Shenoy* is analogous because it is from the same field of endeavor as the '335 patent**

The '335 patent broadly defines the pertinent field as “layered semiconductors that include various field effect transistors.” '335 patent, 1:23-63. The patent “generally relates to transistors,” including “heterojunction field effect transistors (HFET), high electron mobility transistors (HEMT), or modulation doped field effect transistors (MODFET).” *Id.* *Shenoy* falls into this same field of endeavor as the patent. It provides conventional etching techniques for fabricating semiconductor devices that were well known at the time. Shealy, [059], [062], [153]; Petition, 6-7, 58. The '335 patent describes using known masking and etching techniques. '335 patent, 2:54-58, 4:14-31, 4:52-63, Fig. 6A-6C; Shealy, [048]-[049], [059]; Petition, 6, 11-12.

The Petition likewise defined, and Patent Owner did not dispute, a POSITA as having experience in the broad field of “semiconductor device design and/or fabrication, including the processing of semiconductor materials, analysis of device operation, or the development of new device topologies.” Petition, 18; Shealy, [063]. In parallel proceedings, Patent Owner similarly defined the relevant field of a POSITA’s experience as generally relating to semiconductors, covering “epitaxial growth, design, and fabrication of semiconductor electronic devices, including those of GaN.” Ex. 1030 at 2; Ex. 1031 at 3. Under either definition, a POSITA would

have general experience with semiconductors, including those of *Shenoy*, proving *Shenoy* is indisputably analogous. *See* Shealy, [059], [062], [153].

**2. *Shenoy* is analogous because it solves problems pertinent to the '335 patent**

The '335 patent's claimed invention includes a stepped gate structure having a gate-metal layer, which was known at the time. Shealy, [044]-[045], [057]-[059]; Petition, 2-6. The patent asserts this structure solves problems with gate leakage. Shealy, [044]-[045]; Petition, 8-9; '335 patent, 2:34-57, 3:65-4:12, 4:40-51.

As the Petition explains, *Shenoy* provides an efficient and effective etching approach that, when used in combination, would improve gate metal positioning relative to the underlying layer and would reduce manufacturing steps for creating the claimed structure, which would reduce costs. Shealy, [153]-[164]; Petition, 59-63. *Shenoy* thus is “reasonably pertinent” to the problem the '335 patent purports to solve with the claimed structure. *See In re Bigio*, 381 F.3d at 1325.

A POSITA “would have been familiar with many methods of making stepped gate structures with horizontal ledges” claimed in the '335 patent, including use of *Shenoy*'s etching techniques. Shealy, [060]-[063]; Petition, 6-8. The Petition explains *Shenoy*'s method to undercut a photomask would have been an obvious means to achieve the stepped gate structure of the '335 patent when combined with the other references. Shealy, [153]-[164], [233]-[240]; Petition, 58-63, 88-92.

In addition to conclusory attorney argument asserting *Shenoy* is not analogous (discussed above), Patent Owner attempts to rebut Dr. Shealy with attorney argument that *Shenoy* is not analogous because it would not be used to solve *Saxler*'s and *Yoshida*'s problems. POPR, 38-39, 43. **That uses the wrong test for analogous art.** The test is whether *Shenoy* is “reasonably pertinent to the particular problem” of the '335 patent, not problems of other prior art. *In re Bigio*, 381 F.3d at 1325.

Regardless, Patent Owner is wrong. The Petition shows *Shenoy* helps make the claimed gate more efficiently and accurately. It shows a POSITA would have made a simple substitution and used *Beach* and *Shenoy*'s techniques with predictable results for good reasons—to simplify manufacturing, to reduce costs, and to improve positioning. Shealy, [153]-[164], [233]-[240]; Petition, 58-63, 88-92. The Petition thereby shows *Shenoy* is reasonably pertinent to the problem of gate leakage—the problem purportedly addressed by the '335 patent—and is thus analogous.

#### **IV. Conclusion: The Board Should Institute on All Grounds**

For the foregoing reasons, the prior art discloses ledges of “substantially equal width,” and *Shenoy* is analogous art. The Board should institute on all grounds in the Petition.

Dated: January 23, 2024

By: /Lionel M. Lavenue/  
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**CERTIFICATE OF SERVICE**

The undersigned certifies that a copy of the foregoing **Petitioner's Preliminary Reply** was served electronically via email on January 23, 2024, in its entirety on the following counsel of record for the Patent Owner:

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