

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD., AND SAMSUNG ELECTRONICS
AMERICA, INC.,

Petitioner,

v.

HARBOR ISLAND DYNAMIC, LLC,

Patent Owner.

Case No. IPR2024-01403

U.S. Patent No. 7,772,673

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

TABLE OF CONTENTS

	Page
I. Introduction.....	1
II. There Is No Material Dispute over the Level of Ordinary Skill in the Art	1
III. There Are No Claim-Construction Disputes for the Board to Resolve.....	2
IV. Ground 1: Obviousness over the Combination of <i>Yin</i> and <i>Koshimizu</i>	2
A. <i>Koshimizu</i> Is from the Same Field of Endeavor as the '673 Patent: Semiconductor Devices with a Deep Isolation Trench.....	4
B. <i>Koshimizu</i> Is Reasonably Pertinent to the Problems Faced by the '673 Patent.....	9
V. Ground 2: Anticipation by <i>Norström</i>	11
A. HID Ignores the Disclosures of <i>Norström</i> Relied Upon by the Board in Its Institution Decision	12
B. HID's "Two Trench" Theory Leads to Absurd Results that Cannot Be Squared with the Text and Figures of <i>Norström</i>	15
VI. Ground 3: Obviousness over <i>Norström</i>	19
VII. Conclusion	19

TABLE OF AUTHORITIES

Page(s)

Cases

<i>Apple Inc. v. Gesture Tech. Partners, LLC</i> , IPR2021-00923, Paper 27 (P.T.A.B. Dec. 2, 2022)	9
<i>Apple Inc. v. Gesture Tech. Partners, LLC</i> , No. 2023-1494, 2025 WL 1584286 (Fed. Cir. June 5, 2025).....	6, 7, 8, 9
<i>In re Aslanian</i> , 590 F.2d 911 (CCPA 1979)	19
<i>In re Bigio</i> , 381 F.3d 1320 (Fed. Cir. 2004)	5, 11
<i>Donner Tech., LLC v. Pro Stage Gear, LLC</i> , 979 F.3d 1353 (Fed. Cir. 2020)	5, 11
<i>K-TEC, Inc. v. Vita-Mix Corp.</i> , 696 F.3d 1364 (Fed. Cir. 2012)	4
<i>Litton Indus. Prods., Inc. v. Solid State Sys. Corp.</i> , 755 F.2d 158 (Fed. Cir. 1985)	2
<i>Net MoneyIN, Inc. v. VeriSign, Inc.</i> , 545 F.3d 1359 (Fed. Cir. 2008)	12, 19
<i>Netflix, Inc. v. DivX, LLC</i> , 80 F.4th 1352 (Fed. Cir. 2023)	8, 10
<i>In re Oetiker</i> , 977 F.2d 1443 (Fed. Cir. 1992)	4, 5
<i>Okajima v. Bourdeau</i> , 261 F.3d 1350 (Fed. Cir. 2001)	1
<i>Sanofi-Aventis Deutschland GmbH v. Mylan Pharms. Inc.</i> , 66 F.4th 1373 (Fed. Cir. 2023)	9
<i>In re Wright</i> , 569 F.2d 1124 (CCPA 1977)	19

<i>Wyers v. Master Lock Co.</i> , 616 F.3d 1231 (Fed. Cir. 2010)	3, 5, 8, 11
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I. Introduction

HID’s Patent Owner Response (“POR”) largely recycles the same arguments it advanced pre-institution—arguments the Board has already weighed and rejected. Even with a second chance, HID fails to engage with the core disclosures of *Yin*, *Koshimizu*, and *Norström*, and offers no credible reason why a skilled artisan would have ignored familiar techniques such as chamfering trench corners.

As the Petition explained, the ’673 Patent does nothing more than take HID’s own prior art deep isolation trench in a semiconductor (*Yin*) and apply a chamfer. HID concedes that this elementary design choice is the “critical . . . limitation” of the claims. POR, 13. But there is nothing new or novel about HID’s chamfer—it is a routine design option for isolation trenches repeatedly taught in this field. The Board should cancel all challenged claims.

II. There Is No Material Dispute over the Level of Ordinary Skill in the Art

HID argues that a person of ordinary skill in the art (“POSITA”) would hold only a bachelor’s degree in electrical engineering or physics with two years of relevant experience, rather than the master’s degree with two years of experience identified in the Petition. *Compare* POR, § IV, *with* Paper 1 (“Pet.”), § V. But HID’s proffered variation is immaterial. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001) (“specific findings on the level of skill in the art” are not required “where the prior art itself reflects an appropriate level and a need for

testimony is not shown.”) (*quoting Litton Indus. Prods., Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163 (Fed. Cir. 1985)). Both parties agree that a POSITA would have at least two years of experience in semiconductor design and fabrication, and nothing in the POR identifies any claim element or obviousness analysis that would turn on whether a POSITA held a bachelor’s or master’s degree. *See* POR, §§ IV-VI (HID arguing for a lesser POSITA standard followed immediately by claim-construction and merits sections without ever tying its educational dispute to any limitation or analysis).

III. There Are No Claim-Construction Disputes for the Board to Resolve

The parties do not dispute the construction of any term, nor does Petitioner believe any express construction is necessary following HID’s Patent Owner’s Response.

IV. Ground 1: Obviousness over the Combination of *Yin* and *Koshimizu*

HID argues that *Koshimizu* is not eligible as prior art to the ’673 Patent because, according to HID, the ’673 Patent is directed to “the formation of deep trench isolation regions,” while *Koshimizu* is directed to “the manufacture of semiconductor devices having a hetero-junction bipolar transistor.” POR, 13-17.

But HID continues to ignore that both the ’673 Patent and *Koshimizu* explain that their fields of endeavor are much broader. Pet., 9-11, 14-18. HID tries to downplay that the ’673 Patent states that the “invention is generally in the field of

semiconductor fabrication,” POR, 13-15, and likewise removes a pertinent portion of *Koshimizu* by using a conveniently placed ellipsis, POR, 16 (citing *Koshimizu*) (removing the words “to a semiconductor device and a manufacturing technique therefor” from the quotation to *Koshimizu*’s technical field). What’s more, HID made these same arguments at the institution stage, and the Board rejected them. See Paper 7 (“POPR”), 11-20; Paper 9 (“Inst. Dec.”), 25-27, 34-35.¹

In its Institution Decision, the Board rejected HID’s overly narrow field of endeavor, cautioning—correctly—that “the Federal Circuit [has] directed that the scope of analogous art is to be construed broadly.” Inst. Dec., 26 (citing *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1238 (Fed. Cir. 2010)). The Board found that “both the ’673 patent and Koshimuzu [sic] relate to semiconductor devices (and methods of manufacturing semiconductor devices) with a deep trench for isolating a bipolar device.” *Id.*, 27. That finding supported the Board’s preliminary finding

¹ While HID argues that *Koshimizu* is not analogous art, it never disputes any of the motivations to combine *Yin* with *Koshimizu* that were laid out in the Petition. Pet., 37-40. This highlights the form-over-substance nature of HID’s Patent Owner’s Response—it argues that *Koshimizu* is not analogous art to the ’673 Patent while nevertheless conceding that a POSITA would have been motivated to apply its teachings to *Yin*.

that *Koshimizu* qualifies as analogous art in the same field of endeavor as the '673 Patent. *See id.* Despite this, HID never mentions, let alone addresses, the Board's preliminary findings. On the substance, HID's arguments fail for the same reasons they failed pre-institution—they would narrow the “broad” doctrine of field of endeavor to only allow prior art that is essentially identical to the claimed invention.

HID agrees that prior art is analogous if it (1) is from the same field of endeavor, or (2) is reasonably pertinent to the problem addressed by the patent. *See In re Oetiker*, 977 F.2d 1443, 1447 (Fed. Cir. 1992); POR, 13 (citing *K-TEC, Inc. v. Vita-Mix Corp.*, 696 F.3d 1364, 1375 (Fed. Cir. 2012)). *Koshimizu* qualifies as analogous prior art under either prong of *In re Oetiker*. 977 F.2d at 1447.

A. *Koshimizu* Is from the Same Field of Endeavor as the '673 Patent: Semiconductor Devices with a Deep Isolation Trench

Both the '673 Patent and *Koshimizu* describe (1) semiconductor devices (Ex. 1001 (“'673 Patent”), “Field of the Invention”; Ex. 1005 (“*Koshimizu*”), “TECHNICAL FIELD OF THE INVENTION”); (2) methods of fabricating those devices ('673 Patent, 5:42-8:45; *Koshimizu*, ¶¶ [0001]-[0003], [0044]-[0064]); and (3) the formation of deep isolation trenches to electrically isolate a bipolar device ('673 Patent, 4:4-5:41, Figs. 2, 3, 4B-4F; *Koshimizu*, Abstract, ¶ [0052], Figs. 3-16). Each one of these shared features supports the Board's

preliminary finding that “both the ’673 patent and Koshimuzu [sic] relate to semiconductor devices (and methods of manufacturing semiconductor devices) with a deep trench for isolating a bipolar device.” Inst. Dec., 26-27.

This is not a case where the Petition sweeps in art from a field wholly remote from what a POSITA would have understood from the ’673 Patent, such as, for example, digging trenches around farmland or chamfering the edge of a desk. *Cf. In re Oetiker*, 977 F.2d at 1447. *Koshimizu* teaches a semiconductor device with a chamfered isolation trench, *just like the ’673 Patent*. Courts have repeatedly recognized analogous art where the differences between the references and the patent at issue were far more pronounced than here. *See, e.g., Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1359-60 (Fed. Cir. 2020) (rejecting narrow framing of problem and holding that audio equipment mounting art was analogous to guitar pedal boards).

The Federal Circuit has also rejected attempts to define a field of endeavor so narrowly that only essentially the same device and materials qualify. *See, e.g., In re Bigio*, 381 F.3d 1320, 1325-27 (Fed. Cir. 2004) (affirming Board finding that “toothbrush art” is analogous to a claimed hairbrush); *Wyers*, 616 F.3d at 1237-40 (finding varied means of locking to be analogous). The inquiry is functional and broad—and both the ’673 Patent and *Koshimizu* teach semiconductor devices, methods for manufacturing them, and isolation trenches for the same. *See, e.g.,*

'673 Patent, "Field of the Invention," 4:4-8:45, Figs. 2, 3, 4B-4F; *Koshimizu*, "TECHNICAL FI[EL]D OF THE INVENTION," ¶¶ [0001]-[0003], [0044]-[0064]; Figs. 3-16. That is enough for analogous-art status under either test.

Apple Inc. v. Gesture Tech. Partners, LLC does nothing to help HID. *See* POR 18-22 (citing No. 2023-1494, 2025 WL 1584286, at *4-5 (Fed. Cir. June 5, 2025)). In *Gesture*, the petitioner "took the unique approach of not expressly defining the field of endeavor for either" the challenged patent or the prior art reference, "and instead only identified an overlap in a general category of disclosure." *Apple Inc. v. Gesture Tech. Partners, LLC*, No. 2023-1494, 2025 WL 1584286, at *4 (Fed. Cir. June 5, 2025) (internal quotations omitted). And when the patent owner challenged the petitioner's asserted field of endeavor for one reference (Mann) in its POR, the petitioner's "entire response" was to remark in its reply that Mann was directed to the same definition as another piece of prior art and that the patent owner did not challenge that other reference. *See id.* The Court thus affirmed the Board's finding that the Petitioner failed to satisfy its burden on field of endeavor.

The *Gesture* petitioner used inconsistent wordings for each of the petitioner's stated fields of endeavor, and, through that inconsistency, "[t]he Board essentially adopted the narrower of [the petitioner's] proposals." *Id.* Under the narrower proposal for the challenged patent's field of endeavor – which the

petitioner itself advanced – Mann was not analogous. *See id.* (finding Mann was not directed to the “optical sensing” required in petitioner’s narrower advanced field of endeavor). But this case has no “*Gesture*-style” substantive inconsistency, nor does HID identify any. Unlike the Mann reference of *Gesture*, *Koshimizu* fits into *any* of the phrasings used in the Petition. For *Yin*, the Petition stated that the ’673 Patent is “directed to a semiconductor die with a deep trench isolation region that electrically isolates an electronic device such as a bipolar transistor.” Pet., 8 (citing Thompson Dec., ¶ 69; Yin, Field of Invention; ’673 Patent, Field of Invention). So is *Koshimizu*. *See Koshimizu*, “TECHNICAL FI[EL]D OF THE INVENTION,” ¶¶ [0001]-[0003], [0052], Figs. 14-16. For *Norström*, the Petition stated that both it and the ’673 Patent were directed to the manufacture of “bipolar semiconductor devices, in particular bipolar transistors and semiconductor diodes, which are electrically isolated or confined by trenches.” Pet., 14 (citing Thompson Dec., ¶ 77; *Norström*, 1:7-10; ’673 Patent, Field of Invention)). Again, so is *Koshimizu*. *See Koshimizu*, ¶¶ [0001]-[0003], [0044]-[0060], Figs. 1-16. (describing the manufacturing process). The Board could alternatively adopt any one of these wordings for the field of endeavor of the ’673 Patent and *Koshimizu* would fit just as neatly into any of them.

HID would stretch *Gesture* so far as to suggest that any difference in wording for field of endeavor should result in an automatic failure of the petition,

but the *Gesture* Court never held as much. *See Gesture*, 2025 WL at *5 (noting both (1) the petitioner’s own narrower fields of endeavor for the challenged patent *and* (2) the disclosures in both the challenged patent and the asserted reference undermined the use of Mann as an analogous prior art reference). The Federal Circuit has cautioned against elevating semantics over substance. *See Netflix, Inc. v. DivX, LLC*, 80 F.4th 1352, 1358-60 (Fed. Cir. 2023) (“our precedent does not require the use of magic words” with respect to the “field of endeavor” doctrine).

By rehashing the same reasoning it used pre-institution without substantial new evidence, HID’s field-of-endeavor arguments fail for the same reasons. HID does not dispute that both *Koshimizu* and the ’673 Patent each describe semiconductor devices, does not dispute that both provide manufacturing methods for the same, and does not dispute that each discloses a method for creating a deep isolation trench in the same. *See* ’673 Patent, 1:15-27; *Koshimizu*, ¶¶ [0025]-[0026], [0047]-[0052]; Inst. Dec., 26-27. The field-of-endeavor doctrine is to be construed broadly, and *Koshimizu* easily falls within the same broad field as the ’673 Patent. *See Wyers*, 616 F.3d at 1238.

B. *Koshimizu* Is Reasonably Pertinent to the Problems Faced by the '673 Patent

HID also argues that *Koshimizu* does not qualify as prior art to the '673 Patent under the “reasonably pertinent” prong. POR, 22-23. It further argues that Petitioner “waived the use of the ‘reasonably pertinent’ test.” POR, 22.

First, HID identifies no controlling authority for its waiver theory because there is none.² A petitioner does not need to raise analogous art arguments in its petition *at all*. *Sanofi-Aventis Deutschland GmbH v. Mylan Pharms. Inc.*, 66 F.4th 1373, 1379 (Fed. Cir. 2023) (“A petitioner is not required to anticipate and raise analogous art arguments in its petition; instead a petitioner can use its reply to respond to arguments raised in the corresponding opposition, patent owner preliminary response, patent owner response, or decision on institution.”) (internal

² The Board in *Gesture* found that the petitioner “waived any arguments related to the second test (reasonably pertinent to the particular problem).” *Apple Inc. v. Gesture Tech. Partners, LLC*, IPR2021-00923, Paper 27 at 13 (P.T.A.B. Dec. 2, 2022) (internal quotations omitted) (final written decision). But this part of the Board’s decision was never raised before the Federal Circuit and was thus never affirmed or made controlling. *Gesture*, No. 23-1494, slip op. at 10–11 (Fed. Cir. June 5, 2025).

quotation marks and citations omitted). The Federal Circuit has also made clear that a petitioner need not expressly invoke either wording to preserve a “field of endeavor” or “reasonably pertinent” argument on analogous art. *Netflix*, 80 F.4th at 1360 (“Although Netflix’s reply brief before the Board did not formulaically articulate a field of endeavor using those exact words, our precedent does not require the use of magic words.”).

Second, *Koshimizu* is reasonably pertinent to the problem faced by the inventors of the ’673 Patent. As HID concedes, one problem faced by the inventors of the ’673 Patent was that “prior art trenches required a thick layer of polysilicon to adequately fill them.” POR, 22 (citing ’673 Patent, 1:30-34). Dr. Thompson explained pre-institution that textbooks available to a POSITA taught that the amount of polysilicon needed to fill a trench depended on the width of that trench at its widest point. *See* Thompson, ¶¶ 44-45, 81-90. Dr. Thompson likewise explained that trench geometry (including corner shape) was a known tool for improving deposition efficiency and defect avoidance in trench/sidewall structures by 2007. *See id.*

HID never grapples with Dr. Thompson’s testimony or the literature on this point, nor does it present any contrary evidence suggesting a POSITA concerned with polysilicon waste would *not* look to find ways to narrow their trenches at their widest point. It would therefore be a matter of common sense to examine other

isolation trenches in the prior art with narrower trenches at their widest point—the corners. *Koshimizu* provides just one of many such trench geometries.³

On this record, *Koshimizu* is analogous art twice over—same field and reasonably pertinent. Both address semiconductor device fabrication involving deep trench isolation around bipolar devices. And *Koshimizu* is reasonably pertinent to the '673 problem in light of the literature Dr. Thompson cites: conformal refill thickness tracks local trench width, and *Koshimizu*'s chamfers narrow the corner width. That is all the law requires. See *Bigio*, 381 F.3d at 1325; *Donner*, 979 F.3d at 1359-61; *Wyers*, 616 F.3d at 1237-38.

V. Ground 2: Anticipation by *Norström*

As it did for Ground 1, HID repeats the same arguments for Ground 2 that the Board already rejected. Specifically, HID re-asserts (i) that *Norström*'s Figure 13c does not disclose the claimed trench “arranged as in the claim” because, in its view, the “trenches 119” of Figure 13a are a wholly separate structure from the “trench 123” of Figure 13c; and (ii) that *Norström*'s trench does not disclose a singular “trench chamfered corner” that is “situated in a substrate.” See POR, 23-

³ It is worth noting that HID also does not dispute that the prior art discloses *multiple* examples of chamfered isolation trenches in semiconductor devices. *Koshimizu* is simply one of many such examples. Pet., 43-46 (listing others).

33 (quoting *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008)) (citing Ex. 2004 (“Berg”), ¶¶ 62-84).

A. HID Ignores the Disclosures of *Norström* Relied Upon by the Board in Its Institution Decision

HID’s entire argument is based on a false premise. Petitioner does not need to tie **trench** 123 of Figure 13c to element 119 of Figure 13a. Figure 13a *already shows trench* 123—and it is shown being “situated in a substrate” in the exact same manner as element 119 *because both occupy the same space in the substrate in the figure*:

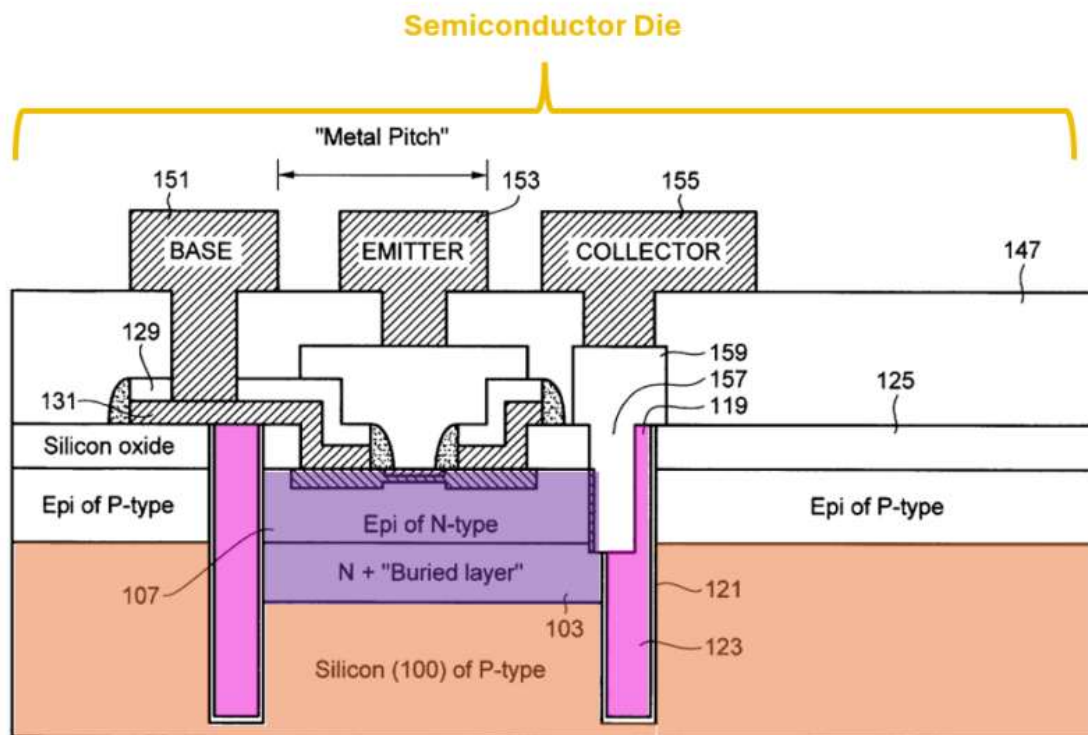


FIG. 13a

See Pet., 62; Thompson Dec., ¶ 154; *Norström*, Fig. 13a (annotated). In fact, the Petition specifically laid out both the geometry of **trench 123** and its location “situated in a substrate” without *ever citing element 119*. See Pet., 60-63. Figure 13c, then, shows that **trench 123** is chamfered:

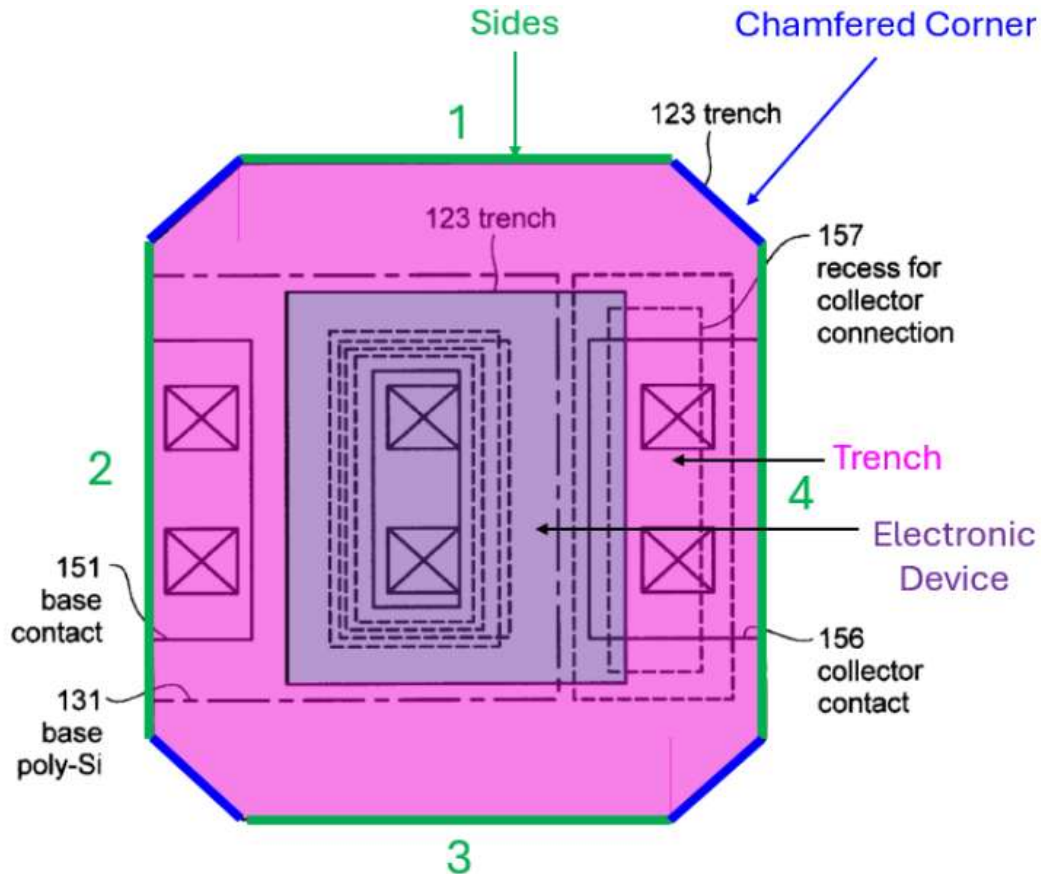


FIG. 13c

Pet., 60-71; Thompson Dec., ¶ 152 (citing *Norström*, Fig. 13c (annotation added), 6:32-34, 11:6-7 (“The result appears from Fig. 13a, see also the plan view of Fig. 13c.”))

In other words, HID’s 119/123 argument is a semantics sideshow. HID does not dispute that *Norström* explains that Figure 13a is the cutaway view of Figure 13c. *Norström*, 11:6-7. It does not dispute that **element** 123 in Figure 13c discloses the “trench chamfered corner” required by the claims. *Norström*, Fig. 13c. And it does not dispute that the same **element** 123 in corresponding Figure 13a is shown situated in the substrate of the device. *Norström*, Fig. 13a. These undisputed disclosures are what the Board relied on in granting institution, and HID provides no reason to disturb them.

HID may not appreciate why there is a separate element “119” in Figure 13a that is not expressly labelled in Figure 13c. The reason is simple: *Norström* uses element 119 to refer to the *empty* structure of the isolating trench and element 123 to refer to the isolating filling *inside that same trench*. Thus, when the trench is filled—as it is in Figures 13a and 13c—elements 119 and 123 occupy the same space. The Petition noted this, pointing to *Norström*’s disclosure on column 9, which specifically explained:

The trenches **119** . . . are filled with an isolating material **123**, for example, silicon oxide deposited over the surface of the plate using CVD-methods, e.g., by chemical decomposition of TEOS (tetmethyl-orthosilicate).

Norström, 9:42-48; *see* Pet., 62 (citing *Norström*, 9:31-55). HID ignores this disclosure in its vain effort to separate elements 119 and 123 into wholly distinct structures.

The Board’s Institution Decision already recognized these undisputed disclosures: *Norström* expressly explains that Figures 13a and 13c depict the same trench from different perspectives, trench 123 is “situated in a substrate,” and the trench includes chamfered corners. Inst. Dec., 31-32. As with Ground 1, HID’s response to Ground 2 offers nothing new—only a rehash of arguments the Board has already rejected. But the record is clear, and HID does not dispute the underlying disclosures on which the Board relied. In the absence of any new evidence or reasoning, there is no basis to disturb the Board’s original findings, and the challenged claims remain unpatentable.

B. HID’s “Two Trench” Theory Leads to Absurd Results that Cannot Be Squared with the Text and Figures of *Norström*

As noted above, HID’s only argument on Ground 2 is that “trenches 119” in Figure 13a show a different structure than “trench 123” in Figure 13c. *See* POR, 29-33. From that premise, it asserts that (i) “trenches 119” do not have chamfered corners, and that (ii) “trench 123” must not be in the substrate of the semiconductor. *Id.*

HID repeatedly points to *Norström*'s use of the plural term “trenches” 119 as evidence that Figure 13a discloses two trenches that are physically distinct (i.e., not connected) to one another and which also cannot correspond to trench element 123 in Figure 13c. POR, 23-33. But *Norström* interchangeably refers to element 119 in either the singular or plural form simply because—as Dr. Thompson explained—the cutaway view of Figure 13a shows two cut sides of the same single trench seen in Figure 13c. Thompson, ¶¶ 75-76; *see also Norström*, 10:14-15 (“The opening of the trench 119 *at this side* is thus free from these layers 129, 131.” (emphasis added)).

Norström's use of the label “123” to depict the same structure as “119” is also internally consistent. As explained in the previous section, *Norström* explains elsewhere that element 123 simply points to the isolating filling *inside* trench 119. It explains that the isolating trench 119 is “filled with an isolating or semi-isolating material 123, for example, silicon oxide or polycrystalline silicon.” *Norström*, 7:45-50. The plan view of Figure 13c then depicts the geometry of the filled trench seen from a bird's eye view—i.e., the planform outline *of the filled isolation region* (looking down into the trench opening). *Norström*, 16:28-42 (“the outer sidewalls

of the trench 123 shown in FIG. 13c have no right angles” and its corners can be beveled by 45° to become 135°).⁴

HID’s reading leads to absurdities that *Norström* itself forecloses. On HID’s telling, “trench 123” is a wholly separate structure from “trenches 119” and appears nowhere in Figure 13a,⁵ and further, Figure 13c depicts multiple “trenches-within-a-trench” that *Norström* never describes. That cannot be squared with *Norström*’s text: (i) Figure 13c is expressly the plan view “according to FIG. 13a,” and so should depict the same components (even if not to scale), and (ii) trenches 119 are filled with isolating material 123. *Norström*, Figs. 13a, 13c, 6:33-34, 10:66-11:12. If trench 123 were an independent trench structure distinct from trench 119, *Norström* would show or say so in Figure 13a; it does neither.

⁴ HID gripes that the view of the isolating trench appears thinner in the cutaway view of Figure 13a than the plan view of Figure 13c. *See* POR, 30. But *Norström* never qualifies its figures as being drawn to scale, and Petitioner never relies on them for being to scale either.

⁵ If HID concedes that trench 123 appears in Figure 13a, it would necessarily concede that it is “situated in a substrate” as claimed, since element 123 is shown as such. *See* Pet., 62; *Norström*, Fig. 13a.

Tellingly, HID’s theory depends on extra-record overlays and made-up labels. HID’s expert draws additional “trench” outlines on top of Figure 13c and adds “north” and “south” sidewalls to elements 119 and 157 that appear nowhere in *Norström*. See POR, 27-28 (citing Berg, ¶¶ 69-70). *Norström* itself never uses “north” or “south” sidewall terminology and does not label two separate trenches in Figure 13c; the only trench-related callout in the plan view is 123, whose chamfered corners are described in the text. *Norström*, 16:28-42; see also *Norström*, Figs. 13a, 13c. A POSITA does not redraw the figures to add unlabeled structures or directional captions that the reference does not disclose.

The simple explanation often is, as here, the correct one. There is one trench in Figure 13a (shown in cutaway as two wall segments, labeled 119) and the same one trench in Figure 13c (the same isolation region viewed from above, labeled by its fill as 123). *Norström*, Figs. 13a, 13c. *Norström*’s text, figure linkage, and chamfer disclosure make that plain—HID’s trench-within-a-trench and “north/south sidewall” narrative is an overlay not found in the reference. *Norström*, 9:31-55, 10:66-11:12 16:28-42, Figs. 13a, 13c; Thompson, ¶¶ 152-55.

HID also identifies no authority—and Petitioner is aware of none—requiring a prior art reference to assign the same reference numeral to a feature across different views for that feature to count toward anticipation. The anticipation inquiry simply asks what a POSITA would have understood is disclosed, not

whether the reference uses identical labels in every figure. *See In re Aslanian*, 590 F.2d 911, 913-15 (CCPA 1979) (noting that drawings must be evaluated for what they reasonably disclose and suggest to a POSITA); *In re Wright*, 569 F.2d 1124, 1127-28 (CCPA 1977) (noting that both the figure and the specification's description of that figure may be examined together for what they would reasonably teach to a POSITA).

Semantic labeling differences between the cross view and plan view of a given figure (119 versus 123) cannot erase what the drawings and text disclose to a POSITA: a single isolation trench region surrounding the device, with chamfered corners at roughly 135°, in the substrate. That is within the four corners of the document, arranged as the claim requires, and needs no modification. *See* POR, 32-33 (citing *Net MoneyIN*, 545 F.3d at 1369 (quoting the anticipation standard)); Pet., 60-63 (mapping Figure 13c's chamfers and corresponding substrate disclosure in Figure 13a).

VI. Ground 3: Obviousness over *Norström*

HID relies on the same arguments for Ground 3 as it does for Ground 2. These arguments fail for the same reasons provided above in Section V.

VII. Conclusion

For the reasons set forth above, and in the Petition, challenged claims 1-17 of the '673 Patent are unpatentable and should be canceled.

Respectfully submitted,

Dated: September 8, 2025

By: / Joshua L. Goldberg /
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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(c)(1), the undersigned hereby certifies that the foregoing Petitioner's Reply to Patent Owner's Response contains 4,041 words, excluding the parts exempted under 37 C.F.R. § 42.24(c) as measured by the word-processing system used to prepare this paper.

Dated: September 8, 2025

By: / Joshua L. Goldberg /
Joshua L. Goldberg, Lead Counsel
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CERTIFICATE OF SERVICE

The undersigned hereby certifies that a copy of the foregoing **Petitioner's Reply to Patent Owner's Response** was served on September 8, 2025, via email directed to counsel of record for Patent Owner at the following:

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