

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICRON TECHNOLOGY, INC.,
Petitioner

v.

YANGTZE MEMORY TECHNOLOGIES COMPANY, LTD.,
Patent Owner

Case No.: IPR2024-00910
U.S. Patent No. 10,861,872
Issue Date: December 8, 2020

Title: THREE-DIMENSIONAL MEMORY DEVICE AND METHOD
FOR FORMING THE SAME

**MOTION FOR REHEARING
PURSUANT TO 37 C.F.R. § 42.71**

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LISTING OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 10,861,872 B2 to Liu et al.
1002	File History of U.S. Patent No. 10,861,872 to Liu et al.
1003	Declaration of Dr. Sanjay Banerjee (“Banerjee”)
1004	<i>Curriculum Vitae</i> of Dr. Sanjay Banerjee
1005	U.S. Patent No. 9,859,297 B2 to Park et al. (“Park”)
1006	U.S. Patent Publ. No. 2019/0081061 A1 to Tessariol et al. (“Tessariol”)
1007	Aritome, “NAND Flash Memory Technologies” (2016)
1008	Silvagni, “3D NAND Flash Based on Planar Cells,” Computers 2017
1009	Micheloni et al., “Inside Solid State Drives (SSDs)” (2 nd Ed. 2018)
1010	U.S. Patent No. 10,381,369 B2 to Kim et al.
1011	U.S. Patent No. 10,475,737 B2 to Tang et al.
1012	Certified English Translation of Chinese Patent Application Publ. No. CN108766971 to Liu (“Liu”)
1013	Chinese Patent Application Publ. No. CN108766971 to Liu
1014	U.S. Patent No. 8,945,996 B2 to Tang et al.
1015	YMTC’s Exemplary Infringement Claim Chart for U.S. Patent No. 10,861,872 – (Ex. 49) 128L [PROTECTIVE ORDER MATERIAL – FILED UNDER SEAL]
1016	YMTC’s Exemplary Infringement Claim Chart for U.S. Patent No. 10,861,872 – (Ex. 50) 176L [PROTECTIVE ORDER MATERIAL – FILED UNDER SEAL]

Exhibit	Description
1017	YMTC’s Exemplary Infringement Claim Chart for U.S. Patent No. 10,861,872 – (Ex. 51) 232L [PROTECTIVE ORDER MATERIAL – FILED UNDER SEAL]
1018	Print out from Geographic Wiki, https://www.studycountry.com/wiki/what-is-a-piece-of-land-surrounded-by-water-on-2-side (last visited Mar. 28, 2024)
1019	U.S. Patent No. 9,530,492 to Lee
1020	Minute Order, Dkt. No. 42, dated February 22, 2024 in <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC</i> , Case No. 3:23-cv-05792-RFL
1021	Combined Civil and Criminal Federal Court Management Statistics (December 31, 2023), available at https://www.uscourts.gov/sites/default/files/data_tables/fcms_na_distcomparison1231.2023.pdf
1022	Docket from <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC</i> , Case No. 3:23-cv-05792-RFL
1023	Micheloni, “3D Flash Memories” (2016)
1024	U.S. Patent No. 9,953,992 to Ogawa et al. (“Ogawa”)
1025	U.S. Patent No. 10,290,643 to Kai et al. (“Kai”)
1026	YMTC’s Exemplary Infringement Claim Chart for U.S. Patent No. 10,861,872 – 232L (Ex G-3 to YMTC’s Disclosure of Asserted Claims and Infringement Contentions), dated May 6, 2024 [PROTECTIVE ORDER MATERIAL – FILED UNDER SEAL]
1027	U.S. Patent No. 10,115,632 to Masamori et al.
1028	U.S. Patent No. 5,945,717 to Chevallier
1029	U.S. Patent No. 10,347,487 to Lee et al.

Exhibit	Description
1030	Ronse, “Optical lithography—a historical perspective,” C. R. Physique 7 (2006)
1031	Complaint for Patent Infringement, Dkt. No. 1, filed Nov. 9, 2023, in <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC</i> , Case No. 3:23-cv-05792-RFL
1032	First Amended Complaint for Patent Infringement, Dkt. No. 29, filed Feb. 2, 2024, in <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC</i> , Case No. 3:23-cv-05792-RFL
1033	Plaintiff and Counterclaim Defendant Yangtze Memory Technologies Company, Ltd.’s Disclosure of Asserted Claims and Infringement Contentions, dated May 6, 2024, in <i>Yangtze Memory Technologies Company, Ltd. v. Micron Technology, Inc. and Micron Consumer Products Group, LLC</i> , Case No. 3:23-cv-05792-RFL
1034	Declaration of Jared Bobrow in Support of Petitioner’s Motion for Admission <i>Pro Hac Vice</i>
1035	Email from E. Hawthorne (PTAB) authorizing preliminary reply

I. INTRODUCTION

On December 10, 2024, the Patent Trial and Appeal Board (“Board”) declined to institute *inter partes* review of claims 7-10 of U.S. Patent No. 10,861,872 (“the ’872 Patent”). See Paper 13 (“ID”). Petitioner Micron Technology, Inc. (“Micron”) respectfully requests rehearing of that decision pursuant to 37 C.F.R. § 42.71(d) on the grounds that the Board (1) incorrectly construed the function of “dummy source structure” by overlooking exemplary embodiments and permissive language, and (2) overlooked the Petition’s showing with respect to the “surrounding” limitation.

The challenged claims of the ’872 Patent are directed to configurations of “dummy source structures” that “surround[] the staircase contact” (along with “dummy channel structures”). *E.g.*, Ex. 1001, Claim 7. The ’872 Patent explains that the conventional structures for the gate replacement process have several drawbacks. Paper 1 (“Pet.”), 20-22 (citing Ex. 1001, 4:30-33, 4:46-55). As a result, the ’872 Patent teaches: “Various embodiments in accordance with the present disclosure provide an improved 3D memory structure scheme suitable for solving the aforementioned issues [i.e., problems with gate replacement] by replacing the GLSs [gate line slits] with dummy source structures.” Ex. 1001, 5:31-34; *see also* Pet., 24.

The Petition¹ argues that a “dummy source structure” would have been understood to mean a “structure that occupies the void that was used for the gate replacement process.” Pet., 29. Rejecting this construction, the Board construed “dummy source structure” as “a structure that does not function as a source to the memory cells.”² ID, 11. The Board primarily relies on (1) a description in the

¹ Micron submitted a preliminary reply (“Prelim. Reply”), and Patent Owner submitted a preliminary sur-reply. Papers 11-12.

² While Micron disagrees with the Decision rejecting that “dummy source structures” are used for the gate line replacement process, that dispute is irrelevant to the Institution Decision. As this Motion explains, the dispositive issue regarding the construction of “dummy source structure” is whether a “dummy source structure” may function as a source. Micron, however, respectfully disagrees with the Board’s finding that the gate replacement process is not an essential part of the claimed invention. ID, 13. The entire point of the ’872 Patent is replacing GLS with a specific positioning of “dummy source structures” to improve the gate line replacement process. Ex. 1001, 5:31-34; *see also* Pet., 29-32. And the only use of “dummy source holes,” which become dummy source structures, is as the source of etchants and deposition materials. Ex. 1001, 1:64-2:2, 2:24-28, 5:49-58, 15:26-35; *see also* Pet., 22-24, 30-31.

specification of the “functions of the dummy source structure,” (2) its assertion that “the Specification does not describe the dummy source structure as functioning as a source for the memory cells,” and (3) an alleged distinction “between dummy source structures and source structures” in the specification. ID, 12-13.

As §III.A demonstrates, in each instance, the Board overlooked or misapplied the law. Regarding (1), the specification describes only exemplary “functions” of dummy source structures, because it uses permissive language (“may”). Regarding (2), the correct legal reading of the ’872 Patent is that it discloses dummy source structures functioning as a source, because the specification states only that the dummy source structures may not function as a source “in some embodiments.” From this language, it follows that, in other embodiments, the dummy source structures may function as a source. Regardless, it is legal error to limit the scope of “dummy source structure” to only the exemplary functions set forth in the specification. Regarding (3), that alleged distinction is set forth only in exemplary embodiments (“in some embodiments”), and thus cannot be read as a definitional distinction. Notably, in a related proceeding addressing some of the above language, the Board expressly found that language (“may”) to be permissible and not limiting. *See* IPR2024-00789, Institution Decision (Paper 15), 23.

At bottom, the patentee chose to craft the specification carefully to place no limits on the function of “dummy source structure.” “[P]atentees frequently use

terms idiosyncratically.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc) (internal citation omitted). Here, patentee uses “dummy source structure” idiosyncratically, as the ’872 Patent states that the “dummy source structure” may, in fact, be a functioning structure (e.g., a contact). Ex. 1001, 16:63-17:3; *see also* ID, 12. For this reason, and because claims “do not stand alone,” the Board must look to the specification. *Phillips*, 415 F.3d at 1315. Doing so here reveals that each portion of the ’872 Patent specification on which the Board relies in no way limits “dummy source structure” to a structure that does not function as a source structure. Instead, the specification was careful in never precluding a “dummy source structure” from functioning as a source. Critically, the specification says only that “in some embodiments,” the “dummy source structure” does not function as a source. Ex. 1001, 16:37-40; *see also* Prelim. Reply, 2-3. As a matter of law, this cannot support the importation of a negative limitation, which the Board has done here. *Ethicon LLC v. Intuitive Surgical, Inc.*, 847 F. App’x 901, 907 (Fed. Cir. 2021) (requiring “express disclaimer or independent lexicography in the written description” to “justify adding that negative limitation”) (citations omitted).

The Petition also demonstrates that the term “surrounding” does not require fully encircling, e.g., it does not require “surrounding” on all sides. Pet., 33-38. Critically, the Petition notes that an express construction of “surrounding” is unnecessary because the Park reference “surrounds” to a greater degree than the ’872

embodiments. *Id.*, 37. The Board nonetheless found that “surrounding” “requires more than structures on two sides of the object.” ID, 15. As §III.B demonstrates, the Board overlooked the Petition’s showing that Park’s dummy source structures “surround” to a greater degree than the ’872 Patent embodiments. Whether one expresses this “surrounding” as “on two sides” or not, the Petition shows that Park satisfies this limitation because Park “surrounds” to a greater degree than the ’872 Patent embodiments. Pet., 37.

Turning to Ground 1, the Board’s constructions of “dummy source structure” and “surrounding” were dispositive. The Board found that Park fails to disclose a “dummy source structure” because the Petition does not show that Park’s “common source lines” do not function as a source. ID, 21. Because “not functioning as a source” is not a proper limitation, this finding is in error. Next, as to “surrounding,” the Board found that the Petition’s arguments are “premised on Petitioner’s proposed claim construction,” that is, surrounding on “two sides of an object.” ID, 22-23. Because the Petition explains that Park “surrounds” to a greater degree than all the embodiments of the ’872 Patent, this finding is in error. The Petition was not premising its argument on any express construction of “surrounding.”

Micron respectfully requests that the Board (1) remove the negative limitation in its “dummy source structure” construction and (2) fully consider the Petition’s

showing that Park’s dummy source structures “surround” the staircase contact. Upon reconsideration, Micron submits that the Board should institute a trial.

II. STANDARD OF REVIEW

Under 37 C.F.R. § 42.71(d), a party “may file a single request for rehearing[,] specifically identify[ing] all matters the party believes the Board misapprehended or overlooked, and the place where each matter was previously addressed.” On rehearing, the Board reviews a previous decision “for an abuse of discretion.” 37 C.F.R. § 42.71(c). That standard is met where the Board “made a clear error of judgment in weighing relevant factors or exercised its discretion based upon an error of law or clearly erroneous factual findings.” *Novo Nordisk of N. Am., Inc. v. Genentech, Inc.*, 77 F.3d 1364, 1367 (Fed. Cir. 1996). It includes basing a decision on an “erroneous conclusion of law,” such as a claim construction. *PPG Indus. Inc. v. Celanese Polymer Specialties Co., Inc.*, 840 F.2d 1565, 1567 (Fed. Cir. 1988) (citations omitted).

III. ARGUMENT

A. The Board Overlooked Permissive Language In The ’872 Patent Specification And, As A Result, Erred When It Limited The “Function” Of The “Dummy Source Structure”

As explained below, in each of the three portions of the Board’s claim construction reasoning that led it to adopt the negative limitation that a “dummy source structure” cannot function as a source, the Board overlooked critical language from the ’872 Patent specification. That language demonstrates that the

specification merely provides examples of the dummy source structure's function. Even if the Board disagrees that the specification discloses that the dummy source structure may function as a source (*see infra*), it is still legally impermissible to limit the functions of "dummy source structure" to only those exemplary functions in the specification. Put another way, the Board's decision amounts to improperly limiting "dummy source structure" to only the exemplary embodiments in the specification. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) ("Even when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using 'words or expressions of manifest exclusion or restriction.'" (internal citation omitted).

First, the Board's decision focuses on various descriptions of "dummy source structure," but overlooks that such descriptions are all exemplary descriptions, e.g., reciting "may include," what it "can further include," and how it "may function" in "some embodiments." ID, 11-12. The Board concludes this discussion with a statement that "the Specification describes the functions of the dummy source structure" as follows (emphasis added):

When conductive materials are used to fill dummy source hole 212 (e.g., contact 244), the dummy source structure 246 **may function** as an interconnect to connect 3D memory device 100 with other peripheral devices. When dielectric materials are used to fill dummy source hole

212, dummy source structure 246 **may function** as a mechanical support structure to improve the stability of the staircase region.

ID, 12 (citing Ex. 1001, 16:63–17:3) (emphasis added). Put simply, the Board overlooked that these portions of the specification are all permissive descriptions of how the “dummy source structure” **may function**. Indeed, in addressing another claim construction issue, the Board recognized that this very language is permissive—and not limiting—in an IPR decision relating to the same patent. IPR2024-00789, Institution Decision (Paper 15), 23 (“Here, the permissive use of ‘may function’ indicates that dummy source structure 246 might not function as an interconnect If ‘conductive contact’ were defined to require contact between a dummy source structure and another structure (e.g., peripheral devices, etc.), as Patent Owner argues, there would be no need to state that the dummy source structure *may function* as an interconnect.”).

The Board concludes this portion of its discussion by stating that: “Notably, the Specification does not describe the dummy source structure as functioning as a source for the memory cells.” ID, 12. Even if this were true (it is not how the specification would have been understood, *see infra*), because the specification does not define a “dummy source structure” as a structure that **does not** function as a source, it is legal error to require that it not perform a function just because the

specification arguably does not expressly disclose it performing the function. See *Liebel-Flarsheim*, 358 F.3d at 906.

Second, the Board’s statement that “the Specification does not describe the dummy source structure as functioning as a source for the memory cells” overlooks a key portion of the specification and is a legally erroneous interpretation of the specification. The specification includes the two following portions:

It is noted that *references in the specification to . . . “some embodiments,” etc., indicate that the embodiment described may include a particular feature, structure, or characteristic, but every embodiment may not necessarily include the particular feature, structure, or characteristic.*

Ex. 1001, 3:1-7; see also Prelim. Reply, 2-3.

In some embodiments, dummy source structure 246 may not connect to channel structures in the inner region. Instead, dummy source structure 246 may be formed simultaneously with source structures in the inner region, while functioning as a mechanical supporting structure after gate-replacement process, without connecting to channel structures in the inner region.

Ex. 1001, 16:38-44; see also Prelim. Reply, 2-3. Plainly, the ’872 Patent only states that “in some embodiments,” the dummy source structure may not function as a source (“connect to channel structures in the inner region”). Indeed, the ’872 Patent states what the dummy source structure may do “instead” of functioning as a source. But by stating that a dummy source structure may not function as a source **in some**

embodiments, “[i]t follow[] that [in] other embodiments,” the dummy source structure may function as a source. *Guardant Health, Inc. v. Vidal*, No. 2021-1104, 2023 WL 3262962, at *2 (Fed. Cir. May 5, 2023) (nonprecedential). Indeed, the ’872 Patent itself makes this clear by stating that when it uses the phrase “some embodiments,” it means that some embodiments may include a feature but other embodiments may not. Ex. 1001, 3:1-7; *see also* Prelim. Reply, 2-3. Put simply, finding that a “dummy source structure” cannot function as a source completely ignores that the patentee said this is only the case “in some embodiments.”

Third, the Board focuses on an alleged distinction “between dummy source structures and source structures” in the specification. ID, 12-13. The Board reasons as follows:

In particular, the Specification teaches that “[s]ource structures formed in the inner region may be connected with surround channel structures . . . via a common source, such as a doped region” in the substrate. Ex. 1001, 16:34-38. Dummy source structures, however, “may not connect to channel structures in the channel region,” and instead “may be formed simultaneously with source structures in the inner region, while functioning as a mechanical supporting structure after gate-replacement process, without connecting to channel structures in the inner region.”

Id. at 16:38-44.

ID, 12-13. Critically, the Board overlooked and omitted permissive language in its reasoning. As to “source structures,” the ’872 Patent states that they “may” act as

sources (“may be connected with surround channel structures”). Ex. 1001, 16:34-38. As to “dummy source structures,” the above discussion omits the ’872 Patent’s statement that “in some embodiments,” they “may not connect ...” *Id.*, 16:38-44. Micron does not dispute that the ’872 Patent may be explaining a typical operation of each respective structure. But it is legal error to limit these structures to, at best, the typical operation in view of the “some embodiment” and permissive (“may”) language in the specification. *Guardant Health*, 2023 WL 3262962, at *2 (finding that “in some embodiments” language is non-limiting); *Liebel-Flarsheim*, 358 F.3d at 906. Indeed, as demonstrated above, the proper legal interpretation of this “some embodiment” language is that a POSITA would have understood it to convey that the dummy source structure, in fact, may function as a source.

In sum, nothing the Board relies on in the specification is a proper legal basis to exclude a “dummy source structure” from functioning as a source. A patentee may be its own lexicographer and “use terms idiosyncratically.” *Phillips*, 415 F.3d at 1314 (internal citation omitted). Here, the patentee uses “dummy source structure” idiosyncratically, but was careful not to limit “dummy source structure” to any particular function (i.e., a function after the hole is used for the gate replacement process).

Finally, it is also noteworthy that the Board’s construction includes a negative limitation, i.e., a “dummy source structure” may not function as a source. In citing

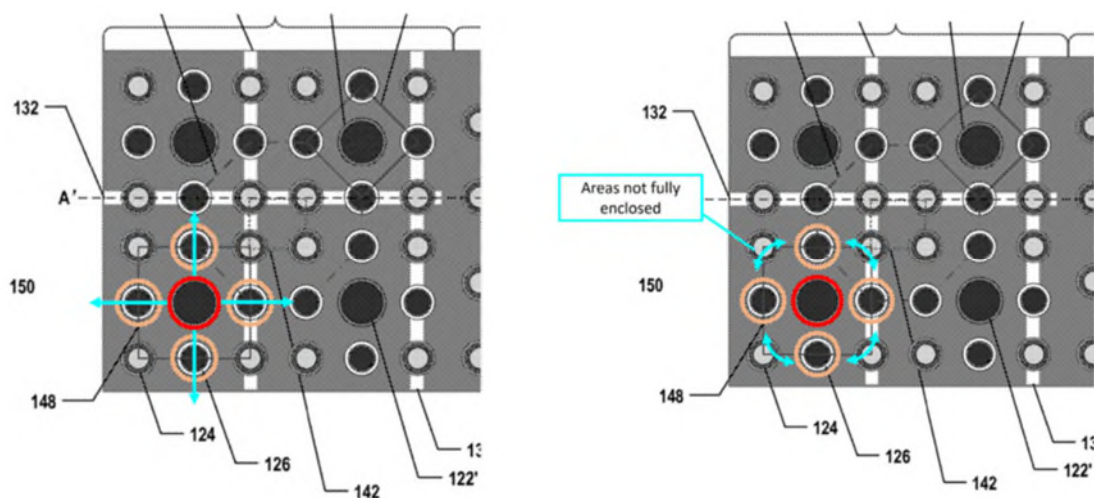
various cases addressing “negative limitations,” the Federal Circuit has explained that negative limitations are only appropriate if apparent from “the words of the claim” or through an “express disclaimer or independent lexicography in the written description that would justify adding that negative limitation.” *Ethicon*, 847 F. App’x at 907 (internal citations omitted). The Board’s construction fails to meet this test. First, a negative limitation is not apparent from the claim language itself because the ’872 Patent departs from the plain meaning of “dummy.” Prelim. Reply, 1; Pet., 32. And the specification never states, definitionally or otherwise, that a “dummy source structure” **cannot** act as a source. Rather, the specification states that only “in some embodiments,” a “dummy source structure” does not function as a source. Ex. 1001, 3:1-7; *see also* Prelim. Reply, 2-3.

B. The Board Overlooked The Petition’s Showing With Respect To The “Surrounding” Limitation.

Although the Petition argues that “surrounding” does not require surrounding on all sides, the Petition made clear regardless of the interpretation of “surrounding,” Park satisfies that limitation because Park’s dummy source structures “surround” a staircase contact to a greater degree than the ’872 Patent’s embodiments. Pet., 33-38, 64-65. Misleadingly, the POPR argues that the Park ground fails because Park’s dummy source structures only “surround” on two sides, and the proper construction of “surrounding” requires surrounding on more than two sides. POPR (Paper 10), 37-41. Accepting Patent Owner’s framing, the Board found that “Petitioner’s

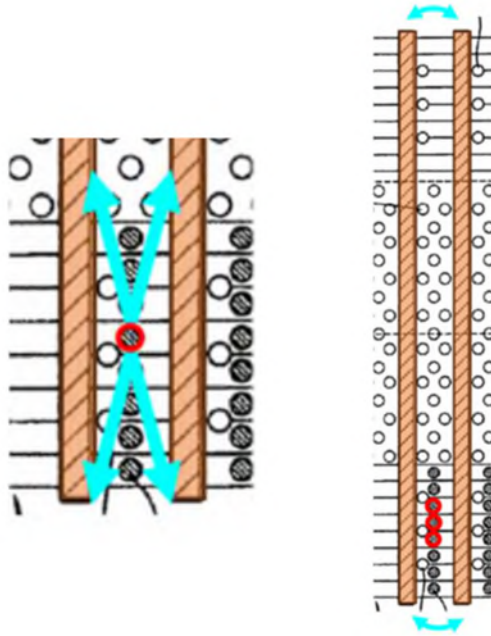
arguments . . . are premised on Petitioner’s proposed claim construction.” See ID, 22-23; §II.B.2, *supra*.” This finding overlooks the Petition’s showing.

The Petition states: “An express construction of [surrounding] is not necessary” Pet., 37. In particular, the Petition explains that “surrounding” in view of the ’872 Patent must be met in two cases given the exemplary ’872 embodiments, namely, (1) drawing four lines radially from the staircase contact and intersecting with a dummy source structure or (2) if the extent of a border around the staircase contact is greater than shown in the ’872 embodiments. *Id.*, 37-38. The Petition illustrated these two examples of when the “surrounding” limitation must be met:



Pet., 35-36 (annotating Fig. 1A of ’872 Patent).

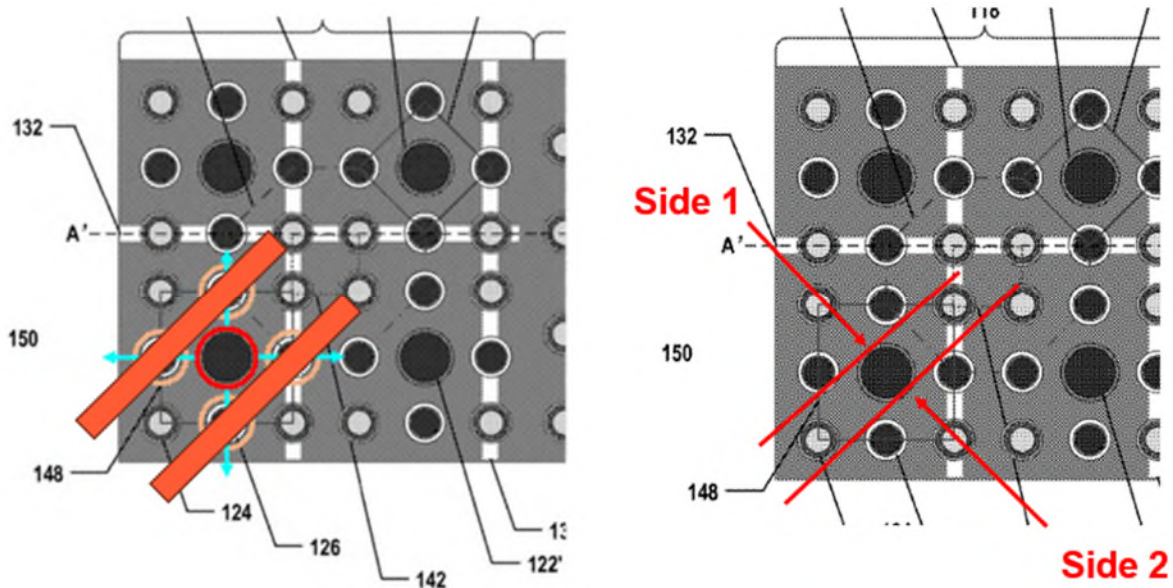
With this context, the Petition shows that Park’s dummy source structures surround the staircase contact in exactly the same way as the ’872 Patent:



Pet., 63-64 (citing partial and annotated Fig. 1 of Park).

Finally, as the above demonstrates, the Board overlooked that considering whether objects “surround” another object requires more than considering whether those objects are on “two sides” of the other object. As shown below, this can be seen in the ’872 Patent’s exemplary embodiments in two regards. First, if the dummy source structures were to become laterally wider, one could say the dummy source structures only surround the contact on two sides, yet those structures surround the contact to a greater degree than the smaller dummy source structures. When the dummy source structures are laterally wider, they simply form (or appear as) a single structure on each side (shown with the orange boxes). Yet these structures must satisfy the “surrounding” limitation, because they surround the contact to a greater extent than the circular structures in the original embodying

figure. Indeed, depending on the perspective when viewing the '872 Patent exemplary embodiment, it can be said that the dummy source structures—even with four—only surround on two sides:



Ex. 1001, Fig. 1A (partial and annotated).

For these reasons, the Petition demonstrates that “surrounding” is best understood as the degree to which objects line the periphery of another object. Pet., 35-37. And the Petition demonstrates that Park’s dummy source structures “surround” the staircase contact to a greater degree than in the '872 Patent’s exemplary embodiments. *Id.*, 59-62.

IV. CONCLUSION

For the foregoing reasons, Micron respectfully requests that the Board reconsider its decision denying review and institute a trial.

Respectfully submitted,

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Dated: January 9, 2025

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CERTIFICATE OF SERVICE

The undersigned hereby confirms that the foregoing paper was caused to be served on January 9, 2025 via electronic mail, upon the following counsel of record for Patent Owner:

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