UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CAIHONG DISPLAY DEVICES CO., LTD.,
Petitioner

v.

CORNING INCORPORATED,
Patent Owner

Case IPR2025-01040
U.S. Patent No. 9,512,025

PATENT OWNER'S PRELIMINARY RESPONSE

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WBIP, LLC v. Kohler Co.,
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Statutes

35 U.S.C. §§ 314(a), 316(e) 8

Other Authorities

37 C.F.R. § 42.104(b)(4) 9

PATENT OWNER'S EXHIBIT LIST

Exhibit No.	Description
2001	*Certain Glass Substrates for Liquid Crystal Displays, Products Containing the Same, and Methods for Manufacturing the Same II*, Inv. No. 337-TA-1441, Order Setting the Procedural Schedule (ITC March 31, 2025)
2002	Display of the Year Award Archive, accessed at https://www.sid.org/Awards/Display-Industry-Awards/DIAAwardsArchive (last accessed Apr. 9, 2025)
2003	"Corning wins awards for EAGLE XG(TM)," accessed at: https://www.glassonline.com/corning-wins-awards-for-eagle-xgtm/ (last accessed Apr. 9, 2025) (May 23, 2007)
2004	Bocko, Peter L., "Handbook of Visual Display Technology," Chapter 5.1.1: Glass Substrates for AMLCD, OLED and Emerging Display Platforms, pp. 599-623 (2012)
2005	Prosecution History of U.S. Patent Application No. 11/478,493 (now U.S. Patent No. 7,851,394)
2006	*See Certain Glass Substrates for Liquid Crystal Displays, Products Containing the Same, and Methods for Manufacturing the Same,* Inv. No. 337-TA-1441, Order 2 (ITC March 7, 2025)
2007	*Gestures Tech. Partners LLC. v. Apple Inc. et al.,* Petition for Writ of Certiorari, Case. No. 24- (filed June 11, 2025)
2008	*Intentionally Left Blank*
2009	*Intentionally Left Blank*
2010	Interim Processes for PTAB Workload Management Memorandum (March 26, 2025)
2011	Guidance on USPTO's rescission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation" (March 24, 2025)
2012	Declaration of Dr. Thomas R. Kurfess
2013	*Curriculum Vitae* of Dr. Thomas R. Kurfess

Exhibit No.	Description
2014	*Certain Glass Substrates for Liquid Crystal Displays, Products Containing the Same, and Methods for Manufacturing the Same*, Case No. 337-TA-1433, Ex. 147 – Corning® EAGLE XG® Glass substrates Innovation Timeline
2015	*Certain Glass Substrates for Liquid Crystal Displays, Products Containing the Same, and Methods for Manufacturing the Same*, Case No. 337-TA-1433, Ex. 153 – Claim Chart for U.S. Patent 9,512,025
2016	Corning Eagle XG Glass Substrates
2017	The Story of Corning® EAGLE XG® Slim Glass Substrates

I. INTRODUCTION

U.S. Patent No. 9,512,025 ("the '025 patent") claims industry-praised, innovative, and non-obvious improvements to the production of glass used in LCD displays. The Petition presents conclusory challenges to the claims plagued by hindsight bias, assumptions, and conjecture. The Petition mixes and matches teachings from three different references without any concrete *Graham* or *KSR* framework because the Petition fails to show a proper motivation to modify and combine the references or a reasonable expectation of success.

Even forgiving its legal *Graham* or *KSR* failures—which the Board should not do—the Petition still fails to show that any claim is obvious because there are three to five claim limitations missing from the prior art for all three independent claims. The primary reference relied upon for nearly every limitation was already determined during prosecution to lack critical features, which shortcomings are not cured in the Petition. One secondary reference relied upon for key missing limitations was found deficient during prosecution and the other secondary reference adds nothing material. Even the expert declaration is conclusory, lacks supporting evidence, and deviates from the analysis presented in the Petition. The Petition presents nothing that the Office has not already considered and rightly rejected, thus it cannot meet its burden of showing unpatentability by a preponderance of evidence.

II. FACTUAL BACKGROUND

The ’025 patent is directed to an apparatus and methods of producing glass ribbons that can be used for displays, such as LCDs. EX1001, 1:8-17. The ’025 patent teaches that devitrification (i.e., crystallization) of glass during manufacturing may cause defects in glass ribbons, leading to manufacturing losses and increased production costs. EX1001, 1:22-26. The heater described by the claims of the ’025 patent reduces devitrification of glass by directing heat towards an edge director of a glass manufacturing apparatus and shielding the edge director from heat loss. EX1001, Abstract.

The ’025 patent identifies an apparatus and process for producing glass that solves a critical problem: the production of nearly defect-free glass. EX1001, 1:33-34. During glass manufacturing, molten glass is directed over a forming wedge to form a continuous glass ribbon. EX1001, 1:17-19. Edge directors are frequently provided at opposing ends of the forming wedge to help achieve a glass ribbon with a desired width and edge characteristics. EX1001, 1:19-22. However, the edge directors may also act as heat sinks, leading to devitrification of molten glass in proximity to the edge directors. This devitrification may lead to defects in the glass ribbon. EX1001, 1:24-26.

One key innovation of the ’025 patent is the use of a heating apparatus to mitigate heat loss near the edge directors. EX1001, 1:51-59. The inventors of the

’025 patent discovered that devitrification of the glass could be reduced by placing a heating apparatus at an angle near the edge directors. *Id*. Doing so effectively applies heat to the desired location while shieling the edge directors from further heat loss. *Id*.

Commercially, key innovations of the ’025 patent amplified the success of Corning® EAGLE XG® glass, a long-term best-selling product for Corning Incorporated (“Patent Owner”). The manufacturing process for larger generation sizes of EAGLE XG® glass is covered by the claims of the ’025 patent. EX2002; EX2003. The industry immediately praised the uniqueness and importance of EAGLE XG Glass, creating demand for an efficient and reliable manufacturing process. In 2007, Eagle XG Glass won the Display Component of the Year Gold Award and the Advanced Display of the Year (ADY) Award. EX2002, 0014; EX2003, 1. The ’025 patent brought the innovation of EAGLE XG® glass to larger size applications and markets.

EAGLE XG Glass has since become the industry standard among the world’s leading LCD panel makers. EX2002; EX2003. PO Corning has used the manufacturing process claimed in the ’025 patent to produce more than 25 billion square feet of EAGLE XG Glass—enough to pave the Great Wall of China 25 times, or cover nearly 390,000 football fields—to meet the needs of its customers. EX2014. This success would not have been possible without the patented

manufacturing process claimed in the ’025 patent, which allows the high-quality results expected of EAGLE XG to be produced to a scale that meets consumer demand.

Specifically, the ’025 patent, entitled “Methods and Apparatuses for Reducing Heat Loss from Edge Directors,” issued on December 6, 2016 to Chung et al. *See* EX1001, (54), (45), (72). It issued from U.S. Patent Application No. 14/278,582, filed on May 15, 2014. The claims of the ’025 patent are directed towards a heating apparatus that, when positioned at an angle in a glass-forming apparatus, reduces heat loss from edge directors to reduce devitrification of glass. EX1001, 1:49-59.

During prosecution of the ’025 patent, the Examiner considered the prior art now cited in the Petition and found the claims patentable. In particular, the Petition readily admits that the primary reference for the sole Ground, El Kahlout (EX1004), and the secondary reference, Tsuda (EX1006), were before the Office during prosecution, with El Kahlout being cited in a rejection. Pet., 7-9 (citing EX1002, 48). The Petition does not identify any error or inadequacy in this prosecution, other than to observe that an additional secondary reference, CN ’869 (EX1005), was not considered, and therefore the “combination” of references in the Ground was not considered. But the Petition identifies nothing material about

CN ’869 that would have changed the Office’s patentability determination. There is nothing.

Indeed, the Office already performed a thorough examination, considered, and properly rejected the same arguments made in the Petition. In the Notice of Allowance, the Examiner identified patentable features of independent claim 1 as “the heating cartridge comprising an enclosure having a heat directing surface that is inclined at an angle of less than about 90° with respect to a bottom surface of the enclosure, the heat directing surface comprising at least one heating element positioned on or adjacent to a face thereof, wherein the heating cartridge is oriented such that the heat directing surface faces the edge director, a view factor from the heat directing surface is greater at the edge director than at the plurality of edge rollers.” EX1002, 22. That is still true.

For independent claim 8, the Office found that “[t]he prior art does not teach[] the replaceable heating cartridge comprising: an enclosure having a heat directing surface that is inclined at an angle of less than about 90° with respect to a bottom surface of the enclosure, the heat directing surface comprising at least one heating element positioned on or adjacent to a face thereof.” EX1002, 23. That is also still a correct assessment.

For independent claim 15, the Office found that “[t]he prior art does not teach[] heating the edge director with a replaceable heating cartridge located in a

port in the housing wherein the replaceable heating cartridge is positioned between the plurality of edge rollers and the edge director, the replaceable heating cartridge comprising an enclosure having a heat directing surface that is inclined at an angle of less than about 90° with respect to a bottom surface of the enclosure, the heat directing surface comprising at least one heating element positioned on or adjacent to a face thereof." EX1002, 23. Nothing in the Petition refutes this either.

The Office also previously observed that El Kahlout does not teach a housing enclosing the forming wedge, edge director, and the plurality of rollers. EX1002, 49. These are all limitations for which the Petition still relies, at least in part, on El Kahlout's deficient teachings. But as the Office previously determined, the differences between the claims and the primary reference cited in the present Petition are quantitatively and qualitatively extensive.

The Petition's secondary reference, Tsuda, is cited in an IDS received July 21, 2016 and considered by the Examiner on August 4, 2016. EX1002, 9. With only ten references total cited in the IDS, there is no doubt that the Examiner was able to give each adequate attention. The Notice of Allowance mailed on August 10, 2016 states that the IDS filed on July 21, 2016 is considered and does not raise questions regarding the previous allowance. EX1002, 6.

III. PERSON OF ORDINARY SKILL IN THE ART ("POSA")

Only for the purposes of this Preliminary Response, Patent Owner does not dispute Petitioner's level of skill for a person of ordinary skill in the art (POSA) as articulated in the Petition.

IV. CLAIM CONSTRUCTION

The Board need not construe any term in order to deny institution on the merits. Patent Owner reserves the right to contest Petitioner's implicit or explicit constructions during any further proceedings.

V. REASONS TO DENY INSTITUTION

As a preliminary matter, the Petition fails to support its arguments with substantial evidence. The supporting expert declaration attempts to fill gaps in the teachings of the prior art and to allege a motivation to modify and combine the references based entirely on conjecture and alleged general knowledge of a POSA. Such evidence is not sufficient to support a finding of unpatentability under 37 C.F.R. § 42.104(b)(4).

Moreover, even when Petitioner's positions are taken at face value, the sole Ground presented fails to show unpatentability for any claim due to multiple missing limitations and a lack of motivation to modify and combine the references. Specifically, there are at least five limitations missing from the cited prior art for independent claim 1, at least three limitations missing for independent claim 8, and at least four limitations missing for independent claim 15.

A. The Petition is not supported by competent evidence.

Because the Petition itself and the Expert Declaration offered in support are wholly deficient, conclusory, and lack particularity, Petitioner cannot meet its burden of proving unpatentability. In an IPR, "the burden of proving a proposition of unpatentability" is borne by (and remains at all times with) the petitioner. 35 U.S.C. §§ 314(a), 316(e); *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1375 (Fed. Cir. 2016). Defects in establishing a ground of unpatentability in a petition are not curable during trial since the petition cannot be corrected or enhanced during trial. *See Sirona Dental Sys. GmbH v. Institut Straumann AG*, 892 F.3d 1349, 1356 (Fed. Cir. 2018).

The Board makes its determination regarding institution based on what the petition actually presents and not what it could have reasonably contained had it been drafted differently. *Magnum Oil*, 829 F.3d at 1381 (holding that the Board is not "free to adopt arguments on behalf of petitioners that could have been, but were not, raised by the petitioner during [a post-grant proceeding]"). The Board cannot "deviate from the grounds in the petition and raise its own" theories of invalidity. *Sirona Dental*, 892 F.3d at 1356.

Petitioner's obviousness arguments in the Petition are largely conclusory and rely heavily on the say-so of Petitioner's supporting expert declaration. There are multiple problems with Petitioner's approach. *First*, aside from Petitioner's

expert's *ipse dixit*, the Petition provides no evidentiary support for a POSA's alleged knowledge and motivation to combine. *See* Pet., 12. The Federal Circuit has made clear that the *ipse dixit* of an expert is not sufficient to support obviousness challenges at the PTAB. *See, e.g.*, *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1362 (Fed. Cir. 2019) (reversing PTAB obviousness finding regarding motivation to combine based only on conclusory expert testimony as not supported by substantial evidence).

Second, Dr. Tsugunobu purports to fill gaps in the prior art by alleging that the methods claimed reflect a finite number of means and would have an expectation of success. EX1003, ¶47. In doing so, he jumps among the three cited references using hindsight bias and fills in missing limitations with assumptions not found in the references themselves. *See* 37 C.F.R. § 42.104(b)(4). The Petition provides no corroboration or analysis for Dr. Tsugunobu's conclusions.

For instance, Dr. Tsugunobu states that there are a finite number of means for processing glass, but never substantiates that claim. EX1003, ¶47. He then opines that the fact that there are a finite number of means is itself the motivation to modify and combine the references, but does not justify that circular, boot-strapping reasoning. *Id.* The mere fact that there are allegedly a finite number of means for processing glass is not a reason one would combine two different means. As another example, Dr. Tsugunobu ignores the claimed structure of the housing,

and instead points to an *external* heater as disclosure for a replaceable (internal) heating cartridge. EX1003, ¶¶60-64. There is no acknowledgement, much less analysis, explaining how or why a POSA would look to an external heater, extract certain features from it, and then modify an internal heating cartridge to incorporate external features otherwise incompatible with its internal structure. He also claims that certain missing limitations (like the precise angles claimed) are obvious or mere optimizations, but does not explain why or which teaching is being optimized. *See, e.g.*, EX1003, ¶¶72, 88, 120, 127, 132, 136, 174.

Moreover, the Petition purports to rely on Tsuda for disclosure of a replaceable heater, Pet., 18, but Mr. Tsugunobu does *not* appear to rely on Tsuda for his opinion of that limitation. *See, e.g.*, EX1003, ¶¶68, 72, 76, 81, 84, 86, 88, 91, 120, 127, 129, 132, 134, 136, 140-142, 144, 160, 165, 167, 170, 172, 174, 176, 179, 181. The Petition therefore has no supporting expert testimony for its arguments regarding Tsuda's disclosure of a replaceable heater.

Finally, the expert declaration discusses various limitations that Mr. Tsugunobu purportedly finds in the prior art, but never actually identifies what structure in the prior art allegedly satisfies those limitations. *See, e.g.*, EX1003, ¶¶78-79 (alleging that the "view factor" recited in the claim is in the prior art without actually identifying it, and without showing how the heater is oriented relative to the other components or describing how angles alpha and beta relate to

the view factor), 85-86 (failing to define the claimed facets), 92-96 (citing a disclosure that does not teach replacing the heater during the glass forming process), 108-110 (citing an enclosure that surrounds the motor and clearly does not enclose the forming wedge, edge director, and edge rollers), 124 (referring to 1[e] above to give motivation to combine CN '869 and El Kahlout, despite 1[e] not using CN '869, and also not explaining what Mr. Tsugunobu considers to be the heating element).

The collective effect of these deficiencies is a Declaration that is conclusory on crucial limitations and lacks supporting evidence or analysis. The Petition—which relies entirely on the Declaration and provides almost no independent analysis or support for its arguments—therefore fails to present substantial evidence of unpatentability for any claim.

B. Ground 1 fails to show unpatentability.

Separate and apart from the evidentiary failures discussed above, Ground 1 (the sole Ground presented) is facially and fatally flawed on the merits. It fails to show every independent claim element in the cited art, in addition to failing to provide any substantive analysis of motivation to modify and combine the cited art or a reasonable expectation of success in doing so. The challenged claims are not unpatentable in view of the three cited references.

"An obviousness determination requires finding that [a Skilled Artisan] would have been motivated to combine or modify the teachings in the prior art *and* would have had a reasonable expectation of success in doing so." *Regents of the Univ. of Cal. v. Broad Inst., Inc.*, 903 F.3d 1286, 1291 (Fed. Cir. 2018); *Intelligent Bio-Sys.*, 821 F.3d at 1367–68; *see also, e.g.*, *NJOY, LLC v. JUUL Labs, Inc.*, IPR2024-00536, Paper 17 (PTAB Aug. 12, 2024) (denying institution where petitioner did not show a reasonable expectation of success in combining the asserted references); *Honeywell Int'l Inc. v. DSM IP Assets B.V.*, IPR2024-00493, Paper 7 (PTAB Aug. 21, 2024) (same). The Petition here does not show this.

Furthermore, in a properly formulated multi-reference obviousness ground, where a patent challenger identifies a primary reference that allegedly discloses some (but not all) limitations of the claims, the challenger must also identify which limitations are missing from the primary reference and where they can be found in the secondary reference. *See, e.g.*, *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966) (providing that identifying the differences between the prior art and the claims is a required step in the obviousness analysis). The challenger must also explain why a POSA would modify the primary reference to incorporate the teachings of the secondary reference. *See Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 888 (Fed. Cir. 2024) (emphasizing that the mere

existence of the claim limitations in the prior art is not enough without a clear motivation to modify and combine). Petitioner here does not do this.

Indeed, Petitioner falls short of carrying its burden of establishing a reasonable likelihood of showing that any of the claims challenged in Ground 1 are obvious for multiple reasons corresponding to multiple missing limitations from all of the independent claims.

1. Ground 1 fails to show that the combination of El Kahlout, Tsuda, and CN '869 teaches or suggests "a [replaceable] heating cartridge comprising an enclosure having a heat directing surface that is inclined … less than about 90° with respect to a bottom surface of the enclosure" required by all claims.

Ground 1 fails to show obviousness of any of claims 1-20 because the Petition fails to cite art that teaches or suggests "a [replaceable] heating cartridge comprising an enclosure having a heat directing surface that is inclined … less than about 90° with respect to a bottom surface of the enclosure," as found in claims 1, 8, and 15 of the '025 patent. In purported support for this limitation, Petitioner cites CN '869, which discloses an angle α between an inclined heating surface and the horizontal plane. Pet., 20-21, 38-39, 51-52. Petitioner does not, however, define what they are relying on to meet the claimed "an/the enclosure" (in either El Kahlout or CN '869), and thus cannot meet the claimed angle "with respect to a bottom of the enclosure." *Id*.

Furthermore, CN ’869 does not disclose a value for the angle α. The Petition states that “the precise angle is simply optimizing the inclination depicted and described in CN ‘869,” but does not provide further analysis. *Id*. Petitioner does not explain how a POSA would determine the optimum angle, the criteria for that determination, or how a POSA would implement that optimization. Nor does the Petition explain why a POSA would recognize the need for optimization of the angle in the first place.

The Petition purports to rely on a combination of El Kahlout and CN ’869 to teach or suggest the “a replaceable heating cartridge” claim limitation. *Id.*, 21, 39.[1] However, neither El Kahlout nor CN ’869, alone or in combination, teach a replaceable heating cartridge. For example, El Kahlout generally teaches a heating apparatus as part of an edge director, EX1004, ¶35, while CN ’869 teaches a heating apparatus that is used to heat a glass-forming body during glass production, EX1005, ¶¶15-16. Neither of these references discusses removing or replacing the heating cartridge for any reason, and the Petition does not present any theory of inherency for the replaceable heating cartridge limitation.

[1] The Petition mentions Tsuda in passing when this limitation appears in claim 8, but *not* when it appears in claims 1 or 15. *Compare* Pet., 21, 39, *with* Pet., 52.

Confusingly, other sections of the Petition appear to change the argument when addressing claim limitations 15[e], 1[e], and 8[p], and rely on Tsuda to allegedly teach the "a replaceable heating cartridge" feature. Pet., 17-19, 35-38, 48-51. Yet Tsuda is not mentioned in the later sections of the Petition purporting to identify the claimed replaceable heating cartridge limitation in the prior art. *Id*., 20-21, 38-39, 51-52. Even if Petitioner meant to rely on Tsuda, this reference does not teach or suggest the claimed enclosure or the claimed heat-directing surface that is inclined less than about 90° with respect to the bottom of the enclosure. Thus, Tsuda cannot fill in the gaps of El Kahlout and CN '869.

In addition to failing to cite each element of the claims, Petitioner's arguments lack the required rationale to combine El Kahlout and CN '869 to teach or suggest the claims. Petitioner fails to identify a starting point (for example, a specific embodiment or example) in El Kahlout, the differences between that starting point and claims 1, 8, and 15, or the proposed modification of that starting point in view of CN '869. Pet., 20-21, 38-39, 51-52. The analysis does not even identify the relevant portions of El Kahlout. *Id*. Rather, the alleged motivation to combine El Kahlout and CN '869 is a single sentence. *Id.*, 21 (limitation 1[g]), 39 (limitation 1[f]), 52 (limitation 8[a]). Petitioner does not explain what is missing from El Kahlout, why one would look to the inclined heating surface taught by CN '869, how or why one would modify or be motivated to modify El Kahlout in view

of CN ’869, or why one would have an expectation of success in doing so. *Id.*, 20-21, 38-39, 51-52.

Patent Owner and the Board are therefore left guessing as to what portions of the cited references are relevant, how they would be combined, and why the resulting combination satisfies the limitations of the claims. Even being as generous as possible to Petitioner—which is not the legal standard—the Petition still fails. All of the references in the Ground, alone *and in each possible combination*, fail to teach or suggest the claimed replaceable heating cartridge, an enclosure, and a heating surface that is inclined less than about 90° with respect to the bottom of the enclosure. This limitation is missing from the prior art in at least three ways.

2. Ground 1 fails to show that the combination of El Kahlout, Tsuda, and CN ’869 teaches or suggests the claimed “view factor from the heat directing surface” required by all claims.

Ground 1 further fails to show obviousness of any claim because the Petition fails to cite art that teaches or suggests the relative view factors from the heat directing surface claimed in limitations 1[h], 8[d], and 15[i].

Petitioner’s arguments cite the angled heating surfaces of CN ’869 that are used for compensating the temperature of a flow guide plate. Pet., 22-23, 40-41, 54-55. Regarding limitations 15[i] and 1[h], Petitioner makes no attempt to establish the orientation of the heating surface with regards to the edge director or

to define the relative view factors experienced by the edge director and plurality of edge rollers. Pet., 22-23, 40-41. In fact, Petitioner does not define an edge director or an edge roller in its analysis at all. *Id*. Those two structures are crucial aspects of the claimed apparatus and methods.

As described in the ’025 patent, the term view factor “refers to the relative proportion of thermal radiation from the heat directing surface 122 which is incident on [a] specified surface.” EX1001, 8:14-18. The view factor is influenced by several factors, including the angle and shape of the heat-directing surfaces, and the position of the heating cartridge within the glass forming apparatus. *Id.*, 9:60-10:10. The novel shape and positioning of the heating cartridge in the ’025 patent results in a view factor that is greater at the edge director than the plurality of edge rollers and increases efficiency of a glass forming apparatus by reducing heat transfer from the edge directors to the cooled plurality of edge rollers. *Id*. Without definition of the edge directors, plurality of edge rollers, and the heating cartridge’s orientation with respect to the edge director and plurality of edge rollers, a POSA cannot determine the relative view factors.

For limitation 8[d], Petitioner makes no attempt to define the enclosure or define the relative view factors above and below the bottom surface of the enclosure. Pet., 54-55. In fact, neither El Kahlout nor CN ’869—the only references cited in the analysis for this limitation—describe an enclosure. El

Kahlout describes possible heating devices, but does not define their structure EX1004, ¶35, while CN '869 simply defines its heating apparatus as a "recessed shape," EX1005, ¶7. The relative view factors depend on both the shape and materials of the enclosure and the angle of the heat directing surfaces. EX1001, 8:1-14. For example, the enclosure may comprise materials that act as a thermal shield, thereby leading to a lower view factor below the bottom surface of the enclosure. *Id.*, 7:36-40. Because Petitioner fails to define the enclosure and its bottom surface, one is left to guess how the angled heating apparatus proposed in the Petition provides a view factor that is greater above the bottom surface of the enclosure than below the bottom surface of the enclosure.

In addition to failing to cite each element of the claim limitation, Petitioner's arguments lack the required rationale to combine El Kahlout and CN '869 to teach or suggest the claimed limitation. Petitioner fails to identify a starting point (for example, a specific embodiment or example) in El Kahlout, the differences between that starting point and claims 1, 8, and 15, or the proposed modification of that starting point in view of CN '869. Pet., 22-23, 40-41, 54-55. Rather, the analysis does not even identify the relevant portions of El Kahlout, and the motivation to combine El Kahlout and CN '869 is a single sentence. *Id.*, 23 (limitation 15[i]), 41 (limitation 1[h]), 54-55 (limitation 8[d]). Petitioner does not explain what is missing from El Kahlout, why one would look to the inclined

heating surface taught by CN ’869 to teach the relative view factors, or how the proposed references would be combined to result in the precise orientation claimed. *Id.*, 22-23, 40-41, 54-55.

Furthermore, Petitioner does not explain how or why one of skill in the art would modify or be motivated to modify El Kahlout in view of CN ’869, or why one would have an expectation of success in doing so. *Id*. The Petition provides a single sentence alleging that a POSA would expect the claimed view factors when CN ’869’s inclined heating surface is employed in El Kahlout’s method. *Id*., 23 (limitation 15[i]), 41 (limitation 1[h]), 54-55 (limitation 8[d]). But saying that a POSA would expect a configuration does not provide why one would be motivated to adopt that configuration in the first place. The cited portions of Petitioner’s expert declaration provide little further analysis and simply state that the results are predictable. EX1003, ¶¶77-79, 127, 163-165.

3. Ground 1 fails to show that the combination of El Kahlout, Tsuda, and CN ’869 teaches or suggests the claimed port in a housing as recited in claims 1 and 15.

Ground 1 further fails to show obviousness of claims 1-7 and 15-20 because the Petition fails to cite art that teaches or suggests a “replaceable heating cartridge located in a port in the housing,” as found in independent claims 1 and 15 of the ’025 patent. As a preliminary matter, the Petition never purports to actually define the housing in any prior-art reference. The ambiguous color coding (component

names highlighted in orange) and underling/bold text that seem to identify the housing are unclear as to their actual alleged boundaries. *See* Pet., 17-19, 35-38.

This failure is fatal because the boundaries of the housing are essential to determining whether the replaceable heating cartridge is located in the housing or not. Compounding this problem, the Petition does not identify any "port" in the housing that receives the heating cartridge. *Id.* Accordingly, the Petition presents no basis to find "a replaceable heating cartridge located in a port in the housing." There is no identified port in which to locate the alleged replaceable heating cartridge, and no clearly identified housing in which to locate the unidentified port.

Even worse, the Petition nominally relies on Tsuda to disclose the claimed replaceable heating cartridge, when Tsuda's heater is an *exterior* heater. EX1006, ¶90. Tsuda's heater is therefore not located in a port in the housing—no matter how the port or housing might be defined. Tsuda's heater even appears to be outside what the *Petitioner* identifies as the alleged "housing." *Compare* EX1006, FIG. 6, *with* Pet., 17-19, 35-38. While there is another heater cited in Tsuda in paragraph 90, it does not appear to be replaceable. EX1006, ¶90. This limitation is therefore missing from the cited art combination in at least four ways.

Finally, in addition to failing to show how the prior art meets each element of the claims, Petitioner's arguments lack the required rationale to combine the prior art to teach or suggest the claimed replaceable heating cartridge limitation.

For example, Petitioner fails to identify a starting point (for example, a specific embodiment or example) in El Kahlout, the differences between that starting point and claims 1 and 15, or the proposed modification of that starting point in view of Tsuda. Pet., 17-19, 35-38. That failure is felt particularly acutely for this limitation, where it is not clear what the prior-art housing is, where any port is in the prior art, what the prior-art heater is, which reference discloses the heater, or where any of these structures are located relative to each other in the references themselves or in the references as modified per the proposed combination.

4. Ground 1 fails to show that the combination of El Kahlout, Tsuda, and CN '869 teaches or suggests that "a lower edge of the heat directing surface and the bottom surface of the [replaceable] heating cartridge are at least partially positioned between the edge director and the plurality of edge rollers" as recited in claims 1 and 15.

Ground 1 further fails to show obviousness of claims 1-7 and 15-20 because the Petition fails to cite art that teaches or suggests "a lower edge of the heat directing surface and the bottom surface of the [replaceable] heating cartridge are at least partially positioned between the edge director and the plurality of edge rollers." EX1001, claims 1, 15.

The analysis in the Petition relies solely on CN '869 for this "lower edge" limitation. For example, the Petition alleges CN '869 teaches a heating apparatus that is placed at a lower end of a glass-forming body to heat the glass-forming body. Pet., 23-24, 41-42. The analysis in the Petition alleges where the heater is

with respect to a glass forming body (lower portion), but does not relate this orientation back to the edge director and edge rollers mentioned in the "lower edge" claim limitation. *Id*. In fact, CN '869 does not teach or suggest edge directors at all. While the Petition elsewhere relies on El Kahlout to teach the edge directors generally, El Kahlout is not mentioned in the analysis for this "lower edge" limitation. Pet., 23-24, 41-42.

Even if the Board were to forgive the Petition's failure to advance or explain the combination, and consider a combination of El Kahlout and CN '869 to teach or suggest this "lower edge" claim limitation, the Petition would still fail. Neither El Kahlout nor CN '869, alone or in combination, teach the claimed replaceable heating cartridge. While other sections of the Petition rely on Tsuda to allegedly teach the replaceable heating cartridge, that reference is not mentioned in the section of the Petition purporting to identify the replaceable heating cartridge in the prior art. *Compare* Pet., 17-19, 35-38, 47-51 (mentioning Tsuda in passing), *with* Pet., 23-24, 41-42 (omitting any mention of Tsuda).

Additionally, even if the edge director and edge rollers taught by El Kahlout were present in Petitioner's analysis, Petitioner fails to explain how the heating apparatus of CN '869 would be combined with the edge director and plurality of edge rollers in El Kahlout (or Tsuda) to teach or suggest the positioning of the lower edge of the heat directing surface with regards to the edge director and

plurality of edge rollers. Pet., 23-24, 41-42. Petitioner fails to identify a starting point (for example, a specific embodiment or example) in El Kahlout, the differences between that starting point and claims 1 and 15, or the proposed modification of that starting point in view of CN '869. *Id*. The analysis does not even identify the relevant portions of El Kahlout, let alone explain what is missing from El Kahlout and why one would look to the inclined heating surface taught by CN '869. *Id*.

Petitioner also makes no attempt to explain why one would be motivated to modify El Kahlout in view of CN '869, or why one would have an expectation of success in doing so. *Id*. The cited portions of the expert declaration merely repeat the Petition's analysis and add a sentence implying that the thermal shielding portion of the limitation is predictable (but doesn't address the positioning between the edge director and edge rollers). EX1003, ¶¶80-81, 128-129. The cited Declaration therefore sheds no additional light on the specific obviousness analysis that purportedly applies to this "lower edge" claim limitation. Petitioner cannot satisfy its burden of proof.

5. Ground 1 fails to show that the combination of El Kahlout, Tsuda, and CN '869 teaches or suggest the claimed housing configurations recited in claims 1 and 8.

Ground 1 further fails to show obviousness of claims 1-14 because the Petition fails to cite art that teaches or suggests the housing configurations found in claims 1 and 8 of the '025 patent.

a. Claims 1-7

Regarding claims 1-7, the Petition fails to teach "a housing enclosing the forming wedge, edge director, and the plurality of edge rollers." EX1001, claim 1 (limitation 1[d]). Instead, the Petition cites a "seal plate 136 [that] is configured to provide closure to an opening leading to the area housing [a] motor 138." Pet., 34-35. Petitioner further cites Figure 2 as evidence that the edge rollers extend through seal plate 136 and into the area housing motor 138. *Id*. However, the forming wedge 62 and edge director 80 disclosed by El Kahlout clearly reside outside of the housing cited in the Petition. *See* EX1004, FIG. 3 (annotated) (showing that the prior-art housing encloses a motor 138 rather than the forming wedge 62, edge director 80, and plurality of edge rollers 132). The cited portions of the Expert Declaration merely restate the flawed analysis in the Petition, and therefore do nothing to advance the argument. EX1003, ¶¶108-110.

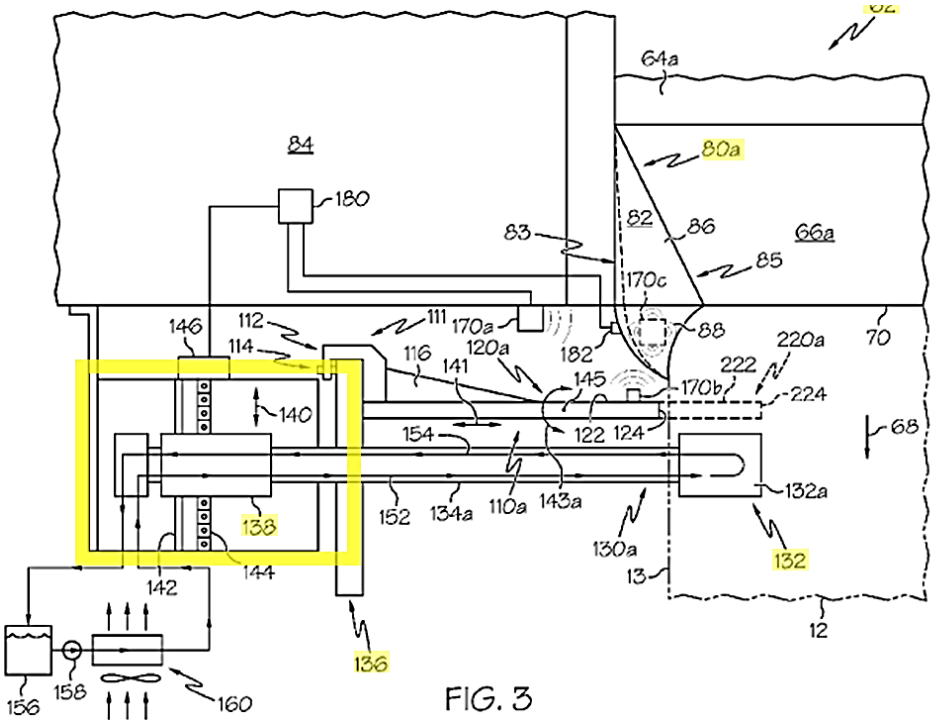


FIG. 3

EX1004, FIG. 3 (annotated).

Accordingly, the Petition fails to identify "a housing enclosing the forming wedge, edge director, and the plurality of edge rollers" in the cited prior art.

b. Claims 8-14

Regarding claims 8-14, the Petition fails to cite art that teaches or suggests "refractory material positioned within the enclosure behind the heat directing surface." EX1001, claim 8 (limitation 8[c]). The Petition simply cites a platinum heater and makes no attempt to identify the claimed refractory material, enclosure, or the heat-directing surface. Pet., 53-54.

Furthermore, CN '869, the only reference cited for this limitation, does not teach or suggest any material positioned behind a heat-directing surface. The Petition makes no attempt to fill the gap in the prior art for this claim limitation—it

simply states that the limitation is present, provides no analysis, and cites a portion of the prior art that does not disclose the limitation. *Id*. The cited portions of the Expert Declaration simply restate the flawed arguments of the Petition. EX1003, ¶161-162.

Finally, the Petition's analysis for limitation 8[c] does not tie CN '869 back to El Kahlout or Tsuda. It does not explain what is missing from El Kahlout or Tsuda, why one would look from the proposed combination of those references to the additional teachings of CN '869, and what the resulting three-way combination of references is purported to be. The Petition thus fails to provide any *Graham* or *KSR* framework for its alleged obviousness positions. And it cannot satisfy its burden of proof in that regard.

C. Ground 1 fails *Graham* factor four based on substantial objective indicia of non-obviousness.

"The objective indicia of non-obviousness play an important role as a guard against the statutorily proscribed hindsight reasoning in the obviousness analysis." *WBIP, LLC v. Kohler Co.*, 829 F. 3d 1317, 1328 (Fed. Cir. 2016). Indeed, as noted by the court in *WBIP*, "evidence of secondary considerations may often be the most probative and cogent evidence in the record." *Id.* (citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1538 (Fed. Cir. 1983)).

Obviousness is a question of law based on underlying findings of fact. *Fox Factory, Inc. v. SRAM, LLC*, 944 F.3d 1366, 1372 (Fed. Cir. 2019) (quoting *In re*

Gartside, 203 F.3d 1305, 1316 (Fed. Cir. 2000)) Those underlying findings of fact include: (1) the scope and content of the prior art, (2) differences between the prior art and the claims at issue, (3) the level of ordinary skill in the pertinent art, and (4) the presence of evidence of secondary considerations, such as commercial success, long felt but unsolved needs, failure of others, and unexpected results. *Id.*. In the present case, objective indicia of non-obviousness include evidence of at least commercial success and industry praise.

1. Nexus

To accord substantial weight to secondary considerations, "the evidence of secondary considerations must have a 'nexus' to the claims, *i.e.*, there must be 'a legally and factually sufficient connection' between the evidence and the patented invention." *Fox Factory*, 944 F. 3d at 1373 (*quoting Henny Penny Corp. v. Frymaster LLC*, 938 F.3d 1324, 1332 (Fed. Cir. 2019)). A patentee is entitled to a presumption of nexus for objective considerations when the patentee shows that the asserted objective evidence is tied to a specific product and that product is the invention disclosed and claimed in the patent. *See WBIP*, 829 F. 3d at 1329.

In the present case, large-size applications of Corning's EAGLE XG Glass are produced by the patented process of the '025 patent. EX2015, 1-32. Further, there is a nexus between the claimed glass made by downdraw, the commercial success of EAGLE XG Glass in large-size applications, and the long-felt need for a

defect-free LCD large panel glass. The claimed manufacturing process was essential to providing a means for producing EAGLE XG at a larger size than previously possible and to scale with a quality and reliability responsible for its commercial success. EX2016; EX2017.

2. Commercial Success

"Demonstrating that an invention has commercial value, that it is commercially successful, weighs in favor of its non-obviousness." *WBIP*, 829 F.3d at 1337. In the present case, the claimed glass produced by a downdraw process and embodied by EAGLE XG Glass was first introduced about eight years before the invention claimed in the '025 patent. While EAGLE XG was revolutionary in many respects, it was not the wildly commercially successful product that it is today until the introduction of the manufacturing process invented and claimed in the '025 patent. EX2016; EX2017. It is the claimed manufacturing process that brought the celebrated innovations of EAGLE XG glass to larger size applications. Corning has produced more than 25 billion square feet of EAGLE XG Glass—enough to pave the Great Wall of China 25 times, or cover nearly 390,000 football fields—to meet the needs of its customers. EX2014. That volume of production, and accordingly that commercial success, would not have been possible without the manufacturing processes described and claimed in the '025 patent.

3. Industry Praise

"Evidence that the industry praised a claimed invention or a product which embodies the patent claims weighs against an assertion that the same claim would have been obvious. Industry participants, especially competitors, are not likely to praise an obvious advance over the known art." *WBIP*, 829 F.3d at 1334. After its introduction, the industry immediately praised the uniqueness and importance of EAGLE XG Glass. In 2007, Eagle XG Glass won the Display Component of the Year; Gold Award, and the Advanced Display of the Year (ADY) Award. EX2002, 0014; EX2003, 1. The manufacturing processes described and claimed and the '025 patent were essential to producing EAGLE XG at commercially scalable quantities without compromising the industry-leading quality and features that made EAGLE XG glass so desirable and praiseworthy.

VI. CONCLUSION

The Board should deny institution of the Petition for *inter partes* review of the '025 patent.

Respectfully submitted,

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CERTIFICATE OF WORD COUNT (37 C.F.R. § 42.24(d))

1. This Patent Owner Preliminary Response complies with the type-volume limitation of 14,000 words, comprising 6,685 words, excluding the parts exempted by 37 C.F.R. § 42.24(a)(1).

2. This Patent Owner Preliminary Response complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman font.

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CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e))

I certify that the above-captioned **PATENT OWNER PRELIMINARY RESPONSE** and associated Exhibits 2012-2017 were served in their entireties on September 16, 2025, upon the following parties via electronic mail:

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