

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MERCEDES-BENZ USA, LLC,
Petitioner,

v.

YECHEZKAL EVAN SPERO
Patent Owner.

U.S. Patent No. 9,955,551 to Spero

Case No.: IPR2023-01040

**PATENT OWNER'S SUR REPLY TO PETITIONER'S REPLY TO
PATENT OWNER RESPONSE**

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List of Exhibits

Exhibit No.	Description
2001	Declaration of Matthew A. Turk, Ph.D.
2002	Curriculum Vitae of Matthew A. Turk, Ph.D.
2003	Best Practices and FAQs for Filing Requests for Reexamination Compliant with 37 CFR 1.510 and 1.915, PTAB, May 2010
2004	<i>Intentionally left blank</i>
2005	Petition challenging U.S. Patent No. 9,955,551, Mercedes-Benz USA LLC v. Yechezkal Evan Spero, IPR2023-01039, June 7, 2023
2006	U.S. Published Patent Application US2003/0137849A1 to Alden, Prosecution History in the U.S. Patent and Trademark Office
2007	Wards Auto “Prospects Bright for Lighting Sensor Supplier Hella,” Roger Schreffler Wards Auto, June 6, 2017 (Available at https://www.wardsauto.com/technology/prospects-bright-lighting-sensor-supplier-hella)
2008	Automotive World, “Hella: Matrix LED technology makes its debut”, February 13, 2014 (Available at https://www.automotiveworld.com/news-releases/hella-matrix-led-technology-makes-debut/)
2009	<i>Intentionally left blank</i>
2010	ATZ Worldwide “Multi-row Headlamp System in the Mercedes-Benz E-Class,” Franz-Josef Kalze, February 2016 (Available at https://link.springer.com/article/10.1007/s38311-015-0105-y)
2011	<i>Intentionally left blank</i>
2012	PR Newswire, “Mercedes Multibeam LED headlamps – in a class of their own,” June 22, 2016 (Available at https://www.prnewswire.com/news-releases/mercedes-multibeam-led-headlamps--in-a-class-of-their-own-300288628.html)
2013	Complaint, Torchlight v. Daimler et al., Case No. 1:21-CV-751 District of Delaware, filed June 7, 2022
2014	Reexamination Application Certified File History of U.S. Patent No. 9,955,551
2015 - 2039	<i>Intentionally left blank</i>
2040	Second Declaration of Matthew A. Turk, Ph.D.
2041	Transcript of Deposition of Nikolaos Papanikolopoulos, Ph.D.

Exhibit No.	Description
	<i>Mercedes Benz-USA, LLC v. Yechezkal Evan Spero</i> , taken on February 23, 2024 IPR2023-01039, IPR2023-01040
2042 – 2049	<i>Intentionally left blank</i>
2050	Jianzhong Jiao and Ben Wang, “Etendue Concern for Automotive Headlamp Using LEDs,” SPIE Proceedings Vol. 5187, (January 2004) (Available at https://www.spiedigitallibrary.org/conference-proceedings-of-spie/5187/0000/Etendue-concerns-for-automotive-headlamps-using-white-LEDs/10.1117/12.504363.short)
2051	Michael Bass, <i>Handbook of Optics</i> 3 RD Edition Volume II, (McGraw-Hill, 2010) (Available at https://www.worldcat.org/title/555545456)
2052	Ben Wang and Jianzhong Jiao “Studies for Headlamp Optical Design Using LEDs,” SAE Technical Paper Series 2004-01-0434, (March 2004) (Available at https://www.sae.org/publications/technical-papers/content/2004-01-0434/)
2053	Ben Wang and Jianzhong Jiao “Optical Transform Limitations in Headlamp Photometric Performance,” SAE Technical Paper Series 2005-01-0861, (April 2005) (Available at https://www.sae.org/publications/technical-papers/content/2005-01-0861/)
2054	<i>Intentionally left blank</i>
2055	Jianzhong Jiao and Ben Wang “High-Efficiency Reflector Optics for LED Forward Lighting,” SPIE Proceedings Vol. 6670, (September 2007) (Available at https://www.spiedigitallibrary.org/conference-proceedings-of-spie/6670/66700M/High-efficiency-reflector-optics-for-LED-automotive-forward-lighting/10.1117/12.730524.short)
2056	Navigant Consulting “Energy Saving Estimates of Light Emitting Diodes in Niche Lighting Applications” Building Technologies Program Office of Energy Efficiency and Renewable Energy U.S. Department of Energy (September 2008) (Available at Energy Savings Estimates of Light Emitting Diodes in Niche Lighting Applications (Technical Report) OSTI.GOV.)

Exhibit No.	Description
2057 – 2059	<i>Intentionally left blank</i>
2060	Michael Bass, <i>Handbook of Optics</i> 3 RD Edition Volume V, (McGraw-Hill, 2010) (Available at https://www.worldcat.org/title/557121959 .)
2061	Texas Instruments/Digikey “How DLP Technology Works,” (Available at https://www.digikey.com/en/product-highlight/t/texas-instruments/dlp-technology .) (Accessed September 12, 2023.)
2062	Texas Instruments “Introduction to +/- 12 Degree Orthogonal Digital Micromirror Devices (DMDs) (Available at https://www.ti.com/lit/an/dlpa008b/dlpa008b.pdf?HQS=dis-dk-null-digikeymode-dsf-pf-null-ww&DCM=yes&distId=10) (Accessed September 12, 2023.)
2063	Surendra Gupte, Osama Masoud, Robert F. K. Martin, and Nikolaos P. Papanikolopoulos “Detection and Classification of Vehicles” IEEE Transactions on Intelligent Transportation Systems, Vol. 3, No. 1 (March 2002) (Available at https://ieeexplore.ieee.org/document/994794) (Accessed February 20, 2024)
2064	<i>Intentionally left blank</i>
2065	Webster’s New Universal Unabridged Dictionary Deluxe 2 nd Edition excerpts, Simon and Schuster (1983)

I. Introduction

Petitioner continues to stretch the limited contours of the Alden disclosure in a manner that is impermissible given their anticipation proofs.

II. Petitioner's Arguments For All Independent Claims Impermissibly Fall Outside the Four Corners of Alden

On Reply, Petitioner presents new arguments that incorrectly interpret the Figure 5 (LED) embodiment based on teachings related to a distinct (single light source) embodiment depicted in Figures 6-7, to effectively modify Figure 5 so it depicts “a sectional view of one row of LEDs in this array.” (Reply, 5.) As stated in the Patent Owner Response (“POR”) because Alden presents three distinct embodiments with varying structural configurations of light sources, optics and materials, a POSA would not look to the second and third embodiments to interpret the first LED embodiment, let alone as clear support to **modify** the actual Figure 5 disclosure. (POR, 9-11.) *See Microsoft Corp. v. Biscotti, Inc.*, 878 F.3d 1052, 1069 (Fed. Cir. 2017) (citations omitted) (“[A]nticipation is not proven by ‘multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention.’” Accordingly, Petitioner’s anticipation proofs should be limited to the disclosure associated with Figure 5.

To support its new effort to modify Figure 5, Petitioner also points to the two-dimensional switch array of Figure 3. (Reply, 6; Ex.1005, ¶[0025].) However,

¶[0025] of Alden doesn't support Petitioner's argument and ¶[0029], which describes the functionality of Figure 5, only borrows the previously described CPU and logic **for controlling a switch**. (Ex.1005, ¶[0029]). The description of Figure 5 makes no mention of the switch arrays 55a/55b, nor provides an explanation as to how the nine LEDs 119 of Figure 5 would have been controlled by the 200+ switches. (Ex.2040, ¶123; POR, 35-36.)

While Figure 3 may provide **switch control logic** common to all three embodiments, at no point does Alden say, or show, that Figure 3's two-dimensional switch array is used with Figure 5's one-dimensional LED array. Yet, Petitioner **chose** to use the two-dimensional switch array from Figure 3 with its Figure 5 proofs, including reliance on both horizontal and vertical coordinates. (Petition, 16, 38.)

On Reply, Petitioner then attempts to use the presumption of prior art "disclosures" being enabled to burden shift. (Reply, 2-3.) While prior art **disclosures** are presumed to be enabled, Petitioner's arguments are entitled to no such presumption. Because Petitioner does not rely on an express disclosure, but rather modifies Figure 5 using Figure 3 and piecemeal descriptors—no presumption attaches.

A **careful** reading of the description of Figure 5 reveals the flaw in Petitioner's underlying argument. Alden expressly teaches/shows the following: 1)

the Figure 5 array as a single row of LEDs (Ex.1005, Figure 5); 2) “[e]ach lighting element [is] controlled by a corresponding switch” (*Id.*, ¶¶[0029], [0047]); and 3) “[e]ach switch is controlled by the CPU and logic previously described¹.” (*Id.*) Then Alden immediately gives an example of what this statement means – “for example, the power 119 is controlled by the CPU which **dictates its respective switch characteristics such that... the power... is controlled...**” (*Id.*) Thus, Alden **discloses** an array of 9 LEDs, where each of the 9 LEDs is controlled by a corresponding switch, and **control** of the power via switches is controlled by the CPU. (POR, 27-28.) What is **not** present is any teaching that the LED array is controlled **by the switch arrays 55a and 55b previously described**. Any presumption of enablement for Figure 5 would only attach to the expressly disclosed teachings – a nine-element one-dimensional LED array controlled by nine switches using the **logic** of Figure 3. Alden is **not** presumed enabled for the combination of elements proffered by Petitioner because Alden **does not disclose the combination of elements proffered by Petitioner**.

Because Petitioner’s single sentence obviousness argument was correctly denied in the DI, Petitioner’s anticipation proofs are limited to the four corners of the Alden reference. (DI, 19-20.) Without more, Alden’s statement that the one-

¹ Emphasis added by Patent Owner unless indicated otherwise.

dimensional switch array of Figure 5 uses the CPU and logic **for controlling switches** “previously described,” does not give Petitioner license to expand the teachings of Alden in the manner attempted.

Given: 1) the differences between the one-dimensional array depicted in Figure 5 versus the two-dimensional arrays actually depicted in Figures 6 and 10; 2) Alden’s express disclosure of arranging the LEDs of Figure 5 “on **a curve along the focal point** of the lens,” (Ex.1005, ¶[0029]); and 3) the absence of a clear, express disclosure (or even a suggestion) that Figure 5 should be interpreted as a section of a two-dimensional array, Alden lacks sufficient precision and detail to “necessarily require” an interpretation of the Figure 5 LED embodiment as a section of a two-dimensional array. *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002). Petitioner’s inferential evidence requires speculation outside the four corners of Alden’s teachings and is thus insufficient to satisfy Petitioner’s burden. Petitioner’s own expert even indicated as much. (Ex.2041, 108:14-18.)

Were Figure 5 interpreted to include additional rows of LEDs, Alden lacks details regarding how the hypothetical structure would be put together—notably whether the two-dimensional LED structure would form a semi-cylinder, a semi-sphere or a flat plane (among other choices), which informs the control strategy and resultant beam spread. The shape and form of the purported two-dimensional

array of LEDs affects how light is mixed from above/below and side-to-side due to overlapping regions and thus impacts the control strategy. (Ex.2040, ¶¶126-130.) Given the lack of a clear disclosure and key gaps in how the hypothetical structure would be put together and then operate, at best Petitioner identifies ambiguities as to how Figure 5 should be interpreted—which establish that Petitioner has failed to meet its burden of proof. *Wasica Fin. GmbH v. Cont'l Auto Sys., Inc.*, 853 F.3d 1272, 1284 (Fed. Cir. 2017). Prior art must be viewed as it is written and as it would be understood by persons in the field of the invention—not as it might have been written to describe a different development. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 851 F.3d 1270, 1274-75 (Fed. Cir. 2017) (This court's precedent “does not permit the Board to fill in missing limitations” even if “a skilled artisan would immediately envision them.”) (citation omitted).

Petitioner's remaining arguments are equally flawed. Petitioner points to Alden's use of the term “array,” but fails to appreciate that an “array” can have a single row. Petitioner also contends that because the CPU logic of figure 4 has X/Y coordinates, that logic, imported into Figure 5, requires X/Y coordinate analysis. (Reply, 7.) Petitioner's argument is insufficient to warrant modification of the Figure 5 depiction—a POSITA would be skilled enough to realize that row-based differentiation is not needed with the Figure 5 one-dimensional array and make appropriate modifications.

Next, Petitioner argues that Figure 5 should not be limited to that which is depicted, because the specification does not expressly limit Figure 5 to a single “row” of LEDs. Turning the doctrine of anticipation on its head, under Petitioner’s logic, absent expressly limiting language, a depiction is a nose of wax, that can be stretched as needed to make an anticipation argument. Here, as Petitioner’s expert confirms, neither Figure 5 nor the associated description clearly establishes the structural features for a two-dimensional array and how any such features would be put together. (Ex.1040, 119:9-22.)

Finally, Petitioner incorrectly relies on a statement related to Figures 11-13, contending that Alden provides that “its ‘segmented light distribution elements described herein’ can perform, including ‘directing light to look around corners,’ ‘concentrat[ing] light to look uphill,’ ... and ‘downhill.’” (Reply, 7-8.) Alden does not show the elements of Figure 5 having the requisite “steering” capability and Petitioner does not explain how fixed, unsteerable LEDs can be used to “concentrate” light in any manner.

Petitioner also points to the boilerplate in ¶[0061] as evidence that Figure 5 is able to “direct”/“concentrate” light—fairly read, those statements are limited to “segmented elements” in embodiments that can actually direct/concentrate light – a function never ascribed to Figure 5 by Alden nor proven by Petitioner. (Reply, 23-24.)

Petitioner's anticipation proofs for independent claims 48, 56, 64, 72, and 80 are thus deficient.

III. Independent Claim 48: Alden Does Not Disclose “Classifying” Objects, and Petitioner Mischaracterizes Alden by Annotating Figure 5

The legal and factual predicate for Petitioner's claim 48 proofs is defective. Petitioner unsuccessfully attempts to stretch Alden's teachings to outline an anticipation argument for claim 48. It does so, however, by presenting an anticipation argument for the “*classify an object*” limitation that replicates its proofs for the “*identify a vehicle*” limitation of claim 8. (Reply, 9-10.) Petitioner's claim 48 proof thus fails to address the differences in claim language, rendering it per se deficient. While the two limitations are linked—to classify an object the system must first be able to identify multiple objects—they address different end applications.

Notwithstanding Petitioner's recast, Alden's system simply searches for sensed light by sector location, once it detects two illuminated spots above a threshold, it draws a “box” around the two illuminated spots and dims sensed light in the relevant sectors. (Ex.1005, ¶¶[0027-0028].) Alden's system is incapable of either identifying an object or classifying an object from multiple objects because it has no means of determining the source of the illuminated spots—it is incapable of distinguishing sensed light originating from a vehicle, streetlights or reflective

signs.

Though the system includes a CCD, Alden uses the CCD data to simply detect intensity and distance—it never receives, stores or processes image data to differentiate between detected light sources. (Ex.2040, ¶113.) Alden never uses the intensity or distance data as the basis to “assess whether” the detected light indicates “two headlights of [an oncoming vehicle] 41” or any other object. Absent the ability to *identify* an object, by showing that the sensed light originates from a given object—the Alden CPU does not and cannot classify the illuminated spots.

Moreover, as Petitioner’s expert explained, Alden’s CPU uses the “same logic” to dim detected light from reflectors as it uses for “vehicle” detection and thus both detected elements will have “the same appearance on the image like the headlights.” (Ex.2041, 80:6-8.) This admission essentially proves that Alden is incapable of classifying (or even identifying) “objects” because it can’t tell the difference between sources.

Alden never mentions the word “classify” and fails to describe anything resembling the ability to “*classify objects*.” References to “a sensed vehicle” do not impart the function of identifying a vehicle. The vehicle is “sensed” because Alden sensed light, not because Alden identified the light as a vehicle, and certainly not because Alden classified the light as a vehicle (among other choices).

Petitioner states that dimming the area above the illuminated spots is

evidence “that Alden is ‘classifying objects’ as vehicles[] . . . [i]f it were not, there would be no need for this step.” (Reply, 10 FN 5.) This is specious reasoning – Alden is designed to eliminate glare, drivers sit above their headlights, and Alden assumes that all detected lights need glare-accommodation – so it dims an area above the lights. It neither cares, nor knows, if such lights are actually vehicles.

Turning to legal sufficiency, despite having the burden to establish why the terms “*classify an object*” and “*identify a vehicle*” should be construed the same, Petitioner provides absolutely no explanation. (Reply, 10-11, FN 6.)

The doctrine of claim differentiation starts out with a presumption that Petitioner chose to ignore—absent a countervailing reason, two different claim terms are to be accorded different meanings. *Kraft Foods, Inc. v. Int’l Trading Co.*, 203 F.3d 1362, 1366 (Fed. Cir. 2000) (the Federal Circuit applied the doctrine of claim differentiation and only departed from it when the intrinsic record overcame the presumption.) Accordingly, if claim differentiation supports a certain meaning of a claim term, that meaning should be presumed correct at the outset of claim construction and remain, absent contrary proof. (*Id.*) Here, Petitioner provided no explanation for its decision to conflate the two terms. And, unlike *Kraft*, Petitioner points to nothing in the intrinsic record to overcome the differentiation presumption. The ’551 Patent’s specification explicitly refers to “*classify*” as distinct from “*identify*” when it states: “Outputs from the CCD arrays are analyzed

by appropriate computational means employing trained pattern recognition technologies, to **classify, identify or locate the contents.**” (Ex.1001, 44:63-45:3.)

On this basis alone, Petitioner’s claim 48 proofs fail.

Additionally, Petitioner fails to rebut the heavy presumption in favor of applying the ordinary meaning of a claim term. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2005). To define the ordinary meaning, Patent Owner turned to the dictionary meaning of “*classify*,” which in conjunction with the ’551 Patent specification, informed the ordinary meaning of “*classify an object*” as requiring “arranging or grouping an object into one of multiple object classes according to some system or principle.” (POR, 7-8, 30; *See, e.g.*, Ex.1001, 44:67-45:3, 51:59-67, 52:19-27, 52:66-53:4, 63:9-12, 64:46-49, 69:54-57, 76:33-39.) The specification repeatedly discusses the system’s ability to identify various objects using image data and then differentially illuminate a scene based on the type of object(s) detected. (*Id.*)

The following section of the ’551 Patent further supports the proffered ordinary meaning: “In a preferred embodiment, using pattern recognition techniques the ALDF 190 is semi or fully automatic . . . The detector pixels 197 can then be used to obtain images of the room which the controller 195 **can assess as furniture, equipment or occupants.**” (*Id.*, 44:33-63.) The above language is consistent with an interpretation of “*classify an object*” as requiring the ability to

group a room object into one of three room classes—furniture, equipment or occupants. Further, in the context of headlights, the '551 Patent discloses classifying vehicles and signs: “Using color and pattern recognition techniques it is possible to determine what is a sign. It is then possible to provide the equivalent of “task lighting” and use the controller and properly aimed SLS to follow and illuminate distant overhead and roadside signs for a longer time[.]” (*Id.*, 52:66-53:4.)

Despite having provided an ordinary meaning that is consistent with the intrinsic record and the dictionary definition of the term, Petitioner’s Reply only states “[t]here is no basis to limit the claims in this way”—it offers no other ordinary meaning or explanation for why the proffered construction is not correct. (Reply, 10 FN 6.) Instead, Petitioner argues that Alden discloses “classifying” objects “as it arranges or groups something (*e.g.*, light sources(s)) in classes (*e.g.*, vehicles and non-vehicles) based on a system or principle (*e.g.*, whether the intensity of detected light is above a threshold or distance).” (*Id.*, FN 6.) Petitioner’s argument is wrong on multiple fronts: 1) Alden never classifies the light sources into vehicle and non-vehicle classes—it is only senses light and dims light in response, this coded response is not proof of classification; and 2) Alden does not express a system or principle of classification, using a threshold, nor does it describe what to do with non-threshold data. It certainly doesn’t treat non-

threshold data as “non-vehicles” – in fact, non-threshold data is likely simply discarded. At best, for the sake of argument only, the threshold is used to sort light – high intensity light is accommodated, lower intensity light is not accommodated—regardless, light is not an object. (Ex.1005, ¶[0028].)

Coupled with Petitioner’s improper recast of the salient facts, Petitioner’s failure to overcome the presumptions associated with the doctrine of claim differentiation and ordinary meaning construction is fatal to its claim 48 proofs.

A. Petitioner Mischaracterizes Alden by Annotating Figure 5

Patent Owner (“PO”) disputes Petitioner’s contention that its annotations do not mischaracterize figure 5 and discusses this with respect to claim 72 below. (§ V1 below, *infra*.)

IV. Independent Claim 56

Petitioner’s proof for the invalidity of claim 56 relies on an anticipation argument involving an impermissible modification of Alden. Specifically, Petitioner’s proof relies on modifying the embodiment of Figure 5 to utilize the two-dimensional switch array of Figure 3. The problems with this choice are discussed in greater detail with respect to claim 72, below. (§ VI, *infra*.) As noted by the Federal Circuit in *Net MoneyIN*, it is not enough for anticipation “that the prior art reference . . . includes multiple, distinct teachings that [an ordinary] artisan might somehow combine to achieve the claimed invention.” *Net MoneyIN*,

Inc. v. VeriSign, Inc., 545 F.3d 1359, 1371 (Fed. Cir. 2008). Instead, the Federal Circuit held that “the prior art reference—in order to anticipate under 35 U.S.C. § 102, must not only disclose all elements of the claim with in the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Id.* at 1369. (citation omitted).

Further, the IPR process is an adversarial process wherein the burden of proof rests with the Petitioner. According to the Federal Circuit “the expedited nature of IPRs bring with it an obligation for Petitioners to make their case in their petition to institute.” *Corephotonics, Ltd. v. Apple Inc.*, 84 F.4th 990, 1002 (Fed. Cir. 2023) citing to *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016). Thus, Petitioner is bound to the argument made in the Petition, and that argument, in this case, relies on “multiple, distinct teachings” that Petitioner chose to combine in the exact manner impermissible for anticipation.

Petitioner is bound to its **choice** to combine a two-dimensional switch array with a one-dimensional LED array. Because such modified combinations are impermissible for anticipation, all of Petitioner’s anticipation proofs suffer from a fatal error.

V. Independent Claim 64

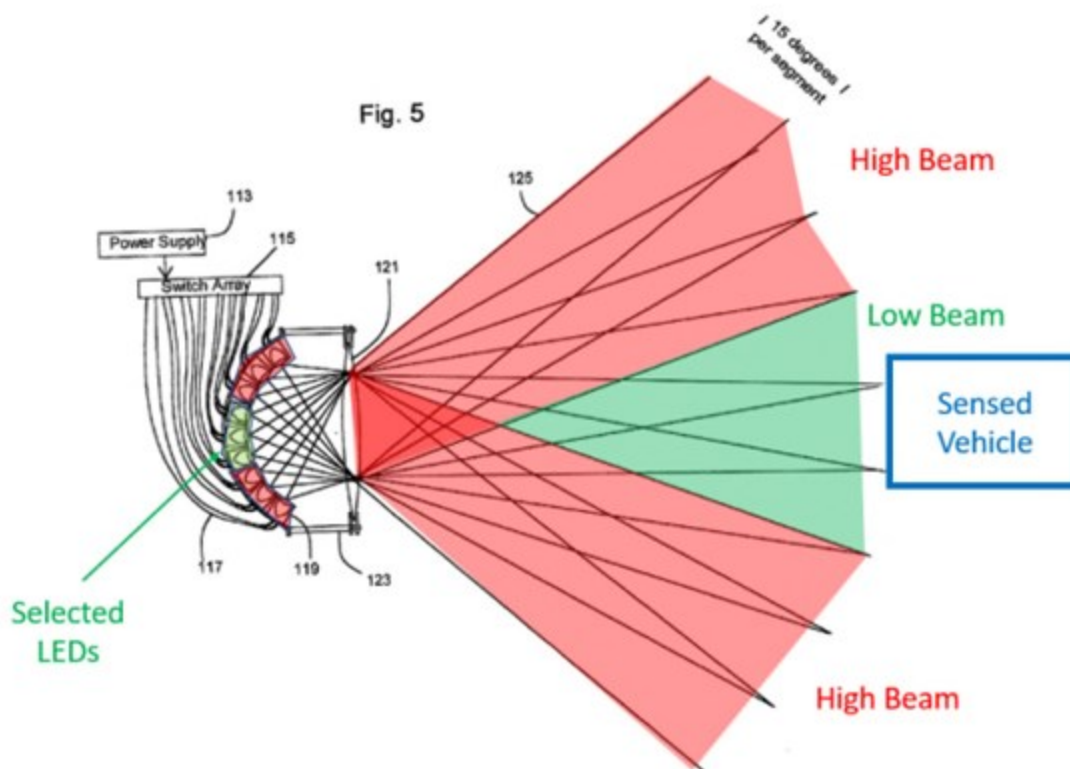
Petitioner’s proof for claim 64 includes the same fatal defects as the proof

for claim 56, noted above and further based on the issues explained in greater detail below with respect to claim 72. (§ IV, *supra*, § VI, *infra*.)

VI. Independent Claim 72: Alden Does Not Disclose Maintaining Dimmed Illumination at Detected Vehicles Relative to Laterally Adjacent Areas

A. High-level Concept Drawings are Insufficient to Establish Usable Evidence of Relative Illumination

Despite arguing that the figures of Alden are simply “conceptual” and not “scaled technical drawings,” Petitioner relies on the following out of scale, annotated version of Figure 5 for its claim 72 proofs (and comparable figure annotations for claims 48, 56, 64, and 80):



(Petition, 54, Figure 5)

Petitioner contends that this annotation “accurately illustrates” the concept that “the light sent to areas where a vehicle present is dimmed, while light sent to areas at a common elevation and laterally adjacent to areas containing the vehicle is switched to high beam” (Reply, 14.) Specifically, with reference to claim 72, Petitioner relies on this figure as **showing** different illumination “laterally adjacent to” the “target.” (Petition, 55.) Petitioner’s annotations are however demonstrably inaccurate in the following ways:

- 1) It fails to accurately show the overlapping additive portions of light—

for example, while the transparent red “fill” overlaps immediately in front of the lamp, it does not overlap in any of the other diamonds. Because of the beam pattern one or more of the red and/or green beams overlap at each diamond. (Ex.2040, ¶129.)

- 2) It fails to extend the green areas along at least a theoretical course—which would have shown that the areas “laterally adjacent” to “the target” (the vehicle) are **also** going to be covered by the green annotation.
- 3) It is misleading in that it fails to account for the differences in the “cluster” proofs for claims 72 and 73. More specifically, as claim 73 depends from claim 72, the annotated figure fails to address how the “cluster” in claim 73 can be met by a “cluster” of LEDs from both lamps and fails to show the impact of overlapping additive light from the second lamp on the claimed outcome (allegedly shown by the annotated figure)—given that the proof for claim 72, relies on a depiction of a single lamp. This at a minimum leaves Petitioner without a complete proof for the system Petitioner ultimately relies on for claim 73, instead misleadingly relying on the output from a single

lamp.² Further, Petitioner should have explained the basis for their disconnected proofs in view of 53:28-37 of the '551 Patent, which sheds light on how the term “cluster” is used.)

Petitioner’s annotated Figure 5, which mislocates and mis-sizes the vehicle and fails to even account for illumination from the second headlight, is unreliable to establish Alden’s actual illumination pattern.

Petitioner’s supporting arguments are equally flawed. The statement that “light sent to areas where a vehicle is present is dimmed, while light sent to areas at a common elevation and laterally adjacent to areas containing the vehicle is switched to high beam” is inaccurate, because, per Petitioner’s own annotation, there is light traveling past the vehicle, where the vehicle isn’t located, but which is laterally adjacent to the target (vehicle), that is comprised of some level of overlapping green light. (Reply, 13-14; POR, 38-40.)

Given the lack of specificity with Alden’s Figure 5 embodiment, Petitioner’s own expert was unable to explain the beam-shape and aimings of the actual emission, and Patent Owner’s expert agreed that Alden lacked sufficient details to confirm the emission pattern. (Ex.2041, 54:13:24, 56:15-20, 60:19-61:13, 111:9-19, 113:9-116:6, 119-9:17, 121:1-10; Ex.2040, ¶¶111-115, 123.) Annotating a

² The same issue noted exists for claims 57, 59, 65, 67, 75, 81, and 83.

“conceptual,” out-of-scale emission pattern (which the Petitioner’s expert could not even explain) and then contending that it **shows** what is claimed is insufficient proof when the actual description is ambiguous. Petitioner’s proofs are thus insufficient to clearly establish that there is different light provided to the target and to areas laterally adjacent the target as claim 72 requires. (Ex.2041, 52:11-15, 57:7:11, 62:1-8, 63:13-64:13, 107:11-18.)

B. Petitioner’s “buffer zone” is both an impermissible new theory and an unreasonable interpretation of “laterally adjacent”

In addition to the fatal flaws with the two-dimensional switch array proofs noted for claims 48, 56, and 64 above (§ III, IV, V, *supra*), and the flaws with the annotated figure noted immediately above, Petitioner’s new “buffer” theory in the Reply is flawed. The proposed buffer zone around the target is a new theory of “laterally adjacent” never presented in the Petition. (Reply, 17-20.) Pursuant to the Petition, the “target” is the vehicle. (Petition, 54.) If one looks at the annotated Figure 5 of the Petition, it is quite plain that if the headlight beam is extended, the areas laterally adjacent to the target are illuminated with the green light of the annotation. (*Id.*) That is true regardless of whether a “buffer” is inserted or how rigidly “laterally adjacent” is interpreted.

Petitioner has chosen a proof reliant on a nine LED system where each lamp has the responsibility for 15 degrees of the field of view. (Ex.1005, ¶[0028].)

Petitioner also chose to use a position of the vehicle in its annotation wherein the vehicle was encompassed by 3 beams of the lamp. As noted in the Institution Decision (“DI”), a single LED with responsibility for a 15-degree arc would cover 39 feet of the scene at 150 feet. (DI, 16-17.) So, for example, at 150 feet away, the “sensed” vehicle (having approximately 6 feet of width) and an area to approximately 55 feet to either side of the vehicle would all be receiving the dimmed illumination. An area to the side of this 117-foot area is not “laterally adjacent to the target” under any interpretation.

The only thing that can really be gleaned from this annotation is that the Petitioner considers a situation, wherein the detected vehicle is centrally located within three beams of a nine-beam system.

Without a single reference to scale, it is quite impossible to determine, from the proffered proof, how much of a “buffer” is considered sufficient for “lateral illumination adjacent.” The proof is thus deficient and ambiguous. Petitioner is not entitled to a particular scaling of the drawing that might render its argument true when it never proposed that scaling. The “concept” shown as the chosen proof clearly sends “green” illumination into the areas laterally adjacent the target vehicle (regardless of whether there is a nominal buffer zone) and therefore Petitioner has not met its burden. Petitioner’s new argument also overlooks the broader claim 56 language, which recites “on both sides of the first area.”

Petitioner's reading of "laterally adjacent to the target" effectively imparts the same meaning to "laterally adjacent to the target" and "on both sides of the first area," despite the clear different choices in language.

VII. Independent Claim 80: Alden Does Not Disclose Changing LED Light as a Sensed Vehicle Moves

In addition to the fatal flaws with the two-dimensional switch array proofs noted for claims 48, 56, 64, and 72 above (§ III, IV, V, VI, *supra*), Petitioner's proof for claim 80 includes an additional material defect. Notwithstanding the fact that, for reasons similar to those presented for claim 72, Petitioner has a proof that does not visually **show** "LEDs **aimed laterally adjacent** to the target," Petitioner's argument also failed to **even identify** such LEDs. (§ VI, *supra*; POR, 49.)

Petitioner did not address this deficiency in Reply. (Reply, 20.) Petitioner's failure to identify the LEDs is fatal to its analysis of the claims. Petitioner's entire argument for this limitation is based on an analogy to other claims, none of which reference "LEDs aimed laterally adjacent to the target." (POR, 49.) This failing alone is fatal to the proof, as all elements of the claim are not shown to be met by Alden. While it would have been inappropriate to attempt to cure this noted deficiency on Reply, Petitioner did not even attempt to do so, and thus is completely foreclosed from any future attempt to cure.

VIII. Petitioner's Proofs for Dependent Claims 50/58/66/74/82, 51/59/67/75/83 and 53/61/69/77/85 Are Flawed

A. Petitioner's Arguments Fail to Establish that Alden Can Concurrently Satisfy Two Applications

Alden cannot tell the difference between headlights and reflective signs because, as Petitioner's expert admits, detection of reflectors "are going to be something that corresponds—it will have the same appearance on the image like the headlights." (Ex.2041, 80:6-8.) Thus, it is impossible to have a system (under the four corners of Alden) that can **both** diminish glare and accommodate a curve, based on "the same logic" with both detected elements having "the same appearance on the image like the headlights." (Reply, 10; Ex.2041, 80:6-8.) Curve detection in conjunction with vehicle detect in the same functioning system is required by at least claims 50/58/66/74/82 and 53/61/69/77/85 because of those claims' dependency from independent claims directed to glare-reduction based on vehicle detection.

Assuming *arguendo*, that without some explanation of how the system operates, Alden **simply saying** that it can detect a curve based on reflectors was sufficient for anticipation, Alden never states that one version of its system can concurrently do **both** things. Instead, it describes a **separate** system which uses the "same logic" and same detector hardware ("the art of the present invention") and simply applies that logic and hardware to a different end. *Id.*

Petitioner contends:

As a final example, Alden discloses additional functionalities its “segmented light distribution elements” can perform, including “directing light to look around corners,” “concentrat[ing] light to look uphill,” and “concentrat[ing] light to look downhill.” (Alden, Figs. 11-13, [0036]-[0038].) In these paragraphs, Alden discloses that it is the “segmented light distribution elements described herein” (which would include those of Figure 5) that can perform these functions, not just the lighting elements of any particular embodiment.

(Reply, 7-8.)

This statement makes several incorrect assumptions. First, there is no showing or explanation as to how a fixed array of non-movable, non-aimable LEDs, whether one-dimensional or two, could “concentrate” light anywhere. So, it is not even clear that this quote from Alden actually refers to Figure 5. Even assuming *arguendo* that the quote did apply to Figure 5, while the “light distribution elements” may be alternatively used for a different end, Alden lacks any capability to tell the difference between headlights and reflectors, which impedes the system’s ability to simultaneously accommodate curves and accommodate vehicles, because the system can’t tell the difference between signs and headlights, and yet it would need to because it handles each situation very differently. Accordingly, at best, Alden is simply describing two separate usages

for its system, rather than a combined function.

Because of dependency from glare-reduction independent claims, these claims require a combined system that can concurrently achieve both glare prevention and curve detection. Accordingly, assuming *arguendo*, that some version of Alden can be used to detect reflectors instead of vehicles, a POSA would understand that both functions cannot be consolidated into a single system because the system would be continually producing incorrect outputs based on its inability to distinguish between curves and headlights. Petitioner essentially concedes this when it admits that “Alden explains that its system can be used for ‘many applications.’” (Reply, 23.) And, again, this is all notwithstanding that Alden provides absolutely no explanation for how detected reflected illumination would be adjudged to be a reflector.

B. Petitioner’s Argument Fails to Appreciate that Petitioner’s Own Proposed System Necessarily Includes Default High-Beam Illumination

Claims 51/59/67/75/83 require “changing illumination in at least a direction of the road curvature.” As noted by PO, Alden’s Figure 5 system defaults to high beam illumination. (POR, 56.) Petitioner attempts to dismiss this by contending that the system “can be used for ‘many applications’” and thus (presumably), when illuminating curves it would not default to high beam (which of course would make that a distinct system). (Reply, 23.) This comment overlooks the fact that

these claims depend from a base argument for a system that defaults to “high beams on.” (POR, 16.) So, for purposes of claim 50, for example, when a function is **added** to that system, Petitioner cannot suddenly contend that Alden will not remain in “high beam” mode per the base version. (See claim 48.) Petitioner’s own arguments contravene such a position. See, e.g., Petition, 29, “Alden discloses that . . . ‘the driver of 47 [i.e., the vehicle implementing the Alden system] has maximum light’” or Petition, 18 “so that the headlight ‘distributes high beams **throughout** its distribution areas except in a box in a direction of the 41.’”

As the base system already provides “maximum” light to areas with no oncoming vehicles, Alden is not going to *change illumination* in the *direction of the road curvature*, where it is already providing maximum light. The proposed Alden combinatorial system is thus incapable of meeting the limitations of 51/59/67/75/83.

Petitioner’s new theory about “different thresholds” to distinguish between vehicles and signs is both impermissible and beyond the four corners of the Alden reference. (Reply, 9-10.) Even if considered, the argument lacks merit, because it fails to recognize that detected intensity is a function of both distance and emission intensity—dim lights at a further distance will have the same or less intensity as reflectors at a closer distance. Reflectors will appear brighter as the vehicle approaches. Accordingly, there is no “threshold” above which all sensed light will

be headlamps and below which all sensed light will be reflective signs. And that is notwithstanding the complete lack of explanation, even from Petitioner, let alone Alden, as to what thresholds would be appropriate at what distances to ensure that, for example, the vehicle did not accidentally read several oncoming vehicles with dim lights as a curve and randomly aim the entire headlamp beam to the left or right while the driver is traveling forwards. (Ex.1003, ¶150.)

C. Claims 53/61/69/77/85

Petitioner contends that sensing “road reflectors” is sufficient to satisfy its proof for claims 53/61/69/77/85. (Reply, 24-25.) As noted above with respect to claim 50 (and 58/66/74/82), Petitioner cannot rely on the light sensors detecting reflector data for proof of “the sensors” in claim 53 (or 61/69/77/85), as Alden does not present a system capable distinguishing between headlights and road-signs. Thus, were a vehicle to attempt both things using the same sensors, it would never know (based on the teachings of Alden) whether it was sensing emitted light or reflected light. This leaves Petitioner with a reliance on “steering wheel sensor” data for 53/61/69/77/85, which is Petitioner’s “alternative argument.” (*Id.*) That data is not capable of being “the sensor data” as required by claim 53 (or the noted counterparts) and, in any event, does not represent an “upcoming” turn because people do not turn steering wheels prior to reaching a turn. (POR, 60-62.)

IX. The Petition Does Not Present an Obviousness Rejection of Claim 51 based on Alden in view of Beam

Petitioner's argument for claim 51 is "Alden anticipates and renders obvious claims 51" (Petition, 65.) This limits the ground to Alden alone. Because Petitioner is master of its Petition, Petitioner lacks the right to revise the basis for the ground based on a citation. Thus, the new ground is impermissible, or the prior ground was not stated with requisite particularity. Either is fatal.

To the extent this impermissible new ground is entertained, PO points out that terminating illumination from one of the nine LEDs in the Figure 5 array is going to terminate illumination of 15 degrees of the field of view. No skilled artisan is going to terminate the illumination of $1/9^{\text{th}}$ of the forward beam, especially when that $1/9^{\text{th}}$ equals 15 degrees of the driver's field-of-view.

X. Conclusion

Patent Owner respectfully requests that the Board finds all challenged claims not unpatentable.

Dated: July 10, 2024

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Certificate of Service

The undersigned hereby certifies that on July 10, 2024, a complete and entire copy of **PATENT OWNER'S SUR REPLY TO PETITIONER'S REPLY TO PATENT OWNER RESPONSE**, was served via electronic mail to the correspondence listed below:

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