

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VOLKSWAGEN GROUP OF AMERICA, INC.,
Petitioner,

v.

YECHEZKAL EVAN SPERO
Patent Owner.

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

Case No.: IPR2023-00336

**PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION
FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.107**

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List of Exhibits

Exhibit No.	Description	Identifier
2001	Patent Owner Notice of Disclaimer	Notice
2002	Declaration of Matthew A. Turk, PhD	Turk Decl.
2003	Curriculum Vitae of Matthew A. Turk, PhD	Turk CV
2004	Best Practices and FAQs for Filing Requests for Reexamination Compliant with 37 CFR 1.510 and 1.915, PTAB, May 2010	Best Practices
2005	Intentionally left blank	
2006	Petition challenging U.S. Patent No. 9,955,551, Volkswagen Group of America, Inc. v. Yechezkal Evan Spero, IPR2023-00315, Paper 2, December 9, 2022	The '315 IPR Petition
2007	Petition challenging U.S. Patent No. 9,955,551, Volkswagen Group of America, Inc. v. Yechezkal Evan Spero, IPR2023-00318, Paper 2, December 22, 2022	The '318 IPR Petition

Pursuant to 37 C.F.R. § 42.107, Patent Owner, Yechezkal Evan Spero (“Patent Owner”), submits the following Preliminary Response (“Preliminary Response”) to the Petition for *Inter Partes* Review of U.S. Patent No. 9,955,551 (“the ‘551 Patent”). While the Petition addresses claims 1-4, 7, 8, and 10-18, as Patent Owner has disclaimed claims 1-4 (Ex.2001, Notice), the Preliminary Response is directed to claims 7, 8 and 10-18 (“Disputed Claims”). Patent Owner respectfully requests that the Patent Trial and Appeal Board (“the Board”) deny Petitioner’s request to cancel the Disputed Claims.

I. Introduction

The Petition is a tangled maze of arguments, often detached from the actual language of the disputed claims and the teachings of the applied references -- resulting in arguments that ignore claim limitations and rely on incomplete proofs. The Petition format also fails to satisfy the particularity requirements of 35 U.S.C. §314. In short, from both a substantive and procedural perspective, Petitioner failed to meet its burden.

On the substantive merits, Petitioner’s rationale for combining the applied references: (i) renders the primary reference unsatisfactory or inoperable or changes its principle of operation; (ii) is impermissibly vague regarding why or how the applied references would be combined; and (iii) suffers from significant hindsight bias.

More specifically, the proffered secondary references do not add anything useful or desirable to the primary references, and are essentially representative of, at best, a different way to achieve the exact same result. Petitioner identifies no rational reason to combine the references in the specific way that it alleges, nor any useful result of such a combination, nor any problem such a combination solves. The only apparent “motivation” to combine the references is an attempt to meet the language of the claims.

As a result, all of Petitioner’s asserted grounds lack sufficient evidence of obviousness. The gaps in the prior art, filled at best with conclusory positions advocated in the Petition, leave Petitioner without a reasonable likelihood of prevailing as to any remaining disputed claim.

Procedurally, the Petition should further be denied under §314 because the Petition lacks particularity. The Petition adopts an extreme word-count preservation strategy of burying the claim limitations in a claim appendix and listing only claim identifiers in the argument, requiring the reader to embark on a scavenger hunt to find the corresponding claim limitations.

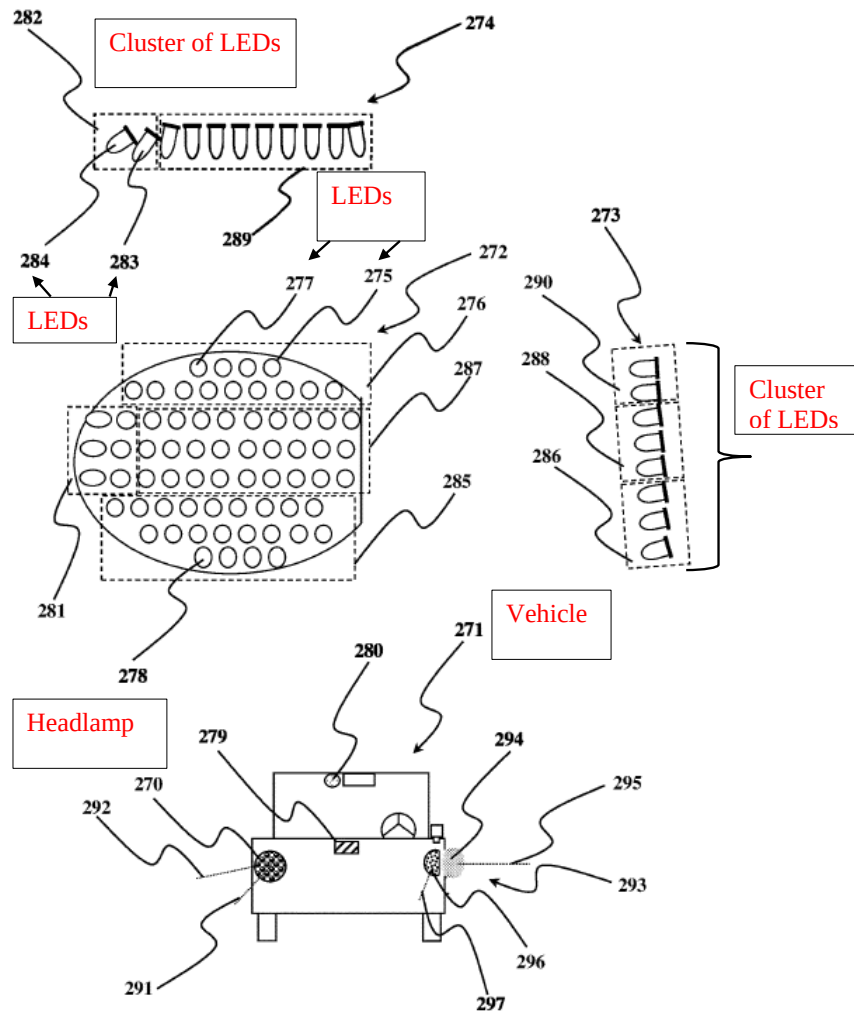
Petitioner lumps alternative grounds and teachings in the argument, resulting in vague and confusing applications of the applied references. When unpacked, it becomes clear that Ground 2 is actually a Lumped Ground including two distinct grounds: (i) Ground 2A -- an argument that Braun alone renders disputed claim 7

obvious; and (ii) Ground 2B -- an alternative argument that the combination of Braun and Dowling renders disputed claim 7 obvious. (Petition at 38-44.) Ground 3 is similarly a Lumped Ground including two distinct grounds: (i) Ground 3A -- an argument that the combination of Braun and Bailey renders disputed claim 8 obvious; and (ii) Ground 3B -- an alternative argument that the combination of Braun, Dowling, and Baily renders disputed claim 8 obvious (*Id.*, at 44-51.) This leaves both the Board and Patent Owner in a position where they must guess how the Petitioner is particularly interpreting and applying the references.

For these reasons, and others explained below, the Board should deny Petitioner's Petition for *inter partes* review.

II. Overview of the '551 Patent

The '551 Patent discloses "a novel multi-light source approach to the design and construction of solid-state lighting fixtures (vs. solid state lamps), which is termed a 'Digital Lighting Fixture', due to the control of individual lighting element 'digits' to provide the 'correct' lighting solution for the situation at hand." (Ex.1001, 11:8-13.) The '551 Patent further explains that "[t]he terminology 'digital' as used herein refers to the discrete nature of the multiple LED lamps provided in the luminaire, whereby, 'digital' control results from the individual control of the discrete, *i.e.*, 'digital' lighting elements, the LEDs, in the luminaire." (*Id.*, 2:65-3:3.)



(Ex.1001, Fig. 15, Annotated)

The ‘551 Patent describes “a different approach which is to provide the end user with the most correct lighting solution not a new technology lamp to replace the old one.” (*Id.*, 11:5-8.) “In contrast to a prior art, single large, lamp replacement like light source, the present invention provides multiple, small sized sources of differing characteristics such that the effect of the whole is greater than the sum of the individual parts.” (*Id.*, 11:45-49.) “The added controllability offered by breaking the

total light output up into **discrete (‘digital’) specifically aimable and dimmable elements** which can be addressed by control electronics to effect intensity, spectrum and spatial distribution of intensity and spectrum, yields a lighting fixture (vs. lamp) of unparalleled performance.” (*Id.*, 11:56-62, emphasis added.) The ‘551 patent explains how to use its “digital lighting” in the context of headlamps to “provide the optimal lighting solution in real-time” – whether that be for predictive curve illumination (*Id.*, 57:31-37.), to preserve forward illumination while preventing glare (*Id.*, 52:54-65.), or both (*Id.*, 53:33-44.)

The Disputed Claims include claims 7 and 8. Claim 7 depends directly from cancelled independent claim 6. Claim 8 is independent. Each of those claims is reproduced below, with emphasis added:

6. An illuminating device having automatic control of the light provided to an illuminated area comprising:

a structure for incorporating illuminating device elements;

one or more light sources incorporated in the structure and in communication with a power source;

electronic circuitry apparatus for the controlled powering of the light source and other illuminating device elements;

one or more cameras placed on the structure for detecting coordinate-specific information about the illuminated area, said camera in communication with power and control device elements;

a controller integrated with the structure, in communication with the light source controlling power circuitry, said controller arranged to processes the information communicated from the camera and automatically control the light provided to the illuminated area.

7. The illumination device of claim 6, where one or more light sources are directional wherein the one or more detectors are configured to sense a presence of glare on a person's eyes in the illuminated area, and wherein the controller is programmed to adjust an intensity of the directional light sources to reduce the glare.

8. An illuminating device which provides light to meet an illumination requirement of an illuminated area in which visual activities are performed, where different sub-areas of the illuminated area need to be illuminated at a different intensity and/or at a different spectrum than another sub-area of the illuminated area, comprising:

a light fixture including a multiplicity of directional light sources including at least two directional light sources pointing in different directions thereby illuminating different sub-areas of the illuminated area, the light fixture having movable structure for aiming the directional light sources mounted thereon in a defined direction;

a camera for obtaining images of the illuminated area functioning as a detector for at least one of (i) a light detector (ii) a spectrum detector, (iii) a motion detector, (iv) a measuring detector for sensing a geometry

of the illuminated area, and (v) a detector for sensing at least one of work surfaces and road objects and at least one of vehicles and people; a controller for adjusting a light intensity and a direction of each of the directional light sources;

a processor with stored algorithms and data for identifying at least one of (i) tasks being carried out by people, (ii) location of people, (iii) frequency of area usage by people, (iv) traffic density in the illuminated area from the sensed geometry, (v) work surfaces, (vi) road objects, people and/or vehicles, and (vii) roadway surface luminance any of which is used by said processor for determining illumination within the illuminated area using at least one of artificial intelligence, pattern recognition, video analytics, and look-up tables wherein said processor, upon calculating the required illumination parameters according to best practice standards, directs the controller to adjust the directional light sources that illuminates the specific sub-areas to meet the illumination requirements of the visual activities.

(Ex.1001, claims 6-8, emphasis added.)

The ‘551 Patent describes a multitude of sensor-based techniques for observing a scene, analyzing a scene, determining varied illumination for a scene, etc. This can include determining what objects are within the scene and what illumination should correlate to those objects (Ex.1001, 44:36-45:44.) The ‘551 Patent notes the general applicability of the varied concepts across embodiments and specifically notes that techniques described elsewhere at least correspond to

headlights (*Id.*, 52:66-53:4.) The ‘551 Patent explains that, by using “digital” headlamps with known light directionality of discrete source elements, such as LEDs, it is possible to “continue to illuminate far ahead (in high beam) without blinding oncoming traffic.” (*Id.*, 52:60-61.) This allows for determination of “what exact aiming is the maximum allowable for any given traffic situation and the road layout.” (*Id.*, 52:64-65.)

The ‘551 Patent also recognizes that different “objects” may be in the field of view in a variety of lighting situations, and that different light output may be appropriate to accommodate these different objects. (*Id.*, 44:36-45:44.) In the context of headlamps, it can, for example, determine types of objects, e.g., without limitation, whether something is a vehicle or a sign, and respond differently to each object. With regards to a preceding vehicle it may reduce illumination of the vehicle and with regards to a preceding sign it may increase illumination of the sign. It can also make these accommodations at the same time, because of the discrete nature of the directional light sources – “use the controller and properly aimed SLS to follow and illuminate distant overhead and roadside signs for a longer time, yet not blind oncoming traffic due to the narrow beam.” (*Id.*, 53:1-4.) This is a headlamp embodiment employing, among other things, the described notion of “task lighting” – contemplation of varied illumination needs within an illuminated scene.

Thus, the ‘551 Patent provides a comprehensive solution for the control and

use of light, and extends the application to headlamps that can accommodate other traffic without blinding it, predictively illuminate road curvatures, and differentially illuminate objects in a scene based on object recognition. All of this lends itself to the complete headlamp solution contemplated and described – a solution where “[a]t any instant in time the intensity, spectrum and beam pattern of the headlamp may be varied as a function of the drivers intent, lay of the road and environmental factors.” (*Id.*, 51:49-52.) The marrying of the ‘551 techniques with the headlamp embodiments results in a headlamp with highly controllable emission elements that, “[w]hen combined with devices capable of detection changes in the surrounding environment the flexible DLF is capable of changing the illumination so as to provide the optimal lighting solution in real-time.” (*Id.*, 57:33-37.)

III. Level of Ordinary Skill

A POSITA for the invention claimed in the ‘551 Patent, would have had a Master of Science Degree (or a similar technical Master Degree, or higher degree) in an academic area emphasizing electrical engineering, computer engineering, or computer science with experience or education in optics and imaging systems or, alternatively, a Bachelor’s Degree (or higher degree) in an academic area emphasizing electrical, computer engineering or computer science and having two or more years of experience in the field of optical and imaging systems.

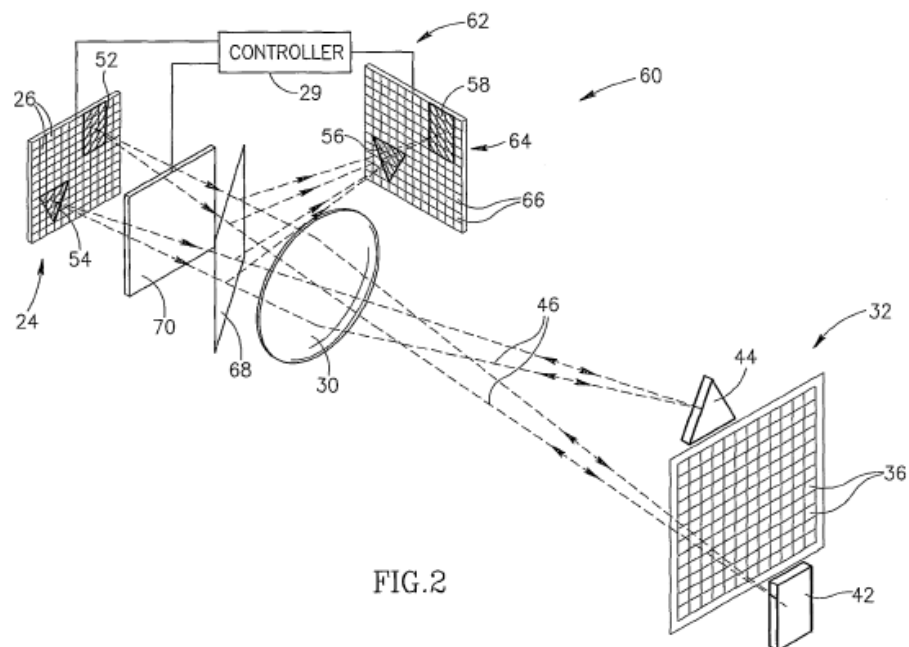
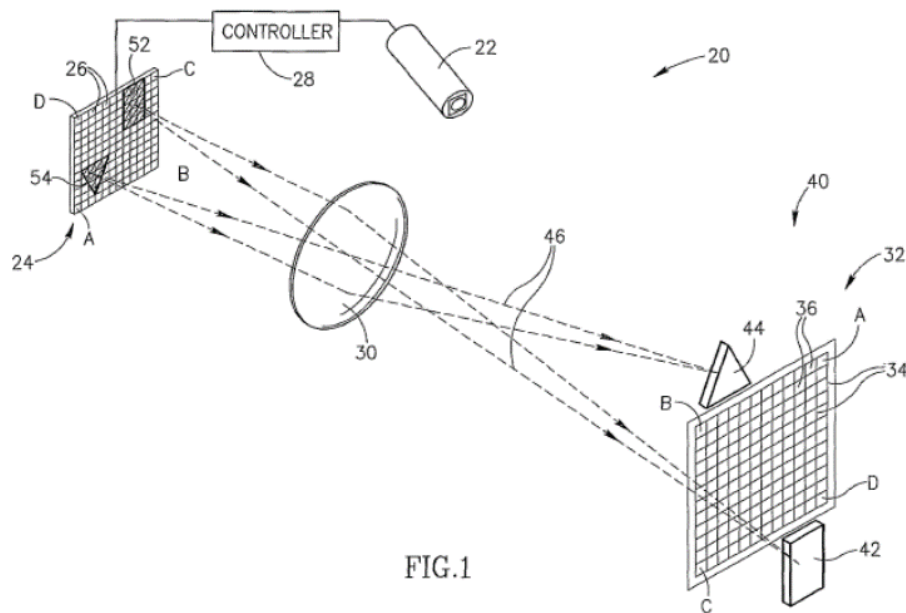
IV. Claim Construction

No claim construction is necessary to deny institution because Patent Owner's arguments for denial do not hinge on the outcome of an actual controversy about claim interpretation. *See Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed to the extent necessary to resolve the controversy”). The deficiencies of the Petition are readily identifiable without defining the bounds of any specific claim term or phrase. (*Id.*)

V. The Applied References

A. Braun

Braun discloses an illumination system 60 having an illuminator 24 with multiple light providing regions, referred to as “luxels” 26, arranged in a planar array. The luxels 26 are controlled by a controller 29 to illuminate different regions of an illumination plane 32 in a scene to be illuminated. The illumination plane 32 is divided into multiple mesh square regions 36, each of which corresponds to and is illuminated by one of the luxels 26 in a one-to-one correspondence. (Ex.1005, 17:6-19:8, Figure 2, 14:12-17:7, Figure 1;Ex.2002, ¶33.)

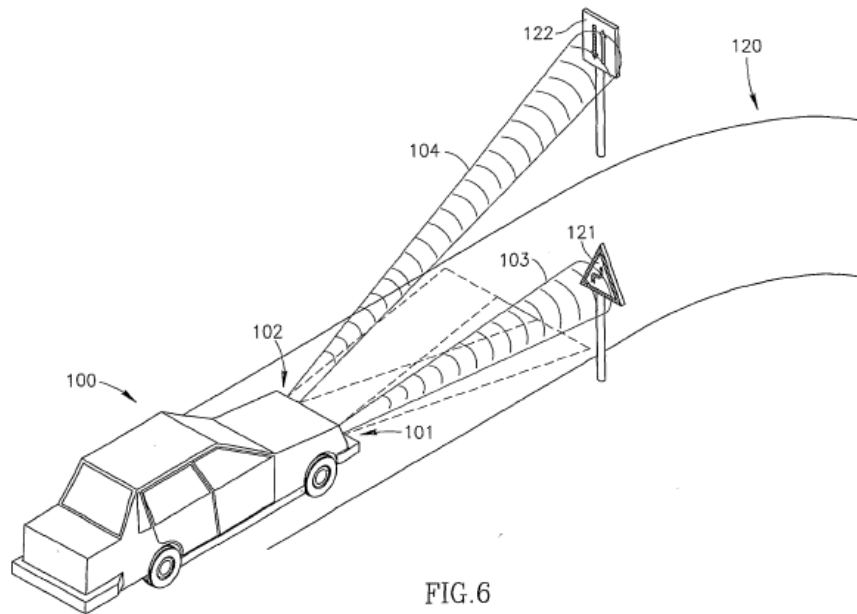


(Ex.1005, FIGS. 1, 2)

Braun's illumination system 60 may also include a 3D range-camera 62 operating as a range finder. The range-camera 62 includes a photosurface 64 having multiple pixels 66. Using a beam splitter 68, a portion of light reflected from the

illuminated scene is collected to capture multiple images of the scene on the photosurface 64 over time. Photosurface 64 may be boresighted with the illuminator 24 so that the image on the photosurface 64 is substantially coincident with the illuminator 24. In the embodiment shown in Figure 2, the pixels 66 of photosurface 64 have a one-to-one correspondence to the luxels 26 of the illuminator 24. (Ex.1005, 7:8-24, 18:24-19:8, Figure 2;Ex.2002, ¶34.)

In operation, controller 29 uses images of the scene captured on photosurface 64 to identify objects present in the scene. For example, objects 42, 44 appearing in areas 58, 56 of the image on photosurface 64 (Figure 2) may be identified as roadside signs 121, 122 (Figure 6) present in the scene. (Ex.1005, 22:17-23:7, 23:28-24:27, Figure 6;Ex.2002, ¶35.)



(Ex.1005, FIG. 6)

Areas 58, 56 of the image on photosurface 64 correspond to areas 52, 54 in illuminator 24, and each of the areas 52, 54 includes multiple luxels 26 that are used to illuminate the roadside signs 121, 122. As vehicle 100 equipped with illumination system 60 moves along roadway 120, the positions of the roadside signs 121, 122 in the scene change over time. Consequently, the positions of the areas 58, 56 in the images captured on photosurface 64 change, as do the positions of the corresponding areas 52, 54 in illuminator 24 corresponding to those areas 58, 56 in the captured images. In response, the controller 29 changes the particular luxels 26 of illuminator 24 that are selected over time to illuminate roadside signs 121, 122 as their position in the scene changes. (Ex.1005, 8:11-24, 12:3-10, 24:22-27;Ex.2002, ¶36.)

Braun thus utilizes the one-to-one correspondence between the planar array of luxels 26 in illuminator 24 and the mesh regions 36 of the illumination plane 32, images of which are captured by the pixels 66 of the photosurface 64, to determine and control the particular luxels 26 selected over time to illuminate an object, including an object (e.g., roadside sign 121) whose position in the scene relative to the illuminator 24 changes over time. Braun does not move either the illuminator 24 or the luxels 26 to illuminate such an object. (Ex.2002, ¶37.)

B. Dowling

Dowling discloses a lighting subsystem 130 equipped with a processor 140, and which may have additional components, such as a transmitter 136, receiver 138,

or environmental sensor. The transmitter and receiver may be optical or radio frequency based, and the environmental sensor may take the form of a proximity sensor, motion sensor, light sensor, camera, or other electromagnetic sensor (e.g., photosensor), sound sensor, temperature sensor, vibration sensor, or another sensor. Multiple lighting subsystems 202, 212, 214, 216 may also be connected in a networked system 200. (Ex.1027, 4:9-22, 5:19-6:12, 8:18-21, 10:15-22, 38:1-19, 40:14-19, Figures 1, 5, 6; Ex.2002, ¶38.)

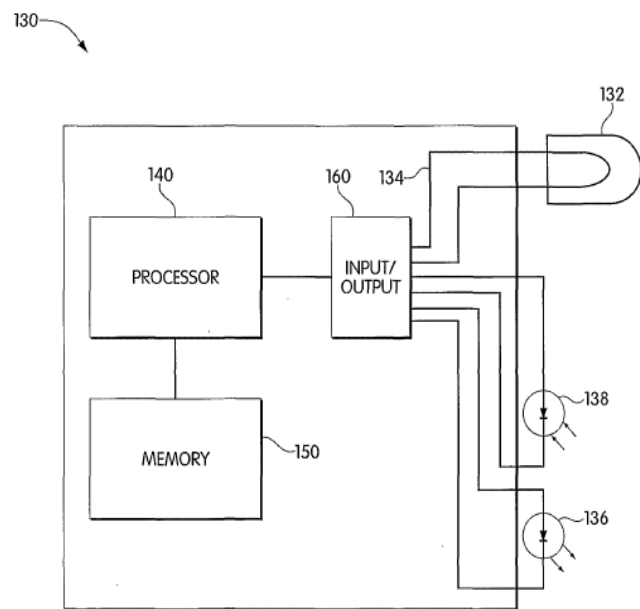


Fig. 5

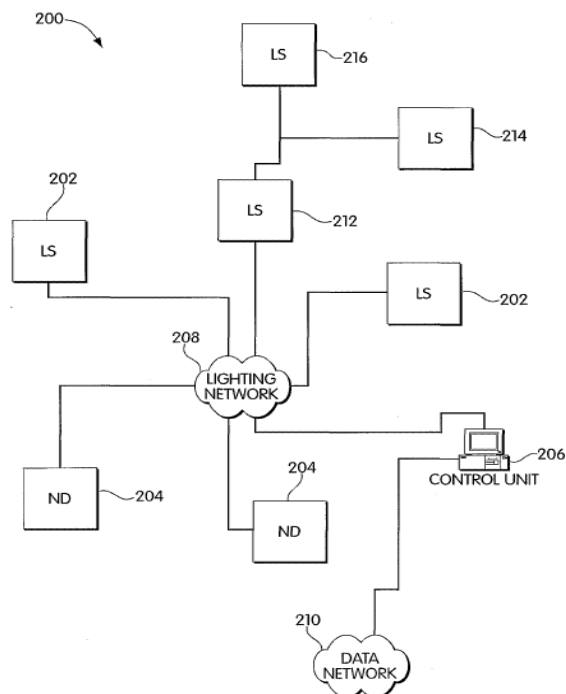


Fig. 6

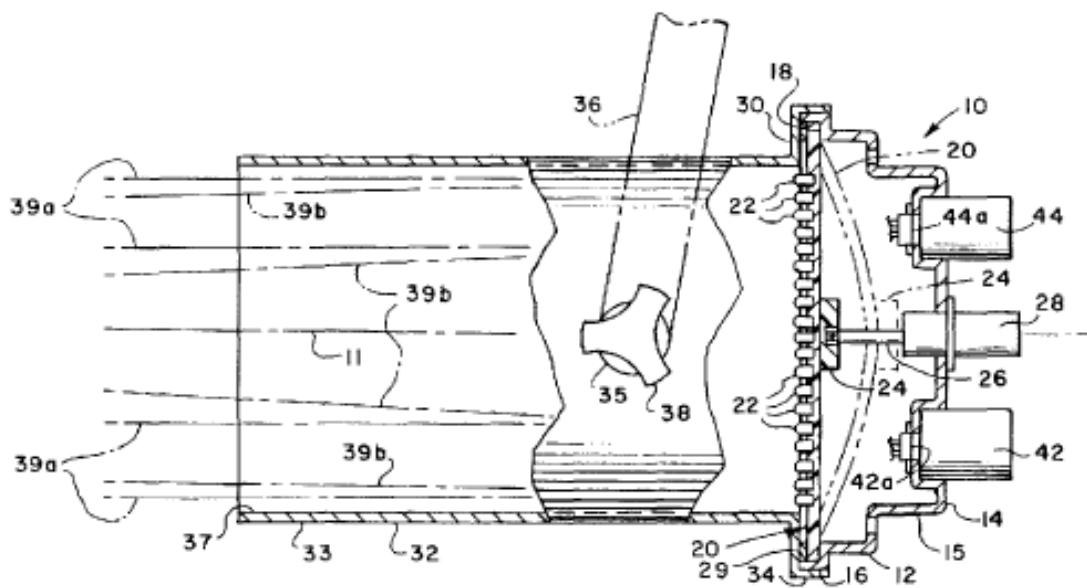
(Ex. 1027, FIGS. 5, 6)

Dowling states that the lighting system 200 and lighting subsystems 130, 202, 212, 214, 216 may be used for communication, building automation, and system monitoring. (Ex.1027, Abstract, 4:9-22, 5:19-6:12, 8:18-21, 10:15-22, 20:3-15,

38:1-19, 40:14-19, 48:6-18, Figures 1, 5, 6, 10.) For example, Dowling discloses increasing illumination or activating a light in response to a proximity sensor sensing a person. (Ex.1027, 9:4-6, 22:20-21; Ex.2002, ¶39.)

C. Bailey

Bailey discloses a stage light apparatus 10 having a housing 12 for a flexible base 20 that supports a grid-like array of light emitting diodes 22. The light apparatus 10 also includes a can-like shield 32 for projecting parallel light beams from the LEDs 22. The shield 32 may include bosses 35 for mounting on a support structure 36. (Ex.1035, Abstract, 2:60-63, 3:30-34, 3:38-41, Figure 2; Ex. 2002, ¶40.)



(Ex.1035, FIG. 2)

The flexible support base 20 may be selectively deflected to concentrate light

beams generated by the LEDs 22 of the array on a target. Specifically, the flexible base 20 is connected to an actuator 28 which is controlled to deflect the base 20. The actuator 28 includes a rod 26 attached to a hub 24 of the flexible base 20. The rod 26 is moved by the actuator 28 to deflect the flexible base 20 to form a concave surface (shown in phantom in Figure 2). (Ex.1035, Abstract, 1:64-2:10, 2:63-3:16, Figure 2; Ex.2002, ¶41.)

D. Begemann

Begemann discloses a luminaire 1 for illuminating an object. The luminaire 1 has one or more lighting modules 2 in a housing 10. Each lighting module 2 has multiple lighting units 20, each of which comprises an LED chip 30. (Ex.1006, Abstract, Figure 2; Ex.2002, ¶42.)

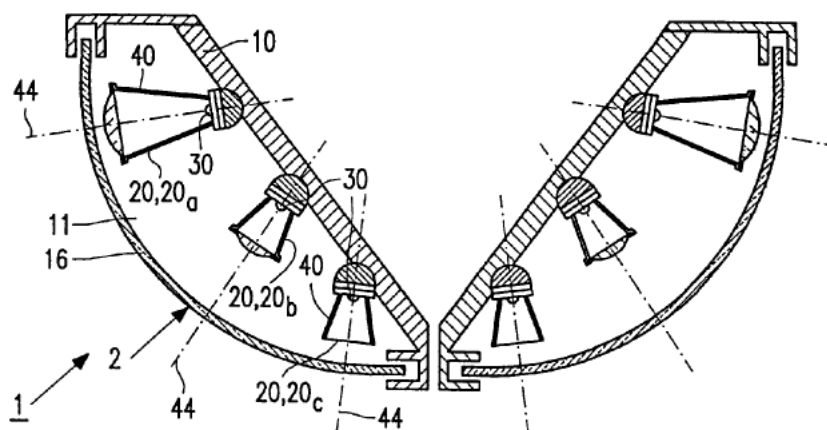


FIG. 2

(Ex.1006, FIG. 2)

Each lighting unit 20 has a hemispherical mounting member 22

accommodated in a mating recess 12 in a heat sink 13. The mating recess 12 and mounting member 22 allow for adjusting a predetermined light beam direction during assembly of the luminaire 1 based on the conditions of its intended use, e.g., as a street lighting luminaire to illuminate different sections of a road or road area. Mounting member 22 is fixed in mating recess 12 by adhesive 14. (Ex.1006, 4:7-13, 6:1-9, Figure 3; Ex.2002, ¶43.)

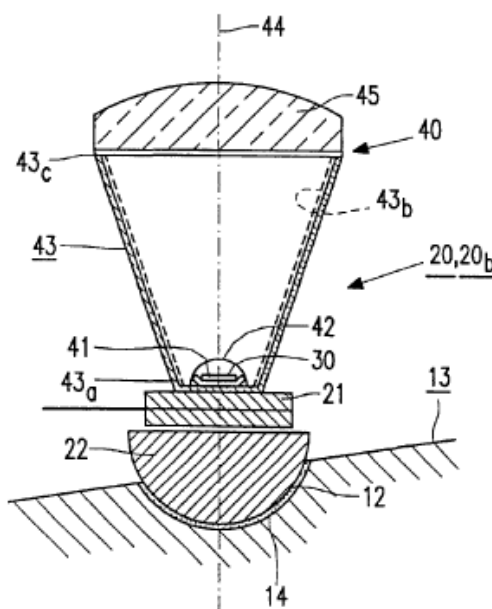


FIG. 3

(Ex.1006, FIG. 3)

In one embodiment, an interior lighting system receives signals from a daylight sensor and a proximity sensor that detects the presence of person in a room to be illuminated. (Ex.1006, 4:66-5:3; Ex.2002, ¶44.)

In another embodiment, a luminaire 401 includes a lighting module 402*b* with a first variety of lighting units 420*p* aimed in fixed predetermined directions to

illuminate driving lanes d_p on a road. Luminaire 401 also includes lighting modules 402a, 402c with a second variety of lighting units 420q aimed in fixed predetermined directions to illuminate peripheral portions d_{q1} , d_{q2} that are provided with vegetation and have a different reflectivity than driving lanes d_p . The different varieties of lighting units 420p, 420q produce different wavelengths of light relative to each other, contributing to the visibility of objects present in peripheral portions d_{q1} , d_{q2} . (Ex.1006, 8:5-35, Figure 11; Ex.2002, ¶45.)

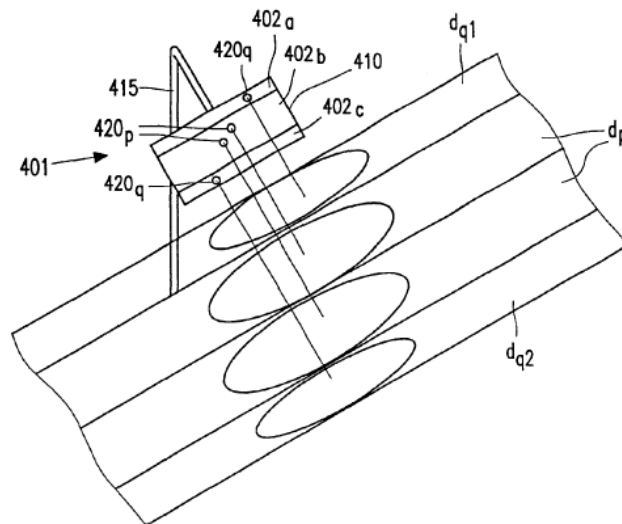


FIG. 11

(Ex.1006, FIG. 11)

In another embodiment, a luminaire 501_a is one of a group of multiple identical luminaires for illuminating a road. Luminaire 501_a includes multiple lighting modules 502_{bI}, 502_{bII}, 502_{cI}, 502_{cII}, 502_{fI}, 502_{fII}, each having 24 lighting units. Lighting modules 502_{bI}, 502_{bII} are aimed in fixed predetermined directions to

illuminate road sections b_I and b_{II} , respectively. Lighting modules 502_{cI} , 502_{cII} are aimed in fixed predetermined directions to illuminate road sections c_I and c_{II} , respectively. Lighting modules 502_{fI} , 502_{fII} are aimed in fixed predetermined directions to illuminate road sections f_I and f_{II} , respectively. A control system 550 activated by a central signal 553 receives signals 551, 552 from weather condition sensors. Depending on the absence or presence of a sensor signal indicating a particular weather condition (i.e., rain, snow, fog), control system 550 controls lighting modules 502_{bI} , 502_{bII} , 502_{cI} , 502_{cII} , 502_{fI} , 502_{fII} according to pre-defined settings to improve visibility. (Ex.1006, 8:38-9:21, Figure 12; Ex.2002, ¶46.)

Begemann discloses that energy savings are produced by using only one of the lighting modules 502_{bI} , 502_{bII} , 502_{cI} , 502_{cII} , 502_{fI} , 502_{fII} in response to low traffic density. A control mode of the control system 550 also realizes energy savings “where modules are switched on temporarily when they are about to be passed by a vehicle.” (Ex.1006, 9:21-29; Ex.2002, ¶47.)

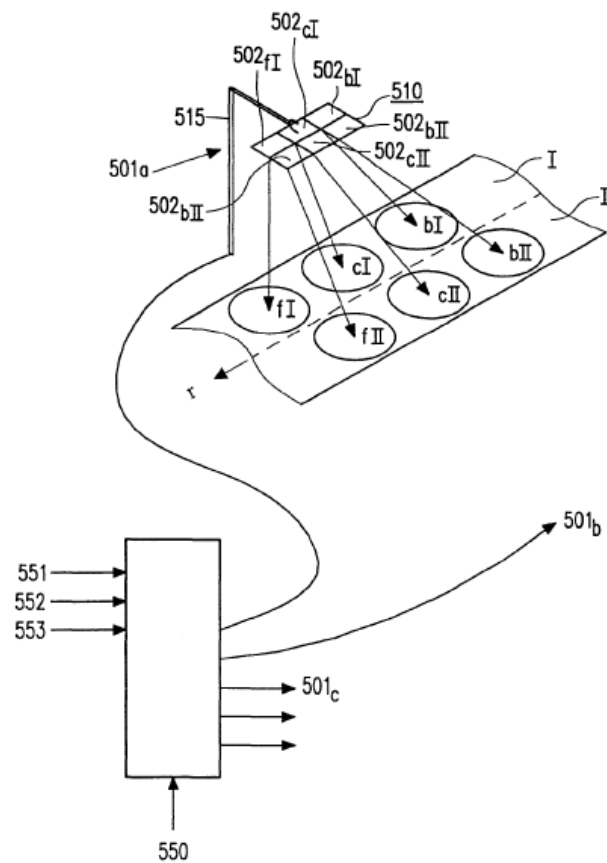


FIG. 12

(Ex.1006, FIG. 12)

E. Lee

Lee discloses a system for automatic control of devices in a local environment (e.g., a home). Regions R1, R2 (e.g., rooms) of the local environment each have a local camera C1, C2, light L1, L2, and heater H1, H2, each of which is connected to a control unit 20. (Ex.1026, Abstract, 4:48-5:24, Figure 2; Ex.2002, ¶48.)

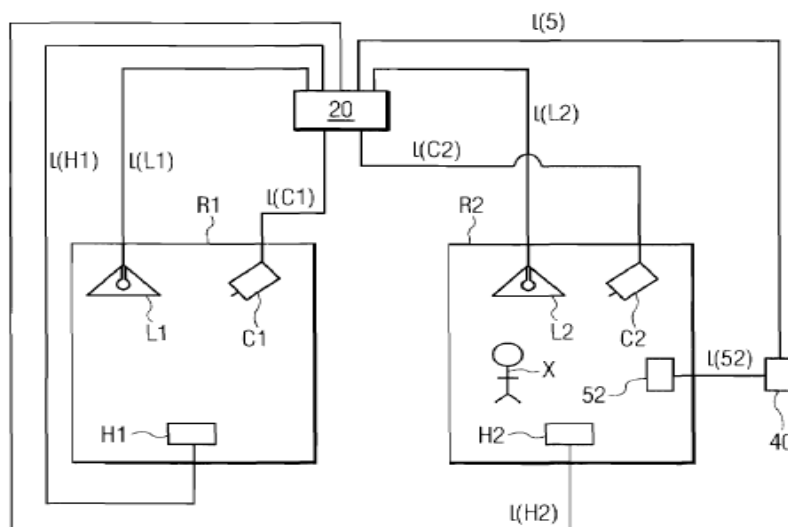


FIG. 2

(Ex.1026, FIG. 2)

The cameras C1, C2 capture images of any person present in regions R1, R2, such as person X present in region R2, which images are provided to the control unit 20. Using image processing, the control unit 20 may determine the identity of person X. The control unit 20 may also store personal preferences of person X for lighting and heating conditions. Upon determination of the identity of person X, the control unit 20 may control the light L2 and the heater H2 according to stored preferences of person X. (Ex.1026, Abstract, 2:47-3:12, 3:53-4:11, 5:56-6:30, 6:38-49, 7:28-37, 8:7-9, 8:25-32, 8:40-47, 9:13-24, 10:23-28, Figure 2; Ex.2002, ¶49.)

F. Pederson

Pederson discloses an LED warning signal light 10. In one embodiment, the light 10 includes a support panel 12 for multiple LED light sources 30. (Ex.1011, ¶¶[0144-0146], Figure 3; Ex.2002, ¶50.)

Claim 7 requires “one or more detectors . . . configured to sense a presence of glare on a person’s eyes in the illuminated area, and wherein the controller is programmed to adjust an intensity of the directional light sources to reduce the glare.” Claim 8 requires “a light fixture . . . having movable structure for aiming the directional light sources mounted thereon in a defined direction.” (Ex.1001, Claims 7, 8, emphasis added.)

For **Ground 2**, Petitioner combines Braun and Dowling to satisfy the above-noted claim 7 elements. (Petition at 38-44.) Petitioner failed to meet the requisite burden of showing a reasonable likelihood that it would prevail on this Ground for at least the reason that Braun, used by Petitioner to address the above elements, fails to teach such elements.

For **Ground 3**, Petitioner combines Braun, Dowling, and Bailey to satisfy the above-noted claim 8 elements. (Petition at 44-51.) For **Ground 5**, Petitioner combines Begemann, Lee, and Pederson to satisfy such claim elements. (Petition at 73-79.) Petitioner failed to meet the requisite burden of showing a reasonable likelihood that it would prevail on either of these Ground for at least the following reasons: Petitioner’s rationale for combining the applied references (i) renders the primary reference unsatisfactory or inoperable or changes its principle of operation; (ii) is impermissibly vague regarding how and why the applied references would be combined; and (iii) suffers from hindsight bias.

A. Petitioner’s Combination of Applied References Does Not Teach all Claim Elements

Petitioner must show where each claim limitation is found in the applied references. *See e.g., Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1361 (Fed. Cir. 2012). Failure to do so defeats a claim of obviousness. (*Id.*) To establish a *prima facie* obviousness rejection, all of the claimed features must be taught or suggested by the prior art. *See In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

1. Ground 2: The Combination of Braun and Dowling Does Not Teach the Claim 7 “*one or more detectors ... configured to sense a presence of glare on a person's eyes in the illuminated area, and wherein the controller is programmed to adjust an intensity of the directional light sources to reduce the glare*”

Claim 7 requires “one or more detectors . . . configured to sense a presence of glare on a person's eyes in the illuminated area, and wherein the controller is programmed to adjust an intensity of the directional light sources to reduce the glare.” (Ex.1001, Claim 7, emphasis added; Ex.2002, ¶53.) Petitioner relies on Braun for satisfying these claim features for Ground 2. (Petition at 43.) In that regard, Braun states the following:

According to an aspect of some embodiments of the present invention, the pattern recognition application identifies oncoming vehicles and automatically adjusts illumination provided by the luxels to prevent glare from light provided by the luxels from blinding a driver

of the oncoming vehicle.

In some embodiments of the present invention, the automotive light is a headlight. Optionally, the controller process images provided by the photosurface to identify oncoming vehicles and when an oncoming vehicle is identified, the controller controls the light providing regions to prevent blinding the driver of the oncoming vehicle.

(Ex.1005, 6:4-7, 12:17-20; Ex.2002, ¶54.)

Based on these statements, Petitioner argues that it would have been obvious to a POSITA that Braun's 3D range-camera 62 senses or derives the presence of glare on a person's eyes by measuring the amount of light reflected by objects in the scene (e.g., a driver's head), and that Braun's controller 29 adjusts the intensity of the luxels 26 of illuminator 24 to reduce that glare. (Petition at 43-44; Ex.2002, ¶55.)

Petitioner's argument is mere speculation not taught by Braun. Except for the above-noted statements, Braun is utterly silent about glare reduction for other vehicles or drivers of other vehicles. Contrary to Petitioner's contention, there is no teaching in Braun of (i) detecting a person's head or eyes; (ii) how to sense or derive the presence of glare on a person's eyes based on reflected light and/or whether reflected light is indicative of glare; (iii) the claimed detectors; or (iv) **how** to adjust

light source intensity to reduce glare. Indeed, the remaining sections of Braun cited by Petitioner on this point simply describe detection of objects, distances, or visibility using reflected light. (Ex.1005, 3:15-21, 11:18-25, 17:12-23, 18:9-23; Ex.2002, ¶56.)

Thus, Petitioner's argument does not actually rely on the teaching of Braun. Indeed, virtually the entirety of Petitioner's statement is missing from the teaching of Braun. Petitioner's argument is a massive leap from Braun's object detection based on reflected light and brief comments that light should be reduced for oncoming vehicles, all the way to a very specific conclusion that is neither supported nor contemplated by Braun.

Braun therefore does not teach "one or more detectors . . . configured to sense a presence of glare on a person's eyes in the illuminated area, and wherein the controller is programmed to adjust an intensity of the directional light sources to reduce the glare," as claimed (Ex.2002, ¶57) and Petitioner relies exclusively on Braun for this teaching. As a result, claim 7 is not obvious based on any combination of Braun and Dowling. See *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974).

B. A Person of Ordinary Skill in the Art Would Not Have Been Motivated to Combine (i) Braun, Dowling, and Bailey, or (ii) Begemann, Lee, and Pederson

"[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l v. Teleflex Inc.*, 550 U.S.

at 418, 82 USPQ2d at 1396 (2007), *quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

1. Petitioner’s Rationale for Combining the Applied References Renders the Primary Reference Inoperable or Unsatisfactory for Its Intended Purpose or Changes its Principle of Operation

If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Moreover, if a proposed modification or combination of prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are insufficient to render a claim obvious. *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959). Petitioner completely fails to address these issues.

a. Ground 3: Petitioner’s Combination Renders Braun Inoperable or Unsatisfactory for Its Intended Purpose, or Changes its Principle of Operation

Claim 8 requires “a light fixture . . . having movable structure for aiming the directional light sources mounted thereon in a defined direction.” (Ex.1001, Claim 8, emphasis added.) Petitioner relies on Bailey for satisfying these claim features for Ground 3. Petitioner proposes modifying Braun to include Bailey’s flexible support base 20 for LEDs 22 and Bailey’s actuator 28 for moving that flexible

support base 20. (Petition at 46-48; Ex.2002, ¶60.)

Braun discloses an illumination system 60 having an illuminator 24 with multiple luxels 26 arranged in a planar array. The luxels 26 are controlled by a controller 29 to illuminate different regions of an illumination plane 32 in a scene. The illumination plane 32 is divided into multiple mesh square regions 36, each of which corresponds to and is illuminated by one of the luxels 26 in a one-to-one correspondence. (Ex.1005, 14:12-17:7, 17:6-19:8, Figures 1, 2; Ex.2002, ¶61.)

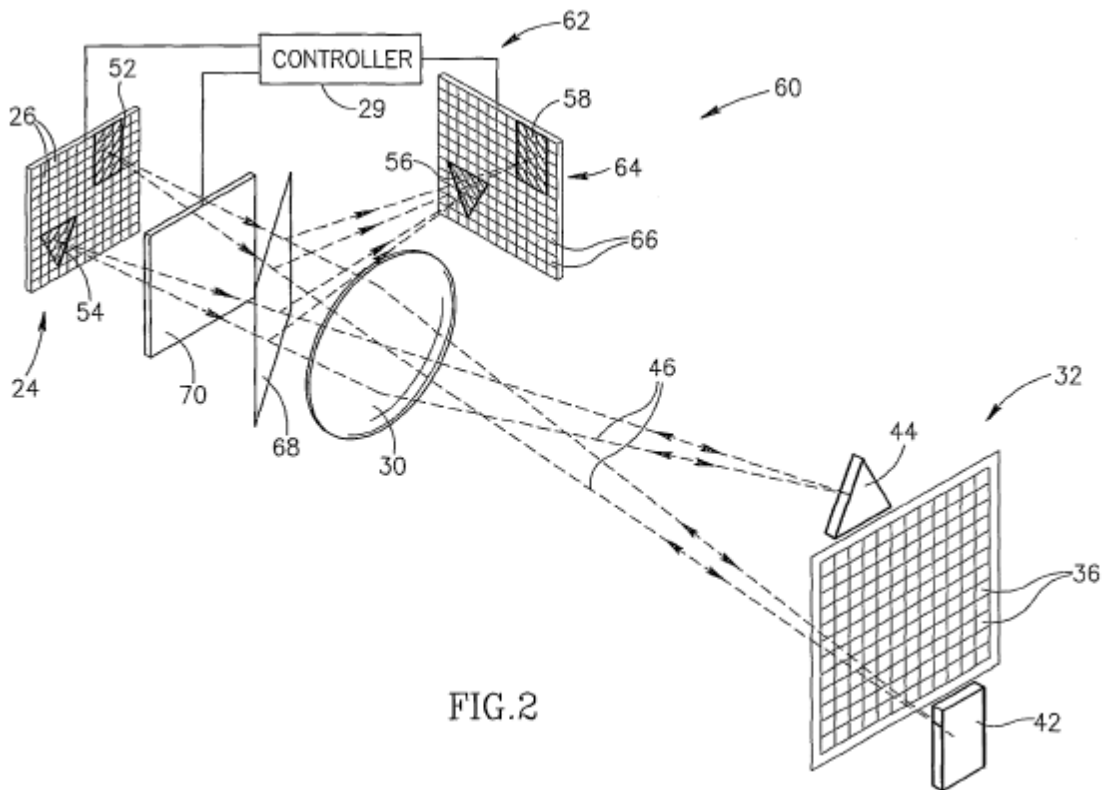
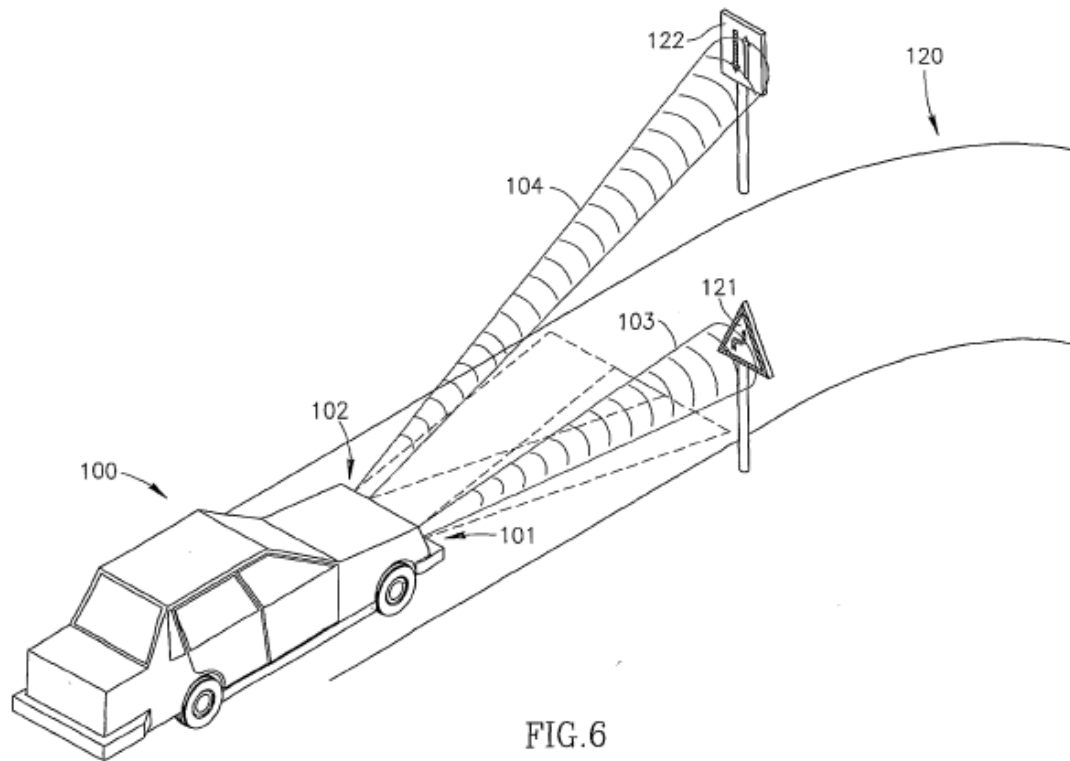


FIG.2

(Ex.1005, FIG. 2)



(Ex.1005, FIG. 6)

A 3D range-camera 62 in Braun's system 60 includes a photosurface 64 having multiple pixels 66. Using a beam splitter 68, a portion of light reflected from the illuminated scene is collected to capture multiple images of the scene on the photosurface 64 over time. Photosurface 64 is boresighted with the illuminator 24 so that the image on the photosurface 64 is substantially coincident with the illuminator 24. (Ex.1005, 7:8-24, 18:24-19:8, Figure 2; Ex.2002, ¶62.)

In operation, controller 29 uses images of the scene captured on photosurface 64 to identify objects present in the scene. For example, objects 44, 42 appearing in areas 56, 58 of the image on photosurface 64 (Figure 2) may be identified as roadside signs 121, 122 (Figure 6) present in the scene. (Ex.1005, 22:17-23:7, 23:28-24:27,

Figure 6; Ex.2002, ¶63.)

Areas 58, 56 of the image on photosurface 64 correspond to areas 52, 54 in illuminator 24, and each of the areas 52, 54 includes multiple luxels 26 that are used to illuminate the roadside signs 121, 122. As vehicle 100 equipped with illumination system 60 moves along roadway 120, the positions of the roadside signs 121, 122 in the scene change over time. Consequently, the positions of the areas 56, 58 in the images captured on photosurface 64 change, as do the positions of the areas 54, 52 in illuminator 24 corresponding to those areas 56, 58 in the captured images. In response, the controller 29 changes the particular luxels 26 of illuminator 24 that are selected over time to illuminate roadside signs 121, 122 as their position in the scene changes. (Ex.1005, 8:11-24, 12:3-10, 24:22-27; Ex.2002, ¶64.)

Braun's controller 29 thus utilizes the one-to-one correspondence between the planar array of luxels 26 in illuminator 24 and the mesh regions 36 of the illumination plane 32, images of which are captured by the pixels 66 of the photosurface 64 coincident with the illuminator 24, to determine and control the particular luxels 26 selected over time to illuminate an object, including an object (e.g., roadside sign 121) whose position in the scene relative to the illuminator 24 changes over time. Braun therefore has no need to move either the illuminator 24 or the luxels 26 to illuminate such an object and, indeed, does not do so. (Ex.2002, ¶65.)

Petitioner's proposed modification of Braun to mount at least a portion of Braun's planar array of luxels 26 of illuminator 24 on Bailey's flexible support base 20 and deflect that flexible support base 20 using Bailey's actuator 28 would render Braun's illumination system 60 inoperable or unsatisfactory for its intended purpose or would change its principle of operation. (Ex.1035, Abstract, 1:64-2:10, 2:63-3:16, Figure 2;Ex.2002, ¶66.)

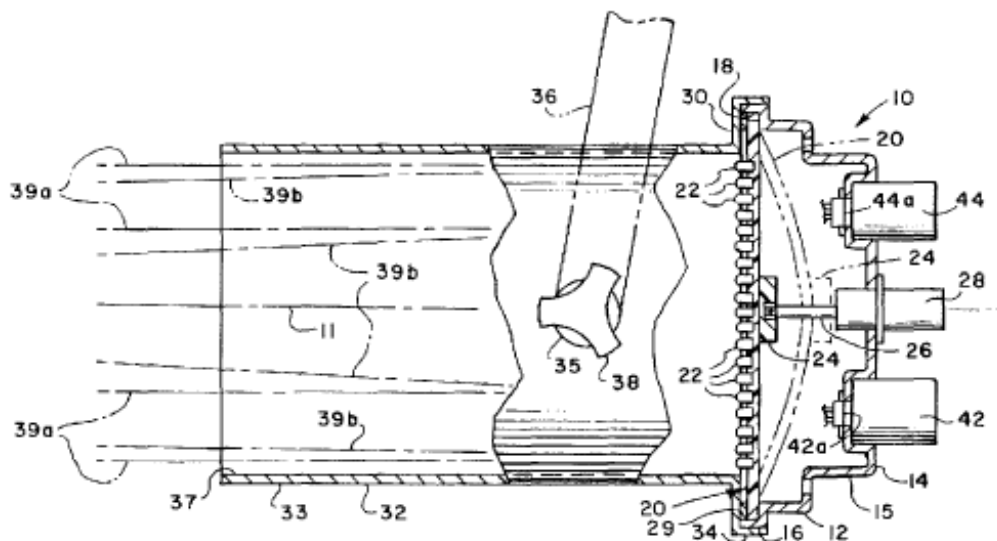


FIG. 2

(Ex.1035, FIG. 2)

Braun's system 60 illuminates objects in a scene using the **one-to-one correspondence** between the **planar** array of luxels 26 and the mesh regions 36 of illumination **plane** 32 in the scene, as well as the **coincident relationship** between the illuminator 24 and the photosurface 64. Deflecting Braun's **planar** array of luxels 26, or any portion thereof, into a **concave shape** as taught by Bailey using its

flexible support base 20 and actuator 28 would destroy that correspondence and coincidence, thereby rendering Braun's system inoperable or unsatisfactory for its intended purpose. Any such deflection of Braun's planar array of luxels 26 into a concave shape may also result in certain mesh regions 36 of the illumination plane 32 in the scene (and hence certain characteristics or features of that scene) that are left un-illuminated or un-illuminable, once again rendering Braun's system inoperable or unsatisfactory for its intended purpose. (Ex.2002, ¶67, emphasis added.)

Petitioner does not address these engineering issues. Petitioner offers no explanation as to how a POSITA, after the proposed modification, would maintain the correspondence between the luxels 26 of a concave-shaped illuminator 24 and the mesh regions 36 of the illumination plane 32, or the coincidence between the illuminator 24 and the photosurface 64, required for operation of Braun's illumination system 60.¹ For example, after deflection of Braun's illuminator 24

¹ This includes those statements made in the Declaration offered by Petitioner in support of the Petition concerning the combination of Braun and Bailey which purport to relate to improving the teaching of Bailey using *three additional references that are not part of the applied combinations relied upon by Petitioner.* (Ex.1003, ¶¶0180-0182.)

into a concave shape, Braun's controller 29 would be unable to determine which luxels 26 of the illuminator 24 should be activated to intentionally illuminate an object in the scene without equating the concave surface of the illuminator 24 to the flat surface of the illumination plane 32. (Ex.2002, ¶68.) Even if a POSITA could somehow equate the concave-shaped illuminator 24 to the illumination plane 32, which Patent Owner does not concede, Petitioner's proposed modification of Braun would clearly change its principle of operation. (Ex.2002, ¶69.)

Therefore, there is no suggestion or motivation to make the proposed modification. *See In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959).

b. Ground 5: Petitioner's Combination Changes the Principle of Operation of Begemann and Renders It Unsatisfactory for Its Intended Purpose

Claim 8 requires “a light fixture . . . having movable structure for aiming the directional light sources mounted thereon in a defined direction.” (Ex.1001, Claim 8, emphasis added.) Petitioner relies on Pederson for satisfying these claim features for Ground 5. Petitioner proposes modifying Begemann to add Pederson's gyrator 90 to each of Begemann's lighting units 20 to make those lighting units 20 moveable. (Petition at 76-78; Ex.2002, ¶71.)

Begemann discloses a luminaire 1 having one or more lighting modules 2,

each having multiple lighting units 20, where each lighting unit 20 comprising an LED chip 30. During assembly of the luminaire 1, each lighting units 20 has a mounting member 22 that is fixed by an adhesive 14 in a mating recess of a heat sink 13 after the lighting unit 20 has been aimed in a predetermined direction based on the conditions of the intended use of the luminaire 1, e.g., as a street lighting luminaire to illuminate different sections of a road or road area. (Ex.1006, Abstract, 4:7-13, 6:1-9, Figures 2, 3; Ex.2002, ¶7.)

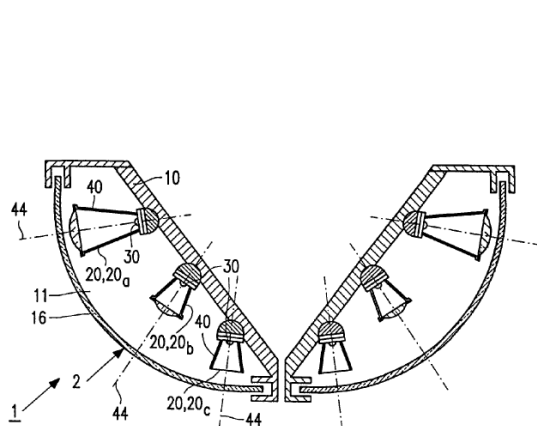


FIG. 2

(Ex.1006, FIGS. 2, 3)

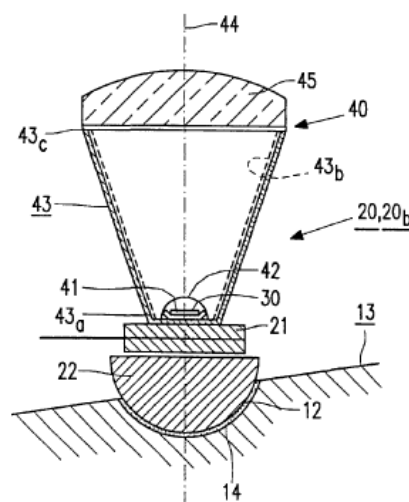


FIG. 3

Begemann thus illuminates a specific section of a road or road area using a lighting unit 20 that is aimed in a fixed predetermined direction to associate the lighting unit 20 with that specific section. (Ex.1006, 8:5-9:21, Figures 11, 12.) Begemann therefore has no need to move the luminaire 1, lighting modules 2, or lighting units 20 to aim any of them in a defined direction to illuminate such sections and, indeed, does not do so. (Ex.2002, ¶73.)

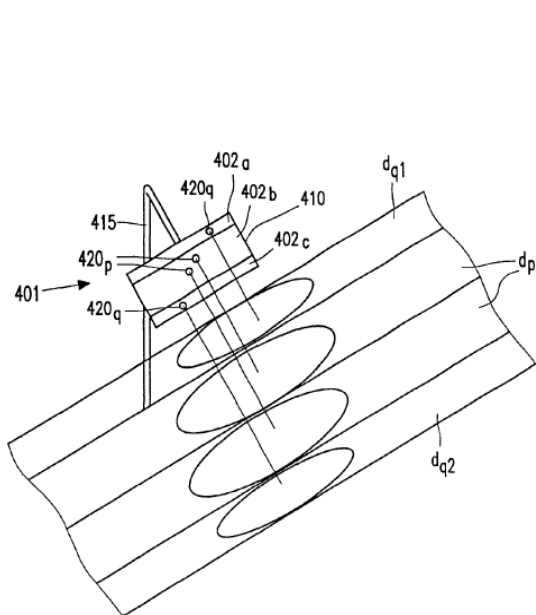


FIG. 11

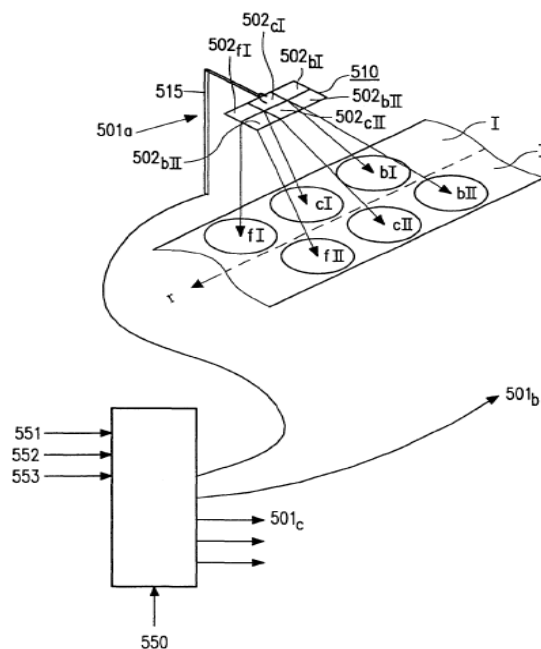
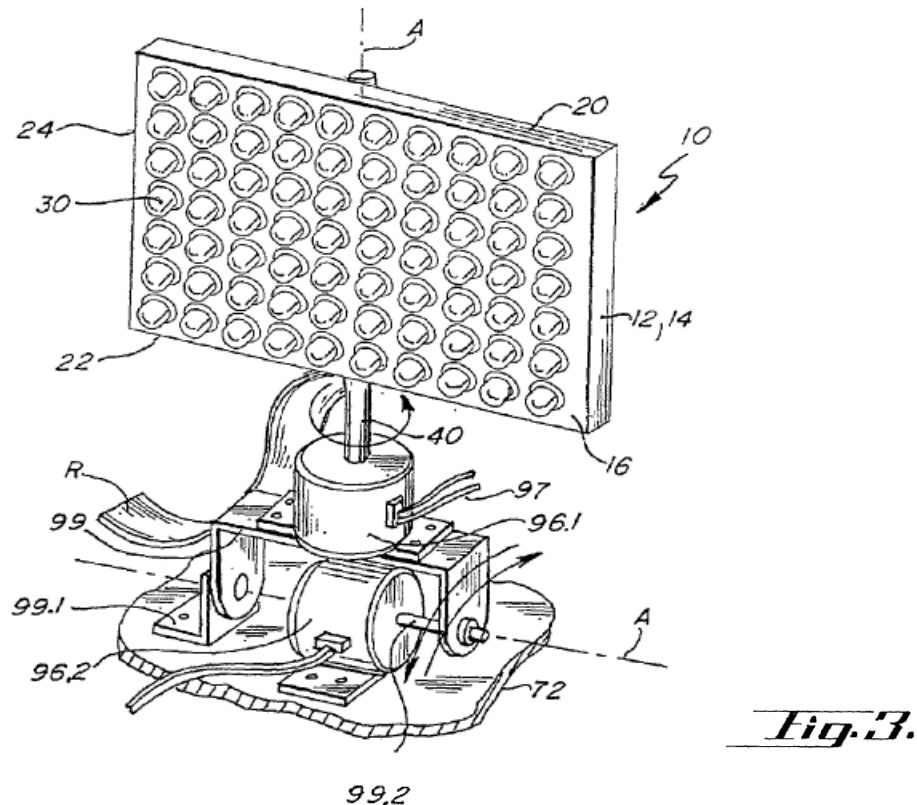


FIG. 12

(Ex.1006, FIGS. 11, 12)

Petitioner's proposed modification of Begemann to add a gyrator 90 as taught by Pederson to each of Begemann's lighting units 20 to make those lighting units 20 moveable would therefore change the principle of operation of Begemann's luminaire 1 and render it unsatisfactory for its intended purpose. Making each of Begemann's lighting units 20 moveable using a gyrator 90 as taught by Pederson would alter the association between the lighting units 20 and the sections of the road or road area, thus clearly changing Begemann's principle of operation. Such a modification may also result in road or road area sections that are inadequately illuminated, thus rendering Begemann's luminaire 1 unsatisfactory for its intended purpose. (Ex.2002, ¶74.)

Petitioner's proposed modification also ignores the claim 8 requirement that the **moveable structure** is for **aiming** the directional **light sources** mounted thereon **in a defined direction**. (Ex.1001, Claim 8.) There is no teaching in Pederson that its gyrator 90 "aims" LEDs 30 in any direction at all, let alone a defined direction. Rather, Pederson's gyrator 90 uses motors 96.1, 96.2 to rotate and oscillate activated LEDs 30 on support panel 12 to create a warning signal. (Ex.1011, ¶¶[0183-0185], Figure 3; Ex.2002, ¶75, emphasis added.)



(Ex.1011, FIG. 3)

Petitioner does not address these engineering issues, offering no explanation

as to how a POSITA would **aim** each of the **lighting units 20** of Begemann's luminaire 1 in a **defined direction** using **gyrators 90** as taught by Pederson. Again, Pederson provides no such teaching of selective aiming, and Begemann discloses that the lighting units 20 are aimed in **fixed** predetermined directions, for a specific reason, during assembly of luminaire 1. (Ex.1006, Abstract, 4:7-13, 6:1-9, Figures 2, 3; Ex.2002, ¶76, emphasis added.) Disrupting these aimings in any manner would have unknown and unintended consequences not addressed by Petitioner, let alone the consequences that would result by combining Braun's streetlamp elements with oscillating gyrators from Pederson.

Therefore, there is no suggestion or motivation to make the proposed modification. See *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984); *In re Ratti*, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959).

2. Petitioner Does Not Explain How or Why a POSITA Would Have Combined the Applied References

Petitioner must explain how and why a POSITA would have modified or combined the prior art. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2006) (requiring articulated reasoning with rationale underpinning as to how or why a person of ordinary skill in the art would have combined or modified the teachings of the prior art); *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017) (holding obviousness determination to be improper where the record lacked a

“clear, evidence-supported account” of “how the combination” would work). *Adidas AG v. Nike, Inc.*, IPR2016-00922, Paper 21, 36 (October 19, 2017) (holding that disputed claims are patentable when the “Petitioner fails to explain why and how a person of ordinary skill in the art would combine” two references).

a. Ground 3: Petitioner Does Not Explain Why or How a POSITA Would Have Combined Braun’s Illumination System with Bailey’s Flexible Support Base and Actuator

Petitioner relies on Bailey’s flexible support base 20 for LEDs 22 and Bailey’s actuator 28 for moving that flexible support base 20 to satisfy the claim 8 features of a *“light fixture . . . having movable structure for aiming the directional light sources mounted thereon in a defined direction”* for Ground 3. (Ex.1001, Claim 8, emphasis added; Petition at 44-49.) However, Petitioner fails to explain **why** a POSITA would have combined Bailey’s flexible support base 20 and actuator 28 with Braun’s illuminator 24 and luxels 26, or **how** such a combination would work. (Ex.2002, ¶79.)

Petitioner states that Braun does not explicitly describe how to mechanically adjust the light direction of luxels 26 to “match changes in the position” of objects in a scene, and that a POSITA would therefore have been motivated to look to Bailey for such details. (Ex.1005, 10:8-17; Petition at 44; Ex.1006, ¶166.) Petitioner’s stated motivation to combine Braun and Bailey is that Bailey’s mechanical

adjustment of the light emissions direction might be needed, for example to selectively focus (i.e., change the direction of) the light beams. (Petition at 45.) (*See, e.g.,* Ex.1035, 2:4-10 (“[A]n actuator . . . may be controlled to deflect the base to change the directional characteristics of light beams being projected by each LED so that the resultant or collective light beam generated . . . may be focused or concentrated on a target distant from the apparatus.”) (Ex.2002, ¶180.)

Thus, Petitioner acknowledges, Braun does not teach mechanical adjustment of luxels 26 to “match changes in the position” of objects in a scene. (Ex.1005, 10:8-1; Petition at 44; Ex.1003, ¶166.) As previously demonstrated, Braun’s controller 29 utilizes the one-to-one correspondence between the planar array of luxels 26 in illuminator 24 and the mesh regions 36 of the illumination plane 32, images of which are captured by the pixels 66 of the photosurface 64 coincident with the illuminator 24, to determine and control the particular luxels 26 selected over time to illuminate an object, including an object (e.g., roadside sign 121) whose position in the scene relative to the illuminator 24 changes over time. (Ex.1005, 8:11-24, 12:3-10, 24:22-27.) Braun therefore has no need to move either the illuminator 24 or the luxels 26 to illuminate such an object and, indeed, does not do so. (Ex.2002, ¶81.) (*See* §VI.B.1.a. (Response at 26-32), *supra.*)

Petitioner’s proposal to mount at least a portion of Braun’s luxels 26 on Bailey’s flexible support base 20 and move that flexible support base 20 using

Bailey's actuator 28 to change the direction of light emitted by Braun's luxels 26 is therefore **completely unnecessary**, in addition to being significantly problematic (Ex.2002, ¶82².) Petitioner thus offers no articulated reasoning with a rationale underpinning as to **why** a POSITA would have combined Braun and Bailey as suggested. *KSR*, 550 U.S. at 418. Petitioner's rationale to combine therefore fails as nothing more than an attempt to piece together teachings of Braun and Bailey to satisfy the limitations of the claim, based on impermissible hindsight reconstruction using Patent Owner's disclosure. (Ex.2002, ¶84.) *See, Leo Pharmaceutical Products, Ltd. v. Rea*, 726 F.3d 1346, 1355 (Fed. Cir. 2013) (holding that a claimed invention cannot be used in hindsight to supply teachings or motivations missing

² Petitioner similarly acknowledges that Dowling also does not explicitly describe how to mechanically adjust light direction to track a moving object and contends that a POSITA would therefore have been motivated to look to Bailey for such details. (Petition at 44.) Thus, like Braun, Dowling also does not teach mechanical adjustment of light direction. (Ex.2002, ¶83.) Instead, Dowling describes a hand-off technique to activate adjacent lighting or other elements associated with the changing location of a moving object. (Ex.1027, 17:6-18:2, 21:10-16, 25:8-26:4.) Petitioner's proposal to combine Braun and Bailey as suggested therefore remains completely unnecessary.

from the prior art).

Moreover, as also previously demonstrated, Braun's system 60 illuminates objects in a scene using the **one-to-one correspondence** between the **planar** array of luxels 26 and the mesh regions 36 of illumination **plane** 32 in the scene, as well as the **coincident relationship** between the illuminator 24 and the photosurface 64. Deflecting Braun's **planar** array of luxels 26, or any portion thereof, into a **concave shape** as taught by Bailey using its flexible support base 20 and actuator 28 would destroy that correspondence and coincidence. (Ex.2002, ¶85, emphasis added.) (See §VI.B.1.a. (Response at 26-32), *supra*.)

Again, Petitioner does not address these engineering issues. Petitioner offers no explanation as to how a POSITA, after the proposed modification, would maintain the correspondence between the luxels 26 of a concave-shaped illuminator 24 and the mesh regions 36 of the illumination plane 32, or the coincidence between the illuminator 24 and the photosurface 64, required for operation of Braun's system 60. Petitioner thus offers no articulated reasoning with a rationale underpinning as to **how** a POSITA would have combined Braun and Bailey as suggested. *KSR*, 550 U.S. at 418. The obviousness ground is therefore improper. (Ex.2002, ¶86.) See *Personal Web Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017).

b. Ground 5: Petitioner Does Not Explain Why or How a POSITA Would Have Combined Begemann’s Luminaire with Pederson’s Gyrator

Petitioner relies on Pederson’s gyrator 90 to satisfy the claim 8 features of a *“light fixture . . . having movable structure for aiming the directional light sources mounted thereon in a defined direction”* for Ground 5. (Ex.1001, Claim 8, emphasis added; Petition at 73-77.) However, Petitioner fails to explain **why** a POSITA would combine Pederson’s gyrator 90 with Begemann’s lighting units 20, or **how** such a combination would work. (Ex.2002, ¶87.)

Petitioner contends that Begemann does not describe how to automatically adapt the direction of its lighting units 20 according to changing environment and application, and that a POSITA would therefore have been motivated to look to Pederson for such details. (Ex.1005, 10:8-1; Petition at 44.) Petitioner’s stated motivation to combine Begemann and Pederson is that Begemann’s controller 550 could then selectively vary and automatically adjust the direction of Begemann’s lighting units 20. (Petition at 73-74; Ex.2002, ¶88.)

However, Begemann already teaches automatically adapting its lighting units 20 to changing environments and applications by selectively varying and automatically adjusting those lighting units 20. As previously described, depending on the absence or presence of a sensor signal indicating a particular weather

condition (i.e., rain, snow, fog), Begemann's control system 550 controls lighting modules 502_{bl}, 502_{bll}, 502_{cl}, 502_{cII}, 502_{fl}, 502_{fII} according to pre-defined settings to improve visibility. (Ex.1006, 8:38-9:21, Figure 12.) Begemann's control system 550 also produces energy savings by using only one of the lighting modules 502_{bl}, 502_{bII}, 502_{cl}, 502_{cII}, 502_{fl}, 502_{fII} in response to low traffic density, and by temporarily turning on lighting modules in response to an approaching vehicle. (Ex.1006, 9:21-29; Ex.2002, ¶89.) (See §VI.B.1.b. (Response at 26-27, 32-36), *supra*.)

Moreover, Begemann performs such adaptation without needing to move its lighting units 20, or the luminaires 1 or lighting modules 2 of which they are a part, to aim any of them in a defined direction. Rather, Begemann's luminaires 1, lighting modules 2, and lighting units 20 are already aimed in fixed predetermined directions. As previously described, Begemann illuminates a specific section of a road or road area using a lighting unit 20 that is aimed in a fixed predetermined direction to associate the lighting unit 20 with that specific section. (Ex.1006, Abstract, 4:7-13, 6:1-9, Figures 2, 3.) Begemann therefore has no need to move the luminaire 1, lighting modules 2, or lighting units 20 to illuminate such sections and, indeed, does not do so. (Ex.1006, Abstract, 4:7-13, 6:1-9, Figures 2, 3; Ex.2002, ¶90.) (See §VI.B.1.b. (Response at 26-27, 32-36), *supra*.)

Petitioner does not explain any deficiency in Begemann's adaptation of its lighting units 20 to changing environments and applications by selectively varying

and automatically adjusting those lighting units 20. Nor does Petitioner explain any advantage or benefit that imparting movement to Begemann's lighting units 20 would provide over the luminaire and system already taught by Begemann. Petitioner's proposal to add a gyrator 90 as taught by Pederson to each of Begemann's lighting units 20 to make them moveable is therefore **completely unnecessary**. And, as with the proposed combination above, there are significant problems created by this combination as well – namely, an oscillating, distracting, and potentially dangerous light-source that was previously designed to function as a fixed-beam streetlamp. (Ex.2002, ¶91.)

Petitioner thus offers no articulated reasoning with a rationale underpinning as to **why** a POSITA would have combined Begemann and Pederson as suggested. (Ex.2002, ¶92.) Petitioner's rationale to combine therefore fails as nothing more than an attempt to piece together teachings of Begemann and Pederson to satisfy the limitations of the claim, based on impermissible hindsight reconstruction using Patent Owner's disclosure. *See, Leo Pharmaceutical*, 726 F.3d at 1355 (Fed. Cir. 2013).

Petitioner's proposed modification also ignores the claim 8 requirement that the **moveable structure** is for **aiming** the directional **light sources** mounted thereon **in a defined direction**. (Ex.1001, Claim 8.) There is no teaching in Pederson that its gyrator 90 **aims** LEDs 30 in any direction at all, let alone a defined direction.

Rather, Pederson's gyrator 90 uses motors 96.1, 96.2 to rotate and oscillate activated LEDs 30 on support panel 12 to create a warning signal. (Ex.1011, ¶¶[0183-0185], Figure 3; Ex.2002, ¶93.)

Petitioner does not address these engineering issues, offering no explanation as to how a POSITA would **aim** each of the **lighting units 20** of Begemann's luminaire 1 **in a defined direction** using **gyrators 90** as taught by Pederson. Again, Pederson provides no such teaching, and Begemann discloses that the lighting units 20 are aimed in fixed predetermined directions during assembly of luminaire 1. (Ex.1006, Abstract, 4:7-13, 6:1-9, Figures 2, 3.) As a result, even if Begemann and Pederson were properly combinable as suggested, which Patent Owner does not concede, such a combination would fail to result in the claim 8 features of a "light fixture . . . having movable structure for aiming the directional light sources mounted thereon in a defined direction." (Ex.1001, Claim 8, emphasis added; Ex.2002, ¶94, emphasis added.)

Petitioner thus offers no articulated reasoning with a rationale underpinning as to **how** a POSITA would have combined Begemann and Pederson as suggested. *KSR*, 550 U.S. at 418. The obviousness ground is therefore improper. *See Personal*

Web Techs., LLC v. Apple, Inc., 848 F.3d 987, 994 (Fed. Cir. 2017).³

3. Petitioner’s Combinations Add Features Already Present in a Primary Applied Reference; the Rationale to Combine Suffers from Hindsight Bias

Where a secondary reference adds features already present in a primary reference -- without a countervailing reason -- there is no motivation to combine. *See Ex parte Tessier*, Appeal 2012-006616 (PTAB October 2, 2014). “We find that the Examiner’s stated reasoning, ‘so as to have an alternative suitable communication and remote HVAC control as additional function from remote location beside for the utility,’ is based on the use of impermissible hindsight reconstruction in view of the Appellants’ disclosure.” *Id.*, 11, quoting *Sensonics Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996).

³ To the extent Petitioner is contending in the Petition that Pederson teaches aiming, then Petitioner’s proposed combination adds purported features from Pederson that are already present in Begemann without any reason to do so. There is therefore no motivation to combine Begemann and Pederson as suggested. Petitioner’s rationale to combine fails because it is based on the use of impermissible hindsight reconstruction in view of Patent Owner’s disclosure. *See Ex parte Tessier*, Appeal 2012-006616 (PTAB October 2, 2014), *citing Sensonics Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996). (*See, e.g.,* §VI.3. (Response at 44-47), *infra.*)

a. Ground 3: Petitioner’s Combination of Braun and Dowling is Based on Impermissible Hindsight By “Adding” Features Already Present in Braun

Petitioner proposes to modify Braun’s illumination system 60 by adding Dowling’s monitoring of the flow of objects such that traffic flow and traffic patterns can be determined. (Petition at 50.) However, Braun already discloses detecting motion of objects and tracking objects as their positions in a scene change over time, which Petitioner acknowledges. (Ex.1005, 6:4-15, 8:11-24, 12:17-20, 21:21-22:16, 26:19-28, 27:5-20, Figure 7; Petition at 29, 34, 36, 48, 52.) In so doing, Braun monitors and determines traffic flow and traffic patterns. (Ex.2002, ¶97.)

Petitioner does not explain any deficiency in Braun’s detecting of objects. Neither does Petitioner explain any new or different functionality provided by the proposed combination of Braun and Dowling. Moreover, Petitioner’s proposal to add Dowling’s monitoring features to Braun’s illumination system is entirely divorced from Petitioner’s stated motivation to combine, i.e., that both Braun and Dowling disclose wireless communication. (Petition at 34-35; Ex.2002, ¶98.)

Petitioner’s proposed combination thus adds features from Dowling that are already present in Braun without any reason to do so. There is therefore no motivation to combine Braun and Dowling as suggested (Ex.2002, ¶99.) Petitioner’s rationale to combine fails because it is based on the use of impermissible hindsight

reconstruction in view of Patent Owner's disclosure. *See Ex parte Tessier*, Appeal 2012-006616 (PTAB October 2, 2014), *citing Sensonics Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996).

b. Ground 5: Petitioner's Combination of Begemann and Lee is Based on Impermissible Hindsight By "Adding" Features Already Present in Begemann

Petitioner's stated motivation to combine Begemann's luminaire 1 with Lee's camera C2 and control unit 20 for capturing and processing images is that such a combination would enable Begemann's control system 550 to detect and identify objects -- namely, people, rain, snow, fog, traffic density, and approaching vehicles. (Petition at 58.) However, Begemann already discloses sensors to detect people, rain, snow, fog, traffic density, and approaching vehicles (Ex.2002, ¶100.)

More specifically, Begemann discloses a proximity sensor to detect the presence of a person in a room to be illuminated. (Ex.1006, 4:67-5:3.) Begemann also discloses a control system 550 that uses signals 551, 552 from sensors for the detection of rain, snow, fog, traffic density, and approaching vehicles to control lighting modules 502_{bl}, 502_{blI}, 502_{cl}, 502_{clI}, 502_{fl}, 502_{flI} of luminaire 501_a according to various lighting system settings. (Ex.1006, 8:37-9:29.) Petitioner acknowledges all these teachings of Begemann. (Petition at 69, 78, 80, 82.) (Ex.2002, ¶102.)

Petitioner does not explain any deficiency in Begemann's sensors or its

detection of people, rain, snow, fog, traffic density, and approaching vehicles. Moreover, there is no teaching in Lee that its control unit 20 can or does use image processing to detect or identify rain, snow, fog, traffic density, or approaching vehicles. (Ex.2002, ¶102.) Finally, while Petitioner notes that Lee's control unit 20 uses image processing to determine the identity of a person, Petitioner does not explain any advantage or benefit that such an identity would provide to Begemann's control system 550. (Petition at 79; Ex.2002, ¶102.)

Petitioner's proposed combination thus adds features from Lee that are already present in Begemann without any reason to do so. There is therefore no motivation to combine Begemann and Lee as suggested. Petitioner's rationale to combine fails because it is based on the use of impermissible hindsight reconstruction in view of Patent Owner's disclosure (Ex.2002, ¶103.) *See Ex parte Tessier*, Appeal 2012-006616 (PTAB October 2, 2014), *citing* *Sensonic Inc. v. Aerosonic Corp.*, 81 F.3d 1566, 1570 (Fed. Cir. 1996).

VII. The Board Should Deny Institution on Procedural Grounds

The Board has discretion to deny institution. 35 U.S.C. § 314(a); *see Cuozzo Speed Techs., LLC v. Lee*, 136 S.Ct. 2131, 2140 (2016). The Board's discretion is informed by 35 U.S.C. §316(b), which requires the Board to consider "the efficient administration of the Office, and the ability of the Office to timely complete proceedings." *See also* Consolidated Trial Practice Guide ("CTPG") at 5.

In this case, the Board should exercise its discretion, and deny institution because as explained below: A) the Petition lacks particularity; and B) Petitioner does not justify filing three petitions challenging the ‘551 Patent, which requires an inefficient use of the Board’s resources. Therefore, the Board should exercise its discretion and deny institution. 35 U.S.C. §§314, 316(b); 2018 CTPG at 56.

A. The Petition Lacks Particularity under 35 U.S.C. § 312(a)(3)

Under 35 U.S.C. §312(a)(3), it is Petitioner’s burden to adequately explain its challenge and the references it uses. The Petition adopts an extreme word count optimization strategy of hiding the claim limitations in a claim appendix, resulting in a lack of particularity regarding the disputed claims. The Petition also combines teachings of the applied references in a vague manner to create a LED system that does not and cannot function to provide controlled light delivery as claimed. (*See, e.g.,* §VI.B.2.a. (Response at 37-40), *supra.*)

Petitioner’s vague and conclusory application of the applied references leave both Patent Owner and the Board in a position where they must venture a guess at how the Petition is interpreting and applying the references. Adequate explanation is Petitioner’s statutory burden from the onset. As such, the Petition should be denied institution for failing to comply with the statutory requirement.

An IPR petition must identify “with particularity, each ***claim*** challenged, the ***grounds*** on which the challenge to each claim is based, and the ***evidence*** that

supports the grounds for the challenge to each claim.” 35 U.S.C. § 312(a)(3). “In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) citing 35 U.S.C. § 312(a)(3). The PTAB Trial Practice Guide advises that “parties should avoid submitting a repository of all the information that a judge could possibly consider, and instead focus on concise, well-organized, easy-to-follow arguments supported by readily identifiable evidence of record.” (CTPG at 39.) Further, “[t]he petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.” 37 C.F.R. § 42.104(b)(4).

“The statutory requirement of particularity in a petition for IPR takes on heightened importance when considered in conjunction with SAS’s ‘all-or-nothing’ approach,” and “the Board may consider whether a lack of particularity as to one or more of the asserted grounds justifies denial of an entire petition.” *Adaptics LTD. v. Perfect Co.*, IPR2018-01596, Paper 20 (PTAB March 6, 2019) (Informative). Further, “where a petition contains voluminous or excessive grounds, Office guidance indicates ‘[t]he panel will evaluate the challenges and determine whether, in the interests of efficient administration of the Office and integrity of the patent system (see 35 USC § 316(b)), the entire petition should be denied under 35 USC § 314(a).’” *Id.* at 18, citing SAS Q&As (June 5, 2018) (“SAS Q&As”), 11 at Part D,

Effect of SAS on future challenges that could be denied for statutory reasons, Question D2.

1. The Petition Does Not Specify Where Each Claims Element is Found in the Prior Art

Under 37 C.F.R. §42.104(b)(4), “The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.” Here, the language of the disputed claims is largely absent from Petitioner’s arguments. (Petition at 38-57, 73-84.) Instead, Petitioner’s arguments include a claim identifier, e.g., “[8.P]”, “[8.A]”, and often a simple paraphrase of complex claim limitations without any justification or explanation, inviting the reader to embark on a scavenger hunt to find the actual claim limitation in the Claim Appendix. *See, e.g.*, Petition at 44-50 and 73-79 compared to Appendix A at 3-5 (Petition at 93-95).

Petitioner’s arguments concerning such claim identifiers also routinely consist of conclusory statements that merely reference prior sections of the Petition, without any accompanying page attributions. (*See, e.g.*, Petition at 38, 46, 48, 76, 78, 79.) Moreover, these prior sections of the Petition relied upon by Petitioner often relate to (i) features of other claims different than those of the claim currently being addressed, where those other claims also have different language directly addressed (*Id.*); (ii) a different combination of references than that currently being applied (*Id.*);

or (iii) multiple sub-sections requiring review, most of which lack any apparent relevance to the claim features currently being addressed (*see, e.g., Id.* at 78-79).

As an example, Petitioner addresses its claim identifier [8.C] with literally no more than the following statement: “Begemann-Lee-Pederson renders [8.C] obvious. §§IX.A-IX.C; EX1003, ¶310.” (*Id.* at 78). The cited §§IX.A-IX.C of the Petition span 15 pages, relate to claim 1 (not claim 8), and cover multiple features of claim 1 not relevant to claim identifier [8.C]. (*Id.* at 57-70.) Similarly, Petitioner addresses its claim identifier [8.F] by citing §IX.B of the Petition (*Id.* at 79), which spans 12 pages, again relates to claim 1 (not claim 8), and again covers multiple features of claim 1 not relevant to claim identifier [8.F]. (*Id.* at 59-70.)

In summary, Petitioner’s format is an extreme word-count optimization strategy that forces the reader to navigate a tangled maze including the appendix, table of contents, and prior sections of the Petition in a frustrating attempt to divine the nature of Petitioner’s arguments -- resulting in a lack of particularity regarding the disputed claims. The Petition should therefore be denied.

2. The Petition Improperly Lumps Grounds and Alternative Teachings

Although Petitioner denominates Ground 2 as an obviousness ground based on the combination of Braun and Dowling, Petitioner effectively argues in the alternative that Braun discloses all the features of claim 7. (Petition at 34, 38-43.)

Similarly, although Petitioner denominates Ground 3 as an obviousness ground based on the combination of Braun, Dowling, and Bailey, Petitioner effectively argues in the alternative that the combination of only Braun and Bailey renders claim 8 obvious. (*Id.*, 44-50.)

Petitioner uses disjunctive terminology to combine the primary applied reference Braun with one or more teachings of a secondary applied reference. As shown in the table below, each of Grounds 2 and 3 thus expands into two alternative grounds. The Petition does not clearly state which of the “Lumped Ground #2” combinations or which of the “Lumped Ground #3” combinations on which Petitioner is relying. It is therefore unclear as to which grounds the Patent Owner is expected to respond, and which grounds the Board must undertake in its review of the Petition.

Grounds		Basis	Disputed Claim(s)	Reference(s)
Lumped Ground #2	2A	103	7	Braun
	2B	103	7	Braun + Dowling
Lumped Ground #3	3A	103	8, 10-13, 15-18	Braun + Bailey
	3B	103	8, 10-13, 15-18	Braun + Dowling + Bailey

For example, regarding Ground 3, Petitioner relies on Braun or, alternatively, Dowling for satisfying claim limitation [8.E]. Petition first states that “Braun’s controller/processes . . . ‘processes images . . . to identify features of the scene and objects in the scene.’” (Petition at 49.) Petitioner then states that “Dowling’s processor executes a predetermined program to monitor the flow of people and vehicles such that traffic flow and traffic patterns can be determined.” (*Id.*) Petitioner concludes that “Braun, alone or in view of Dowling, renders [8.E] obvious. §§VI.A, VII.B.” (*Id.* at 50, emphasis added.)

The USPTO discourages such lumping of obviousness challenges: “***Do NOT lump*** together multiple proposed rejections based on different grounds. [] Separate rejections based on anticipation and rejections based on obviousness.” (Ex.2004 at 3, Best Practices and FAQs for Filing Requests for Reexamination Compliant with 37 CFR 1.510 and 1.915, PTAB, May 2010 (emphasis in original).) The Petition does not identify with particularity “the ***grounds*** on which the challenge to each claim is based,” and therefore should be denied institution under 35 U.S.C. §312(a)(3). Petitioner’s lack of particularity leaves the Board and Patent Owner in a position where they must guess how the Petition is interpreting and applying the references.

In *Adaptics*, the Board determined “that the lack of particularity [in the Petition] results in voluminous and excessive grounds,” and that “in the interests of

efficient administration of the Office and integrity of the patent system and as a matter of procedural fairness to Patent Owner, the entire petition should be denied under 35 USC §314(a).” *See* 35 U.S.C. §316(b); *see also* SAS Q&As, question D2.” *Adaptics* at 24. The Petition does not identify with particularity, “the **grounds** on which the challenge to each claim is based,” and therefore should be denied institution under 35 U.S.C. §312(a)(3).

B. Petitioner’s Parallel Petitions Raise Fairness, Timing, and Efficiency concerns under § 316(b)

The Board will consider whether multiple petitions challenging the same patent is fair and efficient, because “[b]ased on the Board’s experience, one petition should be sufficient to challenge the claims of a patent in most situations.” CTPG at 59. “Two or more petitions filed against the same patent . . . may place a substantial and unnecessary burden on the Board and the patent owner and could raise fairness, timing, and efficiency concerns. *See* 35 U.S.C. §316(b).” CTPG at 59.

While recognizing that “there may be circumstances in which more than one petition may be necessary, including, for example, when the patent owner has asserted a large number of claims in litigation,” the Board clearly relates this statement to Petitioner “need.” (*Id.*). In the same breath, the Board notes “this should be rare.” Further, “the Board finds it unlikely that circumstances will arise where three or more petitions by a petitioner with respect to a particular patent will be

appropriate.” (*Id.*)

Nonetheless, Petitioner filed three IPR petitions challenging the ‘551 Patent within two weeks: 1) The Petition (“The ‘336 IPR Petition”), 2) IPR2023-00315, Paper 2 (Ex.2006, “The ‘315 IPR Petition”), and 3) IPR2023-00318, Paper 2 (Ex.2007, “The ‘318 IPR Petition”). The ‘315 IPR Petition challenges 32 claims (claims 24-55) as obvious over: 1) US 6,144,158 to Beam and H7-101291 to Satonaka, with or without US 6,049,749 to Kobayashi; and 2) WO 1998/054030 to Karlsson and H7-65603 to Nakamura, with or without US 5,588,733 to Gotou. (Ex.2006 at 3.) The ‘318 IPR Petition challenges 32 claims (claims 56-87) as obvious over: 1) Beam and Satonaka, with or without Kobayashi; and 2) Karlsson and Nakamura, with or without Gotou. (Ex.2007 at 3.)

In the ‘315 IPR Petition and the ‘318 IPR Petition, Petitioner challenges all claims with the Beam/Satonaka group of grounds and with the Karlsson/Nakamura group of grounds. These grounds are cumulative and clearly redundant. Satonaka and Nakamura are literally used for the exact same teachings, verbatim, but for some figure renumbering. The overlapping art among the petitions indicates that Petitioner could have dropped one of the redundant groups of grounds and consolidated Petitions 1 and 2 into one petition, while still challenging the same claims and all the claims. It is doubtful that the “unlikely circumstances” supporting three petitions, as contemplated by the Board, included a desire to advance duplicative, overlapping

arguments on multiple grounds for every single claim of the patent.

The PTAB also requires Petitioners to justify filing multiple parallel petitions. CTPG at 60, FN 4 (“[I]t will be expected that petitioners will justify multiple petitions in the first instance in their petitions or in a separate paper [of no more than 5 pages] with the petitions, and patent owners will respond in their preliminary responses or in a separate paper with their preliminary responses.”) However, Petitioner makes no attempt to justify filing three parallel petitions challenging the ‘551 Patent, e.g., “Petitioner filed the IPR petition (IPR2023-00315) on December 9, 2022, and is concurrently filing IPR Petition (IPR2023-00318), challenging new claims 24-55 and 56-87 of the ‘551 patent, respectively.” Petition at 89; see also the ‘315 IPR Petition, Ex.2006 at 89; the ‘318 IPR Petition, Ex.2007 at 87.

Petitioner’s redundant parallel petitions place a substantial and unnecessary burden on the Board and the Patent Owner and raise fairness, timing, and efficiency concerns, and therefore should be denied under 35 U.S.C. §§316(b), 314.

VIII. Conclusion

In light of the remarks herein, Patent Owner respectfully requests that the Board deny the Petition for *inter partes* review of the ‘551 Patent.

Respectfully submitted,

Dated: April 19, 2023

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Certificate of Service

The undersigned hereby certifies that the foregoing **PATENT OWNER'S PRELIMINARY RESPONSE TO PETITION FOR *INTER PARTES* REVIEW UNDER 37 C.F.R. § 42.107**, including any attachments and exhibits, was served in its entirety on **April 19, 2023**, upon the following parties by electronic mail:

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Certificate of Compliance Pursuant to 37 C.F.R. § 42.24

This paper complies with the type-volume limitation of 37 C.F.R. § 42.24. The paper contains 11,114 words, excluding the parts of the paper exempted by § 42.24(a).

This paper also complies with the typeface requirements of 37 C.F.R. § 42.6(a)(ii) and the type style requirements of § 42.6(a)(iii)&(iv).

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